

IFB26-0141 WATER CONSERV II WRF EQUALIZATION PUMP STATION IMPROVEMENTS



The City of Orlando Procurement and Contracts Division has implemented an electronic bidding system to streamline solicitation responses.

[CITY OF ORLANDO PROCUREMENT AND CONTRACTS SITE](#)

**ONLY ELECTRONIC RESPONSES WILL BE ACCEPTED FOR THIS
SOLICITATION - ALL OTHER RESPONSES SHALL BE CONSIDERED
NON-RESPONSIVE**

David Billingsley, CPSM, C.P.M., Chief Procurement Officer
Silvia Coste, CPP, Senior Purchasing Agent

FEBRUARY, 2026

A. ELECTRONIC SUBMITTAL:

Except as provided below for people needing special accommodations, to be responsive, bids for this solicitation must be submitted electronically. Paper responses will be deemed non-responsive.

Instructions for submitting a bid:

1. Once you have logged into your OpenGov account, go to the solicitation in which you want to bid/participate on. Then click on “Draft Response,” complete the information requested, upload your bid/quote/submittal, along with all required attachments, and submit.
2. Do not wait until the last minute to submit your Bid/Responses, The City is not responsible for late submittals or technical difficulties.

Respondents are solely responsible for ensuring that their submittals are complete, uploaded and submitted in the City’s e-Procurement portal by the due date and time. Respondents are strongly encouraged to submit their response well ahead of the final due date and time to avoid any transmission or other issues. **The City shall not be responsible for any submission delays or failures caused by any occurrence.**

Notwithstanding any provision of this Addendum or the Solicitation to the contrary, persons with disabilities needing a special accommodation to submit a bid response or participate in this solicitation should contact the Procurement and Contracts Division, City Hall at One City Commons, 400 South Orange Avenue, Orlando, Florida 32801, telephone number (407) 246-2291, not later than four (4) days prior to the submittal date for accommodations related to the submittal, or four (4) days prior to the date on which any other accommodation is needed.

B. PRE-BID MEETING:

A Non-Mandatory Pre-Bid meeting will be held on **February 17, 2026, at 10:00 a.m.**, on site at, 5420 L.B. Mcleod Road, Orlando, FL 32811.

C. VIRTUAL SOLICITATION OPENING:**Instructions to join the solicitation opening virtual meeting:****1. Sign up for a free Zoom account**

Go to **zoom.us/signup** and enter your email address to create a free account with Zoom web conferencing. You’ll receive an email from Zoom where you will click

on a link to activate your account. If you already have a Zoom account, skip to step #3 below.

2. Choose your device and download Zoom

You can use a smart phone, tablet, laptop, or desktop computer. After signing up, visit **zoom.us/download** and download the “Zoom Client for Meetings” onto your computer. On mobile devices, search your app store for the free Zoom app and download it. Make sure to allow some extra time for the install before joining your first meeting. If you do not have one of the devices just mentioned, you can also call in to the meeting. If you cannot download Zoom and need to connect via web browser, you can use the Zoom web client (more info on browser compatibility visit bit.ly/zoomwebinfo).

3. Join the virtual meeting:

- a. This is the public link: <https://orlando-gov.zoom.us/j/82408951284>
- b. Call in number: +1 305 224 1968
- c. Webinar ID: 824089951284

4. Provide live public comment

Use the “Raise Hand” feature to request to speak. If you have called in you can raise your hand by pressing *9. If you do this you will be called on to speak using the last four digits of your phone number.

SUBMITTAL CHECK LIST:

Bidders should use the following bid check list of standard forms which are to be completed and returned as part of your bid submittal. Failure to complete and return required forms may result in your bid being non-responsive and not considered for award. The City of Orlando, Florida, will receive electronically bids through OpenGov.

_____ Price Proposal
_____ W-9 Form
_____ Section 00300-1 Bid Form Proposal
_____ Section 00300-1a Trench Safety Act
_____ Section 00300-2 Bid Form Continue
_____ Section 00300-4 Substitution List
_____ Section 00300-6 Bid Bond
_____ Section 00310-1 Affidavit of Non-collusion and of Non-interest of City employees
_____ Section 00330-1 Affidavit of present and future compliance with City of Orlando
_____ Responsible Contractors Policy.
_____ Section 00360-1 Affidavit of Compliance with Scrutinized Companies with Activity List.
_____ Section 00420-1 Questionnaire
_____ Veterans Business Participation Form, found in Section 00800
_____ Addendum Acknowledgment in OpenGov: **It is the bidder's responsibility to contact the City's Procurement and Contracts Division prior to submitting a bid to ascertain if any addenda have been issued, to obtain all such addenda, and acknowledge executed addenda in OpenGov. (If applicable)**

Special Items:

_____ 1. **Bid Bond Security 10 %**

NOTE:

Certificate of Insurance: Within two weeks of a notification of intended award, the Contractor shall provide the City with the required Certificate(s) of Insurance, and Performance & Payment Bonds in a form(s) acceptable to the City.

Written Question(s) Form: Written questions must be received by: **February 26, 2026 at 5:00 PM Local Time.**

MISCELLANEOUS FEES, TAXES AND PERMITS OF THE CITY OF ORLANDO

The following are the City of Orlando construction-related fees and permits the CONTRACTOR will be required to pay. The CONTRACTOR shall pay all occupational license taxes, Contractor registration fees, dishonored returned check fees, copy service fees, and any reinspection fees.

**OCCUPATIONAL LICENSE TAXES, CONTRACTOR REGISTRATION FEES,
DISHONORED RETURNED CHECK FEES, COPY SERVICE CHARGES**

1. Occupational License Taxes - These taxes are required of all businesses, occupations or professions that have a permanent location or branch office within the jurisdictional boundaries of the City of Orlando. The maximum tax imposed as prescribed in Sections 36.35 and 36.36 of the City Code for General Contractors, Building Contractors, Residential Contractors, Limited Specialty Contractors or Subcontractors regulated by the Florida Department of Business and Professional Regulation, and Limited Specialty Contractors or Subcontractors not regulated by the State of Florida, is as follows:

Scalable Fee:

Square Footage less than 2000	\$ 52.50
Square Footage from 2000-5000.....	105.00
Square Footage above 5000	262.50

Plus Number of Workers:

When operated solely by owner	\$ 52.50
Not more than 3 workers	78.75
4 and not over 5 workers	126.00
6 and not over 15 workers	157.00
16 and not over 25 workers	199.50
26 and not over 50 workers	236.25
51 and not over 100 workers	288.75
101 and not over 150 workers	330.75
For each 50 or part there over 150	68.25

There is an additional administrative fee of \$10.00.

2. Contractor Registration Fees - These fees are required of all Limited Specialty Contractors (Defined - Section 14.19, City Code) that do not have a Permanent Location or Branch Office within the jurisdictional boundaries of the City of Orlando, but want to pull building permits to perform construction work within the City of Orlando. The fee prescribed by Section 14.25 of the City Code is \$25.00.

3. Dishonored/Returned Check Fees - These fees are imposed on all entities that issue the CITY a check as tender for services rendered and such check is returned from the CITY's bank back to the CITY for collection. The service charge fee imposed as prescribed by Section 832.07, *Florida Statutes*, is \$25 if the check does not exceed \$50; \$30.00 if the check exceeds \$50, but is less than \$300; \$40 for checks greater than \$300 or an amount of up to 5% percent of the face amount of the check, whichever is greater.

Additionally, pursuant to Section 68.065, *Florida Statutes*, charges may be applied for damages of triple the amount of the check, but in no case less than \$50.00, together with the amount of the check, plus any service charges, court costs, reasonable attorneys' fees, and any bank fees incurred by the payee in taking collection actions under this section.

4. Copy Service Charges - Fees imposed for making copies of documents at the request of the customer. The current fee is set at \$.15 cents per page.

BUILDING CODE ENFORCEMENT FEES

Mechanical Fees

1. The CITY shall pay for all permit and inspection fees for the project with the exception of reinspections.
2. For all other inspections or reinspections of mechanical work required or provided for by Chapter 47A, the fee shall be \$50.00.

Plumbing and Gas Permits

1. The CITY shall pay for all permit and inspection fees for the project with the exception of reinspections.
2. For all other inspections or reinspections of gas or plumbing installations required or provided for by Chapters 29 and 47, the fee shall be \$50.00.

Electrical Fees

1. The CITY shall pay for all permit and inspection fees for the project with the exception of reinspections.
2. For all other (OUC visual inspections or reinspections), the fee shall be \$50.00.

Building Permit Fees

1. The CITY shall pay for all permit and inspection fees for the project with the exception of reinspections.
2. Reinspection fees for residential and commercial construction permits where work has been rejected shall be \$50.00.

ORLANDO FIRE DEPARTMENT PERMIT FEE SCHEDULE

TYPE OF PERMIT	PRICING INFORMATION
The CITY shall pay for all permit and inspection fees for the project with the exception of reinspections.	
Reinspections Fee	\$50.00

Off-Duty Assignment Rates:

District Chief	\$41.00 per hour
Lieutenant	38.00 per hour
Engineer	36.00 per hour
Firefighter	34.00 per hour

Truck Rental:

Engine or Tower	\$350.00 flat rate; \$600 for 5 or more hours
Wood, Rescue or Command Vehicle	\$200.00 flat rate; \$400 for 5 or more hours

Off-Duty Fire Inspector:	\$37.50/hour
	Minimum of 4 hours - \$150.00

Note: A 15% administrative fee is added to the total cost.

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INVITATION FOR BID

The City of Orlando, (City) Florida, will receive bids electronically through OpenGov for **IFB26-0141 Water Conserv II WRF Equalization Pump Station Improvements**, on, **March 10, 2026**, at, **2:00 p.m.** Local Time, at which time bids will be opened and publicly read. Instructions on electronic submittal are in the bid package. This Contract is for improvements to the Water Conserv II WRF Equalization (EQ) Pump Station. specifically, the following work is included, but not limited to: replace existing EQ pumps with dry pit submersible pumps; modify yard piping for temporary bypass operation and provide temporary bypass system; perform and maintain temporary bypass of the EQ pump station; replace existing suction and discharge isolation valves and check valves (excluding valves replaced in the last five years, as indicated on drawings); replace suction and discharge pipe fittings and modify discharge manifold to accommodate the new pumps orientation; construct a new electrical building with HVAC; upgrade existing HVAC in EQ pump station; electrical, instrumentation and controls improvements for the components being modified; demolition and/or removal of existing items and systems that will be removed from service.

The estimate for this project is **\$6,672,311.00**.

Plans, specifications and contract documents will be open to public inspection on **February 9, 2026**. Documents can be downloaded from the City's OpenGov website at the following web link: <https://procurement.opengov.com/portal/orlando>. If you have any questions, you can contact the Procurement and Contracts Division at 407-246-2291.

It will be the responsibility of the Bidder to contact the Procurement and Contracts Division or visit <https://procurement.opengov.com/portal/orlando> prior to submitting a bid to ascertain if any addenda have been issued, to obtain all such addenda, and acknowledge executed addenda in OpenGov. The City is under no obligation to respond to questions received after the cut-off day for questions specified in this section.

Refer to "Instruction to Bidders" for more information on the bidding process.

Bids must be accompanied by a bid bond, certified check or cashier's check made out to the City of Orlando, or other security as provided by law, in an amount not less than 10% of the total base bid.

Bidders must be appropriately licensed Florida Contractors pursuant to Chapter 489 *Florida Statutes* to be considered responsible bidders and eligible to be awarded a contract.

A Non-Mandatory Pre-Bid meeting will be held on **February 17, 2026, at 10:00 a.m.**, on site at, 5420 L.B. Mcleod Road, Orlando, FL 32811.

All questions about the meaning/intent of the Plans & Contract Documents must be submitted in writing before **5:00 p.m. Local Time, February 26, 2026**, to **Silvia Coste, CPP, Senior Purchasing Agent**, Silvia.Coste@orlando.gov Procurement and Contracts Division. Questions will be answered in accordance with Article 5 of the "Instruction to Bidders," replies will be given at a later date.

Upon award of contract, the Low Bidder shall be required to provide Performance and Payment Bonds in the amount of the Contract Price. The Surety must be licensed to do business in the State of Florida, must be included on the United States Department of the Treasury's Listing of Approved Sureties, and must have at least an "A-" rating in accordance with the most current A.M. Best Company financial strength ratings.

Use of Trimble Project Management Software

The selected Proposer will be required to utilize the CITY's Trimble Project Management software in the performance of services hereunder.

City's Veteran Business Enterprise (VBE) Program.

The Contractor shall be required to comply, if applicable with the City Veteran Business Enterprise (VBE) program (Chapter 7). The VBE Participation form is provided in the Supplementary Conditions.

Living Wage.

The Contractor is required to pay its workers, as well as its subcontractors providing services pursuant to a contract with the City, a living wage for the time spent providing services to the City. (This provision does not include general administrative personnel unless they are assigned to a City project.) "Living wage" means compensation for employment of not less than \$15.00 per hour for straight time, exclusive of FICA, unemployment taxes, and workers compensation insurance and employee benefits. This provision shall apply to all bid and proposal awards for services which involve City expenditures that exceed \$100,000.00 per year.

Responsible Contractor's Policy

For contracts with an estimated value of at least \$100,000, the Contractor will be required to comply with the City's Responsible Contractor's Policy, which requires that Contractor pay its workers and require its Subcontractors to pay their workers on this Project an hourly wage, based on classification for the Orlando region established by the Davis-Bacon Act (hereinafter "hourly wage"). The Wage Determination for this Project can be found at <https://sam.gov/content/home>. The applicable county is Orange County, and the construction type is Heavy (FL20260128, 01/02/2026).

The City reserves the right to waive any informalities, to reject any or all Bids, or to re-advertise for Bids. Awards, if made, will be to the lowest responsive, responsible bidder whose bid is most advantageous to the City, price and other factors considered.

INSTRUCTION TO BIDDERS

ARTICLE 1 - DEFINED TERMS

Terms used in these "INSTRUCTION TO BIDDERS" which are defined in the General Conditions have the meanings assigned to them in the General Conditions

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.1 Complete sets of the Bidding Documents may be obtained in the manner defined in the Invitation for Bids.

2.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither CITY nor ENGINEER nor DESIGN ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 CITY in making copies of Bidding Documents available on the above terms does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATION OF BIDDERS

3.1 To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit, following receipt of written request by CITY, information including but not limited to financial data, previous experience including references and evidence of authority to conduct business in the jurisdiction where the Project is located. This information must be received by City within ten days of Bidder receiving the written request. Submittals requested pursuant to this paragraph are in addition to those required elsewhere.

ARTICLE 4 - EXAMINATION OF CONTRACT DOCUMENTS AND SITE

4.1 Before submitting a Bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the Work, (c) familiarize himself with federal, state and local laws, ordinance, rules, regulations and policies that may in any manner affect cost, progress or performance of the Work; and (d) study and carefully correlate Bidder's observations with the Contract Documents; and (e) make written requests for interpretations promptly after discovering any conflicts, errors, ambiguities or inconsistencies.

4.2 Reference is made to the General Requirements for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which have been relied upon by DESIGN ENGINEER in preparing the Drawings and Specifications. CITY shall make copies of such reports available to any Bidder requesting them. These reports are not guaranteed as to accuracy or completeness, nor are they part of the Contract Documents; they are provided for guidance only. If this information is used by Bidder in preparing his proposal, he shall assume all risks resulting from actual conditions differing from the conditions set out in the reports.

4.3 When a log of test borings showing a record of the data obtained by the investigation of subsurface conditions by the CITY, the DESIGN ENGINEER or their consultants is included with the plans or other documents, it is expressly understood and agreed that said log of test borings does not constitute a part of the contract, represents only the opinion of the CITY, or the DESIGN ENGINEER or their consultants as to the character of the materials encountered by them in the test borings, is included in the plans or other documents only for the convenience of bidders, and its use is subject to all of the conditions and limitations set forth in this article.

4.4 Before submitting a Bid, each Bidder shall, at Bidder's own expense, make or obtain any additional investigations, examinations, explorations and tests and obtain any additional information which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress or performance of the Work and which Bidder deems necessary to determine its Bid for performing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

4.5 On request, CITY will attempt to provide each Bidder reasonable access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of his Bid. If access is provided, Bidder shall restore site to condition existing prior to conducting said investigations and tests.

4.6 The lands upon which the work is to be performed, rights-of-way for access thereto and other lands designated for use by CONTRACTOR in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor.

4.7 The submission of a Bid shall constitute a conclusive representation by the Bidder that he has complied with every requirement of this Article 4 and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

4.8 The submission of the Bid shall be an indication that the Bidder has considered normal local weather conditions (daily and monthly variations) for the previous ten years from the date of the Bid as compiled by the National Weather Service and measured at Orlando International Airport.

ARTICLE 5 - INTERPRETATIONS

5.1 To ensure fair consideration for all Bidders, the City prohibits communication to or with any officer, elected official (**including the Mayor and City Council**), department, division, office or employee of the City, and any advisory committee members during the solicitation process from the date of issuance of the solicitation through award, except as provided below.

5.2 Prohibited communications initiated by a bidder shall be grounds for disqualifying the offending bidder from consideration on the award of a contract from this or future solicitations.

5.3 Bidders are required to advise the Procurement and Contracts Division of any conflicts in the Contract Documents or any discrepancies between conditions noted at the project site and those shown on the Drawings or described in the Specifications.

5.4 All such communication (as indicated in 5.3 above) as well as other questions about the meaning/intent of the Plans & Contract Documents must be received in writing before **5:00 p.m. Local Time, February 26, 2026**. No inquiries received after this date and time will be given any consideration.

5.5 This/these communication/questions must be submitted to **Silvia Coste, CPP, Senior Purchasing Agent**, Procurements and Contracts Division, 400 S. Orange Ave., 4th Floor, Orlando, Florida 32801, at silvia.coste@orlando.gov.

5.6 Any interpretation made to prospective Bidders will be expressed in the form of an addendum to the solicitation.

5.7 It will be the responsibility of the Bidder to contact the Procurement and Contracts Division prior to submitting a bid to ascertain if any addenda have been issued, to obtain all such addenda, and return each executed addenda acknowledgement Signature Page with the bid.

5.8 Only questions answered by formal written Addenda shall be binding. Oral and other interpretations or clarifications will be without legal effect.

ARTICLE 6 - BID SECURITY

6.1 Bid Security shall be made payable to CITY, in an amount of ten percent of the Bidder's Total Base Bid

and in the form of a certified or cashier's check, a Bid Bond on the form provided (or substantial equivalent) issued by a Surety meeting the requirements of paragraph 5.1 of the General Conditions, or other security as provided by law.

6.2 The Bid Security of the Low Bidder shall be retained until such Bidder has executed the Agreement, furnished the required Contract Security, and the Insurance Certificates and Endorsements, whereupon it will be returned; if the Low Bidder fails to execute and deliver the Agreement or furnish the required Contract Security and the Insurance Certificates and Endorsements, within fifteen (15) days of the Notice of Award, CITY may annul the Notice of Award and the Bid Security of that Bidder may be forfeited. The Bid Security of any Bidder whom CITY believes to have a reasonable chance of receiving the award may be retained by CITY until the earlier of the seventh day after the "effective date of the Agreement" (which term is defined in the General Conditions) or the ninety-first day after the Bid opening. Bid security of other Bidders may be returned within seven days of the Bid opening.

ARTICLE 7 - CONTRACT TIME

The time of completion is the essence of the contract, and the Bidder awarded the Contract shall proceed with the Work in accordance with the Contract time period specified in the Contract Documents. In the event of failure to complete the Work within the time specified, the CITY may assess damages as provided by law or the Contract Documents, unless an appropriate extension of time has been granted by the City.

ARTICLE 8 - LIQUIDATED DAMAGES

Provisions for liquidated damages, if any, are set forth in the Bid Form and Supplementary Conditions.

ARTICLE 9 - SUBSTITUTE MATERIAL AND EQUIPMENT

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the "effective date of the Agreement." The procedure for submittal of any such application by CONTRACTOR and consideration by ENGINEER is set forth in Article 6.7 of the General Conditions which may be supplemented in the General Requirements. If a substitution list is provided as part of the prescribed Bid Form, Bidders must identify proposed substitute materials and a deductive amount representing 50 percent of the cost difference between the specified item and the proposed item. These substitute materials and equipment shall be evaluated after "effective date of the Agreement." In all cases, the Low Bidder shall be determined on the basis of the Base Bid which shall reflect the cost for the materials and equipment specified.

ARTICLE 10 - SUBCONTRACTORS, ETC.

10.1 The CITY shall receive from the Apparent Low Bidder (or the Low Bidder), within ten days after receipt of written notification by CITY, a list of all Subcontractors and other persons and organizations, including those who are to furnish the principal items of material and equipment. This list shall include the name and address of the Subcontractor, person or organization, a description of the services, materials or equipment to be supplied, estimated time required for the preparation and submittal of shop drawings, and estimated lead times required for the fabrication of any long lead items and concurrence thereof. Such list shall be accompanied by a statement of experience with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, person or organization. If CITY or ENGINEER has reasonable objection to any proposed Subcontractor, other person or organization, either may, before the Notice of Award, request the Apparent Low Bidder (or the Low Bidder) to submit an acceptable substitute without an increase in Bid price. If the Apparent Low Bidder (or the Low Bidder) declines to make any such substitution, the contract may not be awarded to such Bidder at the CITY's sole discretion, but his declining to make any such substitution may not constitute grounds for sacrificing his Bid Security. Any Subcontractor, other person or organization so listed and to whom CITY or ENGINEER does not make written objection prior to the Notice of Award will be deemed acceptable to CITY and ENGINEER, but CITY and ENGINEER do not thereby waive any right they may have against the Contractor because of the actions or omissions of said Subcontractor, other person or organization.

ARTICLE 11 - BID FORM

11.1 The Bid Form is included in the Contract Documents.

11.2 Price proposal must be completed in OpenGov. The Bid price of each item on the form must be entered.

11.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other appropriate corporate officer) and the corporate seal must be affixed and attested by another corporate officer. The corporate address and state of incorporation shall be shown below the signature.

11.4 Bids by partnerships must be executed in the partnership name and signed by an authorized partner, whose title must appear under the signature.

11.5 All names and titles must be typed or printed below the signature.

11.6 The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

11.7 The address to which communications regarding the Bid are to be directed must be shown.

ARTICLE 12 - SUBMISSION OF BIDS**Bidders must submit one (1) electronic Solicitation Response submittal via OpenGov.**

Submit bid, and Bid Forms provided in the Contract Documents. Bids shall be submitted at the time and place indicated in the INVITATION FOR BID, marked with the Project title and name and address of the Bidder and accompanied by the Bid Security, the Affidavit of Non-collusion, and, the Affidavit of Present and Future Compliance with City of Orlando Responsible Contractor's Policy. Bids received after the time and date specified in the INVITATION FOR BID shall not be considered.

ARTICLE 13 - MODIFICATION AND WITHDRAWAL OF BIDS

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids. Withdrawal of a bid will not prejudice the rights of Bidder to file a new Bid.

13.2 If within 24 hours after bids are opened, any Bidder files a duly signed written notice with CITY, and within 48 hours thereafter demonstrates to the reasonable satisfaction of the City that: a) there has been a material and substantial mistake in the preparation of the Bid; b) the mistake is of such great consequence that to enforce the Contract would be unconscionable; and c) the mistake occurred notwithstanding the exercise of reasonable care in the preparation of the Bid; the Bidder may withdraw its Bid, and the Bid Security will be returned provided that the CITY is not seriously prejudiced, except for the loss of its bargain. Bidder shall not be allowed to correct a bid with a material and substantial mistake. Thereafter, that Bidder shall be disqualified from further bidding on the work to be provided under the Contract Documents.

ARTICLE 14 - OPENING OF BIDS

14.1 At the specified time and place as indicated in the "INVITATION FOR BID," Bids shall be opened publicly and read aloud.

14.2 An abstract of the amounts of the base Bids and major alternates (if any) will be prepared and made available within a reasonable time after the opening of Bids.

14.3 More than one Bid received for the same work from an individual, firm or partnership, a Corporation or Association or other legal entity under the same or different names shall not be considered. Reasonable grounds for believing that any Bidder is interested in more than one Bid for the same work will cause the rejection of all such Bids in which the Bidder is interested. If there are reasonable grounds for believing that collusion exists among the Bidders, the Bids of the participants believed to be in such collusion shall not be considered.

14.4 Notwithstanding any other provision contained in the Contract Documents, the CITY reserves the right to reject any and all bids and waive any and all irregularities, and the right to disregard any or all non-conforming, unbalanced or conditional bids or counter proposals. The CITY may reject, as non-responsive, any or all bids where bidders fail to acknowledge receipt of addenda as prescribed. If the CITY elects not to reject a bid which fails to acknowledge receipt of any addendum, the Bid shall be construed as though the addendum had been received and acknowledged by the Bidder. Addenda will be provided to prospective Bidders who obtain Contract Documents directly from the City and are included on the list of Plan holders.

14.5 Discrepancies between words and figures shall be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof shall be resolved in favor of the correct sum. Discrepancies in the extension of the unit price times the estimated quantity for any line item shall be resolved in favor of the correct extension. In the event of any discrepancy in the three entries for the price for any item, the unit price as shown in words shall govern unless the extension and the unit price shown in figures are in agreement with each other, in which case they shall govern over the unit price shown in words.

ARTICLE 15 - BIDS TO REMAIN OPEN

15.1 All Bids shall remain open for ninety days after the day of the Bid opening, but CITY may, in its sole discretion, release any Bid and return the Bid Security prior to that date.

15.2 Extensions of time when bids shall remain opened beyond the ninety-day period may be made only by mutual agreement between the City of Orlando, the low Bidder, and the Surety, if any, for the low Bidder.

ARTICLE 16 - AWARD OF CONTRACT

16.1 Award shall be based on products, equipment and materials named in the Contract Documents. Consideration of and decisions regarding substitution shall not be made until after Award of the Contract.

16.2 In evaluating Bids, CITY shall consider the qualifications of the Bidders, and whether or not the Bids comply with the prescribed requirements.

16.3 In evaluating Bids, the CITY shall consider the information provided by the Low Bidder as described in these "INSTRUCTION TO BIDDERS."

16.4 The low Bidder shall submit, upon request of CITY, documentation evidencing its capability to perform classes of work contemplated, and the necessary plant and sufficient capital to execute the work properly within the time specified. This information must be received by CITY within ten days of Bidder receiving written request.

16.5 The CITY may require the low Bidder to submit a certified statement describing his organization, plant, manpower, financial resources and list all previous and/or ongoing construction contracts over the last five years regardless of amount or completion status. Information shall be submitted on the Associated General Contractors of America Form "Standard Questionnaires and Financial Statement for Bidders" available from AGC, 1957 "E" Street, N.W., Washington, D.C. 20006, or other form acceptable to CITY. The information shall be certified by a Certified Public Accountant for bids over \$25,000. The CITY, at its discretion, may require any or all of the above listed information from any other Bidder.

16.6 CITY may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as provided in the Supplementary Conditions and Article 10 of these Instructions. Operating costs, maintenance, considerations, performance data and guarantees of materials and equipment may also be considered by CITY.

16.7 CITY may conduct such investigations and require supplemental information as it deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, proposed Subcontractors, proposed equipment and material suppliers, and other persons and organizations to do the Work in accordance with the Contract Documents to CITY's satisfaction within the prescribed time.

16.8 CITY reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to CITY's satisfaction.

16.9 CITY reserves the right to reject the Bid of any Bidder which is behind on the approved completion schedule for any existing contracts with the City, or in litigation with the City, or has previously defaulted on a contract with the CITY.

16.10 If the Contract is to be awarded, it will be awarded to the lowest responsive, responsible Bidder on the basis of the Total Base Bid. CITY reserves the right to reject all Bids.

16.11 If the Contract is to be awarded, CITY will give the Low Bidder a Notice of Award within ninety days after the day of the bid opening subject to the conditions in Article 15 of the Instructions to Bidders.

16.12 CITY, while reviewing the Bid of the apparent low Bidder, may reasonably require other Bidders to submit promptly for CITY inspection, information, including, but not limited to, their responsibility, qualifications, financial ability, proposed Subcontractors and Suppliers. The acceptance of these submittals shall in no way impose any obligation whatsoever upon CITY to award the Contract to any such Bidders, and all information provided shall be at Bidders' sole expense. The CITY shall in no event be obligated to reimburse Bidders for their costs incurred to supply this information to the CITY.

16.13 A Bidder who is aggrieved in connection with a solicitation or award of a bid or contract may protest in accordance with the provisions of Section 7.900 of the City Code.

ARTICLE 17 - BONDS AND INSURANCE

Article 5 of the General Conditions sets forth CITY's requirements as to Bonds and Insurance. When the successful Bidder delivers the executed Agreement to CITY, it shall be accompanied by the required Bonds, Insurance Certificates, and Endorsements on forms prescribed by CITY. Attorneys-in-fact who sign Bid Bonds, Performance Bonds and Payment Bonds must file with such Bonds a certified copy of their power-of-attorney to sign the Bonds.

ARTICLE 18 - SIGNING OF AGREEMENT

18.1 When CITY gives a Notice of Award to the successful Bidder, it will be accompanied by at least three unsigned counterparts of the Agreement and all other Contract Documents. Within fifteen days of receipt thereafter, successful Bidder shall sign and deliver at least three counterparts of the Agreement to CITY together with the documents described in Article 17 above attached.

18.2 Failure by a successful Bidder to whom the contract is awarded to execute the Agreement or to correctly complete or furnish the required Bonds or insurance certificates and endorsements or to comply set forth in Chapter 57 and the Contract Documents shall be just cause for the annulment of the award and the forfeiture of the Bid Security.

18.3 A successful Bidder who is awarded the Contract and fails to execute the Agreement or correctly complete or furnish the required Bonds or insurance certificates and endorsements within the time period specified in 18.1 above set forth in Chapter 57 and the Contract Documents shall be liable to the CITY for all damages resulting therefrom including reasonable attorneys' fees and costs, and attorneys' fees and cost on appeal. The Bid Security forfeited shall not be a limitation thereon.

ARTICLE 19 - PUBLIC ENTITY CRIMES

Any Person or affiliate, as defined in Section 287.133 of the Florida Statutes, shall not be allowed to contract with the CITY, nor be allowed to enter into a subcontract for work on this Project, if such a person or affiliate has been

convicted of a public entity crime within three (3) years of the date this Project was advertised for bid, or if such person or affiliate was listed on the State's convicted vendor list, within three (3) years of the date of this project was advertised, whichever time period is greater. A public entity crime means a violation of any state or federal law with respect to and directly related to the transaction of business with any public entity or agency (federal, state or local), including but not limited to, any contract for the construction or repair of a public building or public work involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, forgery, falsification of records, receiving stolen property or material misrepresentation.

Any Agreement with the CITY obtained in violation of this Section shall be subject to termination for cause. A subcontractor who obtains a subcontract in violation of this Section shall be removed from the Project and promptly replaced by a subcontractor acceptable to the City.

ARTICLE 20 - CONCURRENT WORK BY OTHERS

Bidders are advised that there may be other contractors working at the project site concurrent with the construction of the Work described herein. Accordingly, Bidders should consider the limitations to site access and the construction sequencing described in the Contract Documents when preparing this bid.

If areas are designated in the Contract Documents which are to be shared with other contractors and these areas must be disrupted, the CONTRACTOR shall provide alternate acceptable access for other contractors.

CONTRACTOR is required to coordinate his activities in the designated areas described above with other contractors working at the project site. CONTRACTOR must submit to the Engineer a description and schedule as to how the designated areas will be utilized, recognizing the required coordination with other contractors.

ARTICLE 21 – RESERVED

ARTICLE 22 - SPECIAL WARRANTY, GUARANTY, GUARANTEE, BONDS INSURANCE MAINTENANCE, AND CORRECTION PERIOD REQUIREMENTS

There may be special requirements pertaining to Warranty, Guarantee, Bonds, Insurance, Maintenance and the Correction Period, which are described in the Contract Documents. Bidders should review these special requirements, if applicable, and reflect in their bids all costs associated therewith.

ARTICLE 23 – LIVING WAGE

CONTRACTOR, as well as its Subcontractors at all tiers, shall pay to all of their employees providing services pursuant to a contract with the CITY, a living wage for the time spent providing services to the CITY. (This provision does not include general administrative personnel unless they are assigned to a CITY project.) “Living wage” means compensation for employment of not less than \$15.00 per hour for straight time, exclusive of FICA, unemployment taxes, and workers compensation insurance and employee benefits. Necessary payroll documentation shall be provided to confirm compliance with this provision and the CONTRACTOR shall allow the CITY to audit (at CONTRACTOR’s place of business) its payroll records to determine if compliance has been achieved. Failure to comply with the provision may result in termination of the contract and/or preclusion from future CITY contracts at the sole option of the CITY.

ARTICLE 24 – RESPONSIBLE CONTRACTOR’S POLICIES

24.1 The CONTRACTOR, when paying its workers on this Project, shall pay such workers an hourly wage, based on classification for the Orlando region established by the Davis-Bacon Act (40 U.S.C. 276a-7) as supplemented by the Department of Labor regulations (29 CFR part 5) (hereinafter “hourly wage”). Payment of the appropriate wages must be documented in CONTRACTOR’S progress payment applications by the submission of certified payrolls by CONTRACTOR for the duration of this Agreement. Moreover, CONTRACTOR shall require compliance with these provisions for Davis-Bacon hourly wages and certified payrolls by **all** Subcontractors at every tier, by means of subcontract provisions and subcontract flow down requirements to include Subcontractors at every tier, and CONTRACTOR will be held responsible for compliance by any Subcontractor or lower tier Subcontractor. Notwithstanding the foregoing, CONTRACTOR acknowledges and agrees that no hourly wage paid

on this project by the CONTRACTOR and Subcontractors will be less than the living wage referenced in Article 24.

24.2 The CONTRACTOR and Subcontractors at all tiers shall each classify all of their workers as either independent contractors or employees in accordance with the requirements of Laws and Regulations. Workers who are employees as defined by Laws and Regulations shall not be classified as independent contractors. The CONTRACTOR and Subcontractors shall each provide written notice to their workers classified as independent contractors of their classification status within seven (7) days after contract award or within seven (7) days of hiring if hired subsequent to contract award. Documentation demonstrating compliance with this requirement for each worker classified as an independent contractor shall be submitted by the CONTRACTOR with its first Application for Payment. For those workers classified as independent contractors hired after submittal of the first Application for Payment, documentation demonstrating compliance with this requirement shall be provided with the first Application for Payment submitted subsequent to the worker's hiring.

24.3 The CONTRACTOR and Subcontractors at all tiers shall each use the E-verify internet-based system operated by the United States Department of Homeland Security to verify that all of their workers performing labor on the Project are eligible to work in the United States. Documentation of E-verify confirmation for each worker shall be submitted by the CONTRACTOR with the first Application for Payment, or for those workers hired after submittal of the first Application for Payment, with the first Application for Payment submitted subsequent to the worker's hiring.

24.4 The CONTRACTOR shall post a copy of the CITY'S Living Wage and Responsible Contractor policies at designated locations on the Project site as required by the Contract Documents.

ARTICLE 25 – RESERVED

ARTICLE 26 - EMPLOYMENT ELIGIBILITY; E-VERIFY SYSTEM

Pursuant to Section 448.095 of the Florida Statutes, prior to Contract execution and at all times during the term of the Contract, Contractor shall register with and use the E-Verify system to verify the work authorization status of all newly hired employees. If Contractor enters into a contract with a subcontractor, the subcontractor must provide the Contractor with an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an unauthorized alien. The Contractor shall maintain a copy of such affidavit for the duration of the Contract and, if longer, for any additional audit period provided to the City in the Contract. Pursuant to Section 448.095(2)(c) of the Florida Statutes, the City, Contractor, or a subcontractor who has a good faith belief that a person or entity with which it is contracting has knowingly violated s. 448.09(1) shall terminate the contract with the person or entity. If the City has a good faith belief that a subcontractor knowingly violated this subsection, but the Contractor otherwise complied with this subsection, the City shall promptly notify the Contractor and order the Contractor to immediately terminate the contract with the subcontractor. Pursuant to Florida Statute, a contract terminated pursuant to subparagraph 1. or subparagraph 2. of Section 448.095(2)(c) of the Florida Statutes is not a breach of contract and may not be considered as such, and the City shall have no liability to Contractor, a subcontractor, or any entity or person arising from or related to such a termination. If the Contract with Contractor is terminated by the City pursuant to Section 448.095(2)(c), the Contractor may not be awarded a public contract for at least one (1) year after the date on which the Contract was terminated and Contractor shall be liable to the City for any additional costs incurred as a result of the termination of the Contract.

ARTICLE 27 - NONDISCRIMINATION POLICY

The following provisions shall be included in all City (and Community Redevelopment Agency and Downtown Development Board) bids, RFP's, and other solicitations for goods and services, and incorporated into all contracts resulting from such solicitations:

Contractor shall:

1. Implement an employment nondiscrimination policy prohibiting discrimination in the performance of the contract in the hiring, discharging, promoting or demoting, matters of compensation, or any other employment-related decision or benefit on account of actual or perceived race, ethnicity, color, religion, national origin,

gender, disability, age, military status, sexual orientation, gender identity, gender expression, or marital or familial status.

2. Not discriminate in the performance of the contract on account of actual or perceived race, ethnicity, color, religion, national origin, gender, disability, age, military status, sexual orientation, gender identity, gender expression, or marital or familial status.
3. Incorporate the foregoing requirements in all subcontracts related to its contract with the City.

ARTICLER 28 – TRIMBLE PROJECT MANAGEMENT SOFTWARE

The selected Proposer will be required to utilize the City of Orlando's Trimble Project Management software in the performance of services hereunder.

ARTICLE 29 - PROHIBITION AGAINST CONSIDERING SOCIAL, POLITICAL, OR IDEOLOGICAL INTERESTS IN GOVERNMENT CONTRACTING

Pursuant to Section 287.05701 of the Florida Statutes, vendors are notified that the City as a local government in Florida, is prohibited from requesting documentation of or considering a vendor's social, political, or ideological interests when determining whether a vendor is a responsible vendor, and from giving a preference based upon such interests.

BID FORM
PROPOSAL TO
THE CITY OF ORLANDO, FLORIDA
FOR THE CONSTRUCTION FOR
IFB26-0141 WATER CONSERV II WRF EQUALIZATION
PUMP STATION IMPROVEMENTS

Name of Bidder: _____

Mailing Address: _____

Street Address: _____

City/State/Zip: _____

Phone Number:() _____

Procurement and Contracts Division
City of Orlando
Orlando, Florida

Pursuant to and in compliance with your notice inviting sealed proposals (Invitation for Bid), Instructions to Bidders, and the other documents relating thereto, the undersigned Bidder, having familiarized himself with the terms of the contract documents, local conditions affecting the performance of the contract, and the cost of the work at the place where the work is to be done, hereby proposes and agrees to perform within the time stipulated in the contract, including all of its component parts and everything required to be performed, and to provide and furnish any and all of the labor, material, and tools, expendable equipment, and all utility and transportation services necessary to perform the contract and complete in a workmanlike manner, all of the work required in connection with the construction of said work all in strict conformity with the plans and specifications and other contract documents, including Addenda Nos. _____ through _____, on file at the Procurement and Contracts Division, City of Orlando, for the prices hereinafter set forth.

The undersigned bidder agrees that the Work shall be completed according to the schedule set forth in the Contract Documents.

The undersigned bidder further agrees to pay liquidated damages as described herein and as may be provided in the Supplementary Conditions, which shall be in addition to such other amounts for actual delay damages

The Price Proposal must be submitted in accordance with paragraph 11.2 of the Instruction to Bidders.

The undersigned as Bidder, declares that the only persons or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any person, firm or corporation; and he proposes and agrees, if the proposal is accepted, that he will execute a contract with the CITY in the form set forth in the Contract Documents; that he will furnish the Contract Security, Insurance Certificates, Endorsements, and Policies, that he will comply, that he is aware that failure to properly comply with the requirements set out in the "Instruction to Bidders" and elsewhere in the Contract Documents may result in a finding that the Bidder is non-responsive and a forfeiture of the Bid Security.

TRENCH SAFETY ACT
FLORIDA STATUTE 90-96

NOTICE TO BIDDERS:

In order to comply with the Trench Safety Act, the Contractor is required to specify the costs of compliance. These costs **are not a separate pay item.** The Contractor must also reference the Trench Safety Standards which will be in effect during construction, and assure in writing that the Contractor will comply with the applicable Trench Safety Standards.

TRENCH SAFETY MEASURE	UNITS OF MEASURE	QUANTITY	UNIT COST	COST

The Work shall be substantially completed as described in paragraph 14.13 of the General Conditions, within **730** days after the date when the Contract Time begins to run as provided in paragraph 2.2 of the General Conditions. The Work shall be completed, ready for final payment in accordance with paragraph 14.9 of the General Conditions, within thirty-five (35) days after the actual date of Substantial Completion, unless agreed to otherwise in writing.

The CITY and CONTRACTOR recognize that time is of the essence of this Contract and Contractor recognizes that the City will suffer financial loss if the Work is not substantially completed as described in Article 14.13 of the General Conditions within the time specified below, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual delay damages (excluding engineering fees and inspection costs) suffered by the CITY if the work is not completed on time. Accordingly, CONTRACTOR agrees to pay CITY as liquidated damages **\$2,000.00** per day for each day CONTRACTOR exceeds the Contract Time for Substantial Completion (defined as **730 days** starting when the Contract Time starts to run as provided in Article 2.2 of the General Conditions) until the Work is substantially complete. The Work shall be completed, ready for final payment in accordance with Article 14.9 of the General Conditions, within thirty-five (35) days after the actual date of Substantial Completion, unless agreed to otherwise in writing. The CONTRACTOR shall pay or reimburse, in addition to the liquidated damages specified herein, the CITY's expenses for engineering fees and inspection costs arising from CONTRACTOR's delay in meeting either or both the Substantial Completion and Final Completion dates.

ACCOMPANYING THIS PROPOSAL IS _____

(insert the word(s) "cashier's check," "bidder's bond," "certified check," or other security as provided by law, as the case may be) in an amount equal to at least 10% of the total base bid, payable to the CITY OF ORLANDO, FLORIDA.

Also accompanying this proposal is an Affidavit of Non-collusion and Non-interest of City Employees, and all other documents as may be required.

The undersigned deposits above-named security as a proposal guarantee and agrees that it shall be forfeited to the CITY as liquidated damages in case this proposal is accepted by the CITY and the undersigned fails to execute a contract with the CITY as specified in the contract documents accompanied by the required payment and faithful performance bonds with sureties satisfactory to the OWNER, and accompanied by the required certificates of insurance coverage, and endorsements. Should the CITY be required to utilize the services of an attorney in connection with the enforcement of this bid, bidder promises to pay CITY's reasonable attorney's fees and costs (including attorney's fees and costs on appeals) incurred with or without suit.

The names of all persons interested in the foregoing proposals as principals are as follows: (NOTICE - If bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer, and general manager thereof; if a partnership, state true names of firm, also names of all individual partners composing firm; if bidder or other interested person is an individual, state first and last name in full; if bidders or other interested person is a joint venture, state the name of joint venture and all joint venturers; if bidder or other interested person is a legal entity not mentioned here, state name and designate the form of the entity.)

SUBSTITUTIONS AND "OR EQUAL"

The undersigned as Bidder agrees that substitutions or "or-equal" items will not be considered until after the "effective date of the Agreement" and will be evaluated in accordance with Article 6.7 of the General Conditions. If Bidder

intends to propose substitutions or "or-equal" items after the "effective date of the Agreement," it is agreed that these items shall be listed on the Substitution List included with the Bid Form (provided herein) with a deductive amount representing 50 percent of the total savings between the named item and the proposed item. The undersigned as Bidder also agrees that if a substitution or "or-equal" item is not listed on the Substitution List included with the Bid, all of the savings between the named item and the proposed item will go to the City if the City accepts the proposed item in accordance with Article 6.7 of the General Conditions.

SUBSTITUTION LIST

Bidder offers the following substitutions and "or equal" items:

Item Number _____

Equipment Item or Material: _____

Specification Section: _____

Alternative Manufacturer/Supplier (List One Only): _____

Deductible Amount* (Indicate Whether Lump Sum or Unit Price): _____

Item Number _____

Equipment Item or Material: _____

Specification Section: _____

Alternative Manufacturer/Supplier (List One Only): _____

Deductible Amount* (Indicate Whether Lump Sum or Unit Price): _____

*Represents 50% of the difference in cost in accordance with paragraph 6.7.5 of the General Conditions.

(Bidder may make additional copies of this page as required.)

NOTE: If a bidder is a corporation, the legal name of the corporation shall be set forth below, together with signature(s) of the officer or officers authorized to sign contracts on behalf of the corporation and corporate seal; if bidder is a partnership, the true name of the firm shall be set forth below with the signature(s) of the partner or partners authorized to sign contracts in behalf of the partnership; and if the bidder is an individual, his signature shall be placed below; if a partnership, the names of the general partners.

Bidder: _____
(Type or Print)

By: _____

Name: _____

Title: _____

Dated: _____, 20____

(Corporate Seal)

Attest (if corporation)

By: _____
(Signature)

Name: _____

Title: _____

WITNESS: _____
(if partnership or individual) (Signature)

(Print Name))

Florida Contractor's License No. _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____,
as Principal, and _____, as Surety, are held and
firmly bound unto the City of Orlando, Florida, hereinafter called the CITY in the penal sum
of _____ Dollars (\$ _____),
lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our
heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such that whereas the Principal has submitted the accompanying bid dated
_____, 20____, for the construction of _____.

NOW THEREFORE, if the Principal shall not withdraw said bid within the period of time set forth in the contract documents, and shall within fifteen (15) calendar days after receipt of the Notice of Award enter into a written contract with the CITY in accordance with the bid as accepted, and if the Principal shall give the required bonds with good and sufficient sureties for the faithful performance and proper fulfillment of such contract and for the protection of subcontractors, laborers and material men, or in the event of the withdrawal of said bid within the period specified, or the failure to enter into said contract, or failure to give such bonds within the time specified, if the Principal shall within twenty (20) days after request by the CITY pay to the CITY the difference between the amount specified in said bid and the amount for which the CITY may procure the required work if the latter amount be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and effect.

It is further agreed that if the CITY is required to utilize legal counsel to recover on this bond, it may also recover its costs relating thereto including a reasonable amount for attorneys' fees and costs, including attorneys' fees and costs in appellate proceedings.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK.]

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals
this _____ day of _____, 20____.

WITNESS:

(if individual or partnership)

(signature)

(Print Name)

PRINCIPAL

By: _____
(signature)

Name: _____

Title: _____

ATTEST (if corporation)

By: _____
(signature)

Name: _____

Title: _____

(Corporate Seal)

SURETY

By: _____
(signature)

Name: _____

Title: _____

(Surety Seal)

Attach a certified copy of Power-of-Authority appointing individual Attorney-in-Fact for execution of Bid Bond on behalf of Surety

Any claims under this bond may be addressed to:

Name of Surety

Mailing Address

Street Address

Telephone number of Surety
and agent or representative
in Florida

_____()_____

_____()_____

AFFIDAVIT OF NON-COLLUSION
AND OF NON-INTEREST OF CITY EMPLOYEES

DESCRIPTION OF CONTRACT: **IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.**

STATE OF _____}

COUNTY OF _____}

_____,* being first duly sworn, deposes and says that he (it) is the bidder in the above bid, that the only person or persons interested in said bid are named therein; that no officer, employee or agent of the City of Orlando or of any other bidder is interested in said bid; and that affiant makes the above bid with no past or present collusion with any other person, firm or corporation.

_____ Affiant

STATE OF _____}

COUNTY OF _____}

The foregoing instrument was acknowledged before me this _____ day of _____, 20____ by _____, who is personally known to me or who has produced _____ as identification and who did take an oath.

NOTARY PUBLIC
My Commission Expires:

*NOTICE: State name of Bidder followed by name of authorized individual (and title) who is signing as Affiant. If Bidder is an individual, state name of Bidder only.

**AFFIDAVIT OF PRESENT AND FUTURE COMPLIANCE WITH
CITY OF ORLANDO RESPONSIBLE CONTRACTOR'S POLICIES**

DESCRIPTION OF CONTRACT: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.

STATE OF _____}

COUNTY OF _____}

PERSONALLY appeared before the undersigned authority duly authorized to take acknowledgements, _____ by its _____,* who after being sworn says that he/it is presently in a compliance with all benefits and wage related requirements for the contract for which he/it is submitting a bid. This compliance includes the bid specifications dealing with health benefits and hourly wages. In addition to the above, by execution of this affidavit, he/it agrees to continue to comply with all wage and benefit requirements until the completion of this Project.

Affiant

STATE OF _____}

COUNTY OF _____}

The foregoing instrument was acknowledged before me this ____ day of _____, 20__ by _____, who is personally known to me or who has produced his/her _____ as identification and who did take an oath.

NOTARY PUBLIC

My Commission Expires:

*NOTICE: State name of Bidder followed by name of authorized individual (and title) who is signing as affiant. If Bidder is an individual, state name of Bidder only.

AFFIDAVIT OF COMPLIANCE WITH
SCRUTINIZED COMPANIES WITH ACTIVITIES LIST

DESCRIPTION OF CONTRACT: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.

STATE OF _____}

COUNTY OF _____}

PERSONALLY appeared before the undersigned authority duly authorized to take acknowledgements, _____ by its _____,* who after being sworn certifies that neither _____ (insert company name), nor any of its wholly owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of such entities or business associations, that exists for the purpose of making profit, are on the Scrutinized Companies that Boycott Israel List, created pursuant to s. 215.4725 of the Florida Statutes, and are not engaged in a boycott of Israel. In addition, if this solicitation is for a contract for goods or services of one million dollars or more, by submitting a response to this solicitation, Bidder certifies that it and those related entities of Bidder as defined above by Florida law are not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Section 215.473 of the Florida Statutes and are not engaged in business operations in Cuba or Syria. Any Bidder awarded a Contract as a result of this solicitation shall be required to recertify the aforementioned certifications at each renewal of the Contract. The City may terminate any contract resulting from this solicitation if Bidder or any of those related entities of Bidder as defined above by Florida law are found to have submitted a false certification or any of the following occur with respect to the company or a related entity: (i) it has been placed on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel, or (ii) for any contract for goods or services of one million dollars or more, it has been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or it is found to have been engaged in business operations in Cuba or Syria. Notwithstanding the preceding, the City reserves the right and may, in its sole discretion, on a case by case basis, permit a company on such lists or engaged in business operations in Cuba or Syria to be eligible for, bid on, submit a proposal for, or enter into or renew a contract for goods or services of one million dollars or more, or may permit a company on the Scrutinized Companies that Boycott Israel List to be eligible for, bid on, submit a proposal for, or enter into or renew a contract for goods or services of any amount, should the City determine that the conditions set forth in Section 287.135(4) of the Florida Statutes are met.

Affiant

STATE OF _____}

COUNTY OF _____}

The foregoing instrument was acknowledged before me this ____ day of _____,
20____ by _____, who is personally known to me or who has produced
his/her _____ as identification and who did take
an oath.

NOTARY PUBLIC

My Commission Expires:

*NOTICE: State name of Bidder followed by name of authorized individual (and title) who is
signing as affiant. If Bidder is an individual, state name of Bidder only.

QUESTIONNAIRE

DESCRIPTION OF CONTRACT: **IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.**

BIDDER: _____

NOTES TO THE BIDDER:

- (A) The Owner may require Low Bidder, and any other Bidders, to complete and submit this form in addition to the "Standard Questionnaires and Financial Statement for Bidders" named in Article 16 of the Instructions to Bidders, within the time required by Article 16 of the Instructions to Bidders.
- (B) The undersigned Bidder warrants that all statements and answer made to the interrogatories that follow are current, accurate and complete as of the date indicated below.

1. ORGANIZATION

- 1.1 Date of organization (or incorporation) _____ State of incorporation _____ (IRS)
EIN _____
- 1.2 Title and name of Principals (President, Vice-President, Secretary and Treasurer, if a corporation; partners, if a partnership):

- 1.3 If your organization has ever been convicted of a public entity crime, or has charges pending, in any state within the last three years from the date of Bid opening, or has been listed on the State Convicted Vendor List within three (3) years from the date of the bid opening, disclose with this Questionnaire all material facts pertaining to any such conviction or any such pending charges against (a) your organization, (b) any business entity related to or affiliated with your organization, or (c) any present or former executive employee, officer, director, shareholder (owning twenty percent (20%) or more of the outstanding shares), partner, or owner of your organization or of any such related or affiliated entity.

Attachment _____, consisting of _____ pages.

2. LICENSING

- 2.1 If your organization holds valid contractors licenses covering all classifications and subclassifications of work which your organization intends to self-perform, attach a list of all such licenses together with a copy of each license.

Attachment _____, consisting of _____ pages.

3. EXPERIENCE

- 3.1 Attach a list of all contracts or subcontracts over **\$5,000,000.00** similar in character and scope to the Work under the Bidding Documents which your organization has performed over the last five (5) years. For each contract or subcontract, include the Owner's contract number, contract title, contract price, substantial completion date or percent complete (if not completed), and the name, address and telephone number of a representative of the owner familiar with your organization and its work.

Attachment _____, consisting of _____ pages.

- 3.2 Within the last five (5) years, have any claims arising from or relating to a contract or subcontract been made against your organization or any officer or partner of your organization which resulted in litigation or arbitration? _____. If so, the Bidder (or nominated subcontractor) shall attach a description of each claim, the amount of the claim, the parties involved, and the settlement amount or award.

Attachment _____, consisting of _____ pages.

- 3.3 Within the last five (5) years, has your organization or an officer or partner of your organization made any claims arising from or relating to a contract or subcontract which resulted in litigation or arbitration? _____. If so, the Bidder (or nominated Subcontractor) shall attach a description of each claim, the amount of the claim, the parties involved, and the settlement amount or award.

Attachment _____, consisting of _____ pages.

4. ADDITIONAL QUALIFICATIONS

- 4.1 Does your organization rent or lease equipment or facilities from other affiliate organizations? _____. If so, state the name of the affiliate organization(s) _____

- 4.2 Credit available? \$ _____

5. REFERENCES

- 5.1 Trade references:

- 5.2 Bank references:

(Company Name)

By: _____

Name: _____

Title: _____

Date: _____

STATE OF _____}

COUNTY OF _____}

Before me, a Notary Public duly commissioned, qualified and acting, personally appeared _____ to me well known, or produced _____ as identification, who being by me first duly sworn upon oath says that he is the _____ for _____, and that he has been authorized to execute the Questionnaire on behalf of the Bidder in favor of the Owner.

Notary Public

My Commission Expires:

END OF SECTION

AGREEMENT

THIS AGREEMENT is dated as of the _____ day of _____ in the year 20____ by and between _____ the _____ City of _____ Orlando, _____ Florida _____ (“CITY”) _____ and _____ (“CONTRACTOR”).

CITY and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.**

ARTICLE 2. ENGINEER

2.1 DESIGN ENGINEER as named in the Contract Documents is: **Hazen and Sawyer, P.C.**

2.2 ENGINEER is the Director of Public Works.

If the CITY is using an agent to review the Application for Payment to assist the ENGINEER, the agent is identified as follows:

(Name)

(Address)

ARTICLE 3. CONTRACT TIME

3.1 The provisions regarding Contract Time and Liquidated Damages are set forth in the Bid Form and may also be set forth in the Supplementary Conditions.

ARTICLE 4. CONTRACT PRICE

4.1 CITY shall pay CONTRACTOR for performance of the Work in accordance with the Contract Documents on the basis of the prices indicated on the Bid Form.

ARTICLE 5. PAYMENT PROCEDURES

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

5.1 Progress Payments. CITY shall make progress payments on the basis of CONTRACTOR's Applications for Payment as recommended by ENGINEER, in accordance with Article 14 of the General Conditions.

5.1.1 Prior to completion of fifty percent (50%) of the Work (which shall be defined for purposes of this Article as the point when the CITY has paid the CONTRACTOR fifty percent (50%) of the Contract Price including approved Change Orders), progress payments will be in an amount equal to ninety-five percent (95%) of the Work completed, and the CITY will pay an amount equal to ninety-five percent (95%) of materials and equipment not incorporated in the Work but delivered and suitably stored on site, less in each case the aggregate of payments previously made. In no event shall payments for materials and equipment stored exceed ninety-five percent (95%) of the value of the related cost for the specific item of work shown in the breakdown of Contract Price regardless of the stated value of the materials or equipment. CITY may, at its sole option, pay an amount equal to ninety-five percent (95%) of materials and equipment not incorporated in the Work stored offsite if stored in a manner acceptable to CITY, as stated above for on-site stored materials. When payment to CONTRACTOR is made for stored materials and equipment, CONTRACTOR shall submit invoices marked paid by the supplier with the next month's request for payment to document that CONTRACTOR has paid for said materials and equipment or the previously paid amount for stored materials shall be deducted from any remaining payment(s) or retainage for any stored materials not so properly documented. The CONTRACTOR shall provide the consent of the Surety with each pay application.

5.1.2 Upon completion of fifty percent (50%) of the Work, progress payments will be in the amount equal to ninety-five percent (95%) of the Work completed, and the CITY will pay an amount equal to ninety-five percent (95%) of materials and equipment not incorporated in the Work but delivered and suitably stored on site, less in each case the aggregate of payments previously made. In no event shall payments for materials and equipment stored exceed ninety-five percent (95%) of the value of the related cost for the specific item of work shown in the breakdown of Contract Price regardless of the stated value of the materials or equipment. CITY may, at its sole option, pay an amount equal to ninety-five percent (95%) of materials and equipment not incorporated in the Work stored offsite if stored in a manner acceptable to CITY, as stated above for on-site stored materials. When payment to CONTRACTOR is made for stored materials and equipment, CONTRACTOR shall submit invoices marked paid by the supplier with the next month's request for payment to document that CONTRACTOR has paid for said materials and equipment or the previously paid amount for stored materials shall be deducted from any remaining payment(s) or retainage for any stored materials not so properly documented. The CONTRACTOR shall provide the consent of the Surety with each pay application.

5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with paragraph 14.9.1 of the General Conditions, CITY shall pay the remainder of the Contract Price as provided in said paragraph 14.9.1

5.3. Living Wage. CONTRACTOR, as well as its Subcontractors at all tiers, shall pay to all of their employees providing services pursuant to a contract with the CITY, a living wage for the time spent providing services to the CITY. (This provision does not include general administrative personnel unless they are assigned to a CITY project.) "Living wage" means compensation for employment of not less than \$15.00 per hour for straight time, exclusive of FICA, unemployment taxes, and workers compensation insurance and employee benefits. Necessary payroll documentation shall be provided to confirm compliance with this provision and the CONTRACTOR shall allow the CITY to audit (at CONTRACTOR's place of business) its payroll records to determine if compliance has been achieved. Failure to comply with the provision may result in termination of the contract and/or preclusion from future CITY contracts at the sole option of the CITY.

5.4. Responsible Contractor's Policies.

5.4.1. The CONTRACTOR, when paying its workers on this Project, shall pay such workers an hourly wage, based on classification for the Orlando region established by the Davis-Bacon Act (40 U.S.C. 276a-7) as supplemented by the Department of Labor regulations (29 CFR part 5) (hereinafter "hourly wage"). Additionally, CONTRACTOR shall provide said workers with health benefits. CONTRACTOR may satisfy this health benefits requirement by providing to its workers on this project either 1) health benefits through a bona fide program or 2) by

increasing the hourly wage by 20%. Evidence of the existence of a bona fide health benefits program must be submitted to the City with the bid at the time of bid opening. The City, in its sole discretion, will determine whether a bona fide health benefits program is acceptable to the City. Payment of the appropriate wages must be documented in CONTRACTOR'S progress payment applications by the submission of certified payrolls by CONTRACTOR for the duration of this Agreement. Moreover, CONTRACTOR shall require compliance with these provisions for health benefits, Davis-Bacon hourly wages and certified payrolls by **all** Subcontractors at every tier, and CONTRACTOR will be held responsible for compliance by any Subcontractor or lower tier Subcontractor. Notwithstanding the foregoing, CONTRACTOR acknowledges and agrees that no hourly wage paid on this project by the CONTRACTOR and Subcontractors will be less than the living wage referenced in this Agreement.

5.4.2. The CONTRACTOR and Subcontractors at all tiers shall each classify all of their workers as either independent contractors or employees in accordance with the requirements of Laws and Regulations. Workers who are employees as defined by Laws and Regulations shall not be classified as independent contractors. The CONTRACTOR and Subcontractors shall each provide written notice to their workers classified as independent contractors of their classification status within seven (7) days after contract award or within seven (7) days of hiring if hired subsequent to contract award. Documentation demonstrating compliance with this requirement for each worker classified as an independent contractor shall be submitted by the CONTRACTOR with its first Application for Payment. For those workers classified as independent contractors hired after submittal of the first Application for Payment, documentation demonstrating compliance with this requirement shall be provided with the first Application for Payment submitted subsequent to the worker's hiring.

5.4.3 The CONTRACTOR and Subcontractors at all tiers shall each use the E-verify internet-based system operated by the United States Department of Homeland Security to verify that all of their workers performing labor on the Project are eligible to work in the United States. Documentation of E-verify confirmation for each worker shall be submitted by the CONTRACTOR with the first Application for Payment, or for those workers hired after submittal of the first Application for Payment, with the first Application for Payment submitted subsequent to the worker's hiring.

5.4.4 The CONTRACTOR shall post a copy of the CITY'S Living Wage and Responsible Contractor policies at designated locations on the Project site as required by the Contract Documents.

ARTICLE 6. [RESERVED]

ARTICLE 7. CONTRACTOR'S REPRESENTATIONS

In order to induce CITY to enter into this Agreement, CONTRACTOR makes the following representations:

7.1 CONTRACTOR has familiarized himself with the nature and extent of the Contract Documents, Work, locality, weather, and with all local conditions and federal, state and local laws, ordinances, rules, policies and regulations that in any manner may affect cost, progress or performance of the Work.

7.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions of the site or otherwise affecting cost, progress or performance of the Work which were relied upon by ENGINEER in the preparation of the Drawings and Specifications and which have been identified in the Contract Documents.

7.3 CONTRACTOR has made or caused to be made examinations, investigations and tests and studies of such reports and related data in addition to those referred to in paragraph 7.2 as he deems necessary for the performance of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by CONTRACTOR for such purposes.

7.4 CONTRACTOR has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.

7.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has

discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

ARTICLE 8. CONTRACT DOCUMENTS

The Contract Documents that comprise the entire agreement between CITY and CONTRACTOR and are made a part hereof consist of, but are not limited to the following:

- 8.1 This Agreement.
- 8.2 Certificates of Insurance (including endorsements).
- 8.3 Payment Bond and Performance Bond (or Public Construction Bond as required by the Contract Documents).
- 8.4 Notice of Award.
- 8.5 General Conditions.
- 8.6 Supplementary Conditions
- 8.7 Federal Contract provisions (if applicable)
- 8.8 Specifications **IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.**
consisting of the divisions as listed in table of contents hereof.
- 8.9 Drawings, as listed in the Index of Drawings.
- 8.10 Addenda numbers _____ to _____, inclusive.
- 8.11 CONTRACTOR's Bid (including documentation accompanying the bid and documentation prior to Notice of Award).
- 8.12 Any Modification, including Change Orders and Field Orders, duly delivered after execution of Agreement.
- 8.13 Invitation for Bid, Instruction to Bidders, Bid Bond and Affidavit of Non-collusion, Proposal, Notice to Proceed.
- 8.14 Forms listed on page 00900-1.
- 8.15 Special Provisions.
- 8.16 General Requirements.

The Contract Documents may only be altered, amended or repealed by a Modification as defined in the General Conditions.

ARTICLE 9. MISCELLANEOUS

9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

9.2 No assignments by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound and any such assignment

shall be void and of no effect; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.3 CITY and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

9.4 Any action taken by the Public Works Director may also be taken by the Chief Procurement Officer of the City of Orlando.

9.5 Human Trafficking in Persons: The Contractor hereby represents, warrants, and certifies that Contractor does not use coercion for labor or services as defined in Section 787.06, Florida Statutes and that Contractor has provided the Human Trafficking Affidavit attached hereto as Form 00654.

IN WITNESS WHEREOF, the parties hereto have signed _____ copies of this Agreement. At least one counterpart each has been delivered to CITY and CONTRACTOR. All portions of the Contract Document have been signed or identified by CITY and CONTRACTOR.

CITY OF ORLANDO, FLORIDA**CONTRACTOR**

By: _____
David Billingsley, CPSM, C.P.M.
Chief Procurement Officer, City of Orlando

(CORPORATE SEAL)

Address for giving notices:

400 South Orange Avenue
Orlando, Florida 32801

APPROVED AS TO FORM AND LEGALITY
for the use and reliance of the City
of Orlando, Florida only

_____, 20____

Assistant City Attorney
Orlando, Florida

By _____

Name _____
(Type)

Title _____

(CORPORATE SEAL)

Attest: _____

Title _____

Address for giving notices:

Florida State Contractor's

License No. _____

Agent for service of process:

Name

Street Address

City, State and Zip

Performance Bond No.: _____

PERFORMANCE BOND**(100% of Contract Amount)**

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)_____
(Principal Business Address of Contractor)_____
(Telephone Number of Contractor)a _____,
(Corporation, Partnership or Individual)hereinafter called Principal, and _____
(Name of Surety)_____
(Principal Business Address of Surety)_____
(Telephone Number of Surety)

hereinafter called Surety, are held and firmly bound unto:

**City of Orlando
400 South Orange Avenue
Orlando, Florida 32801
(407) 246-2266**hereinafter called OWNER, in the penal sum of _____ Dollars,
(\$ _____) in lawful money of the United States, for the payment of which sum well and truly to
be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the
OWNER, dated the _____ day of _____, 20____, and made a part hereof for the construction of:**IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.**_____
(Project Name and Project Contract Number)

This Contract is for improvements to the Water Conserv II WRF Equalization (EQ) Pump Station. specifically, the following work is included, but not limited to: replace existing EQ pumps with dry pit submersible pumps; modify yard piping for temporary bypass operation and provide temporary bypass system; perform and maintain temporary bypass of the EQ pump station; replace existing suction and discharge isolation valves and check valves (excluding valves replaced in the last five years, as indicated on drawings); replace suction and discharge pipe fittings and modify discharge manifold to accommodate the new pumps orientation; construct a new electrical building with HVAC; upgrade existing HVAC in EQ pump station; electrical, instrumentation and controls improvements for the components being modified; demolition and/or removal of existing items and systems that will be removed from service.

(Project Description)**5420 L.B. McLeod Road, Orlando, FL 32811.**_____
(Street Address)

Performance Bond No.: _____

(Legal Description if no Street Address)

This Bond is being entered into to satisfy the requirements of Section 255.05, *Florida Statutes*, as the same may be amended.

The Surety shall be bound by any and all arbitration awards to the same extent as CONTRACTOR is bound. The Surety shall indicate the Bond number assigned by the Surety in the upper right hand corner of this document.

[All dates to be filled in by Owner.]

NOW, THEREFORE, the condition of this obligation is such that if Principal:

1. Promptly and faithfully performs its duties, all the covenants, terms, conditions, and agreements of said Contract including, but not limited to the guaranty period and the warranty provisions, in the time and manner prescribed in the Contract, and

2. Pays Owner all losses, damages, delay damages (liquidated or actual), expenses, costs and attorneys' fees, including costs and attorney's fees on appeal that Owner sustains resulting from any breach or default by Principal under the Contract, then this Bond is void; otherwise it shall remain in full force and effect.

In the event that the Principal shall fail to perform any of the terms, covenants and conditions of the Contract during the period in which this Performance Bond is in effect, the Surety shall remain liable to the Owner for all such loss or damage (including reasonable attorneys' fees and costs and attorneys' fees on appeal) resulting from any failure to perform up to the amount of the Penal Sum.

In the event that the Surety fails to fulfill its obligations under this Performance Bond, then the Surety shall also indemnify and hold the Owner harmless from any and all loss, damage, cost and expense, including reasonable attorneys' fees and costs for all trial and appellate proceedings, resulting from the Surety's failure to fulfill its obligations hereunder. This paragraph shall survive the termination or cancellation of this Performance Bond.

The Surety, for value received, hereby stipulates and agrees that its obligations hereunder shall be direct and immediate and not conditional or contingent upon Owner's pursuit of its remedies against Principal, shall remain in full force and effect notwithstanding (i) amendments or modifications to the Contract entered into by Owner and Principal without the Surety's knowledge or consent (ii) waivers of compliance with terms of the Contract granted by Owner to Principal without the Surety's knowledge or consent, or (iii) the discharge of Principal from its obligations under the Contract as a result of any proceeding initiated under the Bankruptcy Code of 1978, as the same may be amended, or any similar state or federal law, or any limitation of the liability of Principal or its estate as a result of any such proceeding.

Any changes in or under the Contract Documents (which include the Plans, Drawings, and Specifications) and compliance or noncompliance with any formalities connected with the Contract or the changes therein shall not affect Surety's obligations under this Bond and Surety hereby waives notice of any such changes. Further, Principal and Surety acknowledge that the Penal Sum of this Bond shall increase or decrease in accordance with approved changes or other modifications to the Contract Documents; however, the Surety must approve any increase that exceeds thirty-five percent (35%) of the original Penal Sum to be bound to its Bond obligations for the amount that exceeds said thirty-five percent (35%).

Performance Bond No.: _____

IN WITNESS WHEREOF, this instrument is executed in _____ (number) counterparts, each of which shall be deemed an original, this the _____ day of _____, 20____.

ATTEST:

PrincipalBy _____
(Principal) Secretary

By _____

Name _____
(Print or Type)Name _____
(Print or Type)

Title _____

Title _____

(CORPORATE SEAL)

Surety_____
Witness as to SuretyBy: _____
Attorney-in-FactName _____
(Print or Type)Name _____
(Print or Type)Address _____
City/State/Zip _____

(CORPORATE SEAL)

NOTE: Date of the Bond must not be prior to the date of the Contract. If CONTRACTOR is a Partnership, all partners should execute the Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in Florida, unless otherwise specifically approved in writing by the CITY.

ATTACH a certified copy of Power-of-Authority appointing individual Attorney-in-Fact for execution of Performance Bond on behalf of Surety.

The Performance Bond and the Payment Bond and the covered amounts of each are separate and distinct from each other.

Payment Bond No.: _____

PAYMENT BOND**(100% of Contract Amount)***KNOW ALL MEN BY THESE PRESENTS* that_____
(Name of Contractor)_____
(Principal Business Address of Contractor)_____
(Telephone Number of Contractor)a _____,
(Corporation, Partnership, or Individual)hereinafter called "Principal," and _____
(Name of Surety)_____
(Principal Business Address of Surety)_____
(Telephone Number of Surety)

hereinafter called "Surety," are held and firmly bound unto:

City of Orlando
400 South Orange Avenue
Orlando, Florida 32801
(407) 246-2266

hereinafter called "OWNER," in the penal sum of _____
Dollars, (\$_____) in lawful money of the United States, for the payment of which sum well and
truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the
OWNER, dated the _____ day of _____, 20____, and made a part hereof for the construction
of:

IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements._____
(Project Name and Project Contract Number)

This Contract is for improvements to the Water Conserv II WRF Equalization (EQ) Pump Station.
specifically, the following work is included, but not limited to: replace existing EQ pumps with dry pit
submersible pumps; modify yard piping for temporary bypass operation and provide temporary bypass
system; perform and maintain temporary bypass of the EQ pump station; replace existing suction and
discharge isolation valves and check valves (excluding valves replaced in the last five years, as indicated on
drawings); replace suction and discharge pipe fittings and modify discharge manifold to accommodate the
new pumps orientation; construct a new electrical building with HVAC; upgrade existing HVAC in EQ

Payment Bond No. : _____

pump station; electrical, instrumentation and controls improvements for the components being modified; demolition and/or removal of existing items and systems that will be removed from service.

(Project Description)

5420 L.B. McLeod Road, Orlando, FL 32811.

(Street Address)

(Legal Description if no Street Address)

The Surety shall be bound by any and all arbitration awards to the same extent as CONTRACTOR is bound. The Surety shall indicate the Bond number assigned by the Surety in the upper right hand corner of this document.

[All dates to be filled in by Owner.]

NOW, THEREFORE, the condition of this obligation is such that if Principal shall promptly make 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, then this obligation shall be void; otherwise, it shall remain in full force and effect subject, however, to the following conditions:

1. This Bond is furnished for the sole purpose of complying with the requirements of Section 255.05, *Florida Statutes*, as the same may be amended.

2. Any action instituted by a claimant under this Bond for payment must be in accordance with the notice and time limitation provisions in Sections 255.05(2) and 255.05(10), *Florida Statutes*, as the same may be amended.

3. The Surety, for value received, hereby stipulates and agrees that its obligations hereunder shall remain in full force and effect notwithstanding (i) amendments or modifications to the Contract entered into by Owner and Principal without the Surety's knowledge or consent, (ii) waivers of compliance with or any default under the Contract granted by Owner to Principal without the Surety's knowledge or consent, or (iii) the discharge of Principal from its obligations under the Contract as a result of any proceeding initiated under The Bankruptcy Code of 1978, as the same may be amended, or any similar state or federal law, or any limitation of the liability of Principal or its estate as a result of any such proceeding.

4. Any changes in or under the Contract Documents (which include the Plans, Drawings and Specifications) and compliance or noncompliance with any formalities connected with the Contract or the changes therein shall not affect Surety's obligations under this Bond and Surety hereby waives notice of any such changes. Further, Principal and Surety acknowledge that the Penal Sum of this Bond shall increase or decrease in accordance with the approved changes or other modifications to the Contract Documents; however, the Surety must approve any increase that exceeds thirty-five percent (35%) of the original Penal Sum to be bound to its Bond obligations for the amount that exceeds said thirty-five percent (35%).

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK.]

Payment Bond No.: _____

IN WITNESS WHEREOF, this instrument is executed in _____ (number) counterparts, each of which shall be deemed an original, this the _____ day of _____, 20____.

Principal

By: _____

Name: _____

(Print or Type)

Title: _____

ATTEST:

By: _____

(Principal) Secretary

Name: _____

(Print or Type)

(CORPORATE SEAL)

Title: _____

Surety

By: _____

Attorney-in-Fact

Name: _____

(Print or Type)

Address: _____

City/State/Zip: _____

(CORPORATE SEAL)

Witness as to Surety

Name: _____

(Print or Type)

NOTE: Date of the Bond must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located, unless otherwise specifically approved in writing by CITY.

ATTACH a certified copy of Power-of-Attorney appointing individual Attorney-in-Fact for execution of Payment Bond on behalf of Surety.

The Performance Bond and the Payment Bond and the covered amounts of each are separate and distinct from each other.

CERTIFICATE OF INSURANCE

DESCRIPTION OF CONTRACT: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.

Type of Insurance: WORKERS' COMPENSATION INSURANCE

THIS IS TO CERTIFY that the following numbered policies have been issued by the below-stated company in conformance with the limits and requirements as set forth in the General Conditions and Supplementary Conditions.

The Company shall give at least 30 days' written notice by certified mail to the CITY, DESIGN ENGINEER, and ENGINEER prior to any material change, reduction of coverage or cancellation of said policy.

POLICY NUMBER

EXPIRATION DATE

LIMITS OF LIABILITY

Statutory Limits Under the Laws of the State of Florida

Name Insured (Contractor)

Insurance Company

Street Address

Street Address

City/State/Zip

City/State/Zip

By _____
(Company Representative)

Name _____

Title _____

State of _____}

County of _____}

On this _____ day of _____, 20____, before me personally came _____ who is personally known to me or who has produced his/her _____ as identification, did say that he/she is an authorized representative of the _____ and acknowledged to me that he/she executed the within instrument on behalf of said insurance company and was duly authorized so to do.

In witness whereof, I have signed and affixed my official seal on the date in this certificate first above written.

Notary Public

NOTARIAL SEAL

My Commission Expires: _____

Insurance Company Agent for Service
of Process in Florida

Name_____
Agency_____
Street Address_____
Street Address_____
City/State/Zip_____
City/State/Zip() _____
Telephone() _____
Telephone

This certificate or verification of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term, or condition of any contract or other document with respect to which this certificate or verification of insurance 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.

NOTICE

If the insurance called for is provided by more than one insurance company, a separate certificate in the exact above form shall be provided for each insurance company.

INSURANCE ENDORSEMENT**DESCRIPTION OF CONTRACT: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.****Type of Insurance: WORKERS' COMPENSATION INSURANCE**

This endorsement forms a part of Policy No. _____

ENDORSEMENT

It is agreed that with respect to such insurance as is afforded by the policy, the Company waives any right of subrogation it may acquire against the CITY, the DESIGN ENGINEER, the ENGINEER, and their consultants, and each of their directors, officers, agents, and employees by reason of any payment made on account of injury, including death resulting therefrom, sustained by any employee of the insured, arising out of the performance of the above referenced contract.

This endorsement does not increase the Company's total limits of liability.

Name Insured (Contractor)_____
Insurance Company_____
Street Address_____
Street Address_____
City/State/Zip_____
City/State/ZipBy _____
(Company Representative)

Name _____

Title _____

STATE OF _____}

COUNTY OF _____}

On this _____ day of _____, 20____, before me personally came
_____ who is personally known to me or who has produced his/her
_____ as identification, did depose and say:
that he/she is an authorized representative of the _____
and acknowledged to me that he/she executed the within instrument on behalf of said insurance company and was duly
authorized to do so.

In witness whereof, I have signed and affixed my official seal on the date in this certificate first above written.

Notary Public

NOTARIAL SEAL

My Commission Expires:

NOTICE

If the insurance called for is provided by more than one policy, a separate endorsement in the exact above form shall be provided for each policy.

CERTIFICATE OF INSURANCE

DESCRIPTION OF CONTRACT: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.

Type of Insurance: GENERAL LIABILITY INSURANCE

THIS IS TO CERTIFY that the following numbered policies have been issued by the below-stated company in conformance with the limits and requirements as set forth in the General Conditions and Supplementary Conditions and are in force at this time.

POLICY NUMBER	EXPIRATION DATE	LIMITS OF LIABILITY In Thousands (000)		
		<u>Each Occurrence</u>	<u>Aggregate</u>	
A. GENERAL LIABILITY				
		Bodily Injury	\$	\$
		Property Damage	\$	\$
		Personal Injury	\$	\$
		-o-		
		Bodily Injury, Personal Injury and Property Damage Combined	\$	\$
B. AUTOMOBILE LIABILITY				
		Bodily Injury (Each Person)	\$	\$
		Property Damage (Each Occurrence)	\$	\$
		-o-		
		Bodily Injury and Property Damage Combined	\$	\$
C. EXCESS LIABILITY				
		Bodily Injury and Property Damage Combined	\$	\$

SEPARATE CERTIFICATE IS REQUIRED FOR EACH INSURANCE COMPANY PROVIDING COVERAGE.

This certificate and verification of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term, or condition of any contract or other document with respect to which this certificate or verification of insurance 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.

The Company shall give at least thirty (30) days' written notice by certified mail to the CITY, DESIGN ENGINEER, and ENGINEER prior to any material change, reduction of coverage or cancellation of said policy.

Name Insured (Contractor)

Insurance Company

Street Address

Street Address

City/State/Zip

City/State/Zip

By _____
(Company Representative)

Name _____

Title _____

STATE OF _____}

COUNTY OF _____}

On this _____ day of _____, 20____, personally came _____ who is personally known to me or who has produced _____ as identification, did depose and say that he/she is an authorized representative of the _____ and acknowledged to me that he/she executed the within instrument on behalf of said insurance company and was duly authorized so to do.

IN WITNESS WHEREOF, I have signed and affixed my official seal on the date in this certificate first above written.

Notary Public

(NOTARIAL SEAL)

My Commission Expires:

Insurance Company Agent for Service
of Process in Florida_____
Name_____
Agency_____
Street Address_____
Street Address_____
City/State/Zip_____
City/State/Zip_____
Telephone Number_____
Telephone Number**NOTICE:**

If the insurance called for is provided by more than one insurance company, a separate certificate in the exact above form shall be provided for each insurance company.

Insurers must be authorized to do business and have an agent for service of process in Florida and have an "A" policyholder's rating and a financial rating of at least Class XI in accordance with the most current Best's Rating.

INSURANCE ENDORSEMENT**DESCRIPTION OF CONTRACT: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.****Type of Insurance:** **COMPREHENSIVE GENERAL LIABILITY INSURANCE**

This endorsement forms a part of Policy No. _____

ENDORSEMENT

The CITY, the DESIGN ENGINEER, the ENGINEER, and their consultants and each of their directors, officers, agents, and employees are included as additional insureds under said policies but only while acting in their capacity as such and only as respect to operations of the named insured, his contractors, any subcontractor, any supplier, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable in the performance of the above-referenced contract. This insurance shall not apply to the negligent party if the loss or damage is ultimately determined to be the result of the sole and exclusive negligence (including any connected with the preparation or approval of maps, drawing, opinions, reports, surveys, designs, or specifications) of one of more of the aforesaid additional insureds. The insurance afforded to these additional insureds is primary insurance. If the additional insureds have other insurance which might be applicable to any loss, the amount of this insurance shall not be reduced or prorated by the existence of such other insurance.

This endorsement does not increase the Company's total limits of liability.

Name Insured (Contractor)_____
Insurance Company_____
Street Address_____
Street Address_____
City/State/Zip_____
City/State/ZipBy _____
(Company Representative)

Name _____

Title _____

STATE OF _____}

COUNTY OF _____}

On this _____ day of _____, 20____, personally came _____ is personally known to me or who has produced _____ as identification, did depose and say: that he/she is an authorized representative of the _____ and acknowledged to me that he/she executed the within instrument on behalf of said insurance company and was duly authorized so to do.

IN WITNESS WHEREOF, I have signed and affixed my official seal on the date in this certificate first above written.

Notary Public

(NOTARIAL SEAL)

My Commission Expires:

NOTICE:

If the insurance called for is provided by more than one policy, a separate endorsement in the exact above form shall be provided for each policy.

Insureds must be authorized to do business and have an agent for service of process in Florida and have an "A" policyholder's rating and a financial rating of at least Class XI in accordance with the most current Best's Rating.

HUMAN TRAFFICKING AFFIDAVIT

In compliance with Section 787.06(13), Florida Statutes, this affidavit must be completed by an officer or representative of a nongovernmental entity that is executing, renewing, or extending a contract with the City of Orlando (the "Governmental Entity").

The undersigned, on behalf of the entity listed below (the "Nongovernmental Entity"), hereby attests under penalty of perjury as follows:

1. I am over the age of 18 and I have personal knowledge of the matters set forth herein.
2. I am an officer or representative of _____, a non-governmental entity and I am authorized to provide this affidavit on behalf of Nongovernmental Entity)
3. Nongovernmental Entity, and any of its subsidiaries or affiliates, do not use coercion for labor or services, as those terms are defined in Section 787.06, Florida Statutes, as may be amended from time to time.
4. If, at any time in the future, Nongovernmental Entity does use coercion for labor or services, Nongovernmental Entity will immediately notify Governmental Entity and no contracts may be executed, renewed, or extended between the parties.
5. I have read the foregoing affidavit and confirm that the facts stated in it are true, and are made for the benefit of, and reliance by Governmental Entity.

Company: _____

Authorized Signature: _____ **Date:** _____

Printed Name: _____

Title: _____

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me by means of ☐ physical presence or ☐ online notarization, this ____ day of _____, 20____, by _____, as _____ on behalf of the company/corporation. They ☐ are personally known to me or ☐ have produced _____ as identification.

(Affix Notary Stamp or Seal)

Notary Public Signature
Print, Type or Stamp Name of Notary: _____
My commission expires: _____

CERTIFICATE OF INSURANCE

DESCRIPTION OF CONTRACT: IFB26-0141 Water Conserv II WRF Equalization Pump Station Improvements.**Type of Insurance: BUILDERS' RISK "ALL RISK" INSURANCE**

THIS IS TO CERTIFY that the following numbered policies have been issued by the below-stated company in conformance with the limits and requirements as set forth in the General Conditions and Supplementary Conditions and is in force at this time.

<u>POLICY NUMBER</u>	<u>EXPIRATION DATE</u>	<u>LIMITS OF LIABILITY</u>
	(Not Sooner Than Completion Date)	\$ (Not Less Than Contract Amount) Deductible: \$ (Not More than \$25,000)

This certificate of verification of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term, or condition of any contract or other document with respect to which this certificate or verification of insurance may be issued or may pertain, the insurance afforded by the policies described herein is subject to all of the terms, exclusions and conditions of such policies.

The Company shall give at least 30 days' written notice by certified mail to the CITY, DESIGN ENGINEER, and ENGINEER prior to any material change, reduction of coverage or cancellation of said policy.

Name Insured (Contractor)_____
Insurance Company_____
Street Address_____
Street Address_____
City/State/Zip_____
City/State/ZipBy _____
(Company Representative)

Name _____

Title _____

State of _____}

County of _____}

On this _____ day of _____, 20____, before me personally came _____ who is personally known to me or who has produced _____ as identification, did say: that he/she is an authorized representative of the _____ and acknowledged that he/she executed the within instrument on behalf of said insurance company and was duly authorized so to do.

IN WITNESS WHEREOF, I have signed and affixed my official seal on the date in this certificate first above written.

Notary Public

NOTARIAL SEAL

My Commission Expires: _____

Insurance Company Agent for Service
of Process in Florida_____
Name_____
Agency_____
Street Address_____
Street Address_____
City/State/Zip_____
City/State/Zip_____
Telephone Number_____
Telephone Number**NOTICE:**

Insurers must be authorized to do business and have an agent for service of process in Florida and have an "A" policyholder's rating and a financial rating of at least Class XI in accordance with the most current Best's Rating.

INSURANCE ENDORSEMENT**DESCRIPTION OF CONTRACT: IFB26-0141 Water Conserv II WRF Equalization Pump Station Improvements.****Type of Insurance: BUILDERS' RISK "ALL RISK" INSURANCE**

This endorsement forms a part of Policy No. _____

ENDORSEMENT

The CITY, the DESIGN ENGINEER, the ENGINEER, and their consultants, and each of their directors, officers, agents, and employees are included as additional insureds under said policy but only while acting in their capacity as such with respect to the above-referenced contract.

The insurance afforded to these additional insureds is primary insurance. If the additional insureds have other insurance which might be applicable to any loss, the amount of this insurance shall not be reduced or prorated by the existence of such other insurance.

This endorsement does not increase the Company's total limits of liability.

Name Insured (Contractor)_____
Insurance Company_____
Street Address_____
Street Address_____
City/State/Zip_____
City/State/ZipBy _____
(Company Representative)

Name _____

Title _____

State of _____}

County of _____}

On this _____ day of _____, 20____, before me personally came _____ who is personally known to me or who has produced _____ as identification, did depose and say: that he/she is an authorized representative of the _____ and acknowledged to me that he/she executed the within instrument on behalf of said insurance company and was duly authorized to so do.

IN WITNESS WHEREOF, I have signed and affixed my official seal on the date in this certificate first above written.

NOTARIAL SEAL

Notary Public
My Commission Expires:

NOTICE

Insureds must be authorized to do business and have an agent for service in process in Florida and have an "A" policyholder's rating and a financial rating of at least Class XI in accordance with the most current Best's Rating.

GENERAL CONDITIONS

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ARTICLE 1 - DEFINITIONS/INTERPRETATIONS**1.1 Definitions**

Whenever used in the **Contract Documents**, the following terms shall have the meanings indicated, which shall be applicable to both the singular and plural thereof.

Addenda - Written or graphic instruments issued prior to the date for opening **Bids** which modify or interpret the **Contract Documents** by additions, deletions, corrections or clarifications.

Acceptance, Final Acceptance - The formal action by **CITY** accepting the **Work** as being complete after certification by **ENGINEER** of final completion.

Agreement - The written agreement between **CITY** and **CONTRACTOR** covering the **Work** to be performed; other **Contract Documents** are incorporated in or referenced in the **Agreement** and made a part thereof as provided therein.

Allowance: An amount of money set aside as a contingency for unforeseen costs or for items which have not been specified explicitly in the original **Contract Documents**. The **CITY** will adjust the **Contract Price** by **Change Order** for the actual cost.

Apparent Low Bidder - The **Bidder** submitting the lowest **Bid** at the **Bid** Opening without correction of numerical discrepancies or determination of responsiveness and responsibility.

Application for Payment - The form furnished in the **Contract Documents** which is to be used in processing Partial or Final Payments to **CONTRACTOR** and which shall contain an affidavit by **CONTRACTOR** that Partial Payments theretofore received from **CITY** on account of the **Work** have been applied by **CONTRACTOR** to discharge in full all of **CONTRACTOR's** obligations stated in prior **Applications for Payment**. The application includes such supporting documentation as required by the **Contract Documents**.

Bid - The offer or proposal of a **Bidder** submitted in the prescribed manner on the prescribed forms to perform the **Work** in accordance with the **Contract Documents**.

Bidder - The individual, partnership, corporation, joint venture, or other legal entity or combination thereof submitting a **Bid** for the **Work** directly to **CITY** through an authorized representative.

Bid Security - The security designated in the Instructions to Bidders.

Bonds - Instruments of security furnished by **CONTRACTOR** and his surety in accordance with the **Contract Documents**.

Change Order - A written instrument issued on or after the **Effective Date of the Agreement**, which when duly executed by **CITY** amends the **Contract Documents** to provide for changes in the **Work** or in the provisions of the **Contract Documents**, or changes in **Contract Price** or **Contract Time**, or any combination thereof.

Change Request - A written instrument which when signed by **CITY** is a directive authorizing a change in the **Work** or in the provisions of the **Contract Documents**, or an adjustment in **Contract Price** or **Contract Time**, or any combination thereof. Even when signed by **CITY**, a **Change Request** is not an instrument that amends the **Contract Documents**; however, it shall be converted to a **Change Order for payment in the next Application for Payment**. An unsigned **Change Request** may be used by **CITY** and **CONTRACTOR** to negotiate changes in the **Work** or in the provisions of the **Contract Documents**, or adjustments in **Contract Price** or **Contract Time**, or any combination thereof.

Chief Procurement Officer: means the person appointed as the chief contracting authority for the City responsible for the management, administration and supervision of the Procurement and Contracts Division.

CITY - The City of Orlando, Florida; the **OWNER**.

Claim – A written demand submitted to the **CITY** by the **CONTRACTOR** in compliance with Section 11-2 of the General Conditions seeking additional monetary compensation, time, or other adjustments to the Contract, the entitlement or impact of which is disputed by the **CITY**.

Construction Manager - The authorized representative of **ENGINEER** who is assigned to the **Project**.

Contract Documents - Those documents named in Article 8 of the **Agreement**.

Contract Price - The total compensation, subject to authorized adjustments, payable by **CITY** to **CONTRACTOR** for satisfactory completion of work under the **Contract Documents** as stated in the **Agreement**.

Contract Time - The period of time allotted in the **Contract Documents**, subject to authorized adjustments, for **Substantial Completion** of the **Work**, or specified part thereof.

CONTRACTOR - The individual, partnership, corporation, joint venture, or other legal entity or combination thereof who has entered into the **Agreement** with **CITY** for the performance of the **Work**. The term "**CONTRACTOR**" means **CONTRACTOR** or its authorized representative.

CONTRACTOR'S ENGINEER OF RECORD – A Professional Engineer registered in the State of Florida, other than the **DESIGN ENGINEER** or his subcontracted consultant, who undertakes the design and drawing of components of the permanent structure as part of a redesign or Value Engineering Change Proposal ("VECP"), or for repair designs and details of the permanent Work. The **CONTRACTOR'S ENGINEER OF RECORD** may also serve as the Specialty Engineer. The Contractor's Engineer of Record must be an employee of a Florida Department of Transportation pre-qualified firm. The firm shall be pre-qualified in accordance with the Rules of the Florida Department of Transportation, Chapter 14-75. Any Corporation or Partnership offering engineering services must hold a Certificate of Authorization from the Florida Department of Business and Professional Regulation. As an alternate to being an employee of a pre-qualified firm, the **CONTRACTOR'S ENGINEER OF RECORD** may be a pre-qualified Specialty Engineer. For items of the permanent work declared by the State Construction Office to be "major" or "structural", the work performed by a prequalified Specialty Engineer must be checked by another pre-qualified Specialty Engineer. An individual Engineer may become pre-qualified in the work groups listed in the Rules of the Florida Department of Transportation, Chapter 14-75, if the requirements for the Professional Engineer are met for the individual work groups. Pre-qualified Specialty Engineers are listed on the State Construction Website. Pre-qualified Specialty Engineers will not be authorized to perform redesigns or VECP designs of items fully detailed in the plans.

Cost and Pricing Data - Refers to all data available to or relied upon by **CONTRACTOR** in negotiating, pricing or costing **Work** covered by a **Change Order** or a **Change Request**, or involved in a proposal for **Claim**. **Sample Cost and Pricing Data** include proposal or **Claim** estimates, **CONTRACTOR's Bid** estimate, estimating guides, **CONTRACTOR's** computations and projections, and the assumptions made by **CONTRACTOR** in pricing or figuring increases or decreases in **Contract Price** or **Contract Time**.

Date of Commencement of the Contract Time - The date given by the **Notice to Proceed** when the **Contract Time** commences to run.

Day - A calendar day of 24 hours lasting from midnight one day to midnight the next day.

Defective - An adjective which when modifying the word **Work** refers to work that is unsatisfactory, faulty or deficient, or does not conform to the **Contract Documents**, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the **Contract Documents**, or has been damaged prior to Final Payment (unless responsibility for the protection thereof has been assumed by **CITY**).

Delay – Any unanticipated event, action, force or factor which extends the Contractor's time of performance of any controlling work item under the Contract. The term "delay" is intended to cover all such events, actions, forces or factors, whether styled "delay", "disruption", "interference", "impedance", "hindrance", or otherwise, which are beyond the control of and not caused by the Contractor, or the Contractor's subcontractors, materialmen, suppliers or other agents; including, without limitation, the following force majeure events ("Force Majeure Event(s)": (a) acts

of God; (b) flood, fire, earthquake or explosion; (c) war, invasion, hostilities (whether war is declared or not), terrorist threats or acts, riot or other civil unrest; (d) government order or law; (e) actions, embargoes or blockades in effect on or after the date of the Agreement; (f) action by any governmental authority; (g) national or regional emergency; (h) strikes, labor stoppages or slowdowns or other industrial disturbances; (i) epidemic, pandemic or similar influenza or bacterial infection (which is defined by the United States Center for Disease Control as virulent human influenza or infection that may cause global outbreak, or pandemic, or serious illness); (j) emergency state; and (k) other similar events beyond the reasonable control of the Contractor. This term does not include "extra work".

DESIGN ENGINEER - The person, firm, or corporation who is named as such in the **Agreement** who designed the **Project** and has the rights and authority as assigned to him in the **Contract Documents**. The term "**DESIGN ENGINEER**" means **DESIGN ENGINEER** or its authorized representative.

Drawings, Plans - The **Drawings, Plans** or reproduction thereof, which show scope, character, location, dimensions, and other details of the **Work** to be performed and which are included in the **Contract Documents**.

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 by the last of the two parties to sign.

ENGINEER - The Director of Public Works of the City of Orlando, acting directly or through duly authorized representatives; such representatives acting within the scope of the duties and authority assigned to them.

Engineering Standards Manual – Manual produced by the City's Public Works Department which establishes standards for the design and construction of facilities.

Federal Contract Provisions - Federal Regulatory Agency or statutory requirements applicable to the **Work** and included in the **Contract Documents** under this heading.

Field Order - A written instrument issued by **ENGINEER, Construction Manager or Field Representative(s)** to **CONTRACTOR** which orders minor variations in the **Work**, as opposed to a change in the **Work**, and which does not involve an adjustment in **Contract Price** or **Contract Time**.

Field Representative - Person who is assigned to the site or any part thereof by **ENGINEER**.

General Requirements - Sections of Division 1 of the **Specifications**.

Health Benefits – Medical and mental health coverage

Holidays - Days designated by the City of Orlando as legal holidays. These days are:

New Year's Day	-	January 1st
Martin Luther King's Birthday	-	Third Monday in January
Memorial Day	-	Last Monday in May
Juneteenth Day	-	As Designated by the City
Independence Day	-	July 4th
Labor Day	-	First Monday in September
Thanksgiving Day	-	Fourth Thursday in November
Day After Thanksgiving Day	-	Fourth Friday in November
Christmas Holiday	-	As Designated by the City
Christmas Holiday	-	As Designated by the City

Laws and Regulations; Laws or Regulations - Laws, Rules, Regulations, Ordinances, and/or court or administrative Orders of the federal, state and local governments.

Living Wage – Compensation for employment of not less than \$15.00 per hour for straight time, exclusive of FICA, unemployment taxes, worker's compensation insurance and employee benefits.

Low Bidder - The lowest responsive, responsible **Bidder**.

Lump Sum - A contract or pay item within a contract, which is paid without regard to quantities or units of measure.

Notice of Award - The written notice of the acceptance of the **Bid** from **CITY** to **Low Bidder**.

Notice to Proceed - The written notice issued by **CITY** to **CONTRACTOR** authorizing it to proceed with the **Work** and establishing the **Date of Commencement** of the **Contract Time**.

OWNER - Refer to definition of **CITY**.

Payment Bond - The security furnished by **CONTRACTOR** and its surety as a guarantee that **CONTRACTOR** will pay in full all Bills and accounts, from claimants as defined in Florida Statutes Chapter 713, or as amended, for material, labor, services and supplies used directly or indirectly in the prosecution of the **Work**; the covered amount of the **Payment Bond** is separate and distinct from the covered amount of the **Performance Bond**.

Performance Bond - The security furnished by **CONTRACTOR** and its surety as a guarantee that **CONTRACTOR** will perform all of its contractual obligations in accordance with the terms of the **Contract Documents**; the covered amount of the **Performance Bond** is separate and distinct from the covered amount of the **Payment Bond**.

Progress Schedule - All documentation related to the planning and scheduling of the **Work** as described in these General Conditions and the **Special Provisions**.

Project - The total construction of which the **Work** to be provided under the **Contract Documents** may be the whole, or a part as indicated elsewhere in the **Contract Documents**.

Request for Information - **CONTRACTOR's** inquiries for information as submitted on the **Request for Information** form included in the **Contract Documents**.

Responsible Contractor's Policy - A provision providing for a rate of pay based on the Davis-Bacon wage determinations and access to health benefits through health insurance or increased wages.

Shop Drawings - All **Drawings**, diagrams, illustrations, schedules and other data which are specifically prepared by or for **CONTRACTOR** to illustrate some portion of the **Work** and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a **Supplier** and submitted by **CONTRACTOR** to illustrate material or equipment for some portion of the **Work**, specifically indicating how **CONTRACTOR** will comply with the **Contract Documents**.

Specifications - Those portions of the **Contract Documents** consisting of written or graphic technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the **Work** and certain administrative details applicable thereto.

Subagreement - A contract or purchase order awarding a part of the **Work** under the **Contract Documents** to a **Subcontractor**, **Supplier** or other person or entity.

Subcontractor - An individual, partnership, corporation, joint venture, or other combination thereof having a **Subagreement** with **CONTRACTOR** for (a) the performance of labor in connection with part of the **Work** at the site; or (b) for both performing labor in connection with part of the **Work** at the site and furnishing items of materials or equipment for incorporation into the **Work**. **Subcontractor** also means an individual, partnership, corporation, joint venture, or other combination thereof who has a **Subagreement** with another **Subcontractor** to perform any of the **Work** at the site.

Substantial Completion - That date when (a) the **Work** (or a specified part thereof) is complete in accordance with the **Contract Documents**, with the exception of the minor items identified during the inspection described in these General Conditions, and (b) the **Work** can be utilized for the purposes for which it is intended, as may be evidenced by

successful completion of all specified pre-operational start-up and demonstration tests and receipt of a Certificate of Occupancy, if applicable to this **Project**. The terms "substantially complete" and "substantially completed" as applied to any **Work** refer to **Substantial Completion** thereof.

Supplementary Conditions - The part of the **Contract Documents** which amends or supplements these General Conditions or other portions of the Contract Documents as stated therein and is designated as such.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman or vendor.

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

Unit Price - Amount stated in the **Contract Documents** as a price per unit of measurement for materials or services required.

Unit Price Work - **Work** to be paid on the basis of unit prices. The term contingent **Unit Price Work** refers to **Unit Price Work** which is foreseeable but not certain to materialize during the performance of the **Work**.

Warranty Period - The period of time within which **CONTRACTOR** shall promptly, without cost to **CITY** and in accordance with **CITY's** written instructions, either correct **defective Work** or, if it has been rejected by **CITY**, remove it from the site and replace it with **non-defective Work**.

Work - Any and all obligations, duties, responsibilities, labor, materials, equipment, temporary facilities, utilities, and incidentals and the furnishing thereof necessary to complete the construction assigned to, or undertaken by **CONTRACTOR** pursuant to the **Contract Documents**. Also, the completed construction or parts thereof required to be provided under the **Contract Documents**, including all materials, equipment, and supplies incorporated or to be incorporated in the construction.

1.2 Interpretations

1.2.1. Any reference to an Article or paragraph in these General Conditions without identification of the particular Section shall mean a reference to these General Conditions.

1.2.2. Each Article in these General Conditions is composed of sub-articles, numbered as this sub-article 1.2 is numbered; parts, numbered as this part 1.2.2 is numbered; and sub-parts - all of which are generally referred to as "paragraphs". A reference to a sub-article means a reference to the entire sub-article, or to a part, or a sub-part, or any combination of them, depending on the intent of the reference.

1.2.3. Often, the **Contract Documents** omit the modifying word "all" and "any", and the articles "the" and "an". However, omitting modifiers or articles from, or inserting any of them into, a statement shall not in any way affect the meaning or interpretation of either statement.

ARTICLE 2 - PRELIMINARY MATTERS

2.1 Copies of Documents

CITY shall furnish to **CONTRACTOR** one copy and one reproducible of the **Contract Documents** free of charge. One reproducible and one copy of change information will be provided during the course of the **Agreement**. **CONTRACTOR** will be responsible for preparing additional copies.

2.2 Commencement of the Contract Time; Notice to Proceed

2.2.1. The **Contract Time** will commence to run on the day indicated in the **Notice to Proceed**. The **Notice to Proceed** may indicate a **Date of Commencement of the Contract Time** any time within sixty (60) days after the **Effective Date of the Agreement**.

2.2.2. **CONTRACTOR** shall start to perform the **Work** on the **Date of Commencement of the Contract Time**. No **Work** shall be done at the site prior to the date on which the corresponding **Contract Time** commences to run unless otherwise authorized in writing by **CITY**.

2.3 Before Starting Construction

2.3.1. Before undertaking each part of the **Work**, **CONTRACTOR** shall carefully study and compare the **Contract Documents** and check and verify pertinent figures shown thereon and all applicable field measurements. **CONTRACTOR** shall promptly report in writing to **ENGINEER** any conflict, error or discrepancy which **CONTRACTOR** or any of his **Subcontractors** or **Suppliers** may discover and shall obtain a written interpretation or clarification from **ENGINEER** before proceeding with any work affected thereby; provided, however, **CONTRACTOR** shall not be liable to **CITY** or **ENGINEER** for failure to report any conflict, error or discrepancy unless **CONTRACTOR** or any of his **Subcontractors** or suppliers had actual knowledge thereof or should reasonably have known thereof.

2.3.2. Within ten days after the **Effective Date of the Agreement** (unless otherwise specified in the **General Requirements**), **CONTRACTOR** shall submit to **ENGINEER** for review a baseline **Progress Schedule** indicating the starting and completion dates of the various stages of the **Work**, a proposed schedule of **Shop Drawing** submissions, a proposed **Schedule of Values** of the **Work** on the form provided by **ENGINEER**, a site specific safety plan, resume of the Superintendent, Certifications of competent person as defined by OSHA, and a listing of manpower and cash flow projections through the **Contract Time**.

2.3.3 The Schedule of Values shall include quantities and prices of items aggregating the **Contract Price**, and shall subdivide the **Work** into component parts in sufficient detail to serve as the basis for Applications for Payment during construction. **CONTRACTOR** shall confirm in writing at the time of submission, that an appropriate amount of direct costs, supplemental costs, administrative expenses, contingencies and profit have been allocated to each item of work. This provision only applies to projects bid as a lump sum.

2.3.4. If the **Bid Form** contains a bid item price for mobilization, the costs of this item shall be distributed such that no more than 50% of the bid item amount shall be paid as mobilization in the first **Application for Payment** and at least 25% of the bid item amount shall be paid in the last **Application for Payment** as demobilization with the remainder paid in equal installments over the **Contract Time**.

2.3.5. **CITY** or **ENGINEER** will review and return the schedules submitted in accordance with this Article and **CONTRACTOR**, if required, shall revise, adjust or modify and resubmit acceptable schedules within the time periods required, and if none are required, at least ten (10) days before submission of the first Application for Payment.

2.4 Preconstruction Conference

2.4.1. Prior to commencement of **Work** at the site, a conference will be held for review of the schedules, to establish procedures for handling **Shop Drawings** and other submittals and for processing **Applications for Payment**, and to establish a working understanding among the parties as to the **Work**. **CONTRACTOR** shall attend such conference and shall require any or all of its **Subcontractors** and **Suppliers**, as **CITY** directs, to attend the conference.

2.4.2. Unless otherwise stated at the Preconstruction Conference or a Project Meeting, the **Construction Manager** as assigned in writing by **ENGINEER** will be the single authorized representative of **ENGINEER** assigned the duty of, and authorized to, transmit or receive communications between **CONTRACTOR** and **ENGINEER** for the remaining term of the **Agreement**.

ARTICLE 3 - CONTRACT DOCUMENTS; INTENT AND REUSE.

3.1 Applicable Law; Intent

3.1.1. The **Contract Documents** comprise the entire agreement between **CITY** and **CONTRACTOR** concerning the **Work**. The **Contract Documents** are complementary; what is called for by one is as binding as if called for by all. The **Contract Documents** will be governed by the law of the place of the **Project**.

3.1.2. 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 **Work**, materials or equipment that may reasonably be inferred from the **Contract Documents** as being required to produce the intended result shall be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe **Work**, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the **Laws or Regulations** of any governmental entity whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or **Laws or Regulations** in effect at the time of opening of **Bids**, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the **Contract Documents**) shall change the duties and responsibilities of **CITY**, **CONTRACTOR**, **DESIGN ENGINEER** or **ENGINEER**, or any of their consultants, agents or employees from those set forth in the **Contract Documents**, nor shall it assign to **CITY** or **ENGINEER**, or any of their consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the **Work** or any duty or authority to undertake responsibility contrary to the provisions of Article 8 or 9.

3.2 Priority of the Contract Documents

3.2.1. If, during the performance of the **Work**, **CONTRACTOR**, or any of his **Subcontractors** or **Suppliers**, finds a conflict, error or discrepancy in the **Contract Documents**, **CONTRACTOR** shall so report to **ENGINEER** in writing at once, and before proceeding with the **Work** affected thereby, shall obtain a written interpretation or clarification from **ENGINEER**. However, **CONTRACTOR** shall not be liable to **CITY** or **ENGINEER** for failure to report any conflict, error or discrepancy in the **Contract Documents** unless **CONTRACTOR** or any of his **Subcontractors** or **Suppliers** had actual knowledge thereof or should reasonably have known thereof. **ENGINEER** will promptly investigate the matter and respond to **CONTRACTOR** with an interpretation or clarification. After **CONTRACTOR**'s discovery of such a conflict, error or discrepancy, or after the date when **CONTRACTOR** should have reasonably known thereof, until the interpretation or clarification is obtained from **ENGINEER**, any **Work** done by **CONTRACTOR** which is directly or indirectly affected by same, will be at **CONTRACTOR**'s own risk and **CONTRACTOR** shall bear all costs and delay arising therefrom.

3.2.2. In resolving such conflicts, errors or discrepancies, the **Contract Documents** shall be given preference in the following order: **Change Orders**, **Executed Change Requests**, **Field Orders**, **Agreement**, **Notice to Proceed**, **Notice of Award**, **Addenda**, **Federal Contract Provisions**, **Supplementary Conditions**, Instructions to Bidders, General Conditions, Special Provisions, Specifications, Engineering Standards Manual, Standard Indexes and **Drawings**, Invitation for Bid, **CONTRACTORS's Bid**, **Bonds**, Insurance Certificate(s) and Endorsement(s), and Affidavits.

3.2.3. If the issue of priority pertains to Divisions 2 through 16 of the **Specifications** and the **Drawings**, figured dimensions shall govern over scaled dimensions, but **Work** not dimensioned shall be as directed, and **Work** not particularly shown, identified, sized, or located shall be the same as similar parts that are shown or specified. Further, detail **Drawings** shall govern over general drawings, larger scale drawings take precedence over smaller scale drawings, **Change Order** or **Change Request Drawings** govern over Contract **Drawings**, and Contract **Drawings** govern over standard or **Shop Drawings**. In all cases where notes, specifications, sketches, diagrams, details or schedules in the **Specifications** or in the **Drawings**, or between the **Specifications** and the **Drawings**, conflict, the higher cost requirement shall be furnished by **CONTRACTOR**, unless otherwise directed by **ENGINEER**.

3.2.4. If the issue of priority is due to a conflict or discrepancy between provisions of the **Contract Documents** and any referenced standard specification, manual, or code of any technical society, organization or association, the provisions of the **Contract Documents** will take precedence if they are more stringent or presumptively cause a higher level of performance. If there is any conflict or discrepancy between standard specifications, manuals, or codes of any technical society, organization or association, or between **Laws or**

Regulations, the provision with the higher cost requirement shall be binding on **CONTRACTOR**, unless otherwise directed by **ENGINEER**.

3.2.5. In accordance with the intent of the **Contract Documents**, **CONTRACTOR** recognizes and accepts that compliance with the priority order specified shall not justify an increase in **Contract Price** or extension in **Contract Time**.

3.3 Use of Forms Provided

Unless **CITY** provides to the contrary, only those forms (**Change Request Form**, **Change Order Form**, **Notice of Award**, **Notice to Proceed**, **Application for Payment**, Insurance Certificates and Endorsements, Bonds, Bid Form, Certification of Contractor's Bona Fide Health Benefits Program, etc.) provided in the **Contract Documents** shall be used and no modifications or substitutions shall be allowed. Certified payroll forms set forth on the **CITY's** designated electronic on-line payroll tracking system and the **CITY's** designated electronic on-line reporting system must be submitted by the **CONTRACTOR** and **Subcontractors** on-line, as applicable.

3.4 Re-use of Documents

Neither **CONTRACTOR** nor any **Subcontractor** or **Supplier** or other person or organization (other than **CITY**) shall acquire any title to or have ownership rights of any of the **Drawings**, **Specifications** or other documents (or copies of any thereof) prepared by or bearing the seal of **DESIGN ENGINEER**; and they shall not be reused on extensions of the **Project** or any other project nor shall they be generally published without written consent of **CITY**.

ARTICLE 4 - AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

4.1 Availability of Lands

4.1.1. **CITY** shall furnish, as indicated in the **Contract Documents**, the lands upon which the **Work** is to be performed, rights-of-way and easements, and those other lands which are designated for the use of **CONTRACTOR**. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by **CITY**, unless otherwise provided in the **Contract Documents**. Any additional lands, rights-of-way and easements not furnished by **CITY** that **CONTRACTOR** deems necessary, including but not limited to requirements for temporary construction facilities, access and egress, or for storage, shall be obtained by **CONTRACTOR** at no increase in **Contract Price** or extension in **Contract Time**, and **CONTRACTOR** shall confine his operations to those areas furnished or obtained at its expense.

4.1.2. **CONTRACTOR** shall obtain permits and written approvals (and submit copies to **CITY** before utilization of those areas) from the appropriate governmental entity or property owner(s), for use of lands not furnished by **CITY**; and for all lands which include borrow pits, waste and disposal areas, such permits and approvals shall specify their treatment during and at completion of construction.

4.1.3. Access to municipal structures, hydrants, valves, manholes, fire alarms, etc., shall not be obstructed by **CONTRACTOR**. **CONTRACTOR** is to make no connections to or operate valves on water mains or otherwise interfere with the operation of the water system, without first giving written notice to and securing written approval from the appropriate governmental entity.

4.2 Physical Conditions (Including Underground Facilities)

4.2.1. The **Contract Documents** may identify reports of explorations and tests of subsurface conditions at the site, and those drawings of physical conditions in or relating to existing surface and subsurface structures or **Underground Facilities** owned by **CITY** which are at or contiguous to the site, that have been utilized by **DESIGN ENGINEER** in preparation of the **Contract Documents**. **CONTRACTOR** may rely upon the accuracy of the technical data in those reports or drawings, but not upon nontechnical data, interpretations or opinions, or for their completeness for **CONTRACTOR's** purposes. Except as indicated in the preceding sentence and in Paragraphs 4.4 and 4.5, **CONTRACTOR** shall have full responsibility for physical conditions, and **Underground Facilities** owned by **CITY**, shown or indicated in the **Contract Documents**.

4.2.2. The information and data shown or indicated in the **Contract Documents** with respect to **Underground Facilities** owned by others at or contiguous to the site is based on information and data furnished to **CITY** or **DESIGN ENGINEER** by the owners of such **Underground Facilities** or by others. **CITY**, **ENGINEER** and **DESIGN ENGINEER** shall not be responsible for the accuracy or completeness of any such information or data, and, **CONTRACTOR** shall have full responsibility for reviewing and checking all such information and data.

4.2.3. Unless it prejudices **Work** already excavated and uncovered, **CONTRACTOR** shall schedule layout, excavation and uncovering of **Work** or **Underground Facilities** a sufficient time in advance to allow **ENGINEER**'s review, and the possible amending or supplementing of the **Contract Documents**.

4.3 Differing Physical Conditions (including Underground Facilities)

CONTRACTOR shall promptly, after becoming aware thereof, and before the conditions are disturbed (except in a case of an emergency), notify **ENGINEER** in writing of any subsurface or latent physical conditions, or **Underground Facilities**, encountered at or contiguous to the site which differ materially from those indicated in the **Contract Documents**; **Underground Facilities** not shown or indicated in the **Contract Documents** encountered at or contiguous to the site; unknown physical conditions encountered or uncovered at or contiguous to the site, of an unusual nature, differing materially from those ordinarily encountered at or contiguous to the site which differ materially from those indicated in the **Contract Documents**; unknown physical conditions encountered or uncovered at or contiguous to the site, of an unusual nature, differing materially from those ordinarily encountered and not generally recognized as inherent in **Work** of the character provided for in the **Contract Documents**.

4.4 Resolution of a Report of Differing Physical Conditions

4.4.1. Promptly after receipt of notice from **CONTRACTOR**, **ENGINEER** will review the pertinent conditions, determine the necessity of obtaining additional explorations or tests, and advise **CITY** in writing of his findings and conclusions. Until such time when **CONTRACTOR** resumes the affected **Work** (and at all times thereafter), **CONTRACTOR** shall be responsible for the safety and protection of the affected **Work**.

4.4.2. If **CITY**, with the advice of **ENGINEER**, concludes that the conditions do materially differ, and that the **Contract Documents** need to be amended, **CITY** shall, without invalidating the **Agreement** and without notice to any surety, by duly executed **Change Order** or **Change Request**, order the necessary changes in the **Work**, as long as **CITY** has not exercised its rights to terminate the **Agreement**. Upon receipt of that order, **CONTRACTOR** shall promptly proceed or continue with the **Work** involved pursuant to the conditions stated in the order.

4.4.3. If **CITY**, with the advice of **ENGINEER**, concludes that the **Contract Documents** need to be supplemented only, appropriate minor deviations in the **Work** shall be authorized by a **Change Request** duly executed by **CITY** or a **Field Order** issued by **ENGINEER**. **CITY**'s determination that the **Contract Documents** do not need to be amended shall be final and binding on **CONTRACTOR** unless **CONTRACTOR** delivers to **CITY** written notice of a **Claim** within seven (7) days of receipt of that decision.

4.4.4. If any change in the **Work** required due to differing physical conditions causes an increase or decrease in **CONTRACTOR**'s cost of or the time required for the performance of all or part of the **Work**, **CITY** shall make an adjustment in **Contract Price** or **Contract Time**, subject to the provisions of this Article, and Articles 10 and 11.

4.4.5. If the **Contract Documents** necessitate amending to order changes in the **Work** due to **Underground Facilities** owned by **CITY**, whether they be shown or indicated or newly discovered, **CITY** shall authorize the required changes in the **Work**, including any necessary adjustments in **Contract Price** and **Contract Time** by **Change Order** or **Change Request**. If the required changes in the **Work** are due to **Underground Facilities** owned by **CITY** not shown or indicated in the **Contract Documents**, the adjustments in **Contract Price** and **Contract Time** shall include the cost and time to perform the responsibilities outlined in paragraph 4.5.

4.4.6. If the **Contract Documents** necessitate amending to order changes in the **Work** due to **Underground Facilities** owned by others, whether they be shown or indicated or newly discovered, **CITY** shall authorize the required changes in the **Work**, including any necessary adjustments in **Contract Price**, by **Change Order** or **Change Request**.

If those **Underground Facilities** owned by others cause or will cause delays in the performance or extend completion of all or part of the **Work**, **CONTRACTOR** shall absorb all related delay, extension or acceleration costs, however caused; except that, if **CITY** and **CONTRACTOR** believe that the delays require a change in **Contract Time**, **CITY** shall authorize the necessary change in **Contract Time**. However, an extension in **Contract Time**, when and if so granted shall be **CONTRACTOR's** sole and exclusive remedy with respect to **CITY** for any delay, disruption, interference, extension or hindrance and associated costs, however caused, resulting from variance in the location or configuration of **Underground Facilities** owned by others shown or indicated, or from newly discovered **Underground Facilities** owned by others.

4.4.7. No proposal by **CONTRACTOR** for an adjustment under this Article, nor **Claim** by **CONTRACTOR** for an adjustment on account of differing physical conditions, shall be allowed unless **CONTRACTOR** has given the written notice required in paragraph 4.3.

4.5 Special Requirements for Underground Facilities

CONTRACTOR shall have full responsibility: a) for locating any and all **Underground Facilities** shown or indicated as to depth and alignment in advance of excavation; b) for identifying the owner of any newly discovered **Underground Facility** and promptly notifying that owner and **ENGINEER** of that discovery; c) for shoring, blocking, and protecting **Underground Facilities** shown, indicated or discovered; d) for coordination of the **Work** with the owners of all **Underground Facilities** shown, indicated or discovered; e) for repairing any damage done to the satisfaction of those owners, to the extent that the damage was due to **CONTRACTOR's** failure to adhere to the requirements of this paragraph or paragraph 4.2.2., or to the fault or negligence of **CONTRACTOR**; and f) for the safety and protection of any affected **Work**, and for repairing any damage done to the **Work**. Except as otherwise provided in paragraphs 4.4.5. and 4.4.6., all costs involved and time required to perform these responsibilities shall be considered as having been included in the **Contract Price** and in the **CONTRACTOR's** schedule for the performance of the **Work** within the **Contract Times**, even if the **Contract Documents** need amending to authorize minor deviations or changes in the **Work** due to those **Underground Facilities**.

4.6 Reference Points

4.6.1. **CITY** shall provide the 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 shall make no changes or relocations without the prior written approval of **ENGINEER**. **CONTRACTOR** shall report to **ENGINEER** whenever any reference point 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 by professionally qualified personnel.

4.6.2. **CONTRACTOR** shall promptly, after becoming aware thereof and before performing any affected **Work** (except in a case of an emergency), notify **CITY** in writing of any reference points which in **CONTRACTOR's** judgment need correction to enable **CONTRACTOR** to proceed with the proper performance of the **Work**.

4.6.3. In resolving a report of differing reference points, **CONTRACTOR** shall adhere to the procedures, assume the duties and responsibilities, and accept the conditions outlined in paragraph 4.4 in all respects.

ARTICLE 5 - BONDS AND INSURANCE

5.1 Performance, Payment and Other Bonds

5.1.1. **CONTRACTOR** shall furnish a **Performance Bond** and a **Payment Bond**, each with good and sufficient surety, and each in an amount at least equal to the **Contract Price**. These **Bonds** shall be recorded by the Contractor with the Clerk of the Circuit Court of the county where the **Project** is located and the Contractor shall provide to the City a certified copy of the recorded bond no later than the **Date of Commencement of the Contract Time**. These **Bonds** shall remain in effect at least until one (1) year after the date of Substantial Completion of the entire work, except as otherwise provided by **Laws or Regulations**, or the other provisions of the **Contract Documents**. **CONTRACTOR** shall also furnish such other **Bonds** as are required by the **Supplementary**

Conditions. The **Performance Bond** requirement in the **Contract Documents** shall inure solely to **CITY** and its successors or assigns, as obligee, and no other person shall have any right of action based thereon.

5.1.2. All **Bonds** shall be in accordance with statutory bond provisions in Florida Statutes and all other applicable **Laws and Regulations** and be in the form prescribed by the **Contract Documents**. All **Bonds** shall be executed by such sureties as are licensed to conduct business in the state of Florida and, except as otherwise provided by **Laws and Regulations**, are named in the current 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 Audit Staff Bureau of Accounts, U.S. Treasury Department. The sureties which issue the Performance and Payment Bonds must have at least an "A-" rating in accordance with the most current A.M. Best Company financial strength ratings. All **Bonds** signed by an agent must be accompanied by a certified copy of its authority to act.

5.1.3. If the surety on any **Bond** furnished by **CONTRACTOR** is declared bankrupt or becomes insolvent or its license to do business in the state of Florida is terminated or it ceases to meet the requirements of the **Contract Documents**, **CONTRACTOR** shall within five (5) days thereafter substitute another **Bond** and surety, both of which shall be in accordance with the **Contract Documents** and acceptable to **CITY**.

5.1.4. In addition to the other bonding requirements, the surety(ies) named on the **Performance Bond** and **Payment Bond** submitted by **Low Bidder** pursuant to the **Contract Documents** shall be subject to the approval of **CITY**. If **CITY** has a reasonable objection to the proposed Surety, **CITY** may request **Low Bidder** to submit an acceptable substitute without an increase in the **Bid** price. If **Low Bidder** declines or is unable to make any such acceptable substitution, **CITY** may, at its sole option, rescind the **Notice of Award**, and any award of the Contract to **Low Bidder** will be of no effect. The refusal or inability to make any such substitution may constitute grounds for sacrificing its **Bid Security**.

5.2 Contractor's Insurance - General

5.2.1. The types of insurance **CONTRACTOR** shall purchase and maintain are Worker's Compensation and Employer's Liability Insurance, Liability Insurance, and Health Insurance (provided **CONTRACTOR** is using a bona fide program to satisfy the health benefits requirement for this Project), which shall include the specific coverages set forth in this Article, as supplemented in the **Supplementary Conditions**, and be written for no less than the limits of liability coverage provided in the **Supplementary Conditions**.

5.2.2. **CONTRACTOR** shall not commence or continue to perform any work unless it, at its own expense, has in full force and effect all required insurance, and until all insurance Certifications, Certificates and Endorsements have been filed evidencing the specific insurance coverage required, nor shall any payment for **Work** performed become due and payable until such Certificates and Endorsements have been filed. The **CONTRACTOR** shall not permit any **Subcontractor**, **Supplier** or other person or organization to perform work on the **Project** unless the Worker's Compensation Insurance and the health benefits requirement of the Responsible Contractor's Policy have been complied with by such **Subcontractor**, **Supplier** or other person or organization.

5.2.3. Worker's Compensation and Employer's Liability Insurance shall be maintained in effect for the full **Warranty Period**, even as extended. The **CONTRACTOR** choosing to provide health insurance to satisfy the health benefits requirement of the Responsible Contractor's Policy shall maintain such minimum coverage as is outlined in Section 2.4 of the **Supplementary Conditions** for the duration of this Project. Should any coverage approach expiration during the period in which it is to remain in full force and effect, it shall be renewed prior to its expiration.

5.2.4. Insurance coverage shall be placed with satisfactory insurers authorized to do business in the State of Florida. Insurers shall have at least an "A" Best's Rating and a Class XI or better financial category in accordance with the most current A. M. Best Company ratings. (Rating requirement does not apply to Health Benefits Program.)

5.2.5. At the time indicated in the Instructions to Bidders, as evidence of specified insurance coverage, **CONTRACTOR** shall provide a certification, an affidavit, and (as applicable) certificates of insurance evidencing the specific policies issued, the limits of coverage afforded, and the specific endorsements provided, all in accordance with

the requirements of the forms prescribed in the **Contract Documents**, and if none are included, as required by **CITY**. No alteration or substitution of said insurance certificate forms will be allowed, unless approved by **CITY** in writing.

5.2.6. If so requested in writing by **CITY**, **CONTRACTOR** shall deliver one (1) copy to **CITY** of each insurance policy purchased by **CONTRACTOR** pursuant to this Article within thirty (30) days of the request.

5.2.7. All the policies of insurance (excluding the worker's compensation insurance and health insurance) so required of **CONTRACTOR** in the **Contract Documents** shall be endorsed to include as additional insureds: **CITY**, **DESIGN ENGINEER**, **ENGINEER**, their consultants, any subsidiaries or affiliates, and each of their directors, officers, employees, representatives, agents or volunteers. The insurance afforded to these additional insureds shall be primary insurance. If the additional insureds have other insurance which might be applicable to any loss, the amount of insurance provided under **CONTRACTOR**'s policies of insurance shall not be reduced or prorated by the existence of the other insurance.

5.2.8. All the policies of insurance so required of **CONTRACTOR** in this Article shall be endorsed to expand coverage as required in this Article, as supplemented in the **Supplementary Conditions**.

5.2.9. Deleted

5.2.10. Nothing contained in these insurance requirements is to be construed as limiting the liability of **CONTRACTOR** or **CONTRACTOR**'s insurance carriers. It is to be understood that **CITY**, **ENGINEER** and **DESIGN ENGINEER** do not in any way represent that the insurance (or the limits of insurance) specified in this Article (or in the **Supplementary Conditions**) is sufficient or adequate to protect **CONTRACTOR**'s interests or liabilities, but are merely minimums.

5.2.11. Umbrella Liability Insurance shall not be more restrictive than the underlying insurance policy coverages.

5.2.12. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by **CONTRACTOR** in accordance with the **Contract Documents** will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty days' prior written notice has been given to **CITY** and **ENGINEER** by certified mail.

5.3 City's Insurance

CITY shall have the option of self-insuring or purchasing and maintaining its own insurance. If **CONTRACTOR** fails to obtain or renew insurance or fails to maintain insurance in a form required by the **Contract Documents**, or if any insurance company **CONTRACTOR** has procured insurance from declares bankruptcy, is declared bankrupt, or if the Insurer loses its "A" policyholder's rating or if its financial size category rating falls below Class XI in the most current A. M. Best's rating, **CITY** may procure insurance at **CONTRACTOR**'s expense in the coverage amounts required by the **Contract Documents** and shall be entitled to deduct **CITY**'S resultant costs from the **Contract Price** by issuing a **Change Order**. In lieu of procuring insurance at **CONTRACTOR**'s expense, **CITY** has the option to stop or suspend the **Work** or terminate **CONTRACTOR**'s services as provided in Article 15. **CITY**'s actions under this paragraph shall not entitle **CONTRACTOR** to an increase in **Contract Price** or an extension of **Contract Time**.

5.4 Worker's Compensation Insurance; Employer's Liability Insurance; and Health Insurance

5.4.1 **CONTRACTOR** shall obtain full Worker's Compensation Insurance coverage for no less than the statutory limits and Employer's Liability Insurance coverage in limits not less than the amounts set forth in the **Supplementary Conditions**, for all persons whom it employs or may employ in carrying out the **Work** under the **Agreement**. This insurance shall be in strict accordance with the requirements of the most current and applicable state Worker's Compensation laws. The Worker's Compensation insurance shall be endorsed to waive the insurer's subrogation rights against the **CITY**.

5.4.2 If satisfying the health benefits requirement of the Responsible Contractor's Policy through a bona fide program, **CONTRACTOR** shall maintain medical and mental health insurance for no less than the minimum limits set forth in the Supplementary Conditions.

5.5 Liability Insurance

5.5.1. **CONTRACTOR** shall purchase and maintain the liability insurance described herein to provide protection from **Claims** arising out of or resulting from **CONTRACTOR's** performance of the **Work** and **CONTRACTOR's** other obligations under the **Contract Documents**, whether such performance is by **CONTRACTOR**, by any **Subcontractor** or **Supplier**, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.

5.5.2. The liability insurance shall include liability insurance applicable to **CONTRACTOR's** obligations under Articles 6 and 7. **CONTRACTOR** agrees to pay on behalf of **CITY**, and to provide and pay a legal defense for, all such **Claims** applicable to **CONTRACTOR's** obligations under the indemnification provisions in said Articles. **CONTRACTOR** accepts as adequate compensation for the contractual liability insurance the amount contained in the **Contract Documents**.

5.5.3. The liability insurance coverage shall include as a minimum each of the following types of insurance:

A. General Liability

- (1) Comprehensive Form.
- (2) Premises-Operations.
- (3) Explosion and Collapse Hazard.
- (4) Underground Hazard.
- (5) Products/Completed Operations Hazard.
- (6) Contractual Insurance.
- (7) Broad Form Property Damage Including Completed Operations.
- (8) Independent Contractors.
- (9) Personal Injury [with Employment Exclusion deleted.]

B. Automobile Liability

- (1) Comprehensive Form Including Loading and Unloading.
- (2) Owned.
- (3) Hired.
- (4) Non-Owned.

5.6 [Deleted]

5.7 [Deleted]

5.8 Owner May Object to Insurance

5.8.1. Neither **CITY's** review of the coverage afforded by or the provisions of the policies of insurance purchased and maintained by **CONTRACTOR** in accordance with this Article, nor **CITY's** decisions to raise or not to raise any objections about either or both, shall in any way relieve or decrease the liability of **CONTRACTOR**. If **CITY** elects to raise an objection to the coverage afforded by or the other provisions of the insurance furnished, **CONTRACTOR** shall promptly provide to **CITY** such additional information as **CITY** may reasonably request, and **CONTRACTOR** shall remedy any deficiencies in the policies of insurance at once.

5.8.2. **CITY's** authority to object to insurance shall not in any way whatsoever give rise to any duty on the part of **CITY** to exercise this authority for the benefit of **CONTRACTOR** or any other party.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision and Superintendence

6.1.1. **CONTRACTOR** shall supervise 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 all means, methods, techniques, sequences and procedures of construction, for providing adequate safety precautions, for coordinating all portions of the **Work** under the **Contract Documents**, and for enforcement of order and cooperation among **CONTRACTOR's** employees and all **Subcontractors** and **Suppliers** and others having a **Subagreement** for a part of the **Work**. **CONTRACTOR** shall be responsible to see that the finished **Work** complies accurately with the **Contract Documents**.

6.1.2. **CONTRACTOR** shall keep on the **Work** at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to **ENGINEER** except under extraordinary circumstances. **CITY** may, at its sole discretion, require replacement of the superintendent, in which case **CONTRACTOR** shall submit an acceptable replacement at no increase in **Contract Price** nor extension in **Contract Time**. The superintendent shall be **CONTRACTOR's** representative at the site and shall have authority to act on behalf of **CONTRACTOR**. All communications given to the superintendent shall be as binding as if given to **CONTRACTOR**. Whenever the superintendent is not present on any particular part of the **Work** where the **ENGINEER** may desire to inform the **CONTRACTOR** relative to interpretation of the plans and specifications or regarding disapproval or rejection of materials or work performed, the **ENGINEER** may so inform the foreman or other workers in charge of the particular part of the work in reference to which the information is given. Information so given shall be as binding as if given to the superintendent.

6.1.3. The superintendent and similar authorized representatives of any **Subcontractor**, **Supplier** or other person or organization shall attend all meetings pertaining to the **Work**, as requested by **CITY** or **ENGINEER**.

6.2 Personnel and Working Hours

6.2.1. **CONTRACTOR** shall at all times maintain good discipline and order at the site.

6.2.2. **CONTRACTOR** shall provide competent, qualified personnel to perform construction as required by the **Contract Documents**. **Contractor** shall employ a Professional Land Surveyor with current Florida registration to survey and lay out the work (in accordance with any additional provisions included in the **General Requirements**) **CONTRACTOR** is fully responsible to provide a sufficient number of skilled workers and supervisory personnel to perform the **Work** and insure that the **Work** is completed within the **Contract Time**. Failure to fully man the **Project** with supervisory personnel and skilled workers shall be cause for termination of **CONTRACTOR**.

6.2.3. Except in connection with the safety or protection of persons or the **Work** or property at the site or adjacent thereto, and except as otherwise indicated in the **Supplementary Conditions**, all **Work** at the site shall be performed during normal working hours, and **CONTRACTOR** will not permit overtime work or the performance of **Work** on **Saturday**, **Sunday** or any **Holiday** without **CITY's** written consent given after prior written notice to **ENGINEER**. Normal working hours shall be defined as the **CONTRACTOR's** normal eight hour working period occurring between the hours beginning at 7:00 a.m. and ending at 3:30 p.m., exclusive of **Saturdays**, **Sundays**, or **Holidays**. **Work** during other than normal working hours may be scheduled by **CONTRACTOR** if he first obtains written permission from **CITY**. The **Superintendent** shall meet with the **Field Representative** on a daily basis for concurrence to determine quantities.

6.2.4. **CITY** shall be entitled to deduct from the **Contract Price**, by issuing a **Change Order**, **CITY's** extra costs incurred in connection with **CONTRACTOR's** performance of **WORK** during hours other than normal working hours. Such costs may include, but shall not be limited to, **ENGINEER'S** charges to **CITY** while acting as **CITY's** representative, (including charges outside of normal working hours for **Construction Manager** and **Field Representatives**) , **CITY's** costs incurred in the performance of **CITY's** responsibilities as set forth in the **Contract Documents**, and other related costs.

6.3 Apprentices Program

6.3.1 The CONTRACTOR's utilization of Apprentices and Pre-Apprentices shall conform to the CITY's Apprenticeship Program requirements as set forth in the Contract Documents. The goal of this Program is to have 10% of the CONTRACTOR's and first and second tier Subcontractors' work hours sourced from registered State of Florida Pre-Apprenticeship/Apprenticeship Programs, if available. The CONTRACTOR shall submit the Apprentice Utilization Plan at the Pre-Construction Conference and submit a revised Apprentice Utilization Plan whenever a first or second tier Subcontractor is added or removed from the Project. The CONTRACTOR must submit, in the form of a Monthly Employment Report with the CONTRACTOR's progress payment applications, evidence of compliance with the stated goals of the Apprenticeship Program. The CONTRACTOR shall include language in its contracts with all first and second tier Subcontractors, requiring the Subcontractor to comply with the provisions of the City's Apprenticeship Program. The CONTRACTOR shall be responsible for monitoring compliance by the Subcontractors with the program goal and requirements.

6.3.2 The following skilled trades classifications are recognized by the CITY as positions meeting the intent of the Apprenticeship Program requirements and that will be credited to meeting the Program goal: bricklayer, carpenter, cement mason, dry wall applicator, electrician, form builder, glazier, heating and a/c installer, insulation worker, machinist, painter, pipe fitter, plasterer, plumber, roofer, sheet metal worker, structural steel worker, tile setter, and welding technician.

6.3.3 Information regarding apprenticeships can be found by accessing the Florida Department of Education website, <http://www.fldoe.org/workforce/apprenticeship/>. The Department of Education site provides a listing of Occupational/Training Program Sponsors that are acceptable for use. Apprentices who are not currently registered in a state-approved apprenticeship program will not be counted toward satisfying the Apprenticeship Program's goals.

6.3.4 At the Pre-Construction Conference, the CONTRACTOR shall submit to the Engineer a comprehensive plan, on the Apprentice Utilization Plan form provided in Section 00925-1, outlining how the Apprentice utilization goal will be met.

6.3.5 The CONTRACTOR shall submit to the Engineer a Monthly Employment Report, on the form provided in the Contract Documents, Section 00940-5, for the CONTRACTOR and first and second tier Subcontractors. The Monthly Employment Report form shall be completed by the CONTRACTOR and all first and second tier Subcontractors performing work on the Project during the reporting period. The report shall be submitted with each payment application and reflect labor performed during the period of the payment application. The CONTRACTOR shall submit such other information as may be requested by the CITY to verify compliance with the Apprenticeship Program requirements of the Contract Documents. The CITY reserves the right to add, delete, or change as necessary the information required by the CONTRACTOR on the Monthly Employment Report form.

6.3.6 If, during the term of the Contract, the CONTRACTOR determines that it will be unable to meet the Apprentice utilization goal, the CONTRACTOR may make a written request to the CITY to reduce the Apprentice utilization goal percentage. The request shall include documentation of the CONTRACTOR's good faith affirmative, diligent efforts to use registered Apprentices and Pre-Apprentices, including but not limited to, providing copies of correspondence between the CONTRACTOR and approved Pre-Apprenticeship/Apprenticeship Programs, union locals, and others seeking Apprentices and Pre-Apprentices. These documents must demonstrate that the CONTRACTOR has made good faith, affirmative, diligent efforts to use registered Apprentices and Pre-Apprentices.

The CITY shall evaluate the request, and if appropriate, will reduce the utilization goal. If the CITY determines that a reduction in the utilization goal is not justified, the CITY shall communicate the decision in writing to the CONTRACTOR and the CONTRACTOR shall meet the utilization goal.

CONTRACTOR's utilization of apprentices shall conform to the provisions of Florida Statutes Chapter 446.

6.4 CONTRACTOR's Responsibilities for Furnishing

Unless otherwise specified in the **Contract Documents**, **CONTRACTOR** shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools,

appliances, fuel, power, light, heat, ventilation, cooling, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the **Work**.

6.5 Items of Material or Equipment

6.5.1. All materials and equipment shall be of good quality and new, except as otherwise provided in the **Contract Documents**. If required by **ENGINEER**, **CONTRACTOR** shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be handled, stored, applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable **Supplier** except as otherwise provided in the **Contract Documents**; but no provision of any such instructions will be effective to assign to **ENGINEER**, or any of **CITY's** or **ENGINEER's** consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the **Work** or any duty or authority to undertake responsibility contrary to the provisions of Article 8 or Article 9.

6.5.2. Manufacturers' or **Suppliers'** warranties for all materials, products and equipment to be furnished by **CONTRACTOR** and to be incorporated into the completed **Work** shall be furnished to **CITY** through **CONTRACTOR**.

6.5.3. **CONTRACTOR** shall obtain from **Suppliers** of all materials, products and equipment, complete information as to any special condition or restriction to be applied in the use of these items. Should the manner or method of installation, specified performance or test results as set forth in the **Specifications** be contrary to the manufacturer's recommendations for use of the product, **CONTRACTOR** shall notify **ENGINEER** in writing of such conflict as soon as reasonably possible, but no later than the time of **Shop Drawing** submittal including those products. Failure to provide such written notice before proceeding with the **Work** affected thereby shall be certification by **CONTRACTOR** that the **Specification** requirements will be met by the materials, products and equipment, and that the cost and time required to perform or complete the **Work** affected thereby have been included in the **Contract Price** and in the schedule for the performance of the **Work** within the **Contract Time**.

6.5.4. Data submitted on all equipment shall include complete operation and maintenance instructions (including preventive maintenance and operating requirement data) and parts lists in sufficient detail to facilitate ordering replacements. Such submittals shall conform to any additional requirements provided in the **General Requirements**.

6.6 Wood Products

Except as may be otherwise provided by **Laws or Regulations**, pursuant to Florida Statutes Chapter 225, lumber, timber and other forest products specified in the **Contract Documents** shall be produced and manufactured in Florida whenever such products are available, provided that price, fitness and quality are equal to other available products. This requirement does not apply where plywood is specified for monolithic concrete forms.

6.7 Equivalent Materials and Equipment

6.7.1. Whenever materials or equipment are specified or described in the **Drawings** or **Specifications** by using the name of a proprietary item or the name of a particular **Supplier**, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other **Suppliers** may be accepted by **ENGINEER** if (a) the proposed substitution was listed on the substitution list provided on the bid form; and b) sufficient information is submitted by **CONTRACTOR** to allow **ENGINEER** to determine that the material or equipment proposed is equivalent to that named. If the proposed substitution was not listed on the bid form, **CONTRACTOR** shall request in writing that **CITY** waive this requirement. **CITY** reserves the right to either maintain or waive this requirement. If **CITY** elects not to waive this requirement, **CONTRACTOR** shall take immediate action to provide the materials and equipment specified.

6.7.2. Requests for review of substitute items of material and equipment will not be accepted by **ENGINEER** from anyone other than **CONTRACTOR**. If **CONTRACTOR** wishes to furnish or use a substitute item of material or equipment **CONTRACTOR** shall, within adequate time to allow a proper review without impacting the schedule,

make written application to **ENGINEER** for acceptance thereof, certifying that the proposed substitute will perform adequately the functions called for by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function as that specified. The application shall state whether or not acceptance of the substitute for use in the **Work** will require a change in the **Drawings** or **Specifications** to adapt the design to the substitute and whether or not incorporation or use of the substitute in connection with the **Work** is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair and replacement service shall be indicated. The application shall also contain an itemized estimate of all increases or decreases in (1) the cost of, or the time required to perform any part of the **Work**, and the corresponding adjustments in **Contract Price** and **Contract Time**, resulting directly or indirectly from evaluation and acceptance of the proposed substitute, including, but not as a way of limitation, costs and delays associated with redesign, or **Claims** of other contractors affected by the resulting substitute; and (2) increases or decreases in operating, maintenance, repair, replacement or spare part costs, all of which will be considered by **ENGINEER** in evaluating the proposed substitute. **ENGINEER** may require **CONTRACTOR** to furnish, at **CONTRACTOR**'s expense, additional data about the proposed substitute.

6.7.3. **ENGINEER** shall be the sole judge of acceptability, and no substitute shall be ordered or installed without **ENGINEER**'s prior written acceptance. However, **CITY** reserves the right to reject any proposed substitute which would result in an increase in **Contract Price** or **Contract Time**, and **CITY** may require **CONTRACTOR** to furnish at **CONTRACTOR**'s expense a special performance guarantee or other surety with respect to any substitute. If approval is given, **CONTRACTOR** shall not be excused from producing **Work** in conformity with Contract requirements.

6.7.4. **ENGINEER** will record time required by **ENGINEER**, **DESIGN ENGINEER** and their consultants in evaluating substitutions proposed by **CONTRACTOR** and in making changes in the **Drawings** or **Specifications** occasioned thereby. Whether or not **ENGINEER** accepts a proposed substitute, **CITY** shall be entitled to deduct from the **Contract Price**, by issuing a **Change Order**, **CITY**'s costs including the charges of **ENGINEER**, **DESIGN ENGINEER** and their consultants for evaluating any proposed substitute.

6.7.5. The net difference in cost between the substitute item and that specified shall benefit **CITY** and **CONTRACTOR** in equal proportions if the substitution was listed on the **Bid Form**. If the substitution was not listed in the **Bid Form**, all of the savings will go to **CITY**. If **ENGINEER** estimates that the deduction proposed by **CONTRACTOR** does not, in its opinion, reflect the sharing of costs in the portions described above, this shall be adequate justification to reject the proposed substitution.

6.7.6. **CONTRACTOR** assumes sole responsibility for verifying that the proposed substitute items are in accordance with the requirements of the **Contract Documents**, and that the dimensions, arrangement, design and construction details, and all other features of substitute items are suitable for their intended purpose.

6.7.7. In the event that a substitute item differs materially from the specified item of material or equipment, and said difference was not expressly identified in **CONTRACTOR**'s request for the substitution, or the incorporation of the substitute into the **Work** results in a change(s) to the **Work** or in the function or general design of the **Project**, **ENGINEER** will have authority to require the removal and replacement of said substitute.

6.8 Concerning Subcontractors, Suppliers and Others

6.8.1. **CONTRACTOR** shall not award **Work** to **Subcontractors** in excess of 50 percent of the **Contract Price** without prior written approval of **CITY**. **CONTRACTOR** shall not employ any **Subcontractor**, **Supplier** or other person or organization (including but not limited to those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom **CITY** or **ENGINEER** may have reasonable objection. A **Subcontractor**, **Supplier** or other person or organization identified in writing to **CITY** and **ENGINEER** by **CONTRACTOR** prior to the **Notice of Award** and not objected to in writing by **CITY** or **ENGINEER** prior to the **Notice of Award** will be deemed acceptable to **CITY** or **ENGINEER**. Acceptance of any **Subcontractor**, **Supplier** or other person or organization by **CITY** or **ENGINEER** shall not constitute a waiver of any right of **CITY** or **ENGINEER** to reject defective **Work** by **CONTRACTOR** or any **Subcontractor**, **Supplier** or any other person or organization. If **CITY** or **ENGINEER** after due investigation has reasonable objection to any **Subcontractor**, **Supplier** or other person or organization proposed by **CONTRACTOR** after the **Notice of Award**, **CONTRACTOR**

shall submit an acceptable substitute. Such **Subcontractor, Supplier** person or organization shall neither commence nor continue Work after **CITY** or **ENGINEER** objects to said entity. In the event that any such reasonable objection and acceptable substitute will cause additional expense or extend performance of the **Work**, or part thereof, beyond the **Contract Time** for the **Work**, or part thereof, **CONTRACTOR** may make a request for an adjustment in **Contract Price** or **Contract Time**. However, any changes in **Contract Price** made under this paragraph shall exclude any adjustments for any increases in **CONTRACTOR**'s costs in connection with an increase in **Contract Time** resulting from the reasonable objection and acceptable substitute submitted pursuant to this paragraph. In any such case, the extension in **Contract Time** so granted, if any, shall be **CONTRACTOR**'s sole and exclusive remedy for delay, disruption, interference, hindrance and costs thereto. **CONTRACTOR** shall not be required to employ any **Subcontractor, Supplier** or other person or organization against whom **CONTRACTOR** has reasonable objection.

6.8.2. **CONTRACTOR** shall give prompt written notice to **CITY** with copy to **ENGINEER** as to the identity and qualifications (in accordance with Article 10 of the Instructions to Bidders) of any **Subcontractor, Supplier** or other person or organization to whom **CONTRACTOR** intends to award **Work** that was not previously identified in accordance with the Instructions to Bidders, and of **CONTRACTOR**'s intent to remove or replace a **Subcontractor, Supplier** or other person.

6.8.3. **CONTRACTOR** shall be fully responsible for all acts and omissions of his **Subcontractors** and **Suppliers** and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that **CONTRACTOR** is responsible for the acts and omissions of persons directly employed by **CONTRACTOR**. Nothing in the **Contract Documents** shall create any contractual relationship between **CITY** or **ENGINEER** and any **Subcontractor** or **Supplier** or other person or organization having a **Subagreement** with **CONTRACTOR**, nor shall it create any obligation on the part of **CITY** or **ENGINEER** to pay or to see to the payment due any **Subcontractor, Supplier** or other person or organization, except as may otherwise be required by law. **CITY** or **ENGINEER** may furnish to any **Subcontractor** or other person or organization, to the extent practicable, evidence of amounts paid to **CONTRACTOR** on account of specific **Work** done. **No Subcontractor, Supplier or other person or organization shall be a third party beneficiary of this Contract.**

6.8.4. 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. The divisions of the **Specifications** are complementary, and anything mentioned or shown in a division of the **Specifications** or in a specific trade Drawing shall be of like effect as if shown in all divisions of the **Specifications** and in all **Drawings**. In addition to other requirements in the **Contract Documents**, **Shop Drawings** of a specific trade shall be compared to and coordinated with those from other trades by **CONTRACTOR** before submission to **ENGINEER**.

6.8.5. All **Work** performed for **CONTRACTOR** by a **Subcontractor, Supplier** or other person or organization will be pursuant to an appropriate **Subagreement** between **CONTRACTOR** and the **Subcontractor, Supplier** or other person or organization which specifically binds the **Subcontractor, Supplier** or other person or organization to the applicable terms and conditions of the **Contract Documents** for the benefit of **CITY**.

6.8.6. If requested in writing by **CITY**, **CONTRACTOR** shall deliver to **CITY** a copy of each **Subagreement** with a **Subcontractor, Supplier** or other person or organization performing a part of the **Work** within seven (7) days of **CITY**'s request.

6.9 Patent Fees and Royalties

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 its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, it shall remain the responsibility of **CONTRACTOR** to assume all costs incident to the use in the performance of the **Work** or the incorporation in the **Work** of said invention, design, process, product or device. Whenever **CONTRACTOR** is required or desires to use any design, device, material or process covered by letters, patent, trademark or copyright, the right for such use shall be

provided for by suitable legal agreements with the patentee or owner, and a copy of this Agreement shall be filed with **ENGINEER**.

6.10 Permits

Unless otherwise provided in the **Contract Documents**, **CONTRACTOR** shall obtain and pay for all construction 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**. **CONTRACTOR** shall pay all charges of utility service companies for utilities service to accomplish the **Work**. If **CONTRACTOR** fails to obtain or renew any permit or license required by this paragraph, **CITY** has the option of stopping or suspending the work or terminating the **CONTRACTOR's** services or procuring any permit or license directly. **CITY** shall be entitled to deduct **CITY's** resultant costs from the **Contract Price** by issuing a **Change Order**. **CONTRACTOR** shall meet all requirements of all permits and licenses.

6.11 Laws and Regulations

6.11.1. **CONTRACTOR** shall give all notices and comply with all **Laws and Regulations** applicable to the **Work**. If **CONTRACTOR** observes that the **Contract Documents** are at variance therewith, **CONTRACTOR** shall give **ENGINEER** prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate **Change Order** (subject to the provisions of Articles 3, 10, and 11). If **CONTRACTOR** performs any **Work** knowing or having reason to know that it is contrary to such **Laws or Regulations** and without such notice to **ENGINEER**, **CONTRACTOR** shall bear all costs arising therefrom. **CONTRACTOR** shall indemnify and hold harmless **CITY** for all **Claims**, fines, damages, losses and expenses (including but not limited to charges of engineers, architects, other professionals and attorneys' fees and attorneys' fees on appeal and all costs of defense or appeal) arising out of **CONTRACTOR's** failure to comply with the terms of this paragraph.

6.11.2. **CONTRACTOR** shall pay all sales, consumer, use and other taxes required to be paid by it in accordance with the **Laws and Regulations** of the place of the **Project**.

6.11.3. **CONTRACTOR** and the Subcontractors, at all tiers, shall comply with anti-discrimination **Laws and Regulations** pertaining to the employment of persons on the **Project**.

6.12 Use of Premises

6.12.1. **CONTRACTOR** shall confine construction equipment, the storage of materials and equipment and the operations of workmen to areas permitted by **Laws and Regulations**, rights-of-way, permits and easements or the requirements of the **Contract Documents**, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. **CONTRACTOR** shall assume full responsibility for any damage to any such property, or to the owner or occupant thereof or of any other property, caused or alleged to have been caused by or incident to the execution of this **Work**. **CONTRACTOR** shall promptly attempt to settle with such other party by agreement or otherwise resolve the **Claim** by arbitration or at law.

6.12.2. Notwithstanding the designation of Contract limits or the indication of temporary fences or barricades, the provisions of the **Contract Documents** governing certain phases or portions of the **Work**, such as trenching and landscaping, may require that certain operations be carried out beyond such limits. Those operations, if required beyond such designated limits, shall be scheduled in such a manner as to cause or occasion a minimum of inconvenience or disturbance to or interference with the normal operation of **CITY**, abutters and the public. **CONTRACTOR** shall obtain **CITY's** prior approval and all necessary approvals from others, governmental entities and utility companies for such operations, and prosecute such operations expeditiously and restore the affected property to its original condition immediately upon completion of such operations, unless otherwise specified in the **Contract Documents**. All those areas on which temporary driveways or walks are routed shall be restored to their original condition, immediately when normal routing can be reinstated, unless otherwise specified in the **Contract Documents**. Pumping, draining and control of surface and groundwater shall be carried out so as to avoid endangering the **Work** or any adjacent facility or property, or interrupting, restricting or otherwise infringing or interfering with the use thereof.

6.12.3. Except as specifically arranged with the owners of adjacent premises, **CONTRACTOR** shall avoid any encroachment on adjacent premises. It is specifically agreed that **CONTRACTOR** shall repair and make good any damage to adjacent premises or improvements thereon caused by its operation, including any damage or loss to the tenant of such adjoining premises or to the owners thereof, whether to buildings, stocks of merchandise, trade fixtures, or otherwise.

6.12.4. During the progress of the **Work**, and as directed by **ENGINEER**, **CONTRACTOR** shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the **Work**. At the completion of the **Work** **CONTRACTOR** shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by **CITY**. **CONTRACTOR** shall restore to original condition all property not designated for alteration by the **Contract Documents**.

6.12.5. **CONTRACTOR** shall not load or 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.

6.13 Record Documents

Contractor shall maintain in a safe place at the site, one (1) record copy of all drawings, specifications, addenda, change orders, change requests, correspondence, field test records, contractor's daily reports and construction photographs, and written interpretations and clarifications in good order, and annotated to show all changes made during construction. These record documents, together with all approved samples and shop drawings will be available to Engineer for reference.

The record drawings shall be marked up as the work progresses to reflect current conditions and shall become the "as-built" plans. The revisions are to be indicated in a neat, well-organized manner and are to include the elevation and plan location of any utilities, structures, etc., encountered or installed. A "record" survey book will be kept and shall include the following items:

1. The location and elevation of all existing utilities, structures, etc. encountered.
2. The finished product location and elevation of all utilities and structures installed, including, but not limited to, fire hydrants, catch basin and manhole lids, inverts, pipes, and any and all underground structures.

All record notes shall be kept in book(s) designated "record" and no other survey notes will be kept in such books.

Contractor will be required to review with Engineer the status of the as-built plans and the "record" survey notes in connection with Engineer's evaluation of an application for payment.

Failure to maintain record documents current shall be just cause to recommend withholding of payments for work performed.

Upon completion of the work, Engineer shall deliver to the Contractor a reproducible set of updated contract plans. Contractor will transfer all his as-built information to these reproducibles and deliver the resultant as-built set of plans, together with the record survey book to Engineer for City. Each completed set of "As-Built" drawings must include on its face, a certified statement by the **CONTRACTOR'S** Professional Land Surveyor that the set of "As-Built" drawings accurately depicts the actual work as constructed.

6.14 Safety and Protection

6.14.1. **CONTRACTOR** shall be solely and completely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the **Work**. **CONTRACTOR** shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the **Work** and other persons (including but not limited to the general public) who may be affected

thereby; all the **Work** and all materials or equipment to be incorporated therein, whether in storage on or off the site; and other property at the site, adjacent thereto, or utilized by **CONTRACTOR** including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures, **Underground Facilities** and utilities not designated for removal, relocation or replacement in the course of construction regardless of whether or not such other property is indicated in the **Contract Documents**. **CONTRACTOR's** duties and responsibilities for the safety and protection of the **Work** shall continue until such time as **ENGINEER** issues a notice to **CITY** and **CONTRACTOR** that the **Work** is acceptable.

6.14.2. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by **CONTRACTOR**, any **Subcontractor**, **Supplier** or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by **CONTRACTOR** at his sole cost, except damage or loss solely attributable to the fault of the **Drawings** or **Specifications** or the acts or omissions of **CITY** or **ENGINEER** or anyone employed by either of them or anyone for whose acts either of them may be liable.

6.14.3. **CONTRACTOR** shall comply with all applicable **Laws and Regulations** of any governmental entity having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss including, but not limited to, OSHA (Public Law 91-596) and the Contract Work Hours and Safety Standards Act (Public Law 91-54); and shall erect and maintain all necessary safeguards for such safety and protection. **CONTRACTOR** shall comply with all terms and conditions of the site specific safety plan. **CONTRACTOR** shall designate a responsible member of his organization at the site whose duties shall be preventing accidents and insuring compliance with all applicable safety regulations. This person shall be **CONTRACTOR's** superintendent unless otherwise designated in writing by **CONTRACTOR** to **CITY**.

6.14.4. When the performance of the **Work** requires the use of shoring, sheet piling and other special construction related to excavation, and when required by **Laws or Regulations**, **CONTRACTOR** shall cause the design of said shoring, sheet piling and other special construction to be performed by a registered professional engineer licensed in the State of Florida. **CONTRACTOR** shall submit a certification by the registered engineer, stating that it has complied with this requirement. **CONTRACTOR** shall meet all requirements of such designs prepared by a registered engineer. In addition to any requirements imposed by law, **CONTRACTOR** shall shore up, brace, underpin, and protect as may be necessary, all foundations and other parts of all existing structures adjacent to and adjoining the site of the **Work** which are in any way affected by the excavations or other operations connected with the performance of the **Work**.

6.14.5. **CONTRACTOR** shall notify owners of adjacent property and of **Underground Facilities** and 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. Whenever any notice is required to be given by **CITY** or **CONTRACTOR** to any adjacent or adjoining landowner or other party before commencement of any **Work**, such notice shall be given by **CONTRACTOR**.

6.14.6. **CONTRACTOR** shall take reasonable care during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

6.14.7. At all times **CONTRACTOR** shall, and shall cause his **Subcontractors** and **Suppliers** to, carefully protect its and their **Work**, materials, equipment, and supplies against damage or injury from the weather. If in the opinion of **ENGINEER** any of the above has been damaged or injured by reason of failure on the part of **CONTRACTOR**, any **Subcontractor** or **Supplier** to perform according to the requirements of this provision, said **Work**, materials, equipment and supplies shall be removed and replaced at the expense of **CONTRACTOR**.

6.15 Emergencies

In emergencies affecting the safety or protection of persons or the **Work** or property at the site or adjacent thereto, **CONTRACTOR**, without special instruction or authorization from **ENGINEER** or **CITY**, is obligated to act to prevent threatened damage, injury or loss. **CONTRACTOR** shall give **CITY** prompt written notice if **CONTRACTOR** believes that any significant changes in the **Work** have resulted because of the action taken in

response to an emergency. If **CITY** determines that changes are required, **CITY** shall authorize the changes by **Change Order** or **Change Request**. If the emergency was not due to the fault or negligence of **CONTRACTOR**, or any **Subcontractor** or **Supplier** or anyone for whose acts any of them may be liable and the changes cause an increase or decrease in **CONTRACTOR**'s cost or the time required to perform any part of the **Work**, **CITY** shall make an adjustment in **Contract Price** or **Contract Time**, as provided in Articles 10 and 11.

6.16 Shop Drawings and Samples

6.16.1. After checking and verifying all field measurements and after complying with applicable procedures specified in the **General Requirements**, **CONTRACTOR** shall submit to **DESIGN ENGINEER** for review and approval in accordance with the accepted schedule of **Shop Drawing** submissions, five (5) copies for use by **CITY**, **DESIGN ENGINEER** and **ENGINEER** plus additional copies as required by **CONTRACTOR** (unless otherwise specified in the **Contract Documents**) of all **Shop Drawings**, which shall have been checked by and stamped with the approval of **CONTRACTOR** and identified as **DESIGN ENGINEER** and **ENGINEER** may require. **CONTRACTOR** shall submit a copy of the transmittal letter providing drawing numbers and titles for each item included in a **Shop Drawing** submittal to **ENGINEER** at the same time each submittal is made to **DESIGN ENGINEER**.

6.16.2. **CONTRACTOR** shall also submit to **ENGINEER** for review and approval, with such promptness as to cause no delay in the **Work**, all samples required by the **Contract Documents**. All samples shall have been checked by and stamped with the approval of **CONTRACTOR**, identified clearly as to material, manufacturer, any pertinent data such as catalog numbers and the use for which it is intended.

6.16.3. **CONTRACTOR**'s stamp of approval on any **Shop Drawing** or sample shall specifically indicate in writing, or if not indicated in writing, shall constitute a representation that **CONTRACTOR** has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, specified performance criteria, and similar data or assumes full responsibility for doing so, and that **CONTRACTOR** has reviewed or coordinated each **Shop Drawing** or sample with the requirements of the **Work** and the **Contract Documents**.

6.16.4. At the time of each submission, **CONTRACTOR** shall in writing call **ENGINEER**'s and **DESIGN ENGINEER**'s attention to any deviations that the **Shop Drawings** or samples may have from the requirements of the **Contract Documents**, and, in addition, shall cause a specific notation to be made on each **Shop Drawing** submitted of each such variation.

6.16.5. **DESIGN ENGINEER** will review **Shop Drawings** and **ENGINEER** will review samples for approval. **DESIGN ENGINEER**'s and **ENGINEER**'s review and approval will be only for conformance with the design concept of the **Project** and for compliance with the information given in the **Contract Documents** and shall not extend to the accuracy of other matters that may be contained in the submittals, including but not limited to such matters as dimensions, quantities, performance of equipment and systems designed by **CONTRACTOR**, engineering design furnished by **CONTRACTOR**, **CONTRACTOR**'s means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the **Contract Documents**) or to safety precautions or programs incident thereto, the correctness of which shall remain the sole responsibility of **CONTRACTOR**. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. **CONTRACTOR** shall make any corrections required by **DESIGN ENGINEER** and **ENGINEER** and shall return the required number of corrected copies of **Shop Drawings** and resubmit new samples for review. **CONTRACTOR** shall direct specific attention in writing to revisions other than the corrections called for by **DESIGN ENGINEER** or **ENGINEER** on previous submittals.

6.16.6. **DESIGN ENGINEER**'s and **ENGINEER**'s review and approval of **Shop Drawings** or samples shall not relieve **CONTRACTOR** from responsibility for any variation from the requirements of the **Contract Documents** unless **CONTRACTOR** has in writing called **DESIGN ENGINEER**'s and **ENGINEER**'s attention to each such variation at the time of submission and **DESIGN ENGINEER** or **ENGINEER** has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the **Shop Drawing** or sample approval; nor will any approval by **DESIGN ENGINEER** or **ENGINEER** relieve **CONTRACTOR** from responsibility for errors or omissions in the **Shop Drawings** or from responsibility for having complied with the provisions of paragraph 6.16.3.

6.16.7. Where a **Shop Drawing** or sample is required by the **Specifications**, no related **Work** shall be commenced until the submittal has been returned by **DESIGN ENGINEER** or **ENGINEER** and noted "approved". **CONTRACTOR** shall make all changes and corrections required by **DESIGN ENGINEER** or **ENGINEER**.

6.16.8. All costs incurred in connection with **DESIGN ENGINEER's** or **ENGINEER's** review and return of a particular **Shop Drawing** or sample submission after **DESIGN ENGINEER's** or **ENGINEER's** second time review shall be borne by **CONTRACTOR**, including **DESIGN ENGINEER's** and **ENGINEER's** charges to **CITY** under the terms of their agreements with **CITY**. **CITY** shall be entitled to deduct these costs from the **Contract Price** by issuing a **Change Order**.

6.16.9. In reviewing **Shop Drawings** or samples, **DESIGN ENGINEER** or **ENGINEER** shall be allowed (fifteen) 15 **days** from the date **DESIGN ENGINEER** or **ENGINEER** receives the submittal or resubmittal from **CONTRACTOR** to return the submittal in accordance with this Article, unless otherwise provided in the **Contract Documents**. **DESIGN ENGINEER's** or **ENGINEER's** review and return of a **Shop Drawing** or sample within the time allowed shall not justify an increase in **Contract Price** or an extension in **Contract Time**. Any delay in connection with **CONTRACTOR's** submittal and any resubmittal of a particular **Shop Drawing** or sample shall represent delays under the control of **CONTRACTOR** and shall not justify an increase in **Contract Price** or an extension in **Contract Time**.

6.17 Continuing the Work

CONTRACTOR shall carry on the **Work** and maintain the **Progress Schedule** during all disputes or disagreements with **CITY**. No **Work** shall be delayed or postponed pending resolution of any disputes or disagreements, except as **CONTRACTOR** and **CITY** may otherwise agree in writing. Suspension of the **Work** by **CONTRACTOR** during any dispute or disagreement with **CITY** shall entitle **CITY** to terminate the **CONTRACT** for cause, except as otherwise provided in Article 15.

6.18 Indemnity

6.18.1. To the fullest extent permitted by law, **CONTRACTOR** shall indemnify and hold harmless **CITY** and its officers and employees from liabilities, damages, losses, and costs, including reasonable attorney's fees to the extent caused by the negligence, recklessness or intentional wrongful misconduct of the **CONTRACTOR** and persons employed or utilized by the **CONTRACTOR** in the performance of the Agreement.

6.18.2. In the event that **CITY** incurs costs contrary to this indemnification agreement, **CITY** shall be entitled to deduct these costs from the **Contract Price** by issuing a **Change Order**.

6.19 Progress of the Work

6.19.1. If **ENGINEER** determines that **CONTRACTOR** is failing to maintain progress of the **Work** in accordance with the **Progress Schedules** and the **Special Provisions**, **CONTRACTOR** shall take steps as may be necessary to improve his progress, and **ENGINEER** may require him to increase his work force, or hours, or **days** of work, or the amount of construction plant or all of them, and to submit to **ENGINEER** for approval such supplementary schedule or schedules as may be deemed necessary to demonstrate the manner in which the requisite progress will be regained and maintained, all without additional cost to **CITY**.

6.19.2. Failure of **CONTRACTOR** to comply with the requirements of **ENGINEER** under this Article shall be grounds for determination by **ENGINEER** that **CONTRACTOR** is not prosecuting the **Work** with such diligence as will insure completion within the time specified. **ENGINEER** will then so inform **CITY**. **CITY** may thereupon suspend the **Work** or terminate **CONTRACTOR's** services should **CONTRACTOR** fail to comply with the above paragraph.

6.20 Project Meetings

6.20.1. The **CONTRACTOR** along with appropriate **Subcontractors** shall attend Project Meetings requested by **ENGINEER** or **CITY** for the purpose of discussing and resolving matters concerning the various elements of the **Work**. Representatives attending such meetings shall have the authority to bind their respective entities to any decisions made. If **CONTRACTOR** and/or his **Subcontractors** fail to attend a meeting, **CITY** shall be entitled to deduct the costs of **CITY**, **ENGINEER**, and **DESIGN ENGINEER** representatives attending the meeting from the **CONTRACT PRICE** by issuing a **Change Order**.

6.20.2. **CONTRACTOR** shall submit for the Project Meeting a summary bar chart of the work activities anticipated for the following fourteen days. This schedule will be used by the **ENGINEER** for the planning of testing and inspection and shall be an item of discussion at the Project Meeting.

6.21 CONTRACTOR Not Agent of CITY

CONTRACTOR shall perform all **Work** under this **Agreement** as an Independent Contractor and shall not be considered an agent of **CITY**, nor shall **CONTRACTOR's Subcontractors** or **Suppliers** or employees be considered agents of **CITY**. **CONTRACTOR** and not **CITY** shall be solely responsible to any and all **Subcontractors** and **Suppliers** and all those employed by them for their costs, expenses, fees and profits, if any, in performing the **Work**.

6.22 Inspection and Audit

6.22.1. **CITY** shall have access to the **Work** and the right to audit all of **CONTRACTOR's** books, ledgers, records, correspondence, instructions, drawings, receipts, vouchers, memoranda, and other documents pertinent to all **Cost and Pricing Data** used by Contractor in the determination of **CONTRACTOR'S Bid** for the **Work**, in pricing, negotiating or costing **Work** covered by a **Change Order**, **Change Request** or **Claim**, or otherwise relating to the **Work**, and **CONTRACTOR** shall preserve and make available at **CONTRACTOR's** office at all reasonable times all such records for a period of five (5) years after Final Payment.

6.22.2. In the event of termination, the records relating to the **Work**, or part thereof, affected by such termination shall be made available for five (5) years after the termination. Records pertaining to **Claims**, to litigation or the settlement of **Claims** arising under or relating to the performance of the **Work** shall be made available until disposition of such appeals, litigation, or **Claims**.

6.22.3. **CONTRACTOR** shall insert a provision containing all the requirements of paragraph 6.22, including this paragraph 6.22.3, in all **Subagreements** between **CONTRACTOR** and **Subcontractors** or **Suppliers** or other persons, altering the paragraph only as necessary to identify properly the contracting parties.

6.23 Truth-In-Negotiation

6.23.1 **CONTRACTOR** warrants that all bid line items are true, complete and accurate and include all costs, overhead, profit and all other amounts associated with such items and may be relied upon by **CITY** when making additions or deductions to the **Contract Price**. **CONTRACTOR** further warrants that all **Cost and Pricing Data** provided to **ENGINEER** and **CITY** during the term of the **Agreement** shall be complete, accurate and current when provided. Should there be any changes in the **Cost and Pricing Data** previously submitted, the **CONTRACTOR** shall notify and provide the new information to **ENGINEER** and **CITY** immediately. **CITY** shall be entitled to issue an appropriate **Change Order** to adjust the **Contract Price** and **Contract Time** on account of corrections to inaccurate or incomplete information provided by **CONTRACTOR**.

6.23.2 Despite any provisions in the **Contract Documents** to the contrary, any amounts paid by **CITY** to **CONTRACTOR** in excess of what it is entitled under the **Contract Documents** shall be reimbursed by **CONTRACTOR** to **CITY**. The making of Final Payment to Contractor shall not be a waiver of City's right to reimbursement from Contractor nor shall it discharge Contractor's obligation to refund the overpayment. The terms of paragraph 6.23 shall survive the City's making Final Payment.

6.23.3 **CONTRACTOR** shall insert a provision containing all the requirements of paragraph 6.23, including this paragraph 6.23.3, in all **Subagreements** between **CONTRACTOR** and **Subcontractors** or **Suppliers** or other persons, altering the paragraph only as necessary to identify properly the contracting parties.

6.24 Correspondence

All **CONTRACTOR**'s correspondence shall have identification numbers assigned by **CONTRACTOR**. The identification numbers shall be sequential and assigned chronologically such that each **CONTRACTOR**'s submission can be individually identified by reference to the assigned identification number. The numbering system must be approved by **ENGINEER**. Any correspondence not so identified may not be accepted by **ENGINEER**.

6.25 Protection of Historical Properties

6.25.1 **CONTRACTOR** shall comply with Florida's Archives and Historical 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 **Work**.

6.25.2 **CONTRACTOR** shall be responsible for reporting immediately to the governmental entity or agency with jurisdiction any archaeological features which are encountered or unearthed during the performance of the **Work**, and for protecting same to the satisfaction of such governmental entity or agency. **CONTRACTOR** shall absorb all related delay, extension or acceleration costs, however caused, except that if **CITY** and **CONTRACTOR** believe the delays require an extension in **Contract Time**, **CITY** shall authorize the necessary change in **Contract Time** only.

6.26 Responsibility for Connecting to Existing Services and Utilities

At all points where the **Work** constructed by **CONTRACTOR** connects to existing utilities and services, the actual **Work** of making the necessary connection to the existing service or utility shall be arranged for by **CONTRACTOR** at no expense to **CITY** (unless specifically indicated otherwise). Services and utilities included within (but not limited to) this responsibility are roads, ditches, electrical, sewer, mechanical utilities, water, fencing, etc. Connections shall be made at a time that will result in the least possible interference with existing services.

6.27 Additional Provisions

6.27.1. **CONTRACTOR** shall be responsible for all cutting of masonry and other materials, and all fitting, drilling or patching which may be necessary to complete the **Work** or to make its several parts fit together properly, whether or not such **Work** is expressly specified in the **Contract Documents**.

6.27.2. **CONTRACTOR** shall be responsible for preparing and delivering to **ENGINEER**, on a daily basis, reports recording labor and equipment available and utilized, and materials and equipment received each day, on a form acceptable to **ENGINEER**. If **CONTRACTOR** fails to submit reports daily, **ENGINEER** may withhold approval of any **Application for Payment** until such time as **CONTRACTOR** submits the required information. **CONTRACTOR** shall make available any such records as requested by **ENGINEER** to verify that the reports are accurate.

6.27.3. **CONTRACTOR** shall submit to **ENGINEER** at the beginning of each work shift, a list of specific items requiring final inspection, monitoring, or witnessing by **ENGINEER**.

ARTICLE 7 - WORK BY OTHERS

7.1 Related Work At Site

7.1.1. **CITY** may perform other work at the site by **CITY**'s own forces, provide for or allow other work to be performed by other owners, or let other direct contracts for other work. If the fact that such other work is to be performed was not noted in the **Contract Documents**, written notice thereof will be given to **CONTRACTOR** prior to starting any such other work.

7.1.2. **CONTRACTOR** shall afford each owner and contractor (or **CITY**, if **CITY** is performing the additional work with **CITY's** employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the **Work** with theirs. **CONTRACTOR** shall do all cutting, fitting and patching of the **Work** that may be required to make it integrate properly with such other work. **CONTRACTOR** shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of **ENGINEER** and the others whose work will be affected.

7.1.3. If any part of **CONTRACTOR's Work** depends for proper execution or results upon the work of **CITY** or any such other contractor or owner, **CONTRACTOR** shall inspect and promptly report to **ENGINEER** in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. **CONTRACTOR's** failure to so report will constitute an acceptance of the other work as fit and proper for integration with **CONTRACTOR's Work** except for latent or nonapparent defects and deficiencies in the other work. Wherever **Work** to be performed by **CONTRACTOR** is dependent upon the work of any separate contractor, **CONTRACTOR** shall: (1) coordinate his **Work** with the dependent work; (2) provide necessary dependent data and requirements; (3) supply and/or install items to be built into dependent work of others; (4) make provisions for dependent work; (5) check and verify dependent dimensions of previously placed work; (6) notify **ENGINEER** of previously placed dependent work or dependent dimensions which are unsatisfactory or will prevent a satisfactory installation of any such **Work**; and (7) not proceed with any such **Work** until any unsatisfactory dependent conditions have been corrected. Installation of **Work** by **CONTRACTOR** or by a **Subcontractor** in any given area shall constitute acceptance by **CONTRACTOR** or by such **Subcontractor** of all previously placed dependent work, subject to the exceptions previously noted.

7.1.4. If **CITY** contracts with others for the performance of other work at the site, the person or organization with the authority and responsibility for coordination of the activities among the various prime contractors may be identified in the **Supplementary Conditions**, and the specific matters to be covered by such authority and responsibility may be itemized, and the extent of such authority and responsibilities may be provided, in the **Supplementary Conditions**. Unless otherwise provided in the **Supplementary Conditions**, coordination with other prime contractors will be the responsibility of each prime contractor and neither **CITY** nor **ENGINEER** shall have any authority or responsibility in respect of such coordination.

7.2 Mutual Duties and Responsibilities

7.2.1. Should **CONTRACTOR** cause damage to the work or property of any separate contractor or owner performing work at or contiguous to the site, or should any claim arising out of **CONTRACTOR's** performance of **Work** at or contiguous to the site be made by any separate contractor or utility owner against **CONTRACTOR**, **CITY**, **ENGINEER**, or **DESIGN ENGINEER**, **CONTRACTOR** shall promptly attempt to settle with such separate contractor or utility owner by agreement, or to otherwise resolve the dispute at equity or at law.

7.2.2. Should any separate contractor or owner cause damage to the **Work** or property of **CONTRACTOR**, or should the performance of work by any separate contractor or owner at or contiguous to the site give rise to any other claim by **CONTRACTOR**, **CONTRACTOR** shall promptly attempt to settle with such separate contractor or owner by agreement, or to otherwise resolve the dispute at equity or at law. **CONTRACTOR** shall not institute any action, legal or equitable, against **CITY**, **ENGINEER**, **DESIGN ENGINEER**, or their consultants directors, officers, agents, and employees or permit any action against them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability or recover damages from **CITY**, **ENGINEER**, **DESIGN ENGINEER** or their consultants, directors, officers, agents, or employees on account of these.

7.2.3. In the event that **CITY** incurs costs contrary to the provisions of this paragraph, **CITY** will be entitled to deduct these costs from the **Contract Price** by using a **Change Order**.

7.3 Extensions in Contract Time

7.3.1. If **CONTRACTOR** is delayed at any time in performing or furnishing the **Work** by any act or neglect of another contractor or entity performing work at the site noted in the **Contract Documents**, **CONTRACTOR** may request an extension in Contract Time; if **CITY** believes that the delay requires an adjustment in **Contract Time**, City

shall authorize the necessary extension of Contract Time. However, an extension in **Contract Time(s)**, if so granted, shall be **CONTRACTOR's** sole and exclusive remedy with respect to **CITY, ENGINEER, and DESIGN ENGINEER**, and their consultants, agents and employees for any delay, disruption, interference, extension, acceleration or hindrance and associated costs, however caused, resulting from delays caused by others performing other work at the site.

7.4 Contract Time Coordination

7.4.1. **CONTRACTOR** shall give prompt written notice to **CITY, ENGINEER** and any other affected contractor(s) whenever **CONTRACTOR** anticipates a conflict in **Contract Time(s)** related to or simultaneous with associated contract time (s) in the work of others. Within seven (7) days thereafter, **CONTRACTOR** shall be required to deliver to **ENGINEER** proposed actions to either (a) prevent an adverse effect on the **Progress Schedule** of the other contractors arising from delays to the **Work**, or (b) prevent or overcome an adverse effect on the **Progress Schedule** for the **Work** arising from delays from another contract.

7.4.2. When **Work** is performed out of sequence and ahead of interfacing work, **CONTRACTOR** shall be responsible for taking reasonable steps to minimize damage or loss to the **Work** which may be caused by others during the performance of their work, including (but not limited to) furnishing written notice to **ENGINEER** and to the other contractors that **Work** has been performed out of sequence and ahead of interfacing work.

7.4.3. When work by others is performed out of sequence and ahead of interfacing **Work**, the said work shall be considered as if it had been shown on the **Contract Documents**. **CONTRACTOR** shall be responsible for protecting said work and shall replace, repair or otherwise settle with others any and all damage caused as a result of the performance of work out of sequence unless **CONTRACTOR** had no actual knowledge thereof or could not reasonably have known thereof.

ARTICLE 8 - CITY'S RESPONSIBILITIES

8.1 General

8.1.1. **CITY** shall generally issue all communications to **CONTRACTOR** through **ENGINEER**.

8.1.2. In case of termination of the employment of **ENGINEER**, **CITY** shall appoint an engineer whose status under the **Contract Documents** shall be that of the former **ENGINEER**.

8.1.3. **CITY** shall furnish the data required of **CITY** under the **Contract Documents** promptly and shall make payments to **CONTRACTOR** promptly after they are due as provided in Article 14.

8.1.4. **CITY's** duties in respect of providing lands and easements and engineering surveys to establish reference points and identifying and making available to **CONTRACTOR** copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by **DESIGN ENGINEER** in preparing the **Drawings** and **Specifications** are set forth in Article 4.

8.1.5. **CITY** will issue unilaterally or negotiate, at its discretion, **Change Orders** and **Change Requests** as provided in Article 10.

8.1.6. **CITY's** responsibility in respect of certain inspections, tests and approvals is set forth in Article 13.

8.1.7. **CITY** may allow its consultants, agents, attorneys, employees, and others access to the site. **CONTRACTOR** shall cooperate with **CITY** in allowing such access.

ARTICLE 9 - ENGINEER'S AND DESIGN ENGINEER'S STATUS DURING CONSTRUCTION

9.1 CITY'S Representative

ENGINEER will be **CITY's** representative during the construction of the **Work**. The duties and responsibilities and the limitations of authority of **ENGINEER** as **CITY's** representative during construction are set forth in the **Contract Documents** and shall not be extended without written consent of **CITY** and **ENGINEER**.

9.2 Visits to Site

9.2.1. **DESIGN ENGINEER** may make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed **Work** and to determine, in general, if the **Work** is proceeding in accordance with the **Contract Documents**.

9.2.2. **ENGINEER** will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed **Work** and to determine, in general, if the **Work** is proceeding in accordance with the **Contract Documents**.

9.3 Project Representation

ENGINEER may furnish a **Construction Manager** and **Field Representative(s)** to assist **ENGINEER** in observing the performance of the **Work**. **CITY** may designate another agent to represent **CITY** at the site who is not **ENGINEER's** agent or employee.

9.4 Duties, Responsibilities and Limitations of Authority of Construction Manager:

9.4.1. **Construction Manager** will act as directed by **ENGINEER** and will confer with **ENGINEER** regarding his activities. **Construction Manager** will perform the duties and responsibilities described herein with the assistance of **Field Representative(s)**. **ENGINEER** shall generally issue all communications to **CONTRACTOR** through **Construction Manager**, including but not limited to communications directed to **CONTRACTOR**, from **CITY** through **ENGINEER**. **CONTRACTOR** shall generally issue all communications to **CITY**, **DESIGN ENGINEER** and **ENGINEER** through **Construction Manager**.

9.4.2. **Construction Manager** will: review daily inspection reports prepared by **Field Representative(s)**; issue **Field Orders**, prepare **Change Requests** or **Change Orders** as required and review them with **Field Representative(s)**, **ENGINEER** or **CITY**, as applicable.

9.4.3. **Construction Manager** will attend meetings with **CONTRACTOR**, such as the Preconstruction Conference, Project Meetings and any other **Project** related meetings and prepare and circulate copies of minutes thereof.

9.4.4. **Construction Manager** will serve as **DESIGN ENGINEER's** liaison with **CONTRACTOR**, working principally through **CONTRACTOR's** superintendent, to assist in understanding the intent of the **Contract Documents**, and will serve as **CITY's** liaison with **CONTRACTOR** when **CONTRACTOR's** operations affect **CITY's** on-site operations, and when additional information is required from **CITY** for proper execution of the **Work**.

9.4.5. **Construction Manager** will advise **CONTRACTOR**, through or with the assistance of **Field Representative(s)**, of the commencement of any **Work** requiring a **Shop Drawing** or sample, when it is observed that a submittal has not been reviewed by **DESIGN ENGINEER**.

9.4.6. **Construction Manager** will conduct general on-site observations of the **Work** in progress and receive **Field Representative(s)'s** observation comments and written non-conformance reports, to determine if the **Work** is proceeding in accordance with the **Contract Documents**.

9.4.7. **Construction Manager** will notify **CONTRACTOR**, through or with the assistance of **Field Representative(s)**, of disapproval or rejection of **Work** whenever **Construction Manager**, **Field Representative**, or **ENGINEER** believe that any **Work** is defective, and will notify **CONTRACTOR** whether defective **Work** is to be corrected, or replaced.

9.4.8. **Construction Manager** will notify **CONTRACTOR**, through or with the assistance of **Field Representative(s)**, of any **Work** that is to be uncovered for observation, testing inspection or approval.

9.4.9. **Construction Manager** will accompany, through or with the assistance of **Field Representative(s)**, visiting inspectors representing governmental or other agencies having jurisdiction over the **Project**, and record the results of the inspections and report to **ENGINEER**.

9.4.10. **Construction Manager** will transmit to **CONTRACTOR** clarifications and interpretations as issued by **ENGINEER**.

9.4.11. **Construction Manager** will consider and evaluate **CONTRACTOR**'s proposed variations and the changes in the **Work** or the **Contract Documents** and report such proposals and evaluations to **ENGINEER**. **Construction Manager** will communicate decisions on such proposals to **CONTRACTOR** as issued by **ENGINEER** or **CITY**.

9.4.12. **Construction Manager** will report promptly to **ENGINEER** and **CITY** upon gaining knowledge of the occurrence of any accident at the site.

9.4.13. **Construction Manager** will prepare reports of the progress of the **Work** and of **CONTRACTOR**'s compliance with the **Progress Schedule**.

9.4.14. **Construction Manager** will consult as appropriate with **ENGINEER** in advance of scheduled major tests, inspections or the commencement of important phases of the **Work**.

9.4.15. **Construction Manager** will review and evaluate **CONTRACTOR**'s **Application for Payment** and advise **ENGINEER** accordingly.

9.4.16. **Construction Manager** will review and evaluate **CONTRACTOR**'s notice that **CONTRACTOR** considers the **Work** (or part thereof) substantially complete and advise **ENGINEER** accordingly.

9.4.17. **Construction Manager** will observe whether all items on lists of items to be completed prior to Final Payment have been completed and make recommendations to **ENGINEER** concerning **Acceptance**.

9.4.18. During the course of the **Work**, the **Construction Manager** will verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by **CONTRACTOR** are applicable to the items actually installed and deliver this material to **ENGINEER**.

9.4.19. **Construction Manager** will not: (1) authorize any variation or change in the **Work** or in the **Contract Documents**, except for **Field Orders**, or approve any equivalent material or equipment; (2) exceed the limitations of **Construction Manager**'s authority as set forth in this document; (3) undertake any of the responsibilities of **CONTRACTOR**, **Subcontractors** or **CONTRACTOR**'s superintendent, or expedite the **Work**; (4) inspect, advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the **Contract Documents**; (5) inspect, advise on or issue directions as to safety precautions and programs in connection with the **Work**, except for **Work** that may fail to comply with any applicable **Laws** and **Regulations**; (6) certify **Substantial Completion** of the **Work**; or (7) participate in specialized field or laboratory tests, unless qualified by an appropriate certifying agency.

9.5 Duties, Responsibilities and Limitations of Authority of Field Representative(s)

9.5.1. As requested by **Construction Manager**, **Field Representative(s)** will assist in obtaining from **CITY** additional details or information, when required at the job site for proper execution of the **Work**.

9.5.2. **Field Representative(s)** will advise **Construction Manager** and **CONTRACTOR** of the commencement of any **Work** requiring a **Shop Drawing** or sample submission if he observes that a submittal(s) has not been reviewed by **DESIGN ENGINEER**.

9.5.3. **Field Representative(s)** will conduct on-site observations of the **Work** in progress to assist **Construction Manager** in determining if the **Work** is proceeding in accordance with the **Contract Documents** and that completed **Work** will substantially conform to the **Contract Documents**. **Field Representative(s)** may issue **Field Orders**.

9.5.4. **Field Representative(s)** will notify **CONTRACTOR** by issuance of a written notice of non-conformance and report to **Construction Manager** for review and possible disapproval or rejection by **ENGINEER** or **Construction Manager** whenever he believes that any **Work** is **defective** subject to review and concurrence of the **Construction Manager**.

9.5.5. **Field Representative(s)** will notify **CONTRACTOR** and report to **Construction Manager** for determination of necessary action by **ENGINEER** or **Construction Manager** when he believes **Work** should be uncovered for observation, testing, inspection or approval.

9.5.6. **Field Representative(s)** will verify that tests, equipment and systems start-ups and operating and maintenance instructions are conducted as required by the **Contract Documents** and in the presence of the required personnel and that **CONTRACTOR** maintains adequate records thereof; observe, record and report to **Construction Manager** appropriate details relative to the test procedures and start-ups.

9.5.7. **Field Representative(s)** will report to **Construction Manager** when clarifications and interpretations of the **Contract Documents** are needed or requested.

9.5.8. **Field Representative(s)** will keep a diary recording hours on the job site, weather conditions, data relative to questions of extras or deductions, lists of visiting officials and representatives of **Suppliers**, daily activities, decisions, observations in general and specific observations in more detail as in the case of observing test procedures. **Field Representative(s)** will summarize such information on the daily diary and submit copies to **Construction Manager**. **Field Representative** shall meet with the **Superintendent** on a daily basis for concurrence to determine quantities.

9.5.9. **Field Representative(s)** will assist **Construction Manager** with record keeping as directed by **Construction Manager**.

9.5.10. **Field Representative(s)** will report immediately to **CITY**, **ENGINEER** and **Construction Manager** upon gaining knowledge of the occurrence of any accident.

9.5.11. **Field Representative(s)** will assist **Construction Manager** with the review and evaluation of **CONTRACTOR's Application for Payment**, noting particularly their relation to the schedule of values, **Work** completed, and materials and equipment delivered at the site but not incorporated in the **Work**.

9.5.12. **Field Representative(s)** will prepare draft lists of items to be completed or corrected (punch lists) as directed by **Construction Manager**.

9.5.13. **Field Representative(s)** will not: (1) authorize any variation or change in the **Work** or in the **Contract Documents**, except for **Field Orders**, or approve any equivalent material or equipment; (2) exceed the limitations of **Field Representative(s)**'s authority as set forth in this document; (3) undertake any of the responsibilities of **CONTRACTOR**, **Subcontractors** or **CONTRACTOR's** superintendent, or expedite the **Work**; (4) inspect, advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the **Contract Documents**; (5) inspect, advise on or issue directions as to safety precautions and programs in connection with the **Work**, except for **Work** that may fail to comply with any applicable **Laws** and **Regulations**; (6) certify **Substantial Completion** of the **Work**; or (7) participate in specialized field or laboratory tests unless qualified by an appropriate certifying agency.

9.6 Clarifications and Interpretations

ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the **Contract Documents** (in the form of **Drawings** or otherwise) as **ENGINEER** may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the **Contract Documents**.

9.7 Authorized Variations in Work

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 Time** and are consistent with the overall intent of the **Contract Documents** and required to produce the intended result. These may be accomplished by a **Field Order** and will be binding on **CONTRACTOR** who shall perform the **Work** involved promptly.

9.8 Rejecting Defective Work

ENGINEER, Construction Manager, or Field Representative will have authority to disapprove or reject **Work** at any time during the construction of the **Work**, which **ENGINEER, Construction Manager, or Field Representative** believes to be defective. **ENGINEER, Construction Manager, or Field Representative** will also have authority to require special inspection or testing of the **Work**, whether or not the **Work** is fabricated, installed, or completed. When **CONTRACTOR** has been notified by **ENGINEER, Construction Manager, or Field Representative** of disapproval or rejection of defective **Work**, **CONTRACTOR** shall take immediate action to correct or replace same.

9.9 Determinations of Quantities and Classifications of Unit Price Work

ENGINEER, with the assistance of the **Field Representative, and CONSTRUCTION MANAGER** will determine the actual quantities of each classification of **Unit Price Work**. **ENGINEER** will review with **CONTRACTOR, 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 decisions thereon will be final and binding upon **CONTRACTOR**, unless, within seven (7) days after the date of any such decision, **CONTRACTOR** delivers to **CITY** written notice of a **Claim**.

9.10 Decisions on Disputes

Construction Manager will be the initial interpreter of the requirements of the **Contract Documents**, and in such capacity will render initial determinations in respect of the acceptability of the **Work** thereunder. Unless otherwise provided in the **Contract Documents**, notices, proposals or other matter relating to the acceptability of the **Work** or the interpretation of the requirements of the **Contract Documents** pertaining to the performance and furnishing of the **Work** will be referred initially to **Construction Manager** in writing with a request for a formal decision in accordance with this paragraph, which **Construction Manager** will render within a reasonable time. **Construction Manager's** written determination thereon shall be final and binding on **CONTRACTOR** unless **CONTRACTOR** delivers to **CITY** written notice of a **Claim** within seven (7) days of receipt of such decision.

9.11 Limitations on ENGINEER's and DESIGN ENGINEER's Responsibilities

9.11.1. Neither **ENGINEER's** or **DESIGN ENGINEER's** authority to act under this Article or elsewhere in the **Contract Documents** nor any decision or determination made by **ENGINEER** or **DESIGN ENGINEER** in good faith to exercise or not to exercise such authority shall give rise to any duty or responsibility of **ENGINEER** or **DESIGN ENGINEER** to **CONTRACTOR**, any **Subcontractor**, any **Supplier**, or any other person or organization performing any of the **Work**, or to any surety for any of them.

9.11.2. Whenever in the **Contract Documents** the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe requirement, direction, review or judgment of **ENGINEER** or **DESIGN ENGINEER** as to the **Work**, it is intended that such requirement, direction, review or judgment will be solely to evaluate the **Work** for compliance with the **Contract Documents** (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective

to assign to **ENGINEER** or **DESIGN ENGINEER** any duty or authority to supervise or direct the furnishing or performance of the **Work** or any duty or authority to undertake responsibility contrary to the provisions of this Article.

9.11.3. **ENGINEER** and **DESIGN ENGINEER** will not be responsible for **CONTRACTOR**'s means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and **ENGINEER** and **DESIGN ENGINEER** will not be responsible for **CONTRACTOR**'s failure to perform or furnish the **Work** in accordance with the **Contract Documents**.

9.11.4. **ENGINEER** and **DESIGN ENGINEER** will not be responsible for the acts or omissions of **CONTRACTOR** or of any **Subcontractor**, any **Supplier**, or of any other person or organization performing or furnishing any of the **Work**.

ARTICLE 10--CHANGES IN THE WORK

10.1 Changes in the Work

10.1.1 Without invalidating the **Agreement** and without notice to any surety, **CITY** may, at any time, by duly executed **Change Order** or **Change Request**, order changes within the scope of the **Agreement** consisting of additions, deletions or other revisions in the **Work**. Upon receipt of that order, **CONTRACTOR** shall promptly proceed or continue with the **Work** involved (based on the conditions stated and other applicable conditions in the **Contract Documents**). If a change under this Article causes an increase or decrease in the **Contract Price** or any extension or shortening of the **Contract Time**, **CITY** will make an adjustment as provided in Article 11.

10.1.2 **CITY** or **ENGINEER** may present to **CONTRACTOR** an unsigned proposed **Change Request** requesting that **CONTRACTOR** submit a proposal for an adjustment in **Contract Price** or **Contract Time** for a proposed change in the **Work**. **CONTRACTOR** shall submit a proposed adjustment with all supporting data in accordance with Article 11 and the directions given in the **Change Request** within 14 days of receipt. Said proposed adjustment shall include an itemized estimate of all costs and time for the performance that will result directly or indirectly from the changes described. Estimates shall be prepared in accordance with the requirements of Article 11 and in sufficient detail and with documentation such that **ENGINEER** can (1) analyze all material, labor, equipment, subcontract, overhead costs and fees, and any other costs covering all aspects of the **Work** involved in the change, whether such was added, deleted, changed, or impacted; (2) determine that the proposal reflects all impacts on the Contract of the proposed change; and (3) establish that all Contract provisions have been complied with. Any amount proposed for **Subcontractors** or **Suppliers** shall be similarly supported.

10.1.3 **CITY** or **ENGINEER** may give instructions which may result in changes in the **Work** not involving an adjustment in the **Contract Price** or the **Contract Time** when such changes are necessary or expedient to the satisfactory performance and completion of the **Work**. These instructions shall be binding on **CONTRACTOR**. Any instruction, direction, interpretation, or determination from **CITY**, **ENGINEER** or any other source which causes a change shall be treated as a change under this Article provided that **CONTRACTOR** gives **ENGINEER** written notice stating the date, circumstances, specific order, and that **CONTRACTOR** regards the instruction as a change. Such written notification shall be given to **ENGINEER** within 7 days after receipt and before **CONTRACTOR** acts on said instruction, direction, interpretation, or determination. No **Claim**, change or notice by **CONTRACTOR** will be allowed if asserted after work has commenced on, or if notice is not provided within the stated time limit provided after receipt of, the instruction, direction, interpretation, or determination from **CITY**, **ENGINEER**, or any other source.

10.1.4 In making changes under this Article, **CITY** may give consideration to a notice, proposal or **Claim** from **CONTRACTOR**, provided the notice, proposal or **Claim** is presented in accordance with the requirements of this Article and Article 11. **CONTRACTOR** shall provide **CITY** or **ENGINEER** any additional or supplemental information requested for purposes of evaluation of **CONTRACTOR**'s submittal, but such requests by the **CITY** or **ENGINEER** will not constitute acceptance of the notice, proposal or **Claim**.

10.1.5 **ENGINEER** will evaluate a change notice, proposal or **Claim** from **CONTRACTOR**, and **CITY** will review with **CONTRACTOR** the results of the evaluation before rendering a determination. If **CITY**, with the advice of **ENGINEER**, concurs that a change in the **Work** has occurred or been ordered, **CONTRACTOR** will be directed to submit a proposal for an adjustment in accordance with paragraph 10.1.2. If **CITY** concludes that a change

has not occurred or been ordered, **CITY's** determination shall be final and binding on **CONTRACTOR** unless **CONTRACTOR** delivers to **CITY** written notice of a **Claim** within 7 days from receipt of such decision.

10.1.6 If notice of any change affecting the general scope of the **Work** or change in the **Contract Price** is required by the provisions of any **Bond** to be given to the Surety, it shall be **CONTRACTOR's** responsibility to so notify the Surety, and the amount of each applicable **Bond** shall be adjusted accordingly. **CONTRACTOR** shall furnish proof of such adjustment to **CITY** if requested.

10.2 Change Orders and Change Requests

10.2.1 **Contract Price** or **Contract Time** shall be changed only by **Change Order**. The basis for a subsequent change in **Contract Price** or **Contract Time** may also be authorized by **Change Request** duly executed by the **CITY**.

10.2.2 A **Change Order** duly executed by **CITY** and **CONTRACTOR** provides for an all inclusive settlement for all changes and direct, supplemental, indirect, consequential and cumulative costs and delays, and **CONTRACTOR's** signature represents a waiver of any and all rights to file a **Claim** on account of that instrument.

10.2.3 **CITY** and **CONTRACTOR** shall execute **Change Orders** covering changes in the **Work** (including any necessary adjustments in **Contract Price** or **Contract Time**) which are ordered or agreed to by the parties, changes in **Contract Price** or **Contract Time** which are agreed to in total or in part, or previously executed **Change Requests** with reasonable promptness. Adjustments to **Contract Price** resulting from changed work shall only be included in **Applications for Payment** after a **Change Order** has been duly executed. **Change Requests** shall be converted to **Change Orders** with the next **Application for Payment**.

10.2.4 When duly executed by **CITY**, **CITY** may use **Change Requests** to order changes in the **Work**, provide the basis for a subsequent adjustment in **Contract Price** or **Contract Time**, or authorize deviations in the **Work**. Amounts for work directed by a **Change Request** shall not be included in **Applications for Payment** until that **Change Request** has been incorporated into a **Change Order**, and duly executed.

10.2.5 A **Change Order**, or **Change Request**, duly executed by **CITY**, but not executed by **CONTRACTOR**, or executed by **CONTRACTOR** with a notice of reservation of rights to claim additional adjustments, shall become final and binding on **CONTRACTOR**, without consideration of the reservation of rights, unless **CONTRACTOR** delivers to **CITY** written notice of a **Claim** within 7 days after receipt of that instrument.

10.2.6 An unsigned **Change Request** may be used by **CITY** and **CONTRACTOR** to negotiate changes in the **Work**, or in **Contract Price** or **Contract Time**. A **Change Request** will be the instrument used by **CITY** to direct **Work** on a cost of the **Work** basis as described in Article 11. A **Change Order** will be issued to incorporate the instruction to proceed with a change on a cost of the **Work** basis into the **Contract Documents** after the actual cost of the work has been determined.

10.3 Waivers

10.3.1 No proposal or **Claim** by **CONTRACTOR** for an adjustment under this Article shall be allowed for any costs or delay incurred more than 7 days before **CONTRACTOR** gives written notice as required.

10.3.2 No proposal or **Claim** by **CONTRACTOR** for an adjustment under this Article shall be allowed if made after the date of Final Payment.

10.3.3 Additional **Work** performed without authorization of a **Change Order** or properly executed **Change Request** will not entitle **CONTRACTOR** to an increase in **Contract Price** or an extension of **Contract Time**, except in the case of an emergency as provided in Article 6.

10.3.4 **CONTRACTOR** acknowledges that there may be changes during the course of the **Work** and acknowledges that the probable effect of changes has been accounted for in the development of the **Contract Price** and **Progress Schedule**. Whenever **CONTRACTOR** makes a proposal or **Claim** under Article 11 such proposal or **Claim**

shall include the total amount of adjustment in **Contract Price** and **Contract Time** to which the **CONTRACTOR** believes it is entitled. Except as **CITY** and **CONTRACTOR** may otherwise agree in writing, **CONTRACTOR** shall be deemed to have waived (1) any adjustment to which it might otherwise be entitled under Article 11 where such proposal or **Claim** fails to request such adjustments, (2) any increase in the amount of adjustment additional to that requested in the proposal or **Claim**, and (3) any **Claim** for reimbursement of impact allegedly resulting from the cumulative effect of the number, nature, or extent of any changes.

ARTICLE 11--CHANGES IN CONTRACT PRICE OR CONTRACT TIME

11.1 Changes in Contract Price or Contract Time

The **Contract Price** constitutes the total compensation (subject to authorized adjustments) payable to **CONTRACTOR** for all duties, responsibilities, and obligations required to perform the **Work**. All duties, responsibilities, and obligations assigned or undertaken by **CONTRACTOR** shall be at its expense without change in the **Contract Price** or **Contract Time** except as set out below.

11.2 Proposals or Claims Substantiating Adjustments

11.2.1. Supporting data for any proposal or **Claim** by the **CONTRACTOR** shall include at a minimum a complete and detailed breakdown of the proposed price and a detailed explanation of any time impact for the change. Said proposed price shall be based on the lowest reasonable cost consistent with sound construction practice. Such breakdown shall include itemizations by trade of all labor with man hours and hourly rates, equipment with hours of use and rates, and material by item with costs, all in sufficient detail to evaluate the cost of the individual components of the **Work**, including copies of purchase orders, invoices and subcontract change orders.

11.2.2. **CONTRACTOR** proposals or **Claims** shall state in writing, and provide evidence that the amounts included cover all direct, supplemental, indirect, consequential, and cumulative costs and delays, as applicable, and that those costs and delays would be or were necessarily incurred, despite **CONTRACTOR**'s reasonable, prudent and diligent efforts to mitigate them.

11.2.3. **CONTRACTOR** proposals and **Claim** supporting data shall become due within 14 days of receipt of the unsigned **Change Request** or receipt by **CITY** of written notice of **Claim** (unless **ENGINEER** allows an additional period), and shall remain firm for a period of not less than 60 days from receipt by **ENGINEER** of the proposal or supporting data. Any delay in the submittal of a proposal or **Claim** will not justify or constitute basis for an increase in **Contract Price** or **Contract Time**. Proposals or **Claims** shall be submitted on forms acceptable to **CITY**.

11.2.4. Failure of **CONTRACTOR** to comply with the time requirements for written notice or for submittal of supporting data shall be considered a waiver by **CONTRACTOR** of any **Claim** for an addition to the **Contract Price** or an adjustment to the **Contract Time** and **CONTRACTOR** agrees that no additional compensation or time adjustments are due if the provisions of Article 10 and this Article are not complied with.

11.2.5. Where the change in **Contract Price** arises from changes in the schedule of all or part of the **Work**, or where a change in **Contract Time** is sought, the proposal shall be based on a detailed analysis of the **Progress Schedule**, and shall cover all applicable elements affecting the Work involved, including, but not limited to, labor crews, craft levels, equipment utilization, work during other than normal working hours, productivity and production rates, shop drawing preparation, submittal and review, material and equipment delivery, and testing and start-up times.

11.2.6. Proposals or **Claims** shall cover all aspects of the **Work** involved, whether relating to deleted, added, revised, or impacted items of **Work**. Amounts for **Subcontractors** or **Suppliers** at any tier shall be equally supported.

11.2.7. No proposal or **Claim** for an adjustment in **Contract Price** or **Contract Time** shall be valid unless submitted in accordance with Article 10 and this Article.

11.3 Methods for Determining Adjustments in Contract Price

11.3.1. The methods to be used to determine an adjustment in **Contract Price** necessitated by changes ordered or negotiated pursuant to these General Conditions, or **Work** covered by a proposal or a **Claim**, collectively to be referred to as the "**Work** involved," are limited to the following:

11.3.2. Contract Unit Prices: Where the **Work** involved is covered or is of the same character as **Unit Price Work**, by application of those unit prices to the quantities of the items involved (subject to the provisions covering **Unit Price Work**). No additional allowances or charges shall be added to these unit prices.

11.3.3. Negotiated Unit Prices: Where the **Work** involved is not covered by unit prices contained in the **Contract Documents**, unit prices may be negotiated on the basis of costs calculated in accordance with this Article.

11.3.4. Negotiated Lump Sum: By mutual acceptance of a lump sum price negotiated on the basis of **CONTRACTOR's** itemized estimate of the anticipated Cost of the **Work** involved, determined as specified in this Article.

11.3.5. Cost of the **Work**: Where **CITY** and **CONTRACTOR** cannot agree on any of the methods described in paragraphs 11.3.2, 11.3.3, or 11.3.4, **CITY** may direct **CONTRACTOR** to proceed with the **Work** involved on the basis of actual costs in accordance with this Article. When the cost of the **Work** basis is directed by **CITY**, **CITY** shall prescribe the required procedures for accounting of the allowed costs. These procedures shall include daily accounting of the material and equipment used and labor employed. Failure to submit this information for acknowledgement by the **ENGINEER** within one day after any part of the **Work** is performed shall result in any discrepancy between **ENGINEER's** records and **CONTRACTOR's** records being resolved in favor of the **ENGINEER's** records.

11.3.6. Estimated Adjustment: Where **CITY** and **CONTRACTOR** cannot agree on any of the methods described in paragraphs 11.3.2, 11.3.3, or 11.3.4, and the **CITY** does not wish to proceed on a Cost of the **Work** basis as described in paragraph 11.3.5, **CITY** with the advice of **ENGINEER** shall determine a reasonable adjustment of the **Contract Price** for the **Work** involved on the basis as described in Article 10 and this Article. The adjustment in **Contract Price** and **Contract Time** will be issued by **Change Request**, incorporated into the **Contract Documents** by **Change Order** and **CONTRACTOR** shall be paid on that basis. **CITY's** determination shall be final and binding unless **CONTRACTOR** delivers to **CITY** written notice of a **Claim** within seven (7) days of receipt of such determination.

11.3.7. Where the **Work** involved is not covered by any of the preceding methods, and when payment is to be determined by a court of competent jurisdiction, it is agreed that the cost of the **WORK** method shall be the appropriate method for determining the cost of the **Work** involved. Payroll, equipment, material and other costs will only be allowable when determined from daily time sheets which expressly correlate to the **Work** involved, were prepared while work was in progress, clearly list actual units and usage, and were submitted to **ENGINEER** as the work was performed.

11.3.8. Anticipated or actual costs computed for the **Work** involved means the sum of all incremental costs which would be, or actually were, necessarily incurred by **CONTRACTOR** in the proper performance of the **Work**. Those costs shall be in amounts no higher than those prevailing in the locality of the **Project** or as allowed elsewhere in these **Contract Documents**, and shall include only the appropriate items for labor, material, equipment, and supplemental costs specified below.

11.4 Determining Cost Adjustments to Changes in Contract Price

11.4.1. **CONTRACTOR** shall provide to **ENGINEER**, if requested, proof of any burdens, including insurance costs, added to base wages to determine payroll costs described in this Article.

11.4.2. Changes in the Contract Price made on the basis of the methods described in paragraph 11.3 shall be based upon the following: Payroll costs for craft labor in the direct employ of **CONTRACTOR** assigned to the site and engaged in furnishing and incorporating materials or equipment in the **Work** involved. Payroll costs shall include wages plus the necessary labor burdens, which may include social security, unemployment, workers compensation, health and retirement benefits, vacation and **Holiday** pay, and other payments pursuant to union agreements but shall exclude profit sharing, bonuses, and similar remunerations. Labor charges shall be allowed only for hourly labor

directly involved in the **Work**. Such personnel may include working foreman at the site. The cost of all salaried employees shall be considered as a part of allowances allowed in this Article. Labor rates shall be as actually paid based on certified payroll records or in accordance with general rates for various pay categories established by union agreements or by mutual agreement between **CITY** and **CONTRACTOR** prior to the commencement of the **Work**. The expenses of performing **Work** outside of normal working hours, on weekends or **Holidays**, shall be included in the above to the extent authorized by **CITY** as set out in the **Contract Documents**.

11.4.2.2. Payments by **CONTRACTOR** to **Suppliers** for all material and equipment in the **Work** involved, including transportation and storage costs, and necessary **Suppliers** field services. All cash deposits shall accrue to **CITY**, if **CITY** advances funds to **CONTRACTOR** with which to make payments. All trade discounts, rebates and refunds and all returns from sale of surplus items shall accrue to **CITY** and **CONTRACTOR** shall make provisions so that they may be obtained. When required by **CITY**, **CONTRACTOR** shall obtain competitive bids from **Suppliers** in order to achieve a reasonable price. When determining material and equipment costs, actual invoices segregating items associated with **Work** involved shall be the record upon which actual costs shall be based.

11.4.2.3. Payments by **CONTRACTOR** to **Subcontractors** for **Work** involved performed by **Subcontractors**. When required by **CITY**, **CONTRACTOR** shall obtain competitive detailed bids from **Subcontractors** in order to achieve a reasonable price. When determining **Subcontractor** costs at any tier, the **Subcontractor's** Cost shall be determined in the same manner as **CONTRACTOR's** costs. All Subcontracts shall be subject to the provisions of this Article insofar as applicable.

11.4.2.4. Costs of field supplies consumed in the performance of the **Work** involved, and purchase costs of small tools used or consumed in the performance of the **Work** involved (and purchase cost less market value if used but not consumed) which are individually valued at less than \$1,000.00. Consumables shall include such items as rags, nails, fasteners, weld rod, gases, lubricants, paper, grout, stakes, power and fuel for tools and equipment, chains, cables, hoses, water, and similar items normally used in the course of the **Work**.

11.4.2.5. Equipment costs required solely in connection with the **Work** involved reflecting rented or leased or owned equipment cost for individual construction equipment or machinery whose replacement value is in excess of \$1,000.00. Transportation, loading and unloading, installation, dismantling and removal costs shall be included only if such equipment is or was transported to the site solely to perform the **Work** involved. All equipment costs shall cease when the equipment is no longer necessary to perform the **Work** involved. Payroll costs for craft labor operating the equipment shall be as in paragraph 11.4. Equipment costs shall be computed using the same accounting and estimating rules regardless of whether related to added or deleted items of **Work**.

11.4.2.5.1. Rented or owned equipment at the site, and not in actual use, shall be paid at the rates for rented equipment, or on the basis of fifty percent (50%) of the rates for owned equipment, respectively, as specified below. In no event shall the idle time claimed in a day exceed the established normal working hours. Payments for idle equipment shall come due only as long as the equipment was idled solely by actions of **CITY**, and provided that the idle period exceeds that normally experienced for such equipment.

11.4.2.5.2. Except as provided below, for equipment rented or leased, **CONTRACTOR** shall be entitled to amounts based on negotiated rental or lease rates, but in no event shall the amounts allowed exceed an hourly rate based on the monthly rates, listed in the most current and most appropriate Rental Rate Blue Book (Blue Book) published by Dataquest, Inc. for the area where the **Project** is located (presently 3 volumes, relating to equipment of various ages) divided by 176 hours per month. Rates for equipment not included in the Blue Book shall be interpolated or extrapolated from the information contained therein. In addition to the rental or leasing rate, operating costs shall not exceed the estimated hourly operation rate in the Blue Book. For multiple shift **Work**, the allowable equipment rate for second or third shifts shall not exceed fifty percent (50%) of the adjusted base rate.

11.4.2.5.3. For equipment rented or leased from lessor firms associated with or owned by **CONTRACTOR**, **CONTRACTOR** shall be entitled to reimbursement as though the equipment was owned equipment, as specified below.

11.4.2.5.4. For equipment owned by **CONTRACTOR**, **CONTRACTOR** shall be entitled to costs based on billings established by his normal accounting practices, but in no event shall those costs exceed the maximum allowable costs for rented or leased equipment.

11.4.2.6. Costs of special consultants who are not employees in the direct employ of **CONTRACTOR** or any of the **Subcontractors** or **Suppliers**, or special **Subcontractors**; provided that those costs are or were authorized by **CITY** prior to proceeding with the **Work** involved, and only if their activities are not covered by costs included under paragraph 11.4, or are not excluded by paragraph 11.9.

11.4.2.7. Sales, consumer, or similar taxes related to the **Work** involved, and for which **CONTRACTOR** is liable, royalty payments, and fees for permits and licenses, any of them related solely to the **Work** involved.

11.4.2.8. Deposits to be lost for causes other than negligence of **CONTRACTOR**, any **Subcontractor** or anyone directly or indirectly to be employed by any of them or for whose acts any of them may be liable, related solely to the **Work** involved.

11.4.2.9. Increased costs of premiums for **Bonds** and Insurance resulting solely because of the **Work** involved.

11.5 Costs Covered by CONTRACTOR's Allowances

11.5.1. Except as otherwise specifically provided in paragraph 11.9, the cost of the **Work** involved shall not include any of the following costs, all of which are considered to be covered by **CONTRACTOR's** Allowances:

11.5.2. Payroll costs and other compensation of personnel employed by **CONTRACTOR** whether at the site or in **CONTRACTOR's** principal or a branch office for management or administration of the **Work**, including, but not limited to, (a) **CONTRACTOR's** officers, executives, principals, general managers, project managers, construction managers, estimators, schedulers, detailers, claims consultants, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, and (b) resident superintendents, nonworking foremen, field engineers and architects, safety personnel, timekeepers, and clerks.

11.5.3. Expenses of **CONTRACTOR's** principal, branch and site offices except as authorized in writing by **CITY** prior to proceeding with the **Work** involved.

11.5.4. Any part of **CONTRACTOR's** capital expenses, including interest on **CONTRACTOR's** capital employed for the **Work** involved and charges for delinquent payments.

11.5.5. Costs due to the fault or 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 deposits to be lost, costs to correct **defective Work**, disposal of materials or equipment wrongly supplied and making good any damage to property.

11.5.6. Market value of small tools used but not consumed which remain in the property of **CONTRACTOR**.

11.5.7. Costs associated with the preparation of **Change Orders** or **Change Requests** (whether or not ultimately authorized by **CITY**), or the preparation or filing of **Claims**.

11.5.8. Expenses of **CONTRACTOR** associated with anticipated lost profits or lost revenues, lost income or earnings, lost interest on earnings or unpaid retainage.

11.5.9. Costs derived from the computation of a "home office overhead" rate by application of the Eichleay, Allegheny, Burden Fluctuation, or other similar methods.

11.5.10. Costs of special consultants or attorneys, whether or not in the direct employ of **CONTRACTOR**, employed for services specifically related to the resolution of a **Claim**, dispute, or other matter relating to the acceptability of the **Work**.

11.5.11. Other administrative expense or contingent costs of any kind, and the costs of any item not specifically and expressly included in Article 11.

11.6 **CONTRACTOR Allowances for Changes to the Work**

CONTRACTOR's allowances, which includes costs not directly chargeable under this Article, expenses itemized in paragraph 11.5, and profit shall not exceed the following percentages of the various portions of the **Work** involved. No other allowances in addition to these will be allowed.

Cost Element	Allowances for Additions	Allowances for Deletions
CONTRACTOR and Subcontractor labor per 11.4.2.1. exclusive of the premium portion of craft labor.	10%	0%
CONTRACTOR and Subcontractor equipment and materials per 11.4.2.2.	10%	0%
Subcontractor costs resulting from direct Subagreement with CONTRACTOR per 11.4.2.3.	5%	0%
CONTRACTOR and Subcontractor owned or rented equipment per 11.4.2.5.	10%	0%
CONTRACTOR and Subcontractor supplemental costs per 11.4.2.9. premium portion of craft labor costs; and other authorized costs.	0%	0%

11.7 **Unit Price Work**

11.7.1. Where the **Contract Documents** provide for **Unit Price Work**, the **Contract Price** stated in the **Agreement** will include for all **Unit Price Work** an amount equal to the sum of the unit prices for each item of **Unit Price Work** times the estimated quantity of each item as indicated in the **Agreement**. Each unit price will be deemed to include an amount considered by **CONTRACTOR** to be adequate to cover all costs, including supplemental and administrative costs, and profit. The estimated quantities of **Unit Price Work** indicated in the **Agreement** are given solely for the purpose of comparison of bids and determining the **Contract Price** for the **Work** as awarded.

11.7.2. **CONTRACTOR** shall promptly, after becoming aware of, and before proceeding with any significant quantities of affected **Work**, notify **CITY** in writing of any additional or reduced quantities for an item of **Unit Price Work** which will require a twenty percent (20%) or higher adjustment in the as-awarded quantity for that item or an increase in **Contract Price** greater than 5%.

11.7.3. **CITY** reserves the right to notify **CONTRACTOR** in writing of any variation in quantities meeting the criteria established in this paragraph.

11.7.4. Prior to Final Payment, or before the total amount paid exceeds the established **Contract Price**, an appropriate **Change Order** will be issued on the recommendation of **ENGINEER**, to adjust the estimated quantities for **Unit Price Work** and to correspondingly adjust the **Contract Price**.

11.7.5. Regardless of the amount of changes in quantities for an item of unit price work, the **CONTRACTOR** shall be paid on the basis of unit prices stated in the bid form.

11.7.6. In re-evaluating unit prices contained in the **Contract Documents**, **CONTRACTOR** and **CITY** shall take into account increases or decreases in **CONTRACTOR**'s supplemental and administrative costs for the performance of the **Work** solely as a result of the variation in quantities, as opposed to as a result of **CONTRACTOR**'s fault or negligence, or bid estimate errors.

11.8 Cash Allowances

It is understood that when cash allowances are named in the **Contract Documents** **CONTRACTOR** has included in the **Contract Price** all allowances so named. **CONTRACTOR** shall cause the **Work** so covered to be within the limit of the allowances set forth in the **Contract Documents**. Upon Final Payment, the **Contract Price** shall be adjusted as required and an appropriate **Change Order** issued. **CONTRACTOR** agrees that the original **Contract Price** includes such sums as the **CONTRACTOR** deems proper for costs and profit on account of cash allowances. No demand for additional cost or profit in connection therewith will be valid.

11.9 Criteria for Determining Adjustments in Contract Time

11.9.1. The criteria to be used to determine an adjustment in **Contract Time** necessitated by changes ordered or negotiated pursuant to these General Conditions, or **Work** covered by a proposal or a **Claim**, are limited to the following:

11.9.2. An extension in **Contract Time** will not be granted unless **CONTRACTOR** can demonstrate through an analysis of the **Progress Schedule** that the increases in the time to perform or complete the **Work**, or specified part of the **Work**, beyond the corresponding **Contract Time(s)** arise from unforeseeable causes beyond the control and without the fault or negligence of both **CONTRACTOR** and his **Subcontractors, Suppliers** or other persons or organizations, and that such causes in fact lead to performance or completion of the **Work**, or specified part in question, beyond the corresponding **Contract Time**. An adjustment in **Contract Time** will be based solely upon net increases in the time required for the performance or completion of parts of the **Work** controlling achievement of the corresponding **Contract Time(s)** at the time that the incident which causes the change occurs. However, even if the time required for the performance or completion of controlling parts of the **Work** is extended, an extension in **Contract Time** will not be granted until performance or completion of the controlling **Work** necessarily extends beyond the **Contract Time** in question despite **CONTRACTOR**'s reasonable and diligent actions to guard against those effects. Examples of unforeseeable causes include: (1) acts of God or of the public enemy; (2) acts of **CITY** or **ENGINEER** in its sovereign or contractual capacity; (3) acts of the Government or another Public Entity in its sovereign capacity; (4) acts of another contractor in the performance of a contract with the **CITY**, if not identified in the Contract; (5) fires, floods, epidemics, quarantine restrictions; (6) sink holes, archaeological finds; (7) strikes, freight embargoes; (8) unusually severe weather; (9) a case of differing physical conditions; (10) a case of existing **Underground Facilities** owned by others; and (11) unusually severe shortages of construction materials from such causes as area-wide shortages, an industry-wide strike, or a natural disaster which affects all feasible sources of supply.

11.9.3. Notwithstanding any provisions in the **Contract Documents** to the contrary, an extension of **Contract Time** shall be the sole remedy of **CONTRACTOR** for any delay of any kind. The only exception, under which an adjustment in **Contract Price** shall be allowed, shall be if the delay has been caused solely by acts constituting intentional interference by **CITY** or **ENGINEER** with **CONTRACTOR**'s performance of the **Work** and such acts continue after **CONTRACTOR**'s notice to **ENGINEER** of such interference. Intentional interference is an act or omission by the **CITY** or **ENGINEER** by which the **CITY** or **ENGINEER** intentionally, willfully, or knowingly delays job progress. The **CITY**'s exercise of any of its rights under Article 10 and this Article regardless of the extent or number of the changes, or the **CITY**'s exercise of its remedies of stopping the **Work** or requiring correction or re-execution of any **defective** work shall not under any circumstances be construed as intentional interference with the **CONTRACTOR**'s performance of the **Work**. No adjustment in **Contract Price** under this paragraph shall be provided for any reason if: (1) performance would have been so extended by any one other cause, including fault or negligence of **CONTRACTOR**, or his **Subcontractors, Suppliers**, or other persons or organizations or; (2) an adjustment is provided or excluded under any other provision of the **Contract Documents** or; (3) delays

merely prevent **CONTRACTOR**'s achievement of completion of the **Work**, or part in question, ahead of the corresponding **Contract Time(s)**, including any authorized adjustments.

11.9.4 An adjustment in **Contract Price**, to complement an extension in **Contract Time**, on account of delays meeting the requirement for an adjustment in **Contract Price** under paragraph 11.9.3 shall be determined as follows subject to all applicable requirements of paragraph 11.9. Amounts shall only be allowed to the extent they were increased or decreased on account of such delays, and shall include only the appropriate amounts for **CONTRACTOR** and **Subcontractors**: labor, material and equipment costs, construction equipment costs, supplemental costs, and in accordance with paragraph 11.4, payroll costs, and travel and subsistence expenses, for the superintendent and other personnel classifications agreed by **CITY**, which shall not include any of the personnel listed in paragraph 11.9.2, in the direct employ of **CONTRACTOR** and **Subcontractors** at the site; rental/lease costs of site office and temporary facilities, and costs of utilities, telephone service and sanitary facilities expended to maintain such facilities, and an allowance of 15% of the total of these costs for any other costs not directly chargeable (including overhead expense) and profit.

11.10 Waivers

CONTRACTOR's recovery (1) of acceleration costs incurred as an alternative to an extension in **Contract Time** on account of delays not meeting the requirements for extensions in **Contract Time** or an adjustment in **Contract Price**; (2) of escalation costs for any part of the **Work**; (3) of delay costs, except as otherwise specifically provided in this Article, shall be excluded.

ARTICLE 12 - SCHEDULES

12.1 Progress and Submittal Schedules

12.1.1. Types of Schedules

12.1.1.1. **CONTRACTOR** shall prepare and submit to **ENGINEER** for review, a **Progress Schedule** showing the order in which **CONTRACTOR** proposes to carry out the **Work**, the dates on which the several salient features (including procurement of materials and equipment) will start and the contemplated dates for completing same.

The **Progress Schedule** shall show the order in which **CONTRACTOR** proposes to accomplish the **Work** activities and shall clearly depict the order, interdependence, duration, and installation man-days by craft of each activity. The **Progress Schedule** shall comply with the **Contract Times** and all interim and final completion requirements of the **Contract**. The schedule shall show all of the work to be completed for, and the critical path leading to each such completion requirement. The total float for each activity shall be depicted. At a minimum, a schedule diagram shall be submitted which is neatly lettered and legibly drawn to a time scale. The schedule breakdown shall be by divisions of work subdivided into areas or facilities in sufficient detail so that **ENGINEER** may readily evaluate **CONTRACTOR**'s progress at any given time during the course of the **Work** and shall be so arranged and itemized as to be of assistance to **ENGINEER** in the evaluation of **CONTRACTOR**'S requested **Application for Payment**.

12.1.1.2. **CONTRACTOR** shall prepare and submit to **ENGINEER** for review, a schedule of **Shop Drawing** and sample submissions. This schedule shall consist of a list of the submittals to be made over the course of the project; anticipated and actual dates of submittal and return for both initial and resubmissions; and the anticipated dates of submittal approval so as not to delay the **Project**. The schedule shall allow for review and processing time by **DESIGN ENGINEER** and **ENGINEER**.

12.1.1.3. **CONTRACTOR** shall prepare and submit to **ENGINEER** for review with the **Project Schedule**, manpower charts and cash flow projections contemplated or required by the schedule in a form acceptable to **ENGINEER**. Updated plan and actual expended manpower charts and cash flow projections shall be submitted with each monthly or interim schedule submission when requested by **ENGINEER**.

12.1.2. Submittal

12.1.2.1. **CONTRACTOR** shall enter on the Progress Schedules the actual progress on a monthly basis, or at such intervals as requested by **ENGINEER**, and shall deliver to **ENGINEER** five (5) copies of the schedule documentation.

12.1.2.2. Progress Schedules are to be submitted with each **Application for Payment**. An **Application for Payment** shall not be paid until the schedule submittal and any requested corrections or clarifications have been accepted by **ENGINEER** for inclusion into the **Application for Payment**. If additional updated schedules are requested by **ENGINEER** they are to be provided within seven days of the date of request, but do not constitute permission to submit additional **Applications for Payment**.

12.1.3. Review

12.1.3.1. **ENGINEER** shall review schedule submittals. If, in the opinion of **ENGINEER**, the schedule (1) does not accurately reflect **CONTRACTOR**'s actual progress or work plan or, (2) is unreasonable or cannot be used to effectively evaluate **CONTRACTOR**'s progress or, (3) is not in compliance with this Article and other appropriate sections of the Contract, it will be returned to **CONTRACTOR** for corrections or clarification.

CONTRACTOR shall make the necessary corrections and resubmit or shall respond in detail to **ENGINEER**'s comments and request that the submittal be accepted without modification. Failure by **CONTRACTOR** to provide corrections or clarifications to schedule submittals as directed by **ENGINEER** shall constitute reason to withhold approval of any **Application for Payment**.

12.1.3.2. **ENGINEER**'s review of schedule submittals shall not relieve **CONTRACTOR** from responsibility for any variation from the requirements of the **Contract Documents** unless **CONTRACTOR** has, in writing, called **CITY**'s attention to each such variation at the time of submission and **CITY** has given written approval of each such variation; nor shall any approval by **CITY** or **ENGINEER** relieve **CONTRACTOR** from responsibility for compliance with any provision of the **Contract Document**.

12.1.4. Time of Performance

The **Contract Time** establishes the period and duration in which **CITY** expects the **Work** to be performed. Any schedule which shows completion ahead of the **Contract Time** shall include additional supporting data to explain the basis of the shorter time for performance. **ENGINEER** shall review the supporting data, and make recommendations to **CITY** as to the acceptability of the shorter schedule. **CITY** may (1) notify **CONTRACTOR** that the **Contract Time** is being adjusted by **Change Order** to reflect the shorter schedule duration or (2) elect not to adjust the present **Contract Time** and allow the use by all parties of the increased schedule flexibility that the shorter schedule represents. In any case **CITY** shall not be responsible for any costs, actual or anticipated, resulting from any delay to **CONTRACTOR** that prevents completion of any part or all of the **Work** unless it prevents completion by the **Contract Time(s)**; nor shall the **CITY** be obligated to incur any additional costs for administration or inspection of accelerated **Work**.

12.1.5. Changes

It is understood that revisions in the schedule are inherent in the nature of construction. This may require that changes be made in the schedule to reflect the dynamic nature of the design and the **Work**. Actions by **CITY**, **CONTRACTOR**, **ENGINEER** or **DESIGN ENGINEER** that may affect the progress of any part or all of the **Work** shall make use of the flexibility in the **Progress Schedule**, often expressed as schedule float or slack time, and that which may result from changes in the sequencing of individual work items, to limit the impact of such actions. The concept of shared schedule flexibility shall not be limited by the inclusion of restraints, logic or imposed dates into the schedule that cannot be reasonably justified. Excessive use of schedule flexibility by any party is contrary to this sharing concept and may be cause for denial of a request for an extension in **Contract Time** or, in the case of excessive use by the **CITY**, **ENGINEER** or **DESIGN ENGINEER**, may be cause for an extension in **Contract Time** if so allowed by Article 11.

12.1.6. As-Built Schedule

After **Substantial Completion**, but prior to Final Payment, **CONTRACTOR** shall submit an as-built schedule. The schedule shall reflect (1) all as-built critical paths, (2) all contract activities, including all added activities, with their actual start and finish dates, (3) the actual number of separate work **days** during which work was performed on each activity, and (4) the actual number of man-days that were required to complete each activity.

ARTICLE 13 - WARRANTY AND GUARANTEE, TESTS AND INSPECTIONS, CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1 Warranty and Guarantee

CONTRACTOR warrants and guarantees that all **Work** will be in accordance with the **Contract Documents** and will not be **defective**. All **defective Work**, whether or not in place, may be rejected, corrected or accepted as provided in this Article. The obligations of **CONTRACTOR** under this paragraph shall be in addition to and not in limitation of any obligation imposed upon him by special guarantees required by the **Contract Documents** or otherwise prescribed by **Laws or Regulations**.

13.2 Access to Work

CITY, ENGINEER, DESIGN ENGINEER, their representatives, testing agencies and governmental entities with jurisdiction shall be permitted access to the **Work** for their observation, inspection and testing. **CONTRACTOR** shall provide proper and safe conditions for such access.

13.3 Tests and Inspections

13.3.1. **CONTRACTOR** shall give **ENGINEER** timely notice of readiness of the **Work** for all required inspections, tests or approvals. Inspections, tests or observations by **ENGINEER, DESIGN ENGINEER, CITY** or their agents may be performed at their discretion to provide information to the **CITY** on the progress of the **Work**. However, such information is not intended to fulfill the **CONTRACTOR's** obligations in accordance with the **Contract Documents**.

13.3.2. If any law, ordinance, rule, regulation, code or order of any public body, government entity or court having jurisdiction requires any **Work** (or part thereof) to specifically be inspected, tested or approved, **CONTRACTOR** shall assume full responsibility therefor, pay all related costs, schedule related activities at appropriate times, and furnish **ENGINEER** the required certificates of inspection, testing or approval. **CONTRACTOR** shall also be responsible for and shall pay all costs, in connection with any inspection or testing required in connection with **CITY's** or **ENGINEER's** acceptance of a proposed manufacturer, fabricator, supplier or distributor of materials or equipment proposed to be incorporated in the **Work**, or of material or equipment submitted for approval prior to **CONTRACTOR's** purchase thereof for incorporation of the **Work**. All inspections, tests or approvals shall be performed by persons or organizations acceptable to **CITY** and **ENGINEER**.

13.3.3. The **CONTRACTOR** shall perform sufficient testing and inspection of the **Work** to support the Warranty and Guaranty requirements.

13.3.4. Neither observations by **ENGINEER** or **CITY** nor inspections, tests or approvals by others shall relieve **CONTRACTOR** from his obligations to perform the **Work** in accordance with the **Contract Documents**.

13.3.5 If any testing, inspection or approval under this paragraph reveal **defective Work**, **CONTRACTOR** shall not be allowed to receive any associated costs and **CITY** shall be entitled to deduct from the **Contract Price**, by issuing a **Change Order**, **CITY's** costs arising out of the **defective Work**, including costs of repeated procedures, compensation for **ENGINEER's** and **DESIGN ENGINEER's** services and other related costs. **CONTRACTOR** shall be solely responsible for paying or reimbursing the **CITY**, as applicable, for all additional re-testing and/or inspections resulting from **defective Work** and the corrections thereof. The **CITY** may deduct additional inspections and testing Costs from the **Contract Price** by **Change Orders**.

13.4 Uncovering Work

13.4.1. If any **Work** that is to be inspected, tested or approved is covered without written concurrence of **ENGINEER**, it must, if requested by **ENGINEER**, be uncovered for observation. Such uncovering shall be at **CONTRACTOR**'s expense and will exclude the right to an increase in the **Contract Price** or **Contract Time** unless **CONTRACTOR** has given **ENGINEER** timely written notice of **CONTRACTOR**'s intention to cover such **Work** and **ENGINEER** has not acted with reasonable promptness in response to such notice.

13.4.2 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. If it is found that such **Work** is **defective**, **CONTRACTOR** shall bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, including compensation for additional professional services, any additional expenses experienced by the **CITY** due to delays to others performing additional work, other contractual obligations, and attorneys' fees and **CITY** shall be entitled to issue an appropriate deductive **Change Order**. **CONTRACTOR** shall further bear the responsibility for maintaining the schedule and will not be allowed an increase in **Contract Price** or **Contract Time** due to the uncovering. If, however, such **Work** is not found to be **defective**, and paragraph 13.4.1 is not applicable, **CONTRACTOR** shall be allowed an increase in the **Contract Price** or the **Contract Time**, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction if it makes a **Claim** therefor as provided in Article 10.

13.5 Correction or Removal of Defective Work

CONTRACTOR shall promptly, without cost to **CITY** and as specified by **ENGINEER**, either correct any **defective Work**, whether or not fabricated, installed or completed, or, if the **Work** has been rejected by **ENGINEER**, remove it from the site and replace it with conforming **Work**. The **CONTRACTOR** shall bear the cost of repairing or replacing all **Work** and property of the **CITY** or others destroyed or damaged or in any way impacted by such correction or removal.

13.6 Acceptance of Defective Work

If, instead of requiring correction or removal and replacement of **defective Work**, **CITY** prefers to accept it, **CITY** may do so. In such case, if acceptance occurs prior to Final Payment, **CITY** shall be entitled to issue a **Change Order** incorporating the necessary revisions in the **Contract Documents**, including appropriate reduction in the **Contract Price**. If the acceptance occurs after such Final Payment, an appropriate amount shall be paid by **CONTRACTOR** to **CITY**.

13.7 CITY May Correct Defective Work

If **CONTRACTOR** fails within a reasonable time after written notice of **ENGINEER** to proceed to correct and to correct **defective Work** or to remove and replace rejected **Work** as required by **ENGINEER** in accordance with this Article, or if **CONTRACTOR** fails to perform the **Work** in accordance with the **Contract Documents** (including any requirements of the **Progress Schedule**), **CITY** may, after seven days written notice to **CONTRACTOR**, correct and remedy any such **deficiency**. In exercising its rights under this paragraph **CITY** shall proceed with reasonable promptness. To the extent necessary to complete corrective and remedial action, **CITY** may exclude **CONTRACTOR** from all or part of the site, take possession of all or part of the **Work**, and suspend **CONTRACTOR**'s services related thereto, take possession of **CONTRACTOR**'s tools, appliances, construction equipment and machinery at the site and incorporate in the **Work** all materials and equipment stored at the site or for which **CITY** has paid **CONTRACTOR** but which are stored elsewhere. **CONTRACTOR** shall allow **CITY**, **CITY**'s representatives, agents and employees such access to the site as may be necessary to enable **CITY** to exercise its rights under this paragraph. All direct and indirect costs of **CITY** in exercising such rights shall be charged against **CONTRACTOR** in an amount documented by **CITY**, and **CITY** will be entitled to issue a **Change Order** incorporating the necessary revisions in the **Contract Documents** and a reduction in the **Contract Price**. Such direct and indirect costs shall include, in particular but without limitation, all corrective or replacement costs, compensation for additional professional services required and all costs of repair and replacement of property of others destroyed, impacted or damaged by correction, removal or replacement of **CONTRACTOR**'s **defective Work**.

CONTRACTOR shall not be allowed an increase in the **Contract Price** or the **Contract Time** because of any delay in the performance of the **Work** attributable to the exercise by **CITY** of **CITY's** rights hereunder.

13.8 Warranty Period

13.8.1. The **Warranty Period** shall commence on the date of **Substantial Completion** of the entire **Work**, or a later date if so specified in the Contract Documents, and extend until one (1) year after that date (or whatever longer period may be prescribed by **Laws or Regulations** or by the terms of any applicable special guarantee or specific provision of the **Contract Documents**.)

13.8.2. If within the designated **Warranty Period**, the **Work**, or any part of the **Work**, is discovered to be **defective**, **CONTRACTOR** shall promptly, without an adjustment in **Contract Price** and in accordance with **CITY's** or **ENGINEER's** written instructions, either correct that **defective Work**, or if it has been rejected by **CITY** or **ENGINEER**, remove it from the site and replace it with **non-defective Work**. If circumstances warrant it, including, but not limited to, in an emergency, **CITY** may have the **defective Work** corrected or the rejected **Work** removed and replaced. In that event, **CONTRACTOR** shall not be allowed to recover any associated costs, and he shall reimburse **CITY** for all direct, indirect and consequential costs of **CITY**, or **CITY** shall be entitled to issue a **Change Order** to incorporate an appropriate decrease in **Contract Price** if prior to Final Payment. **CITY** shall reserve and retain all of its rights and remedies at law and equity against **CONTRACTOR** and its Surety for damages and for corrections of any and all latent defects.

13.9 Extended Warranties and Guarantees

13.9.1 **CITY** may at its sole discretion advance or defer the date of commencement of the **Warranty Period**, in which case **CONTRACTOR** shall maintain the warranties and guarantees in full force and effect until the revised date for commencement of the **Warranty Period**. If such advancement or deferral in the date for commencement of the **Warranty Period** causes an increase or decrease in the cost of the warranties and guarantees provided by **CONTRACTOR**, **CITY** shall make an adjustment in **Contract Price** or **Contract Time**, as provided in Articles 10 and 11.

13.9.2 In circumstances where **CITY** undertakes Partial Utilization of a portion of the **Work** which was specifically identified in the **Contract Documents**, **CONTRACTOR** shall maintain the warranties and guarantees in full force and effect during the period between the applicable commencement of Partial Utilization date, and the date of commencement of the **Warranty Period**, and for such warranties and guarantees **CONTRACTOR** shall receive no adjustment in **Contract Price**.

13.9.3 In special circumstances where **CONTRACTOR** fails to complete the **Work**, or a separable portion of the **Work** within the corresponding **Contract Time**, including any authorized adjustments, and **CITY** undertakes Partial Utilization, **CONTRACTOR** shall maintain the warranties and guarantees in full force and effect during the period between the applicable commencement of Partial Utilization date, and the date of commencement of the **Warranty Period**, and for such warranties and guarantees **CONTRACTOR** shall receive no adjustment in **Contract Price**.

13.10 Special Maintenance Requirements

In special circumstances where the **Work**, or a designated part, reaches **Substantial Completion**, but as provided in the **Contract Documents**, is not placed in continuous service until the commencement of the **Warranty Period**, **CONTRACTOR** shall maintain the **Work**, or designated part, in good order and in proper working condition, provide suitable drainage, and take all other actions as are necessary for its protection during the period between the applicable **Substantial Completion** date and the date of commencement of the **Warranty Period**, and for such maintenance **CONTRACTOR** shall receive no adjustment in **Contract Price**. In the event that the **Work** suffers loss or damage prior to Substantial Completion, however caused, **CONTRACTOR** shall rebuild, repair, restore and make good without an increase in **Contract Price** all losses or damages to any portion of any **Work** and shall without an increase in **Contract Price** provide suitable drainage and erect such temporary structures and take all other action as necessary for its protection." Suspension of **Work** or the granting of an extension in **Contract Time** for any

cause shall not relieve **CONTRACTOR** of his responsibility for the **Work**, or designated part, as specified in this paragraph.

13.11 Extended Warranty Period Due to Defective Work

Any **defective Work** that is either corrected or rejected and replaced will be warranted and guaranteed for a period or one (1) year from the date of such correction or removal and replacement, even if it had previously been corrected or replaced, in accordance with the provisions of this Article 13. If within such extended **Warranty Period**, that **Work** is once again found to be **defective**, **CITY** shall be entitled to all of **CITY's** rights and remedies under this Article.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 Schedules

At least ten days prior to submitting the first **Application for Payment**, **CONTRACTOR** shall (except as otherwise specified in the **Special Provisions**) submit to **ENGINEER** acceptable **Progress** and **Shop Drawing** Submittal Schedules and acceptable manpower and cash flow projections. These schedules shall be satisfactory in type, form and substance to **ENGINEER**. After the first Application for Payment, **CONTRACTOR** shall submit a revised, updated Progress Schedule, satisfactory in type, form and substance to the **ENGINEER** with each subsequent Application for Payment. The **CONTRACTOR** will not be entitled to receive a progress payment until the revised Progress Schedule is approved by the **ENGINEER**.

14.2 Application for Payment

The payment period for this Agreement shall be monthly commencing on the date given in the Notice to Proceed when the Contract Time begins to run. The **CONTRACTOR** may submit an **Application for Payment** beginning on the first business day of the payment period. Not later than the first business day of each payment period, **CONTRACTOR** shall meet with **ENGINEER** to discuss quantities of work completed and materials on site to be used as the basis for an **Application for Payment** for the previous month. **ENGINEER** may generate a draft **Application for Payment** form with quantities of work completed and materials on site and deliver it to **CONTRACTOR** not later than the first business day of each payment period to assist the **CONTRACTOR's** development of the **Application for Payment**. The **CONTRACTOR** may use the quantity figures set forth in the **ENGINEER's** draft when developing the **CONTRACTOR's Application for Payment**. **CONTRACTOR** shall submit a signed **Application for Payment** to **ENGINEER**, accompanied by such supporting documentation as is required by the **Contract Documents** and also as **ENGINEER** may reasonably require.

14.2.1 On each **Application for Payment**, **CONTRACTOR** shall list the name and address of each of its **Subcontractors** and **Suppliers** who have performed **Work** or provided supplies or material during the time period of **Work** reflected by the Application. After the first **Application for Payment**, **CONTRACTOR** shall include an affidavit stating that all previous progress payments received on account of the **Work** have been applied (1) to discharge **CONTRACTOR's** obligations and (2) to pay in full (less retainage) all amounts owed to its **Subcontractors** and **Suppliers** reflected in prior Applications for Payment. **CONTRACTOR** shall on the **Application for Payment** form note and explain when it has not discharged its obligations or paid in full (less retainage) all amounts owed as stated above.

14.2.2 The **CITY** shall require the consent of the Surety on each **Application for Payment**.

14.2.3 The **CONTRACTOR** shall submit weekly, and require the **Subcontractors** at all tiers to submit weekly, certified payrolls on the **CITY's** designated electronic on-line payroll tracking system. An **Application for Payment** including the Final Application shall not be considered complete and a proper invoice until complete and accurate certified payrolls for the **CONTRACTOR** and **Subcontractors** at all tiers have been submitted (1) electronically for all **Work** performed by them included in the **Application for Payment** and (2) the Certified Payroll Summary Report has been included with the **Application for Payment**. The certified payroll may capture worker information that includes, but is not limited to, the following: name, address, social security number, job classification, hourly rate, hours worked, gross pay, FICA, tax, benefits and net pay.

14.2.4 Neither the **CITY** or **ENGINEER** is under any duty or obligation whatsoever to any **Subcontractor, Supplier**, laborer, or any other party to ensure payments due and owing by **CONTRACTOR** to any of them are or will be made.

14.2.5 **CONTRACTOR** shall submit to **ENGINEER** acceptable As-Built Surveys reflecting work performed during the last pay period as provided in Section 01050.

14.3 Materials on Site

14.3.1. Prior to completion of fifty percent (50%) of the **Work** (which shall be defined for purposes of this Article as the point when the **CITY** has paid the **CONTRACTOR** fifty percent (50%) of the Contract Price including approved Change Orders), **CITY** may, at its sole option, pay an amount equal to ninety percent (90%) of the value of materials and equipment not incorporated into the **Work** but delivered and suitably stored, less in each case the aggregate of payments previously made. In no event shall payments for materials and equipment stored on site exceed ninety percent (90%) of the value of the related cost for the specific item of work shown in the schedule of values regardless of the stated value of the material or equipment. **CITY** may, at its sole option, pay an amount equal to ninety percent (90%) of the value of materials and equipment not incorporated into the **Work** and stored off site if stored in a manner acceptable to **CITY**, as stated above for on-site stored materials. Upon completion of fifty percent (50%) of the **Work**, **CITY** will pay an amount equal to ninety-five percent (95%) of the value of materials and equipment not incorporated into the **Work** but delivered and suitably stored, less in each case the aggregate of payments previously made. In no event shall payments for materials and equipment stored on site exceed ninety-five percent (95%) of the value of the related cost for the specific item of work shown in the schedule of values regardless of the stated value of the material or equipment. **CITY** may, at its sole option, pay an amount equal to ninety-five percent (95%) of the value of materials and equipment not incorporated into the **Work** and stored off site if stored in a manner acceptable to **CITY**, as stated above for on-site stored materials. When payment to **CONTRACTOR** is made for stored material and equipment, **CONTRACTOR** shall submit invoices marked paid by the **Supplier** with the **Application for Payment** following payment to **CONTRACTOR** documenting that **CONTRACTOR** has paid for said materials and equipment or the previously paid amount shall be deducted from remaining payments or retainage for stored materials and equipment not so properly documented.

14.3.2. If payment is requested on the basis of materials and equipment not incorporated into the **Work** but delivered and suitably stored at the site or at another location agreed to in writing, the **Application for Payment** shall be accompanied by such data, satisfactory to **CITY**, as will establish **CITY's** title to the material and equipment and protect **CITY's** interest therein, including applicable insurance. In no event shall the quantity of material and equipment submitted for payment be in excess of the actual final installed quantity. **CITY** may deduct from the final **Application for Payment** amounts paid **CONTRACTOR** for material and equipment not finally installed in the **Work**.

14.4 CONTRACTOR's Warranty of Title

The **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 **CITY** at the time of payment free and clear of all liens, claims, security interests and encumbrances (hereafter referred to as "Liens").

14.5 Review and Payment

14.5.1 The twenty (20) business day payment period (twenty-five (25) business days if **ENGINEER's** review is performed by an agent of the **CITY**) begins upon receipt of the **CONTRACTOR** executed **Application for Payment** by the **ENGINEER**. **ENGINEER** will review the **Application for Payment** and all required attachments and submittals, as well as the on-line submission of certified payrolls, and either indicate in writing a recommendation of payment and present the **Application** to **CITY** for payment, or return the **Application** to the **CONTRACTOR**, indicating in writing **ENGINEER'S** reasons for refusing to recommend payment and indicating what corrective action will be required to bring the pay **Application** into compliance. If the pay **Application** is returned to the **CONTRACTOR**, **CONTRACTOR** shall make all necessary corrections promptly and re-submit the **Application** to **ENGINEER** for review which, if all corrections are made, will be paid no later than ten (10) business days after

receipt. If the payment amount is disputed, the **ENGINEER** will recommend the portion of the **Application for Payment** not in dispute for payment by **CITY**.

14.5.2. **ENGINEER's** recommendation of any payment requested in an **Application for Payment** will constitute a representation by **ENGINEER** to **CITY**, based on on-site observations of the **Work** in progress and on **ENGINEER's** review of the **Application for Payment** and the accompanying attachments and schedules as well as the on-line submission of certified payrolls and that the **Work** has progressed to the point indicated; that to the best of **ENGINEER's** knowledge, information and belief, the quality of the **Work** is in accordance with the **Contract Documents** (subject to an evaluation of the **Work** as a functioning **Project** prior to or upon **Substantial Completion**; to the results of any subsequent tests called for in the **Contract Documents**; or to any qualifications stated in the recommendation); that **CONTRACTOR** has complied with the minimum health benefits requirements; that **CONTRACTOR** has paid its workers (and ensured that its **Subcontractors** as well as its **Subcontractors'** subcontractors at all tiers, have paid its workers) the hourly wage required by the Responsible Contractor's Policy; that **CONTRACTOR** has paid its workers (and ensured that its **Subcontractors** at all tiers have paid their workers) the Living Wage as required by the **Contract Documents**; and that **CONTRACTOR** is entitled to payment of the amount recommended. However, by recommending any such payment, **ENGINEER** will not thereby be deemed to have represented that any examination has been made to ascertain how or for what purpose **CONTRACTOR** has used the monies paid or to be paid to **CONTRACTOR** on account of the **Contract Price**, or that title to any **Work**, materials or equipment has passed to **CITY** free and clear of any lien.

14.5.3. **ENGINEER** may refuse to recommend the whole or any part of any payment if, in its opinion, it would be incorrect to make such representations to **CITY** in accordance with paragraph 14.5.2 above. **ENGINEER** may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended to such extent as may be necessary in **ENGINEER's** opinion to protect **CITY** from loss or anticipated loss, because: (1) the **Work** is **defective**, or completed **Work** has been damaged requiring correction or replacement or, (2) written **Claims** have been made against **CITY** or Liens have been filed in connection with the **Work** or, (3) the **Contract Price** has been reduced because of **Change Order** or, (4) **CITY** has been required to correct **defective Work** or complete the **Work** or, (5) of **CONTRACTOR's** unsatisfactory prosecution of the **Work** in accordance with the **Contract Documents** or, (6) of **CONTRACTOR's** failure to make payment to **Subcontractors**, **Suppliers** or for labor, or (7) of **CONTRACTOR's** failure to provide acceptable schedule submittals for inclusion into the **Application for Payment** or, (8) of **CONTRACTOR's** failure to properly maintain and submit with **Application for Payment** acceptable Progress As-Built Survey or Final As-Built Survey, as applicable, as defined in Section 01050 (9) of **CONTRACTOR'S** or **Subcontractor's** failure to submit, for itself and all **Subcontractors**, at all tiers, on-line certified payrolls or **CONTRACTOR's** failure to submit the Certified Payroll Summary Report.

14.6 Retainage

14.6.1. The value of each **Application for Payment** shall be equal to the total value of the work performed to date, less an amount retained, and less payments previously made and amounts withheld in accordance with this Article.

14.7 Overpayment

Any overpayment by **CITY** to **CONTRACTOR** shall be promptly repaid to **CITY** upon demand, or when **CONTRACTOR** is aware of such overpayment, whichever occurs first.

14.8 Final Application for Payment

14.8.1. After **CONTRACTOR** has completed all corrections to the satisfaction of **CITY** and **ENGINEER** as verified by Final Inspection and delivered all maintenance and operating instructions, schedules, guarantees, warranties, **Bonds**, certificates of inspection, marked-up record documents and other documents, all as required by the **Contract Documents** and acceptable to **CITY**, and after **ENGINEER** has indicated that **Work** is acceptable, **CONTRACTOR** may make application for Final Payment following the procedure for **Applications for Payment**.

14.8.2. The final **Application for Payment** shall be accompanied by all documentation called for in the **Contract Documents** and such other data and schedules as **ENGINEER** may reasonably require. City shall require consent of the Surety to each **Application for Payment** and Final Payment.

14.9 Final Payment and Acceptance

14.9.1 The twenty (20) business day payment period begins upon receipt of the signed final Application for Payment by the **ENGINEER**. If, on the basis of **ENGINEER'S** observations of the **Work** during construction and Final Inspection, and **ENGINEER'S** review of the final **Application for Payment** and accompanying documentation all as required by the **Contract Documents**, and **ENGINEER'S** review of the **CONTRACTOR'S** and **Subcontractors'** on-line submission of certified payrolls, **ENGINEER** is satisfied that the **Work** has been completed and **CONTRACTOR** has fulfilled all of its obligations under the **Contract Documents**, **ENGINEER** will, after receipt of the final **Application for Payment**, indicate in writing its recommendation of payment and present the **Application** to **CITY** for payment. Thereupon **ENGINEER** will give written notice to **CITY** and **CONTRACTOR** that the **Work** is acceptable. Otherwise, **ENGINEER** will return **Application** 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** to **ENGINEER** for review which, if all corrections are made, will be paid no later than ten (10) business days after receipt. If the **Application** and accompanying documentation as well as the on-line submission of certified payrolls are appropriate as to form and substance, **CITY** shall pay **CONTRACTOR** the amount due by giving considerations to the recommendations of **ENGINEER**, but not being bound thereby.

14.9.2. After receipt of the **ENGINEER'S** written notice that the **Work** is acceptable and prior to Final Payment, **CONTRACTOR** shall submit an affidavit, in a form acceptable to **CITY**, certifying that the **Bonds** and insurances required under Article 5 are in effect and will not be allowed to expire for the required period of time.

14.10 Waiver of Claims

14.10.1. The making and acceptance of Final Payment shall constitute:

14.10.2. A waiver of all **Claims** by **CITY** against **CONTRACTOR**, except **Claims** arising from unsettled Liens, from **defective Work** appearing after final inspection, from fraud or gross negligence amounting to fraud, or from failure to comply with the **Contract Documents** or the terms of any special guarantees specified therein or the terms of any **Bonds**; however, it shall not constitute a waiver by **CITY** of any rights in respect of **CONTRACTOR'S** continuing obligations under the **Contract Documents**; and

14.10.3. A waiver of all **Claims** by **CONTRACTOR** against **CITY**, **ENGINEER**, and **DESIGN ENGINEER** other than those enumerated in the Final **Application for Payment**.

14.11 CITY's Obligations

14.11.1. In no event shall any interest be due and payable to **CONTRACTOR** on any of the sums retained by **CITY** pursuant to any of the terms or provisions of any of the **Contract Documents**.

14.11.2. Any provision to the contrary notwithstanding, **CITY** shall not be obligated to make any payment to **CONTRACTOR** and may withhold partial payments if any one or more of the following conditions exists: (1) **CITY** has reason to believe **CONTRACTOR** is in default of any of its obligations or otherwise is in default under any of the **Contract Documents**; (2) Any part of such payment is attributable to **Work** which is **defective**, provided, however, payment shall be made for **Work** which is performed in accordance with the **Contract Documents** and is not **defective**; (3) **CONTRACTOR** has failed to make payments promptly to **Subcontractors** and **Suppliers** or for labor and material for which **CITY** has made payment to **CONTRACTOR**; (4) If **CITY**, in its good faith judgment, determines that the portion of the **Contract Price** remaining unpaid will not be sufficient to complete the **Work** in accordance with the **Contract Documents**; (5) **CONTRACTOR** has failed to maintain progress of the **Work** in accordance with the **Progress Schedule**; (6) **CONTRACTOR** has failed to meet an interim completion date or the Substantial or Final Completion Date; (7) **CONTRACTOR** has failed to pay its workers, or **Subcontractors** have failed to pay their workers, the hourly wage required by the Responsible Contractor's Policy, or **CONTRACTOR**, has

failed to pay its workers or **Subcontractors** have failed to pay their workers, the Living Wage required by the Contract; (8) **CONTRACTOR** has failed to provide acceptable schedule submittals for inclusion into the **Application for Payment**; (9) **CONTRACTOR** has failed to properly maintain and submit with the **Application for Payment**, acceptable progress As-Built survey or Final As-Built Survey, as applicable, as defined in Section 01050; (10) **CONTRACTOR** has failed or **Subcontractors** have failed to submit, for itself and all **subcontractors** at all tiers, on-line certified payrolls and/or the Certified Payroll Summary Report.

14.12 Partial Utilization

14.12.1. Use by **CITY** of completed portions of the **Work** may be accomplished at the option of **CITY** prior to **Substantial Completion** of all the **Work** subject to the following:

14.12.1.1. **CITY** at any time may request **CONTRACTOR** in writing to permit **CITY** to use any part of the **Work** which **CITY** believes to be substantially complete and which may be so used without significant interference with construction of the other parts of the **Work**. If **CONTRACTOR** agrees, **CONTRACTOR** shall certify to **CITY** that said part of the **Work** is substantially complete and request **ENGINEER** to issue a certificate of **Substantial Completion** for that part of the **Work**. **CONTRACTOR** at any time may notify **CITY** and **ENGINEER** in writing when **CONTRACTOR** considers that a portion of the **Work** which has been identified in the **Contract Documents** as eligible for Partial Utilization is substantially complete. Within a reasonable time thereafter, **CITY**, **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 **CONTRACTOR** in writing giving the reasons therefor. If **ENGINEER** considers that part of the **Work** to be substantially complete, **ENGINEER** will execute and deliver to **CITY** and **CONTRACTOR** a certificate to that effect, fixing the date of **Substantial Completion** as to that part of the **Work**, and attaching a list of minor items as to that part of the **Work** to be completed or corrected before Final Payment.

14.12.1.2. Prior to issuing a certificate of **Substantial Completion** as to part of the **Work**, **ENGINEER** will deliver to **CITY** and **CONTRACTOR** a written recommendation as to the division of responsibilities pending Final Payment between **CITY** and **CONTRACTOR** with respect to security, operation, safety, maintenance, utilities, insurance and the **Warranty Period** for that part of the **Work**. **CITY** shall have the right to exclude **CONTRACTOR** from any part of the **Work** which **ENGINEER** has so certified to be substantially complete, but **CITY** shall allow **CONTRACTOR** reasonable access to complete or correct items described above.

14.12.1.3. In lieu of the issuance of a certificate of **Substantial Completion** as to part of the **Work**, **CITY** may take over operation of a facility constituting part of the **Work** whether or not it is substantially complete if such facility is functionally and separately useable; provided that prior to any such takeover, **CITY** and **CONTRACTOR** have agreed in writing as to the division of responsibilities between **CITY** and **CONTRACTOR** for security, operations, safety, maintenance, **Warranty Period**, utilities with respect to such facility. During such utilization and prior to **Substantial Completion** of that portion of the **Work**, **CITY** shall allow **CONTRACTOR** reasonable access to complete or correct items and to complete other related **Work**.

14.13 Substantial Completion

14.13.1. When **CONTRACTOR** considers the entire **Work** to have progressed to the point where it is substantially complete, **CONTRACTOR** shall, in writing to **ENGINEER**, certify that the entire **Work** is substantially complete, submit to **ENGINEER** all operation and maintenance manuals and instructions and spare parts required by the **Contract Documents**, and request that **ENGINEER** issue a Certificate of **Substantial Completion**. Within seven (7) days thereafter, **CITY**, **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. **CONTRACTOR** shall then accomplish the requisite **Work** and then recertify that the entire **Work** is substantially complete. If **ENGINEER** considers the **Work** substantially complete, **ENGINEER** will prepare and deliver to **CONTRACTOR** and **CITY**, within five (5) days after the inspection, a Certificate of **Substantial Completion** which shall fix the date of **Substantial Completion**. There shall be attached to the certificate a list of items (which should be minor in scope and nature) to be completed or corrected before Final Payment. **CONTRACTOR** shall continue to be responsible for maintaining the **Work** until the date of certification of **Substantial Completion**, or longer if so required by the **Contract Documents**.

14.13.2. **CITY** shall have the right to exclude **CONTRACTOR** from the **Work**, or specified part, after the date of **Substantial Completion**, but **CITY** shall allow **CONTRACTOR** reasonable access to complete or correct items on the list attached to the Certificate of **Substantial Completion**.

14.14 Final Inspection

Upon written notice from **CONTRACTOR** that the minor items described in the list attached to the Certificate of **Substantial Completion** have been completed, **ENGINEER** will make an inspection with **CITY** and **CONTRACTOR** and will notify **CONTRACTOR** in writing of the results of this inspection as to the items of the **Work** that appear to be incomplete, non-conforming or **defective**. **CONTRACTOR** shall immediately take such measures as are necessary to remedy such deficiencies, and notify **ENGINEER** upon completion. The Final Inspection by **ENGINEER** with **CITY** and **CONTRACTOR** will verify completion of all items.

14.15 CONTRACTOR's Continuing Obligation

CONTRACTOR's obligation to perform and complete the **Work** in accordance with the **Contract Documents** shall be absolute. Neither recommendation of any progress or Final Payment by **ENGINEER**, nor the issuance of a Certificate of **Substantial Completion**, nor any payment by **CITY** to **CONTRACTOR** nor any Partial Utilization by **CITY** nor any act of acceptance by **CITY** nor any failure to do so, nor any review and approval of the **Shop Drawings** or samples, nor any review of a **Progress Schedule**, nor the issuance of a notice of acceptability by **ENGINEER**, nor any correction of **defective Work** by **CITY** will constitute an acceptance of **Work** not in accordance with the **Contract Documents** or a release of **CONTRACTOR's** obligation to perform the **Work** in accordance with the **Contract Documents** except as provided in a waiver of **Claims** at the time of making and acceptance of Final Payment.

14.16 Payment Dispute Resolution

If the **CONTRACTOR** disputes the **ENGINEER's** refusal to recommend payment of an Application for Payment or a final Application for Payment (including the **ENGINEER's** refusal to recommend payment of a corrected Application for Payment or final Application for Payment) or the **CITY's** refusal to make payment of an **Application for Payment** or a final **Application for Payment**, the **CONTRACTOR** shall, within seven (7) days of receipt of the **ENGINEER's** notice of refusal, give **CITY** written notice of its dispute of the **ENGINEER's** or **CITY's** determination. The **CONTRACTOR's** notice shall state with specificity the nature of the dispute and shall provide supporting documentation and information demonstrating the validity of the **CONTRACTOR's Claim**. The **CITY's** Chief Administrative Officer will review the **Claim** and the **ENGINEER's** or **CITY's** response thereto, at his/her option meet with the **CONTRACTOR** and/or **ENGINEER** to discuss the dispute, and shall provide the **CONTRACTOR** with his/her determination of the validity of the **CONTRACTOR's Claim**, which shall constitute final action on behalf of the **CITY**. The review of the **Claim** shall be commenced no later than forty-five (45) days after the date on which the payment request, as defined in §218.72 *Florida Statutes*, was received by the **ENGINEER** and shall be concluded by final decision of the **CITY** no later than sixty (60) days after the date on which the payment request, as defined in §218.72 *Florida Statutes*, was received.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.1 CITY May Stop the Work

If the **Work** is **defective** and the **CONTRACTOR** has been notified by **ENGINEER** or **CITY**, or if **CONTRACTOR** fails to furnish or perform the **Work** in such a way that the completed **Work** will conform to the **Contract Documents**, or if **CONTRACTOR** fails to supply sufficient supervisory personnel or skilled workmen or suitable materials or equipment, or if **CONTRACTOR** fails to obtain, maintain or renew insurance in conformance with the **Contract Documents** in a form acceptable to **CITY**, or if any insurance company **CONTRACTOR** has obtained insurance from declares bankruptcy or is declared bankrupt, or if **CONTRACTOR's** prosecution of the **Work** endangers persons or property or violates **Laws and Regulations**, **CITY** may order **CONTRACTOR** to stop the **Work**, or any portion thereof, until the cause for such order has been eliminated. **CITY's** order to stop the **Work** may be communicated through **ENGINEER** or by **CITY**. This right of **CITY** to stop the **Work** shall not give rise to

any duty on the part of **CITY** or **ENGINEER** to exercise this right for the benefit of **CONTRACTOR** or any other party. **CONTRACTOR** shall bear all direct, indirect, and consequential costs of such order to stop the **Work** (including but not limited to fees and charges of engineers, attorneys and other professionals, any additional expenses incurred by **CITY** due to delays to others performing work under a separate contract with **CITY**, and other obligations), and **CONTRACTOR** shall further bear the responsibility for maintaining the **Progress Schedule** and shall not be entitled to any extension of **Contract Time** or increase in the **Contract Price**. **CITY** shall be entitled to deduct any expenses so incurred from the **Contract Price** by issuing a **Change Order**.

15.2 Suspension for Convenience

15.2.1. Without invalidating the **Agreement**, and without notice to any surety, **CITY** may, at any time, order **CONTRACTOR** in writing to stop, delay or interrupt **Work** for such a period of time as **CITY** may deem appropriate. Upon receipt of that order, **CONTRACTOR** shall immediately proceed in accordance with any specific provisions or instructions, protect and maintain the **Work**, and make reasonable and diligent efforts to mitigate costs associated with the suspension order.

15.2.2. If any suspension of **Work** under this paragraph causes an increase or decrease in **CONTRACTOR**'s cost or the time required to perform or complete any part of the **Work**, **CITY** shall make a change in **Contract Price** or **Contract Time**, as provided in Article 10 and 11; except that no change in **Contract Price** or **Contract Time** will be made for any suspension of **Work** to the extent that performance would have been suspended anyhow by causes not meeting the criteria in Article 11, or for which an adjustment is provided or excluded under any other provision of the **Contract Documents**.

15.3 Termination for Cause

15.3.1. **CITY** may upon the occurrence of any one or more of the following events terminate the services of **CONTRACTOR**:

15.3.1.1. If a trustee, receiver, custodian or agent of **CONTRACTOR** is appointed under applicable law or under contract, whose appointment or authority to take charge of property of **CONTRACTOR** is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of **CONTRACTOR**'s creditors;

15.3.1.2. If **CONTRACTOR** admits in writing an inability to pay its debts generally as they become due;

15.3.1.3. If **CONTRACTOR** fails to perform the **Work** in accordance with the **Contract Documents** (including, but not limited to, failure to supply sufficient skilled workers, sufficient supervisory personnel, or suitable materials or equipment or failure to adhere to the **Progress Schedules**);

15.3.1.4. If **CONTRACTOR** discontinues prosecution of the **Work** or any portion thereof;

15.3.1.5. If **CONTRACTOR** allows any final judgment against it to remain unsatisfied for a period of ten days;

15.3.1.6. If **CONTRACTOR** disregards laws, policies, court orders, or administrative directives, etc. of any governmental body, agency or court having jurisdiction;

15.3.1.7. If **CONTRACTOR** disregards the authority of **ENGINEER**;

15.3.1.8. If **CONTRACTOR** otherwise violates in any substantial way any provisions of the **Contract Documents**; or

15.3.1.9. If **CONTRACTOR** fails to promptly pay **Subcontractors**, **Suppliers**, Materialmen, Laborers, etc.

15.3.2. As it is recognized that if **CONTRACTOR** is adjudged bankrupt or makes a general assignment for the benefit of creditors or if a receiver is appointed on account of its insolvency, such could impair or frustrate

CONTRACTOR's performance of the **Work**, therefore it is agreed that upon occurrence of any such event, **CITY** shall be entitled to request **CONTRACTOR** or its successor to provide adequate assurance of future performance in accordance with the terms and conditions of the **Contract Documents**. Failure to provide said adequate assurance within seven (7) days of the delivery of the request shall entitle **CITY** to terminate **CONTRACTOR**. In all events pending receipt of adequate assurance of performance and actual performance in accordance herewith, **CITY** shall be entitled to proceed with the **Work** with its own forces or with their contractors on a time and material or other appropriate basis the cost of which will be back charged against **CONTRACTOR**. **CITY** shall be entitled to deduct these costs from the **Contract Price** by issuing a **Change Order**.

15.3.3. **CITY** may, after giving **CONTRACTOR** and surety seven (7) days written notice, and to the extent permitted by laws and regulations, terminate the services of **CONTRACTOR**, 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), incorporate in the **Work** all materials and equipment stored at the site or for which **CITY** has paid **CONTRACTOR** but which are stored elsewhere, and finish the **Work** as **CITY** may deem expedient. **CONTRACTOR** shall assign all of its interest in any or all **Subagreements** to **CITY** upon **CITY's** request. In such case **CONTRACTOR** shall not be entitled to receive any further payment until the **Work** is finished. If the unpaid balance of the **Contract Price** exceeds the direct, indirect and consequential costs of completing the **Work** (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs including costs for appellate proceedings) such excess will be paid to **CONTRACTOR**. If such costs exceed such unpaid balance, **CONTRACTOR** shall pay the difference to **CITY**. If **CONTRACTOR** leaves the site at any time during the seven day period, **CITY** shall have the right to secure the site to protect the property from damage and to insure the health and safety of the public.

15.3.4. Notwithstanding the above notice period, in the event of an emergency, the **CITY** may take over the site and perform any or all of the activities set out above immediately. **CITY** shall provide notice of such takeover within 24 hours after its occurrence.

15.3.5. Where **CONTRACTOR's** services have been terminated by **CITY**, the termination shall not affect any rights of **CITY** against **CONTRACTOR** then existing or which may thereafter accrue. Any retention or payment due **CONTRACTOR** by **CITY** will not release **CONTRACTOR** from liability.

15.3.6. **CITY** may, at its sole discretion, permit **CONTRACTOR** to continue to perform work when **CONTRACTOR** is in default, however caused. Such a decision by **CITY** shall in no way operate as a waiver on the part of **CITY** of any of its rights under the **Contract Documents**.

15.4 Termination for Convenience

15.4.1. **CITY** may, without prejudice to any other right or remedy, terminate this Contract in whole or in part at any time for its convenience by giving **CONTRACTOR** and surety seven (7) days written notice. **CITY** shall have the right, in that event, to take over any or all of **CONTRACTOR's** materials, (whether stored on or off site) supplies, equipment, **Subagreements** or other obligations to complete the **Work** and **CONTRACTOR** shall assign them to **CITY** upon **CITY's** request. **CONTRACTOR** shall proceed to complete any part of the **Work**, as directed by **CITY**, and shall settle all its claims and obligations under the **Agreement**.

15.4.2. In any such termination for the convenience of **CITY**, **CONTRACTOR** shall be paid for **Work** completed in accordance with the **Contract Documents** prior to receipt of the notice of termination, and for reasonable termination settlement costs relating to commitments which had become firm prior to the termination; however, payment to **CONTRACTOR** will exclude any and all anticipated supplemental costs, administrative expenses, overhead and profit on uncompleted **Work**. **CONTRACTOR** shall justify its **Claims** as requested by **CITY** with thorough, accurate records and data.

15.4.3. If, after notice of Termination for Cause of **CONTRACTOR**, it is determined that **CONTRACTOR** was not in default, the termination shall be deemed to have been for the convenience of **CITY**. In such event **CONTRACTOR** may recover from **CITY** payment in accordance with paragraph 15.4.2.

15.5 CONTRACTOR May Stop Work or Terminate

If, through no act or fault of **CONTRACTOR**, or a **Subcontractor** or their agents or employees or any other person for whose acts they may be responsible, the **Work** is suspended for a period of more than ninety (90) days by **CITY** or under an order of court or other public authority, or **ENGINEER** fails to act on any **Application for Payment** within forty-five (45) days after it is submitted, or **CITY** fails for forty-five (45) days to pay **CONTRACTOR** any sum finally determined to be due, then **CONTRACTOR** may, upon seven (7) days written notice to **CITY** and **ENGINEER**, terminate the **Agreement** and recover from **CITY** payment for all **Work** executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the **Agreement**, if **ENGINEER** has failed to act on an **Application for Payment** or **CITY** has failed to make any payment as aforesaid, **CONTRACTOR** may upon seven (7) days' notice to **CITY** and **ENGINEER** stop the **Work** until payment of all amounts then due. Except as specifically provided in this paragraph, these provisions shall not relieve **CONTRACTOR** of the obligation under Article 6 to carry on the **Work** in accordance with the **Progress Schedule** and without delay during disputes and disagreements with the **CITY**.

ARTICLE 16 - VALUE ENGINEERING INCENTIVE

16.1 This provision applies to any **CONTRACTOR** developed, prepared, and submitted Value Engineering Change Proposal (VECP). The following definitions shall apply to this article:

16.1.1. "**CONTRACTOR's** development and implementation costs" means those costs incurred in a VECP before **CITY** acceptance and those costs **CONTRACTOR** incurs specifically to make the changes required by **CITY** acceptance of a VECP.

16.1.2. "**CITY** costs" means those costs that result directly from evaluating and implementing the VECP and any net increases in the cost of testing, operations, maintenance, repair, replacement, spare parts, and support. They include **ENGINEER's** and **DESIGN ENGINEER's** charges to **CITY** in connection with evaluating and implementing the VECP and the cost of any consultant retained by **CITY**, **ENGINEER** or **DESIGN ENGINEER** to assist in the evaluation of the VECP. However, they do not include the normal administrative costs of processing the VECP.

16.1.3. "Contract savings" means the estimated reduction in **CONTRACTOR's** cost of performance resulting from acceptance of the VECP, minus **CONTRACTOR's** development and implementation costs (including **Subcontractors'** development and implementation costs).

16.1.4. "Value Engineering Change Proposal (VECP)" means a proposal that: (1) requires a change to the **Contract Documents** to implement, and (2) results in reducing the **Contract Price** or estimated cost without impairing in any way necessary functions or characteristics of the **Project**, provided that it does not involve a change in deliverable end-item quantities only.

16.2 As a minimum, **CONTRACTOR** shall include the following information in each VECP in sufficient detail to allow **CITY** a meaningful evaluation:

16.2.1. A description of the difference between the existing requirement in the **Contract Documents** and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are proposed to be altered, and the effect of the change on the end items performance.

16.2.2. A list of all changes to the **Contract Document** that must be made if the VECP is accepted, including any suggested specification revisions (and also including any additional items such as new permits, regulatory entity approvals, etc.).

16.2.3. An itemized estimate of Contract savings, which shall contain at a minimum, separate, detailed cost estimates for both the requirement of the existing **Contract Documents** and the VECP, **CONTRACTOR's** development and implementation costs, and any license fees or royalty payments to be made. **CONTRACTOR's** cost estimate for the VECP shall also include, but not be limited to, costs of any delays that may be associated with implementing the VECP and cost and claims of other contractors affected by the VECP. **CONTRACTOR** shall also

provide a description and itemized estimate of costs **CITY** may incur in implementing the VECP, such as those defined above.

16.2.4. A statement of the time by which a **Change Request** or **Change Order** accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the **Contract Time(s)** or **Progress Schedule**.

16.2.5. Identification of any previous submissions of the VECP.

16.3 **CONTRACTOR** shall submit VECP's to **ENGINEER**. **ENGINEER** shall notify **CONTRACTOR** of the status of the VECP within 45 **days** after **ENGINEER** receives it. If additional time is required, as determined by **ENGINEER**, **CONTRACTOR** shall be notified within the 45 **day** period and provided the reason for the delay and the expected date of **CITY**'s decision. VECP's shall be processed expeditiously; however, **CITY** shall not be liable for any delay in acting upon a VECP. If additional information is required, **ENGINEER** shall inform **CONTRACTOR**, who shall expeditiously provide the required information, and failing to comply with said request shall waive the benefits under this Article.

16.4 If the VECP is not accepted by **CITY**, **ENGINEER** shall provide **CONTRACTOR** written notification of rejection. **CONTRACTOR** may withdraw, in whole or in part, any VECP not accepted by **CITY** within the period specified in the VECP. **ENGINEER** may require that **CONTRACTOR** provide written notification before undertaking significant expenditures for VECP effort. Nothing contained herein to the contrary, **CITY** is under no obligation to accept all or part of any VECP, and **CITY** may at its discretion reject a VECP in whole or in part for any reason. **CONTRACTOR** shall be responsible for **CONTRACTOR**'s development and implementation costs and **CITY** costs incurred in connection with a rejected VECP. **CITY** will be entitled to an appropriate decrease in **Contract Price** for **CITY** costs incurred in connection with a rejected VECP.

16.5 Any VECP may be accepted in whole or in part by a **Change Order** citing this clause. **CITY** may accept the VECP, even though an agreement on price reduction has not been reached, by a **Change Request** ordering **CONTRACTOR** to proceed with the change. Until such **Change Request** is issued, **CONTRACTOR** shall perform in accordance with the existing **Contract Documents**. **CITY**'s decision to accept all or part of any VECP shall not be contestable by **CONTRACTOR**.

16.6 The **CONTRACTOR**'s share of savings will be fifty percent (50%) of Contract savings.

16.7 Payment of any amount due **CONTRACTOR** for use of a VECP shall be authorized by a **Change Order** which (1) accepts the VECP, (2) reduces the **Contract Price** or estimated cost by the amount of Contract savings, and (3) provides **CONTRACTOR**'s share of savings by adding the amount calculated in 16.6 to the **Contract Price** as reduced in clause (2) herein.

16.8 **CONTRACTOR** shall include value engineering clauses in any **Subagreement** of \$50,000 or more and may include them in **Subagreements** of lesser value. To compute any adjustment in the **Contract Price**, **CONTRACTOR**'s VECP development and implementation costs shall include any **Subcontractor**'s development and implementation costs that clearly result from the VECP, but shall exclude any value engineering incentive payments to **Subcontractors**. **CONTRACTOR** may choose any arrangement for **Subcontractor** value engineering incentive payments, provided that these payments are not made from **CITY**'s share of the savings resulting from the VECP.

16.9 **CONTRACTOR** may restrict **CITY**'s right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

"These data, furnished under the Value Engineering Incentive clause of Contract _____, shall not be disclosed outside the **CITY** by **CITY**, **ENGINEER** or **DESIGN ENGINEER**, except as otherwise required by law, or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a VECP submitted under the clause. This restriction does not limit the **CITY**'s right to use information contained in these data if it has been obtained or is otherwise available from the **CONTRACTOR** or from another source without limitations."

If a VECP is accepted, **CONTRACTOR** hereby grants **CITY** unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, **CITY** shall have the rights specified in the **Change Order** implementing the VECP and shall appropriately mark the data.

ARTICLE 17 - MISCELLANEOUS

17.1 Giving Notice

17.1.1. Whenever any provision of the **Contract Documents** requires the giving of written notice it shall be deemed to have been validly given as of the time of actual delivery if delivered in person; or if it is delivered by registered mail, delivery service, or telegram, charges prepaid, at the actual time of delivery at the last business address known to the giver of the notice.

17.1.2. Written notice to be delivered to **CITY** or **ENGINEER** or to any of its representatives by **CONTRACTOR** shall be delivered at the office stated in the **Agreement**, unless otherwise specified in writing to **CONTRACTOR**. Written notice to **CONTRACTOR** by **CITY** or **ENGINEER** shall be delivered to the individual or member of the firm or to an officer of the corporation for whom it is intended at the office stated in the **Agreement**, or such other office or individual designated by **CONTRACTOR** in writing to **CITY**.

17.2 Notice to Other Agencies

CONTRACTOR shall notify all public and private entities or agencies in accordance with any and all ordinances, laws, agreements, licenses, and any other directions of construction activity, disruption of access or services. **CITY** or **ENGINEER** shall not be responsible for any such notification.

17.3 Computation of Time

When any period of time is referred to in the **Contract Documents** by **days**, it shall 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 **Holiday**, such **day** shall be omitted from the computation.

17.4 Claims for Injury or Damage to Person or Property

Should **CITY** or **CONTRACTOR** suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time from the first observance of such injury or damage. This provision shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.5 No Conflict with Laws or Regulations

17.5.1. The duties, obligations, criteria or procedure imposed by these General Conditions and the rights and remedies made available 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**, except that in the event that a specific part or detailed requirement of a provision, criterion or procedure in these General Conditions and a specific part or detailed requirement of a provision, criterion or procedure imposed or available by **Laws or Regulations** are in conflict the specific part or detailed requirement of **Laws and Regulations** shall govern. All other specific parts or detailed requirements in the provisions, criteria or procedures of the applicable **Laws or Regulations** and these General Conditions not in conflict shall remain in full force and effect and be read with the controlling specific part or detailed requirement.

17.5.2. 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.

17.5.3 Each and every provision of law and clause required by law to be inserted in the **Contract Documents** shall be deemed to be inserted therein and the Contract shall be read and enforced as though it were included therein.

17.6 Partial Invalidity

If any provision of this contract is held by a court of competent jurisdiction to be invalid or unenforceable, such invalidity or unenforceability shall not affect the other parts of this Contract if the rights and obligations of the parties contained herein are not materially prejudiced and if the intentions of the parties can continue to be effectuated. To that end, this contract is declared severable.

17.7 No Waiver of Rights, Duties

17.7.1 Except as otherwise specifically provided in the **Contract Documents**, no action or failure to act by the **CITY, ENGINEER, CITY's Representative(s), or CONTRACTOR** shall constitute a waiver of any right or duty afforded any of them under the **Contract Documents**, nor shall any such action or failure to act constitute an approval of or acquiescence of any breach thereunder.

17.7.2. All representations, indemnities, warranties and guarantees required by the **Contract Documents**, including the **Warranty Period** shall survive Final Payment and termination or completion of this **Agreement**.

17.8 Advertising

No advertising shall be permitted upon any part of the site or structures located on the site. News or press releases pertaining to the services, work product(s), or performance of **CONTRACTOR** under this **Agreement** or the **Project** to which it relates shall be at the sole discretion of **CITY**.

17.9 Venue

The location of any litigation arising between the parties shall only be in the courts of Orange County, Florida.

17.10 Recovery of Damages

In no event shall **CONTRACTOR** be entitled to recover from **CITY** any indirect, incidental, or consequential damages in any proceeding arising out of or relating to this **Agreement** or breach thereof.

SUPPLEMENTARY CONDITIONS

1. INTRODUCTION

These Supplementary Conditions amend or supplement the General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below.

2. CONTRACTOR'S INSURANCE

2.1 General Liability Insurance.

Bodily injury coverage shall be for not less than \$1,000,000 for each occurrence and not less than \$1,000,000 aggregate.

Property damage coverage shall be for not less than \$500,000 each occurrence and \$500,000 aggregate.

Personal injury coverage shall be for not less than \$1,000,000 aggregate.

Bodily injury, personal injury, and property damage coverage shall be in a combined single limit of not less than \$1,000,000 each occurrence and \$1,000,000 aggregate.

2.2 Automobile Liability.

Bodily injury coverage shall be for not less than \$1,000,000 for each person and not less than \$1,000,000 for each accident, per each occurrence.

Property damage coverage shall be for not less than \$500,000 for each occurrence.

Bodily injury and property damage coverage shall be in a combined single limit of not less than \$1,000,000 for each occurrence and \$1,000,000 aggregate.

2.3 Employer's Liability Insurance.

Bodily Injury coverage by accident shall be for not less than \$100,000 for each employee and \$100,000 for each accident.

Bodily Injury coverage by Disease shall be for not less than \$100,000 for each employee and \$100,000 for each aggregate disease.

VETERAN BUSINESS ENTERPRISE PARTICIPATION FORM

In order to foster economic development and business opportunities, promote the growth and development of local businesses, and rectify the economic disadvantages of service-disabled veterans and wartime veterans who have made extraordinary sacrifices on behalf of the nation, the City of Orlando has adopted a Veteran Business Enterprise (“VBE”) Preference. For further information regarding this program, please refer to Chapter 7 of the Code of the City of Orlando. In order for a bidder to receive credit for VBE certification for this solicitation, the bidder must have its principal place of business in the Metropolitan Statistical Area (i.e. Orange, Lake, Seminole or Osceola Counties) and be a certified veteran business enterprise by the State of Florida Department of Management Services as set forth in Section 295.187 of the Florida Statutes as of the date set for submittal of bids.

If your company is currently certified, please enter the certification number and the expiration date in spaces provided below or submit a copy of the certificate received from the State of Florida Department of Management Services stating that your company is certified as a veteran business enterprise:

Business Name: _____

Certification Number: _____

Expiration Date: _____

There shall be no third-party beneficiaries of the Veteran Business Enterprise Preference provisions of this solicitation or resulting contract. The City of Orlando shall have the exclusive means of enforcement of the Veteran Business Enterprise Preference Ordinance and any contract terms. No right of action for non-signatories of the contract is intended or implied. The City of Orlando is the sole judge of compliance. All solicitations and submittals awarded will be evaluated in accordance with Chapter 7 of the Code of the City of Orlando.

3. DOCUMENTS INCORPORATED BY REFERENCE

Division II Technical Provisions/Construction Details and Division III Materials of the City of Orlando Standard Specifications for Road, Bridge, and Utility Construction (“White Book”) are hereby incorporated into these Contract Documents by reference and shall be complied with by

the **CONTRACTOR**. The Special Provisions modify or supplement the above-referenced document.

The City of Orlando Roadway and Traffic Design Standards for Design, Construction, Maintenance, and Utility Operations for Streets and Highways (“Blue Book”) are hereby incorporated into these Contract Documents by reference and shall be complied with by the **CONTRACTOR**.

The General Conditions, Division I of the White Book, are not incorporated into these Contract Documents by reference. The **CONTRACTOR** shall comply with the General Conditions set forth herein in Section 00700.

The current edition of the City of Orlando Engineering Standards Manual (“Engineering Standards Manual”) as of the date of bid opening is hereby incorporated into these Contract Documents by reference and shall be complied with by the **CONTRACTOR**. The Engineering Standards Manual requires compliance with the specifications and standards of the Florida Department of Transportation’s “Standard Specifications for Road and Bridge Construction” and the “Design Standards Manual,” except when in conflict with the City of Orlando’s White Book, Blue Book or Engineering Standards Manual, in which case the applicable provision of the City of Orlando documents shall prevail. The Engineering Standards Manual can be accessed at the following internet address:

http://www.cityoforlando.net/public_works/esd/records/resources.html.

4. STORMWATER POLLUTION PREVENTION PLAN

The **CONTRACTOR** and its Subcontractors shall comply with the provisions of the Stormwater Pollution Prevention Plan and amendments thereto, which are a part of the Contract Documents, if applicable for this Project. The **CONTRACTOR** and each Subcontractor implementing any measure or provision of the Stormwater Pollution Prevention Plan shall sign and date a copy of the following certification statement before conducting any activities at the site:

“I certify under penalty of law that I understand, and shall comply with, the terms and conditions of the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities and this Stormwater Pollution Prevention Plan prepared thereunder.”

5. RESPONSIBLE CONTRACTOR'S POLICIES/ DAVIS-BACON PAY RATE AND CLASSIFICATION

5.1 The wage rates set forth in the applicable Wage Determination General Decision for Orange County, Florida, identified in the Invitation for Bid, shall be the minimum hourly wage for the stated job classification to be paid to workers on this Project. However, no CONTRACTOR or Subcontractor's worker shall be paid at a rate less than the Living Wage of \$15.00 per hour.

5.2 The CONTRACTOR shall post a copy of the CITY'S Living Wage and Responsible Contractor's Policies set forth in the Supplementary Conditions as Attachment 2 at CITY designated locations on the Project site.

6. OWNER DIRECT PURCHASES (ODP)

6.1 Notwithstanding anything contained in any of the Contract Documents to the contrary, CITY hereby reserves the right to purchase materials for incorporation into the Work directly from a Supplier and the Contract Price may be adjusted to account for any such CITY furnished materials. Any materials purchased directly by CITY shall be referred to as owner direct purchase materials ("ODP Materials") and the responsibilities of both CITY and CONTRACTOR relating to such ODP Materials shall be governed by the terms and conditions of these Supplementary Conditions, which shall take precedence over other conditions and terms of the Contract Documents where inconsistencies or conflicts exist. CONTRACTOR represents and warrants that it will cooperate with the CITY in implementing these procedures for the procurement of ODP Materials.

6.2 At any time upon the request of the CITY, CONTRACTOR shall provide CITY with a list of all intended Suppliers for such materials as specified by CITY for consideration for procurement by the CITY as ODP Materials. The list shall include price quotes from the Suppliers, as well as a description of the materials to be supplied, estimated quantities and prices. The CITY may, but is not required to use, the supplier selected by CONTRACTOR. Upon CITY's request, CONTRACTOR shall assign any or all of its subcontracts or other agreements with material Suppliers for such supplies to CITY or require its Subcontractors to assign its agreements with material Suppliers for such supplies to City, if applicable.

6.3 Upon request from the CITY, and in a timely manner, CONTRACTOR shall prepare a Purchasing Requisition Request Form which shall, in form and detail acceptable to CITY, specifically identify the materials which CITY, in its discretion, has identified and elected to purchase directly as ODP Materials. The Purchasing Requisition Request Form shall include:

- a. the name, address, telephone number and a contact person for the material Supplier.

- b. the manufacturer or brand, model or specification number of the item.
- c. quantity needed as estimated by **CONTRACTOR**.
- d. the price quoted by the Supplier for the materials identified.
- e. any sales tax associated with such quote.
- f. delivery dates as established by **CONTRACTOR**.
- g. any reduction in **CONTRACTOR**'s cost for both the Payment Bonds and the Performance Bonds.
- h. shipping, handling and insurance costs.
- i. details concerning any bonds or letters of credit provided by the Supplier if included in such Supplier's proposal.
- j. Special terms and conditions which have been negotiated with the Supplier relative to payment, discounts, rebates, warranty, credits or other terms and conditions which will be assigned to the **CITY**; and
- k. Such other information as may reasonably be requested by **CITY**.

CONTRACTOR shall include copies of Suppliers' quotations and specifically reference any terms and conditions, which have been negotiated with them concerning letters of credit, terms, discounts, or special payments.

6.4 After receipt of the Purchasing Requisition Request Form, **CITY** shall prepare a Purchase Order for all items of material which **CITY** chooses to purchase directly. The Purchase Order shall include the **CITY'S Consumer's** Certificate of Exemption number and a copy of the Consumer's Certificate of Exemption and a Certificate of Entitlement. The **CITY'S** Purchase Order shall be sent directly to the Supplier by the **CITY** with a copy sent to the **CONTRACTOR**, including a copy of the Certificate of Entitlement. Pursuant to the Purchase Order, the Supplier will provide the required quantities of material at the price established in the Supplier's quote to the **CONTRACTOR** or Subcontractor, or such other price as may be directly negotiated by the **CITY**, excluding any sales tax associated with such price. The **ENGINEER** shall be the approving authority for the **CITY** on Purchase Orders in conjunction with ODP Materials.

6.5 In conjunction with the issuance by the **CITY** of Purchase Orders for ODP Materials to Suppliers, **CONTRACTOR** shall execute and deliver to **CITY** one or more deductive Change Orders, referencing the full value of all ODP Materials to be provided by each Supplier from whom the **CITY** elected to purchase materials directly, plus all sales taxes associated with such materials in **CONTRACTOR**'s bid to **CITY**, plus any savings to **CONTRACTOR** in the cost of Payment and Performance Bonds associated with such ODP Materials. The **ENGINEER** shall be the approving authority for the **CITY** on deductive Change Orders in conjunction with ODP Materials.

6.6 Except as expressly stated herein, **CONTRACTOR** shall be fully responsible for all matters relating to the procurement of ODP Materials furnished by and incorporated into the Work in accordance with these Supplementary Conditions including, but not limited to, assuring the correct quantities, verifying documents and the placement of all orders in a timely manner, assuring coordination of purchases, providing and obtaining all warranties and guarantees required by the Contract Documents, and inspection and acceptance of the materials at the time of delivery. The **CONTRACTOR** shall coordinate delivery locations and schedules, sequence of delivery, loading orientation, and other arrangements normally required by the **CONTRACTOR** for the particular materials furnished. The **CONTRACTOR** shall provide all services required for the unloading, handling and storage of materials through installation. The **CITY** assumes the risk of loss of ODP Materials from the time title to such material passes from the Supplier at purchase, or upon delivery if allowed by Laws and Regulations.

6.7 Upon delivery of ODP Materials to such locations as the **CITY** may designate, the **CONTRACTOR** shall visually inspect all shipments from Suppliers and sign off on all receiving reports for ODP Material delivered or received. The **CONTRACTOR** shall assure that each delivery of ODP Materials is accompanied by delivery tickets, or such other documentation as is adequate to identify the Purchase Order against which the purchase is made. This documentation may consist of a delivery ticket and a copy of the invoice from the Supplier conforming to the Purchase Order together with such additional information as the **CITY** may require. The **CONTRACTOR** will then forward the delivery tickets to the **ENGINEER** to match up with the invoice for payment. The **CITY** shall be directly invoiced by the Suppliers for all ODP Materials. In the event that **CONTRACTOR** receives any invoices (other than copies of invoices the originals of which have been sent directly by the Supplier to the **CITY**), **CONTRACTOR** shall not pay such invoice and shall immediately notify the Supplier that the **CITY** must be directly invoiced on all ODP Materials.

6.8 The **CONTRACTOR** shall insure that ODP Materials conform to all specifications contained in the Contract Documents. **CONTRACTOR** shall determine prior to incorporation into the Work if such materials are patently defective, and whether such materials are identical to the materials ordered and match the description on the bill of lading. If the **CONTRACTOR** discovers defective or non-conformities in ODP Materials upon such visual inspection, the **CONTRACTOR** shall not utilize such nonconforming or defective materials in the Work and instead shall promptly notify the **CITY** of the defective or nonconforming condition so that repair or replacement of those materials can occur without any undue delay or interruption to the Work. If the **CONTRACTOR** fails to perform such inspection and otherwise incorporates into the Work such defective or nonconforming ODP Materials, the condition of which it either knew or should have known by performance of an inspection, **CONTRACTOR** shall be responsible for all damages to **CITY** resulting from **CONTRACTOR**'s incorporation of such materials into the Work, including liquidated or delay damages.

6.9 The **CONTRACTOR** shall maintain records of all ODP Materials it incorporates into the Work. The **CONTRACTOR** shall account monthly to the **CITY** for any ODP Materials delivered into the **CONTRACTOR**'s possession, indicating portions of all such materials which have been incorporated into the work

6.10 The **CONTRACTOR** shall be responsible for obtaining and managing all warranties and guarantees for all ODP Materials in the same manner and on the same terms as materials obtained by the **CONTRACTOR** as required by the Contract Documents. All repair; maintenance or damage-repair calls shall be forwarded to the **CONTRACTOR** for resolution with the appropriate Supplier or Subcontractor. The **CONTRACTOR** agrees and understands that it shall undertake all warranty enforcement and other related duties of the **CITY** for all ODP Materials. Additionally, all ODP Materials shall be warranted and guaranteed by the **CONTRACTOR** as part of the **CONTRACTOR**'s warranty and guarantee of the Work to the same extent and degree as other materials procured and provided to the Work by **CONTRACTOR**. **CONTRACTOR**'S warranty and guarantee duties shall be governed by and carried out pursuant to the terms of the Contract Documents. To that end, the **CONTRACTOR** expressly agrees it shall make no distinction in discharging such warranty and guarantee duties and obligations between ODP Materials and equipment and materials otherwise supplied by the **CONTRACTOR**.

6.11 Notwithstanding the transfer of ODP Materials by the **CITY** to the **CONTRACTOR**'s possession, the **CITY** shall retain legal and equitable title to any and all ODP Materials. The transfer of possession of ODP Materials from the **CITY** to the **CONTRACTOR** shall constitute a bailment for the mutual benefit of the **CITY** and the **CONTRACTOR**. The **CITY** shall be considered the bailor and the **CONTRACTOR** the bailee of the ODP Materials. Transfer of possession shall be deemed to occur immediately and automatically upon delivery of ODP Materials to the **CITY** without notice from **CITY** to **CONTRACTOR**. ODP Materials shall be considered returned to the **CITY** for purposes of their bailment at such time as they are incorporated into the Project. While in **CONTRACTOR**'S possession, **CONTRACTOR** shall handle and store all ODP Materials in a manner consistent with the Supplier's or manufacturer's instructions regarding handling and storage to ensure later installation of ODP Materials in a sound and undamaged condition.

6.12 The **CONTRACTOR** shall purchase and maintain builders' risk insurance sufficient to protect against any loss of or damage to ODP Materials. Such insurance shall cover the full value of any ODP Materials not yet incorporated into the Work during the period between the time the **CITY** first takes title to any of such ODP Materials and the time when the last of such is incorporated into the Work. The **CONTRACTOR** shall purchase and maintain builders' risk, "all-risk" insurance based on the completed value of the Project. The **CONTRACTOR** must name **CITY** as additional insured on its policy with respect to all ODP Materials and **CITY** shall be solely entitled to all proceeds related to the loss or damage of ODP Materials.

6.13 The **CITY** shall in no way be liable for any interruption or delay in the Work, for any defects or other problems with the Work, or for any extra costs resulting from any delay in the delivery of, or defects in ODP Materials. **CONTRACTOR**'s sole or exclusive remedy shall be an extension of the time of completion of the Work for such reasonable time as determined by City.

6.14 **CONTRACTOR** shall be required to review all invoices submitted to the **CITY** by Suppliers of ODP Materials and either concur or object to the **CITY**'s issuance of payment to the Suppliers, based upon **CONTRACTOR**'s records of materials and any defects detected in such materials. The **CITY** shall directly pay all Suppliers with respect to ODP Materials purchased by the **CITY**.

6.15 In order to arrange for timely payment to the Suppliers of ODP Materials, **CONTRACTOR** shall promptly submit to **CITY** within ten (10) days of **CITY**'s receipt of an invoice from a Supplier (i) a copy of the applicable purchase order as receiving report, (ii) copies of the delivery tickets, (iii) written acceptance of the delivered items by the **CONTRACTOR**, and (iv) such other documentation as may be reasonably required by the **CITY**. Upon receipt of the appropriate documentation, the **CITY** shall prepare a check drawn to the Supplier based upon the data provided by **CONTRACTOR**. This check will be made payable and remitted directly to the Supplier. The **CONTRACTOR** agrees to assist the **CITY** to immediately obtain partial or final release of waivers as appropriate.

6.16 At completion of the Work, **CONTRACTOR** will be provided with a deductive Change Order for the costs incurred by **CITY** to provide all ODP Materials not covered by previous Change Orders. Salvage ODP Materials shall be stored or removed from the site at the **CITY**'s direction or may be turned over to the **CONTRACTOR** by the **CITY** for salvage or disposal at the **CITY**'S discretion.

6.17 The procedures set forth herein for Owner Direct Purchases are intended to comply with the requirements of the Florida Department of Revenue for the direct purchase of materials by governmental entities for use in Public Works Contracts set forth in Section 12A-1.094 of the Florida Administrative Code, as amended. Under no circumstances shall any materials which will not be incorporated into the Work be purchased by the **CITY** as ODP Materials, including but not limited to any consumables such as fuel or any equipment related to the Work which will not be affixed or otherwise incorporated into the Work such as reusable construction equipment.

7. SOCIAL SECURITY NUMBER COLLECTION

Pursuant to Section 119.071(5) of Florida law, the **CITY** is required to provide notification in writing of the purposes for which an individual's social security number is collected. The **CITY**

collects social security numbers for the following purposes: identification and verification; tracking, employment verification and auditing. Social security numbers are also used as a unique numeric identifier and may be used for search purposes.

8. E-VERIFY

The Contractor shall utilize the U.S. Department of Homeland Security's E-Verify system, in accordance with the terms governing use of the system, to verify the employment eligibility of all new employees hired by the Contractor during the term of the Contract. In addition, Contractor shall require any subcontractors performing

work or providing services pursuant to the Contract to verify the employment eligibility of all new employees hired by the subcontractor during the term of the Contract.

9. PUBLIC RECORDS

To the extent applicable, Contractor shall comply with Florida public records laws, including Sections 119.0701(2) (b) 1 through 4 of the Florida Statutes. **IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CITY CLERK OR RECORDS AND ARCHIVES MANAGER AT, RECORDS@ORLANDO.GOV, TELEPHONE NUMBER (407) 246-2148, 400 S. ORANGE AVE., ORLANDO, FL 32801.**

10. SB 674: UNITED STATES-PRODUCED IRON AND STEEL IN PUBLIC WORKS PROJECTS

United States-produced Iron and Steel in Public Works Projects; Requiring governmental entities to include a requirement in certain contracts that certain iron or steel products be produced in the United States; authorizing the minimal use of foreign steel and iron materials in certain circumstances; exempting specified products from the requirement, etc. Any iron or steel products permanently incorporated into this public works project must be produced in the United States.

11. LIVING WAGE AND RESPONSIBLE CONTRACTOR'S POLICIES

The following City policies are applicable to this construction Project:

- (1) CONTRACTOR, as well as its Subcontractors at all tiers, shall pay to all of their employees providing services pursuant to a contract with the CITY, a living wage for the time spent

providing services to the CITY. (This provision does not include general administrative personnel unless they are assigned to a CITY project.) "Living wage" means compensation for employment of not less than \$15.00 per hour for straight time, exclusive of FICA, unemployment taxes, and workers compensation insurance and employee benefits. Necessary payroll documentation shall be provided to confirm compliance with this provision and the CONTRACTOR shall allow the CITY to audit (at CONTRACTOR's place of business) its payroll records to determine if compliance has been achieved. Failure to comply with the provision may result in termination of the contract and/or preclusion from future CITY contracts at the sole option of the CITY.

- (2) The CONTRACTOR, when paying its workers on this Project, shall pay such workers an hourly wage, based on classification for the Orlando region established by the Davis-Bacon Act (40 U.S.C. 276a-7) as supplemented by the Department of Labor regulations (29 CFR part 5) (hereinafter "hourly wage"). Payment of the appropriate wages must be documented in CONTRACTOR'S progress payment applications by the submission of certified payrolls by CONTRACTOR for the duration of this Agreement. Moreover, CONTRACTOR shall require compliance with these provisions for Davis-

Bacon hourly wages and certified payrolls by **all** Subcontractors at every tier, and CONTRACTOR will be

held responsible for compliance by any Subcontractor or lower tier Subcontractor. Notwithstanding the foregoing, CONTRACTOR acknowledges and agrees that no hourly wage paid on this project by the CONTRACTOR and Subcontractors will be less than the living wage referenced in this Agreement.

- (3) The CONTRACTOR and Subcontractors at all tiers shall each classify all of their workers as either independent contractors or employees in accordance with the requirements of Laws and Regulations. Workers who are employees as defined by Laws and Regulations shall not be classified as independent contractors. The CONTRACTOR and Subcontractors shall each provide written notice to their workers.
- (4) classified as independent contractors of their classification status within seven (7) days after contract award or within seven (7) days of hiring if hired subsequent to contract award. Documentation demonstrating compliance with this requirement for each worker classified as an independent contractor shall be submitted by the CONTRACTOR with its first Application for Payment. For those workers classified as independent contractors hired after submittal of the first Application for Payment, documentation demonstrating compliance with this requirement shall be provided with the first Application for Payment submitted subsequent to the worker's hiring.

- (5) The Contractor shall utilize the U.S. Department of Homeland Security's E-Verify system, in accordance with the terms governing use of the system, to verify the employment eligibility of all new employees hired by the Contractor during the term of the Contract. In addition, Contractor shall require any subcontractors performing work or providing services pursuant to the Contract to verify the employment eligibility of all new employees hired by the subcontractor during the term of the Contract. Documentation of E-verify confirmation shall be submitted by the CONTRACTOR with the first Application for Payment, or for those workers hired after submittal of the first Application for Payment, with the first Application for Payment submitted subsequent to the worker's hiring.
- (6) The CONTRACTOR shall post a copy of the CITY'S Living Wage and Responsible Contractor's Policies at designated locations on the Project site as required by the Contract Documents.

"General Decision Number: FL20260128 01/02/2026

Superseded General Decision Number: FL20250128

State: Florida

Construction Type: Heavy

County: Orange County in Florida.

HEAVY CONSTRUCTION PROJECTS (Including Sewer and Water Lines)

Modification Number	Publication Date
0	01/02/2026

ENGI0673-013 05/01/2024

	Rates	Fringes
OPERATOR: Oiler.....	\$ 24.50	15.10

IRON0808-003 01/01/2024		

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 31.50	16.45

LAB00517-002 05/01/2023		

	Rates	Fringes
LABORER: Grade Checker.....	\$ 22.61	11.59

PAIN1010-011 08/01/2025		

	Rates	Fringes
Painter - Brush, Roller & Spray.....	\$ 25.86	14.73

SUFL2009-167 06/24/2009		

	Rates	Fringes
CARPENTER.....	\$ 13.56	1.84
CEMENT MASON/CONCRETE FINISHER...	\$ 13.44	0.00
ELECTRICIAN.....	\$ 16.71	3.51
FORM WORKER.....	\$ 12.00	1.43
LABORER: Common or General.....	\$ 8.69	2.24
LABORER: Landscape.....	\$ 7.25	0.00
LABORER: Pipelayer.....	\$ 12.12	2.01
LABORER: Power Tool Operator (Hand Held Drills/Saws, Jackhammer and Power Saws Only).....	\$ 10.63	2.20
OPERATOR: Asphalt Paver.....	\$ 11.88	0.00

OPERATOR: Backhoe Loader Combo.....	\$ 16.10	2.44
OPERATOR: Backhoe/Excavator.....	\$ 12.81	3.37
OPERATOR: Bulldozer.....	\$ 12.03	3.14
OPERATOR: Crane.....	\$ 16.17	3.89
OPERATOR: Grader/Blade.....	\$ 16.00	2.84
OPERATOR: Loader.....	\$ 12.34	1.92
OPERATOR: Mechanic.....	\$ 13.83	2.19
OPERATOR: Roller.....	\$ 10.67	1.87
OPERATOR: Scraper.....	\$ 11.00	1.74
OPERATOR: Trackhoe.....	\$ 20.92	5.50
OPERATOR: Tractor.....	\$ 10.00	0.00
TRUCK DRIVER, Includes Dump Truck.....	\$ 9.50	1.70
TRUCK DRIVER: 4 Axle Truck.....	\$ 14.12	0.00
TRUCK DRIVER: Lowboy Truck.....	\$ 11.00	0.00
TRUCK DRIVER: Off the Road Truck.....	\$ 12.21	1.97

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded.

If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION

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FORMS

The following forms are part of the Contract Documents, and are required to be used during the course of the Contract by CONTRACTOR, ENGINEER, and DESIGN ENGINEER, except as otherwise allowed by OWNER.

00905-1	NOTICE OF INTENDED ACTION: AWARD OF BID
00910-1	NOTICE OF AWARD
00920-1	NOTICE TO PROCEED
00930-1,2,3,4	CHANGE ORDER FORM
00940-1,2,3,4	APPLICATION FOR PAYMENT
00945-1	CERTIFIED PAYROLL REPORTING FORM
00950-1	REQUEST FOR INFORMATION
00960-1	STORED MATERIALS FORM
00965-1	SCHEDULE OF VALUES
00970-1,2	EROSION AND SEDIMENT CONTROL INSPECTION FORM
00975-1	SHOP DRAWING SUBMITTAL
00980-1	CERTIFICATE OF SUBSTANTIAL COMPLETION
00990-1	CERTIFICATE OF FINAL INSPECTION
00995-1,2	CONTRACTOR'S RELEASE



**NOTICE OF INTENDED ACTION:
AWARD OF BID**

Date:

TO: All Bidders

Re: Notice of Intended Action
IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.

On _____, at 2:00 P.M. Local Time, Orlando, Florida, sealed bids for the above referenced project were received and opened in the Procurement and Contracts Division.

This notice serves as official notification that the City intends to award the above referenced project to the following, in the best interest of the City:

_____ of _____
Company City, State

If you have any questions regarding the bidding procedures, please contact the Procurement and Contracts Division at (407) 246-2291.

We appreciate your interest in doing business with the City of Orlando and look forward to receiving submittals from your firm on future projects.

Procurement and Contracts Division

Note: The Solicitation process is governed by Chapter 7 of the City Code

NOTICE OF AWARD

Contractor

Effective Date: _____

Project: **IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.**

Date of Bid Opening: _____ Amount: \$ _____

You are hereby notified as of the date indicated above that you are the Successful Bidder on the Project noted above. Upon compliance with the conditions precedent to be fulfilled by you within the time specified, the Agreement will be executed and delivered to you.

Enclosed are the following:

<u>No. Copies</u>	<u>Item</u>
3	Agreement Between City and Contractor
3	Performance Bond
3	Payment Bond
3	Certificates of Insurance or (ACCORD FORM)
3	Human Trafficking Affidavit
3	Notice of Award

Please take the following actions:

1. Execute Agreement.
2. Have your bonding company complete bond forms and attach notarized Acknowledgement of Authorized Representative.
3. Have your insurance company complete the Certificates of Insurance.
4. Return all 3 copies of documents enclosed no later than fifteen (15) days after the date indicated above to:

CITY OF ORLANDO
Attention: **Silvia Coste, CPP, Senior Purchasing Agent**
Procurement and Contracts Division
400 South Orange Avenue, 4th Floor
Orlando, Florida 32801

We will return a fully executed copy of the contract document to you along with a Notice to Proceed.

BY OWNER:
City of Orlando
Procurement & Contract Division
400 South Orange Avenue 4th Floor
Orlando, FL 32801

By: _____
David Billingsley, CPSM, C.P.M. Chief Procurement Officer

Acknowledge Receipt of Notice

By: _____
Contractor

Title: _____

Date: _____

NOTICE TO PROCEED

Contractor

Date: _____

Project Name: **Water Conserv II WRF Equalization Pump Station Improvements.**

Project No. : **IFB26-0141.**

Contractor is hereby notified to proceed with the work on the subject project as of the date _____, which shall constitute the date of the Commencement of the Contract Time.

Contractor shall mobilize and be working on site within 10 calendar days following this date, unless agreed to otherwise in writing.

Enclosed is one set of Conformed Contract Documents.

Date of Substantial Completion of the Work: _____

Amount of Liquidated Damages per day for
non-completion of the work by date of
Substantial Completion (unless
agreed to otherwise in writing)

\$ _____

CITY OF ORLANDO
Department of Public Works
400 S. Orange Avenue, 8th Floor
Orlando, Florida 32801

BY: _____
Corey Knight, P.E., Director of Public Works

Acknowledged Receipt of Notice

BY: _____
Contractor

Title: _____

DATE: _____

c: Raymond Scullian, Risk Management Division Manager

**CITY OF ORLANDO
CHANGE ORDER FORM**

CONTRACT NAME _____
CHANGE ORDER NO. _____
CONTRACTOR _____ VENDOR NO. _____
CHARGE CODE _____ CONTRACT ORDER (CO) NO. _____
AGREEMENT DATE _____ ORIGINAL CONTRACT TIME _____

The following changes are hereby made to the CONTRACT DOCUMENTS

ORIGINAL CONTRACT PRICE _____
Current CONTRACT PRICE ADJUSTED by previous Change Order _____
The CONTRACT PRICE due to this Change Order will increase/decrease _____
The CURRENT CONTRACT PRICE including this Change Order will be _____
The CONTRACT TIME (Days) due to this Change Order will increase/decrease _____
The CURRENT CONTRACT TIME (Days) including this Change Order will be _____
The date for Substantial Completion of all work will be _____

CHANGES ORDERED

GENERAL

This Change Order is necessary to cover changes in the work to be performed under this Contract. The GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, SPECIFICATIONS, and all parts of the Project Manual listed in Article 1, definitions of the GENERAL CONDITIONS apply to and govern all work under this Change Order.

II. WORK CHANGED BY CHANGE ORDER

1. **Required Changes -**

2. **Justification -**

3. **Payment**

III. ORIGINAL CONTRACT SCOPE IMPACTED BY THIS CHANGE ORDER

1. **Required Changes/Impact**

2. **Justification**

3. **Payment**

**CITY OF ORLANDO
CHANGE ORDER FORM****IV. PRIOR CHANGE ORDERS IMPACTED BY THIS CHANGE ORDER****V. WAIVER**

This change order constitutes full and mutual accord and satisfaction for the adjustment in Contract Price and/or Time as a result of increases or decreases in costs and time of performance caused directly and indirectly from the change. Acceptance of this Waiver constitutes an agreement between CITY and CONTRACTOR that the Change Order represents an equitable adjustment to the contract and that CONTRACTOR shall waive all rights to file a claim on this change order. Execution of this Change Order shall constitute CONTRACTOR'S complete acceptance and satisfaction that it is entitled to no more costs or time (direct, indirect, impact, etc.) pursuant to this Change Order.

VI. APPROVAL AND CHANGE ORDER AUTHORIZATION**ACKNOWLEDGEMENTS**

The aforementioned change, and work affected thereby, is subject to all provisions of the original contract not specifically changed by this Change Order; and,
It is expressly understood and agreed that the approval of the Change Order shall have no effect on the original other than matters expressly provided herein.

Change Order Requested by

Public Works Department, City of Orlando, Florida

Change(s) Ordered by

Richard Howard, P.E., Director of Public Works

RECOMMENDED BY

ACCEPTED BY

CONSTRUCTION MANAGER

DATE _____

DIVISION MANAGER

DATE _____

APPROVED BY

CITY OF ORLANDO, FLORIDA
OWNER_____
DIRECTOR OF PUBLIC WORKS

DATE _____

CONTRACTOR

BY _____

TITLE _____

DATE _____

APPROVED BY CITY COUNCIL

DATE: _____

ITEM NO.: _____

DOC NO.: _____

WITHIN DIRECTOR'S AUTHORITY

YES _____

NO _____

[illegible]

CITY OF ORLANDO

APPLICATION FOR PAYMENT

PAGE 2 OF 4

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	BID AMOUNT	PREVIOUS TOTAL		PRESENT TOTAL	
						QTY	AMOUNT	QTY	AMOUNT
SUBTOTAL THIS PAGE					\$0.00		\$0.00		\$0.00
TOTAL					\$0.00		\$0.00		\$0.00
TOTAL PREVIOUS APPLICATION							\$0.00		
TOTAL RETAINAGE PREVIOUS APPLICATION							\$0.00		
TOTAL							\$0.00		\$0.00
LESS (5%) RETAINAGE									\$0.00
PLUS MATERIALS STORED (95% of Actual)							\$0.00		\$0.00
AMOUNT DUE TO DATE									\$0.00
PREVIOUS PAYMENTS							\$0.00		\$0.00
AMOUNT DUE THIS ESTIMATE									\$0.00
SUBSTANTIAL COMPLETION DATE _____									

CITY OF ORLANDO APPLICATION FOR PAYMENT

CONTRACTOR'S AFFIDAVIT

The undersigned hereby swears under penalty of perjury that (1) all previous progress payments received from the Owner on account of Work performed under the contract referred to above have been applied by the Contractor to discharge in full all obligations of the Contractor incurred in connection with Work covered by prior Applications for Payment under said contract, being Applications for Payment 1 through current; (2) all materials and equipment incorporated in said Project or otherwise listed in or covered by this Application for Payment are free and clear of all liens, security interests and encumbrances; (3) all previous progress payments have been applied by the Contractor to pay in full (less retainage) all amounts owed to its Subcontractors, Suppliers, Materialmen and Equipment Suppliers reflected in prior Applications for Payments; (4) there have been no new labor hires made by the prime or any subcontractors at all tiers since the last pay application. If in fact there have been new labor hires since the previous pay application, then the contractor attests that confirmation of E-Verify for each of those new hires accompanies this pay application. Documentation of E-Verify is only required for contracts greater than \$100,000.00; and (5) the Surety consents to this Application for Payment as set forth by signature below or by documentation provided attached hereto and incorporated herein.

DATED _____, _____
STATE OF _____) CONTRACTOR
COUNTY OF _____) (NAME AND TITLE)

BEFORE ME, on this _____ day of _____, 20____, personally appeared _____,

known to me, or who has provided _____ as identification who duly sworn, deposes and says that (s)he is the _____ of the Contractor abovementioned; that (s)he executed the above Application for Payment and statement on behalf of said Contractor; and that all statements contained therein are true, correct and complete.

NOTARY PUBLIC My Commission Expires _____

WE, the _____, having heretofore executed performance and payment bonds for the above named Contractor covering the project as described above in the sum of \$ _____ dollars (\$ _____) hereby agree that the City may make payment as provided herein, to said Contractor.

It is fully understood that the granting of the right to the City to make payment to said Contractor and/or his assigns, shall in no way relieve this surety company of its' obligations under its' bond, as set forth in the contract documents and bond pertaining to the above project.

IN WITNESS WHEREOF, the _____ has caused this instrument to be executed on its behalf by its _____ and/or its duly authorized attorney in fact, and its corporate seal to be hereunto affixed, all on this ____ day of _____, 20____.

_____, Surety Company

BY: _____, Attorney-in-Fact

(Power of Attorney must be attached if executed by Attorney-in-Fact.)

CITY OF ORLANDO'S APPROVAL

In accordance with terms of the contract, the undersigned recommend payment to the Contractor of the Amount Due as presented.

CONSTRUCTION MANAGER DATE _____

DIVISION MANAGER DATE _____

DIRECTOR OF PUBLIC WORKS DATE _____

ACCOUNT CHARGE CODE _____

CITY OF ORLANDO
APPLICATION FOR PAYMENT

SUBCONTRACTOR & SUPPLIER LISTING

PAGE 4 of 4

Subcontractor and Supplier Listing

List below the name and mailing address of each of your Subcontractors, Suppliers, Materialmen and Equipment Suppliers who have performed Work or provided materials, supplies or equipment during the time period represented by this Application and with each the dollar amount of their work you are applying for. If more room is necessary, please attach another sheet of paper and put an "X" in the following blank _____.

NAME	ADDRESS (Include City, State, Zip Code)	AMOUNT

All amounts owed to its Subcontractors, Suppliers, Materialmen and Equipment Suppliers reflected (and listed) in prior Applications for Payment, have been paid (except retainage) except as stated hereunder.

NAME	\$ AMOUNT UNPAID	REASON FOR NONPAYMENT

CITY OF ORLANDO
CERTIFIED PAYROLL SUMMARY REPORT
 (FOR CONTRACTOR'S USE)

☐ CONTRACTOR		☐ SUBCONTRACTOR		CITY PROJECT NAME _____ Project # _____												
PAYROLL NO. _____		PAYROLL PERIOD: BEGIN: _____ END: _____		APPLICATION FOR PAYMENT: _____												
IF A SUBCONTRACTOR: HEALTH BENEFITS ARE PROVIDED BY: ☐ INSURANCE COMPANY _____ AND POLICY NO. _____ OR ☐ 20% HOURLY WAGE INCREASE																
NAME, ADDRESS & SOCIAL SECURITY # OF EMPLOYEE	WORK CLASSIFICATION (1)	HOURS WORKED EACH DAY							TOTAL HOURS	RATE OF PAY	GROSS AMOUNT EARNED	FICA	WITH- HOLDING TAX	OTHER	ADD BENEFIT INS.	NET WAGES
		S	M	T	W	T	F	S								
		OT														
		R														
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(1) MUST AGREE WITH FEDERAL DAVIS-BACON CLASSIFICATIONS

RFI NO. _____

REQUEST FOR INFORMATION

Project: _____

Project No. _____

Contractor: _____

QUESTION

Reference: Specification Section: _____

Drawing No. _____

Requested by: _____

Date: _____

REPLY

Reply by: _____

Date: _____

cc: _____

CITY OF ORLANDO STORED MATERIALS FORM

[illegible]

CITY OF ORLANDO
SCHEDULE OF VALUES

CONTRACT NAME: _____					
PROJECT NUMBER: _____					
CONTRACTOR _____					
ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	BID AMOUNT
SUBTOTAL THIS PAGE					\$0.00

CITY OF ORLANDO
EROSION AND SEDIMENT CONTROL INSPECTION FORM

Project Name: _____

Permit Number: _____ Inspection Date: _____ Inspected By: _____

1. Erosion and turbidity controls are properly installed and are maintained. _____

2. All disturbed areas are properly stabilized. _____

3. All offsite areas adjacent to disturbed areas appropriately protected with perimeter controls. _____

4. All receiving waters are adequately protected with floating turbidity curtains and other means as needed. Note: Floating turbidity curtains should extend to the bottom of the water body in which they are deployed. _____

5. Offsite tracking prevented and/or cleaned. Note: Examples are gravel stabilized pads away from storm inlets and receiving waters and/or truck rinse areas with contained runoff. _____

6. All stormwater inlets are adequately protected from sediments. _____

7. All soil stockpiles are adequately contained or stabilized. _____

8. Any alum treatment systems (if needed) have been described to and coordinated with the City of Orlando. _____

9. Any problems with erosion are being addressed and corrected as they arise. _____

10. All dewatering operations are discharging water with turbidity readings below 30 NTU's. _____

11. Site subject to NPDES stormwater regulations? Yes / No If yes, Pollution Prevention Plan on site? Yes / No

12. Erosion and Sediment Control Plans reviewed? Yes / No

Comments: _____

Site In Compliance? **YES** ____ **NO** ____ SIGNED: _____ DATED: _____

CITY OF ORLANDO PROJECT/CONSTRUCTION MANAGEMENT	SHOP DRAWING SUBMITTAL SUBMITTAL NUMBER: _____
_____ _____ _____	PROJECT/CONSTRUCTION MANAGEMENT 400 SOUTH ORANGE AVENUE, 8TH FLOOR ORLANDO, FLORIDA 32801
DESIGN ENGINEER	
ATTN: _____	ATTN: _____
PROJECT MANAGER	CONSTRUCTION MANAGER
PROJECT: _____	CONTRACTOR: _____

ITEM NO.	COPIES	DESCRIPTION	PREVIOUS SUBM.NO.	SPEC. SECTION	PLAN SHEET NO.

SUBMITTED BY _____

SUBMITTAL RETURN (to be completed by C.M.)				
ITEM NO.	COPIES	RESUBMIT		COMMENTS
		YES	NO	

COPY: _____ RETURNED BY: _____

CONSTRUCTION MANAGER DATE

**CERTIFICATE OF SUBSTANTIAL
COMPLETION**

CONTRACT NO: _____

PROJECT: _____

CONTRACTOR: _____

CONTRACT FOR: _____ **CONTRACT DATE:** _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or the following specified parts thereof: **IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.**

The Work to which this Certificate applies has been inspected by authorized representative of 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 not alter the responsibility of 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.

The CONTRACTOR shall pay or reimburse, in addition to the liquidated damages specified herein, the CITY's expenses for engineering fees and inspection costs arising from CONTRACTOR's delay in meeting either or both the Substantial Completion and Final Completion dates.

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligations to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____, 20____

ENGINEER

BY: _____

Executed by
CONSTRUCTION MANAGER on _____, 20____

CONSTRUCTION MANAGER

BY: _____

CONTRACTOR accepts this Certificate of Substantial Completion

on _____, 20____

CONTRACTOR

BY: _____

TITLE: _____

c: Ray Scullian, Risk Management
Laurie Botts, Real Estate
Navid Erfan-Nirizy, Facilities
Comptroller

CERTIFICATE OF FINAL INSPECTION

Project: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.

Contract/Contract No. _____

TO: Contractor _____

Project Manager _____

Client Bureaus _____

A joint inspection of the work described in the Contract Documents has been made by the City and the Contractor on _____ (date) in accordance with Article 14 of the Contract General Conditions, and is accepted by the City, subject to the provisions of Article 13.11 of the Contract General Conditions, or for a period of warranty as otherwise agreed upon and attached.

ACCEPTED BY:

Contractor:

BY: _____

Date _____

TITLE:: _____

Date _____

Capital Improvements and Infrastructure Development Division

BY: _____

Date _____

TITLE:: _____

Date _____

APPROVED:

Assistant Division Manager of the Capital Improvements and
Infrastructure Development Division

Date _____

Division Manager of the Capital Improvements and
Infrastructure Development Division

Date _____

Director of Public Works

Date _____

CONTRACTOR'S RELEASE

PROJECT NAME: IFB26-0141, Water Conserv II WRF Equalization Pump Station Improvements.

STATE OF _____}

COUNTY OF _____}

BEFORE ME, the undersigned authority in said County and State, appeared _____, who, being duly sworn and personally known to me, or has produced _____ as identification deposes and says that he/she is _____ of

_____, a company and/or corporation authorized to do business under the laws of Florida, which is the contractor on _____, with the City of Orlando, dated the ____ day of _____, 20____, that the deponent is duly authorized to make this affidavit by resolution of the Board of Directors of said company and/or corporation; that deponent knows of his own knowledge that said contract has been complied with in every particular by said Contractor and that all parts of the work have been approved by the City's Engineer; that there are no bills remaining unpaid for labor, materials, or otherwise, in connection with said contract and work; that the Surety consents to this full and final payment as set forth by signature below, and that there are no suits pending against the undersigned as Contractor or anyone in connection with the work done and materials furnished or otherwise under said contract. Deponent further says that the final contract price in the amount of \$ _____ which has been submitted to the City simultaneously with the making of this affidavit constitutes all claims and demands against the City on account of said contract or otherwise, and that acceptance of the sum specified in the final payment in the amount of \$ _____ will operate as a full and final release and discharge of the City from any further claims, demands or compensation by Contractor under the above contract. Deponent further agrees that all guarantees under this contract shall start in full force from the date of the substantial completion as spelled out in the contract documents.

Affiant

STATE OF _____}

COUNTY OF _____}

BEFORE ME, the undersigned authority, personally appeared _____ to me known as the person described in or who has produced _____ as identification and who executed the foregoing instrument in the name of _____ as its _____ and the said _____ acknowledged, being duly sworn, that he executed said instrument in the name of _____ as its _____ and/or _____ for the purpose therein expressed and that he had due and legal authority to execute the same on behalf of said _____, a corporation.

IN WITNESS WHEREOF, I have hereunto set my hand official seal at _____ this ____ day of _____, 20____.

Notary Public

WE, the _____, having heretofore executed performance and payment bonds for the above named Contractor covering the project as described above in the sum of \$ _____ dollars (\$ _____) hereby agree that the City may make full payment of the final payment, including the retained percentage, to said Contractor.

It is fully understood that the granting of the right to the City to make payment of the final estimate to said Contractor and/or his assigns, shall in no wise relieve this surety company of its' obligations under its' bond, as set forth in the contract documents and bond pertaining to the above project.

IN WITNESS WHEREOF, the _____ has caused this instrument to be executed on its behalf by its _____ and/or its duly authorized attorney in fact, and its corporate seal to be hereunto affixed, all on this _____ day of _____, 20____.

Surety Company

BY: _____
Attorney-in-Fact

(Power of Attorney must be attached if executed by Attorney-in-Fact.)

SECTION 01000INDEX OF DRAWINGSPART 1 – GENERAL

1.01 SUMMARY

The following list of engineering drawings titled, “WATER CONSERV II EQUALIZATION PUMP STATION IMPROVEMENTS PROJECT”, are incorporated into the Contract Documents by reference.

1.02 INDEX OF DRAWINGS

Sheet Number	Title
G-00-01	COVER SHEET, LOCATION MAP
G-00-02	PLANT CONSTRUCTION RULES AND SHEET INDEX
G-00-03	GENERAL NOTES
G-00-04	ABBREVIATIONS AND SYMBOLS
C-01-00	EXISTING SITE SURVEY
C-01-01	SITE GEOMETRY, GRADING, AND DRAINAGE PLAN
C-01-02	EXISTING SITE PLAN AND DEMOLITION
C-01-03	YARD PIPING
C-01-04	STORMWATER POLLUTION PREVENTION PLAN MAP AND NOTES
C-01-05	STORMWATER POLLUTION PREVENTION PLAN AND DETAILS
A-10-01	EXISTING AND PROPOSED FLOOR PLANS
A-10-02	EQUALIZATION PUMP STATION EXISTING AND PROPOSED FLOOR PLANS
A-10-03	EQUALIZATION PUMP STATION ELEVATION, DETAILS, AND NOTES
A-20-01	ELECTRICAL BUILDING FLORIDA CODE SUMMARY
A-20-02	ELECTRICAL BUILDING LIFE SAFETY PLAN
A-20-03	ELECTRICAL BUILDING FLOOR PLAN
A-20-04	ELECTRICAL BUILDING ROOF PLAN
A-20-05	ELECTRICAL BUILDING REFLECTED CEILING PLAN
A-20-06	ELECTRICAL BUILDING ELEVATIONS
A-20-07	ELECTRICAL BUILDING BUILDING SECTIONS
A-20-08	ELECTRICAL BUILDING WALL SECTIONS
A-20-09	ELECTRICAL BUILDING DETAILS & SCHEDULES
S-00-01	GENERAL STRUCTURAL NOTES - SHEET 1
S-00-02	GENERAL STRUCTURAL NOTES - SHEET 2
S-00-03	STRUCTURAL GENERAL CONCRETE REPAIR DETAILS AND NOTES
S-99-01	STRUCTURAL STANDARD DETAILS - SHEET 1
S-99-02	STRUCTURAL STANDARD DETAILS - SHEET 2

Sheet Number	Title
S-99-03	STRUCTURAL STANDARD DETAILS - SHEET 3
S-99-04	STRUCTURAL STANDARD DETAILS - SHEET 4
S-10-01	BOTTOM FLOOR - DEMOLITION PLAN
S-10-02	INTERMEDIATE FLOOR- DEMOLITION PLAN AND SECTIONS
S-10-03	TOP FLOOR - DEMOLITION PLAN AND SECTIONS
S-10-04	BOTTOM FLOOR PLANS
S-10-05	INTERMEDIATE AND TOP FLOOR PLANS
S-10-06	ENLARGED STAIR PLANS
S-10-07	ENLARGED TOP STAIR PLAN AND SECTIONS
S-10-08	STAIR SECTIONS AND DETAILS
S-10-09	DETAILS
S-20-01	ELECTRICAL BUILDING - FLOOR AND ROOF PLAN
S-20-02	ELECTRICAL BUILDING - SECTIONS AND DETAILS
M-10-01	EQUALIZATION PUMP STATION - BOTTOM AND INTERMEDIATE DEMOLITION PLANS
M-10-02	EQUALIZATION PUMP STATION - DEMOLITION SECTIONS
M-10-03	EQUALIZATION PUMP STATION - BOTTOM FLOOR
M-10-04	EQUALIZATION PUMP STATION - SECTIONS
M-10-05	EQUALIZATION PUMP STATION - ISOMETRIC VIEWS
M-10-06	EQUALIZATION PUMP STATION TEMPORARY BYPASS PUMPING
M-10-07	EQUALIZATION PUMP STATION - DETAILS
H-00-01	GENERAL NOTES AND SYMBOLS
H-10-01	EQUALIZATION PUMP STATION DEMO PLAN - PUMP STATION
H-10-02	EQUALIZATION PUMP STATION PLAN - PUMP STATION
H-10-03	EQUALIZATION PUMP STATION PLAN- PUMP STATION SECTIONS
H-20-01	PLAN ELECTRICAL BUILDING
H-98-01	SCHEDULES & CONTROLS
H-99-01	DETAILS
E-00-00	NOTES, SYMBOLS AND ABBREVIATIONS
E-00-01	DEMOLITION SITE PLAN
E-00-02	OVERALL SITE PLAN
E-00-03	OVERALL SITE SINGLE LINE DIAGRAM (DEMOLITION)
E-00-04	OVERALL SITE SINGLE LINE DIAGRAM (MODIFICATION)
E-00-05	SWITCHGEAR SINGLE LINE DIAGRAM
E-00-06	EXISTING EQ PUMP STATION MCC & FRONT VIEW DEMOLITION
E-00-07	PANEL PP-01 – SINGLE LINE DIAGRAM (NEW ELECTRICAL BUILDING)
E-00-08	PANEL PP-02 – SINGLE LINE DIAGRAM (NEW ELECTRICAL BUILDING)
E-00-09	PANEL PP-03 – SINGLE LINE DIAGRAM (EXISTING EQ BUILDING)
E-00-10	PANEL PP-04 – SINGLE LINE DIAGRAM (EXISTING EQ BUILDING)

Sheet Number	Title
E-00-11	SWITCHGEAR FRONT ELEVATION
E-00-12	ELECTRICAL INSTRUMENTATION RISER DIAGRAM & ELEMENTARIES
E-10-01	EXISTING ELECTRICAL ROOM DEMOLITION & MODIFICATION PLAN
E-10-02	BOTTOM LEVEL DEMOLITION PLAN
E-10-03	BOTTOM LEVEL EQ PUMP STATION POWER PLAN
E-10-04	BOTTOM LEVEL EQ PUMP STATION LIGHTING PLAN
E-10-05	INTERMEDIATE LEVEL EQ PUMP STATION DEMOLITION PLAN
E-10-06	INTERMEDIATE LEVEL EQ PUMP STATION POWER PLAN
E-10-07	INTERMEDIATE LEVEL LIGHTING PLAN
E-20-01	ELECTRICAL ROOM POWER PLAN
E-20-02	ELECTRICAL ROOM LIGHTING PLAN
E-20-03	ELECTRICAL ROOM GROUNDING & LIGHTING PROTECTION PLAN
E-20-04	PLAN SCHEDULE
E-20-05	LIGHTING SCHEDULE AND DETAILS
E-20-06	ELECTRICAL DETAILS – SHEET 1
E-20-07	ELECTRICAL DETAILS – SHEET 2
I-00-01	LEGEND AND SYMBOLS
I-00-02	EQUALIZATION PUMP STATION - EXISTING NETWORK DIAGRAM
I-00-03	EQUALIZATION PUMP STATION - PROPOSED NETWORK DIAGRAM
I-00-04	EQUALIZATION PUMP STATION - P&ID
I-00-05	INSTRUMENTATION EQUALIZATION PUMP STATION DETAILS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 01010SUMMARY OF WORKPART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Summary
2. Location and Description of Work
3. Construction Contracts, This Project
4. Construction Contracts, Other Projects
5. Work by Others
6. Work by Owner
7. Sequence and Progress of Work
8. Contractor's Use of Site
9. Easements and Rights-of-Way
10. Notices to Owners and Authorities of Properties Adjacent to the Work
11. Salvage of Equipment and Materials
12. Partial Utilization by Owner

1.02 LOCATION AND DESCRIPTION OF WORK

A. The Work is located at the following Site:

1. Conserv II WRF
5420 L B McLeod Rd
Orlando, FL 32811

B. The Work to be performed under this Contract includes, but is not limited to, furnishing all labor, equipment, and materials for constructing the Work described below and all appurtenances related to the Work. The Work shall consist of, but not be limited to the following:

- a. Replace existing EQ pumps with dry pit submersible pumps

- b. Modify yard piping for temporary bypass operation and provide temporary bypass system.
- c. Perform and maintain temporary bypass of the EQ Pump Station.
- d. Replace existing suction and discharge isolation valves and check valves (excluding valves replaced in the last five years)
- e. Replace suction and discharge pipe fittings and modify discharge manifold to accommodate the new pumps orientation
- f. Construct a new electrical building with HVAC
- g. Upgrade existing HVAC in EQ pump station
- h. Electrical, Instrumentation and Control (I&C) improvements for the components being modified
- i. Perform demolition and/or removal of existing items and systems that will be removed from service.

1.03 CONSTRUCTION CONTRACTS, THIS PROJECT

A. The Contracts under which the Project will be constructed are:

- 1. Work specified in Divisions 1 through 16 (inclusive) of the Specifications.
- 2. Work shown on Final Contract Drawings.

B. Contractor shall provide equipment and material in accordance with the Contract Documents.

1.04 CONSTRUCTION CONTRACTS, OTHER PROJECTS (NOT USED)

1.05 WORK BY OTHERS

A. The contractor shall coordinate, as necessary, with work under other contracts that may impact on the completion of the work described in this contract.

1.06 WORK BY OWNER

A. Owner will perform the following in connection with the Work: Operate all existing valves, gates, pumps, equipment, and appurtenances that will affect Owner's operation, unless otherwise specified or indicated.

1.07 CONTRACTOR'S USE OF SITE

A. Contractors' use of the site shall be confined to the areas shown. Contractors shall share use of the Site with other contractors and others specified in this Section.

- B. Contractor shall move stored products that interfere with operations of Owner, other contractors, or others performing work for Owner.

1.08 SALVAGE OF EQUIPMENT AND MATERIALS

- A. Existing equipment and materials removed and not shown or specified to be reused in the Work will be Contractor's property, except the following items that shall remain Owner's property:
 - 1. PLC Cabinets and contents
 - 2. Seal water pumps and rotameters
- B. Existing equipment and material removed by Contractor shall not be reused in the Work, except where specified or indicated.
- C. Carefully remove in manner to prevent damage to all equipment and materials specified or indicated to be salvaged and reused or to remain property of Owner. Store and protect salvaged items specified or indicated to be used in the Work. Replace in kind or with new items equipment, materials, and components damaged in removal, storage, or handling through carelessness or improper procedures.
- D. The contractor may furnish and install new items, with Engineer's approval, instead of those specified or indicated to be salvaged and reused, in which case such removed items will become Contractor's property.

1.09 PARTIAL UTILIZATION BY OWNER

- A. The owner reserves the right to enter and use portions of the Work prior to Certificate of Substantial Completion is issued by Engineer.
- B. Owner shall be responsible to prevent premature connections by private and public parties, persons, or groups of persons, before Engineer issues Certificate of Substantial Completion for the portion of Work being partially utilized by Owner.
- C. The Contractor shall cooperate with the Owner, Owner's agents, and Engineer to accelerate completion of Work designed for partial utilization by Owner in accordance with Contractor's progress schedule.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 01014CONSTRUCTION SEQUENCING & TEMPORARY PUMPINGPART 1 – GENERAL

1.01 SUGGESTED SEQUENCE OF CONSTRUCTION

- A. Work under the Contract shall be scheduled and performed in such a manner as to result in the least possible disruption to the operation of the existing treatment facilities. Process control modifications and/or shutdowns shall not be made without first obtaining written permission from the Owner/Engineer. For the EQ Pump Station Bypass System described herein, at no time shall the EQ Pump Station be removed from service or the Contractor schedule the bypass during the months of August through November, generally the height of hurricane season.
- B. Critical events in the sequence of construction are specified herein. The outline sequence of construction does not include all items necessary to complete the work but is intended to identify the sequence of critical events necessary to minimize disruption to the on-going treatment plant process and to ensure compliance with discharge requirements. Critical events identified are not all inclusive and additional items of work not shown may be required. The sequence of construction is a precedence requirement and does not attempt to schedule the Contractor's work. It is intended only to indicate which activities must precede other activities in order to minimize interferences and disruptions.
 - 1. Mobilization and Preliminary Site Work
 - a. Mobilize for work – set up field offices and staging area, obtain permits, develop and submit construction schedule, shop drawing schedule and begin shop drawing submittals.
 - b. Clear and grub areas and install temporary erosion control measures as identified in the contract documents.
 - 2. Equalization Pump (EQ) Station Bypass
 - a. For the EQ pump station project, Contractor shall provide a temporary bypass pumping system to allow complete bypass of the EQ Pump Station.
 - b. Upon written approval of the Contractor's Sequence of Operation and schedule by the Owner/Engineer, Contractor shall provide and maintain the Temporary Bypass Pumping System and associated temporary piping as shown on the drawings.
 - c. Contractor will be responsible for the complete design and shall provide and maintain the Temporary Bypass System complete with all temporary bypass

pumps, valves, yard piping, diesel fuel storage, ventilation, and all appurtenances needed for a fully functional bypass system.

- d. The bypass pumps will route raw plant influent from the Equalization (EQ) Tanks to the Preliminary Treatment Structure (PTS) located east of the existing maintenance building.
- e. Temporary piping to the bypass pumps and to the PTS may be routed above ground as generally shown on the drawings. Routing must be approved by the Owner/Engineer and not interfere with City vehicular access to either side of the pipeline.
- f. Temporary bypass pipe shall be HDPE.
- g. Once the Temporary Bypass Pumping System is proven operational, the Owner will divert flow, through operation of existing valves, from the Equalization (EQ) Storage Tank to the Temporary Bypass Pumping System.
- h. Contractor is responsible for containment area around the temporary bypass pumps in accordance with OSHA. Complete containment is required.
- i. The EQ Pump Station Bypass shall be in place and operational as required for work to be completed inside the EQ Pump Station and work completed for transition to new electrical equipment.
- j. The Contractor shall make available a full-time representative that is qualified in the operation and maintenance of the bypass pump system. The temporary pumping system must be monitored during plant peak hours (6 AM to 9 AM and 5 PM to 8 PM daily) during operation by a representative of the Contractor trained and certified by the pump supplier. The bypass pump system shall have a remote alarm and notification system for malfunction and low fuel level to representative and Contractor for on-call response within 30 minutes. Notification shall also include Owner's monitoring station.
- k. In the event of a pump failure or a leak in the temporary bypass pipeline, the Contractor's local representative must remain on-site during the operation of the bypass pumps.
- l. After flow has been diverted with bypass system fully operational, the Contractor shall pump out to completely clean the remaining raw sewage from the EQ piping in the EQ Pump Station including pumps, discharge valves and discharge header.
- m. Temporary Bypass Pumping system shall not be disabled or removed by the Contractor

- 1) Until the EQ Pump Station improvements are substantially complete and the EQ Pump Station is fully operational
 - 2) Without written approval from the Owner/Engineer.
 3. Anticipated Work and Equipment Installation during Bypass
 - a. Demolish and/or reroute all underground piping
 - b. Install EQ Pumps, piping, valves, electrical conduit and cable in the EQ Pump Station
 - c. Construct the new Electrical Building
 - d. Install all electrical and control equipment in the new Electrical Building
 - e. Relocate existing transformers and install ductbanks for new conduit and cable to the transformers
 - f. Install HVAC equipment
 - g. Any other Work necessary for a fully functional EQ Pump Station
 - h. Start-Up of New Facilities
 - 1) Complete O&M manuals
 - 2) Complete start-up of equipment
 - 3) Start-up of systems shall be in accordance with Section 01650, "Checkout and Startup Procedures"
 - C. The existing facilities shall be maintained in an operable condition by the Contractor during construction (excluded from this requirement are all normal and emergency maintenance functions normally performed by the Owner with the Owner's staff or by Contract.)
 - D. At no time shall the Contractor undertake to close off any pipelines, open valves, or take any other action which would affect the operation of the existing treatment plant.
 - E. Temporary mechanical, electrical and instrumentation installations/connections may be required to complete a particular aspect of work. All such subject temporary installations shall be subject to review and acceptance by the Engineer. All such temporary work shall be provided at no change in the Contract time or price.
- 1.02 RELATED WORK SPECIFIED ELSEWHERE
- A. Section 01525 – Temporary Pumping Systems

1.03 ADDITIONAL REQUIREMENTS

- A. The Contractor shall schedule and perform the work so that the plant and its individual process facilities are maintained in continuous operation during the construction period except during the approved plant or process interruptions or temporary bypass operations. All short-term system or partial system shutdowns or diversions shall be submitted to the Owner/Engineer in writing. No shutdowns or diversions shall be allowed without written approval from the Owner/Engineer.
- B. The Contractor shall submit a detailed, written plan of operation for each work item related to proposed shutdowns to the Owner/Engineer for their review or approval. The plan of operation shall be submitted at least 21 days prior to the scheduled commencement date for that work. The Owner/Engineer will review and return the plan with comments within 7 days. The Contractor shall schedule a meeting between the Contractor, Owner, and Engineer to incorporate Owner/Engineer comments and finalize scheduling of the work. A final (revised) written plan of operation shall then be conducted in accordance with this final written plan of operation, unless agreed to in writing between the Contractor, Owner, and Engineer. The written plan of operation shall address the following items:
1. Step-by-step detailed sequence for performing the work.
 2. Anticipated duration of each activity.
 3. Documentation on all temporary flow diversion equipment to be utilized by Contractor, including tapping saddles, line stops, temporary bypass pumps and piping.
 4. Temporary Bypass Pumping System. For this system, the Contractor must submit the following with the Contractor's Sequence of Operation:
 - a. Pump quantity, manufacturer, and model.
 - b. Pump quantity shall be based on duty pumps to provide minimum 100 percent of required pumping capacity of 52 MGD. Minimum two duty pumps shall be required. One additional pump sized same as the largest duty pump shall be provided as standby (N+1).
 - c. Refer to Section 01525 Temporary Pumping Systems for pump specifications.
 - d. System and certified performance curves to demonstrate that pumps are sized correctly. Where multiple pumps shall be operated simultaneously, provide combined pump curves.
 - e. Provide details on diesel fuel storage and manpower to ensure that adequate fuel supply is maintained. No less than three days fuel storage shall be provided onsite.
 - f. Pipe sizing with appropriate calculations to show pipes are sized correctly.

- g. Provide details on HDPE temporary piping.
- h. Qualification of the onsite representative(s) during the operation the Temporary Bypass Pumping System for the EQPS.
- i. A flow meter is required within acceptable proximity to the bypass pumps. The Contractor shall provide a daily totalized flow for all bypass flow for each and every day while the bypass pumping system is in operation. The Contractor shall route the cable to make the connection to the City's Programmable Logic Controller (PLC).
- j. Operation of the bypass pumps shall be based on level of EQ Tank and able to maintain the EQ Tank level within a City prescribed low and high level.

PART 2 – PRODUCT (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01040COORDINATIONPART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Contractor shall provide labor, materials, tools, equipment, and incidentals shown, specified, and required for execution of the Work as specified in this Section, including the following:
 - a. Construction Electronic Documentation
 - b. Demolition
 - c. Cutting and Coring
 - d. Patching
 - e. Installation
2. Requirements for demolition, removal and disposal of existing buildings, structures, pavement, curbs, and sidewalks and electrical, plumbing, heating and ventilation equipment and materials as indicated in the Contract Documents for demolition.
3. General requirements for installation of equipment and material. Additional installation requirements are included in the individual Specification Sections.
4. General requirements for connections to existing facilities. Requirements for tie-ins and shutdowns necessary to complete the Work are included in Section 01520 – Maintenance of Utility Operations During Construction.
 - a. To extent possible, materials, equipment, systems, piping, and appurtenances that will be placed into service upon completion of connection to existing facilities shall be checked, successfully tested, and in condition for operation prior to making connections to existing facilities, if valves, gates, or similar watertight and gastight isolation devices are not provided at the connection point.
5. Requirements for cutting and coring, and rough and finish patching of holes and openings in existing construction. Provide cutting, coring, fitting, and patching, including attendant excavation and fill, required to complete the Work, and to:
 - a. Remove and replace defective Work.

- b. Remove samples of installed Work as specified or required for testing.
- c. Remove construction required to perform required alterations or additions to existing work.
- d. Connect to completed Work not performed in proper sequence.
- e. Remove or relocate existing utilities and pipes that obstruct the Work in locations where connections must be made.
- f. Make connections or alterations to existing or new facilities.

B. Related Sections:

- 1. Section 01520 – Maintenance of Utility Operations During Construction
- 2. Section 01510 – Temporary Utilities
- 3. Section 01560 – Temporary Environmental Controls
- 4. Section 01600 – Materials and Equipment
- 5. Section 01730 – Operations and Maintenance Data
- 6. Section 02050 – Demolition

1.02 REFERENCES

A. Definitions:

- 1. “Manufacturer’s installation instructions” includes manufacturer’s written instructions; drawings; illustrative, wiring, and schematic diagrams; diagrams identifying external connections; and other such information pertaining to installation of equipment and materials. Installation instructions are printed instructions, including those attached to the equipment and materials, all inclusive.
- 2. “Salvage” items are equipment and materials shown on the Contract Documents for selective removal by the Contractor to furnish to the Owner. The contractor shall be responsible for removal, handling, and depositing of equipment and material to location designated by Owner.

B. Reference Standards:

- 1. 29 CFR 1910, OSHA.
- 2. ANSI A10, Construction and Demolition Operations

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Review installation procedures under other Sections and coordinate Work that must be performed with or before the Work specified in this Section.
2. Notify other contractors in advance of Work for connections to existing facilities to prevent delay of the Work.
3. Remove and dispose of equipment and materials indicated for demolition on the Contract Documents, unless indicated as salvage items for the Owner. Contractor shall obtain ownership of removed equipment and materials following Engineer and Owner approval. Disposal of equipment and materials shall be in accordance with the Contract Documents

B. Sequencing:

1. Contractor shall remove and demolish equipment and materials in sequence specified in Section 01520 – Maintenance of Utility Operations During Construction and following approval by Engineer and Owner.
2. Contractor shall replace equipment and materials removed without proper authorization from Engineer, which are necessary for the operation of the existing facilities. Re-installation of equipment and materials shall be to the satisfaction of the Engineer at no cost to the Owner

C. Title to Equipment and Materials:

1. Equipment and materials indicated for demolition and removal in the Contract Documents, and not designated as Owner's salvaged items, shall become the Contractor's property following removal from the Site. Contractor shall be responsible for legally disposing of the equipment and material.
2. Contractor shall have no right or title to any of the equipment, materials, or other items to be removed until the elements have been removed from the Site.
3. Contractor shall not sell or assign or attempt to sell or assign any interest in the equipment, materials, or other items until removal from Site.
4. Contractor shall have no claim against the Owner because of the absence of equipment, fixtures, and materials.

D. Salvage Equipment and Materials:

1. Contract Documents indicate equipment and materials that shall be retained by Owner. Owner has the right to request any demolished equipment and materials be retained at their discretion.

2. Contractor shall move salvaged equipment and materials to storage areas located at the Site as instructed by Owner.
 3. Architectural equipment and materials may be salvaged for incorporation into the Work when approved by Engineer.
 4. Materials to be salvaged include PLC cabinets and contents, Seal water pumps and rotameters.
- E. Use of Explosives: Contractor shall not use explosives or blasting equipment and material in the Work in accordance with the Contract Documents.

1.04 SUBMITTALS

A. Action/Informational Submittals:

1. Construction electronic documentation as specified in this Section.
2. Demolition Plan: Submit detailed description of methods, equipment, and sequence for demolition Work, including means of ensuring stability of structures during demolition activities.
3. Cutting and Patching Request:
 - a. Submit a written request to the Engineer at least seven (7) days prior to executing any cutting or alteration which affects:
 - 1) Work of the Owner or any separate contractor.
 - 2) Structural value or integrity of any element of the Project.
 - 3) Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4) Efficiency, operational life, maintenance, or safety of operational elements.
 - 5) Visual qualities of sight-exposed elements.
 - b. Request shall include:
 - 1) Identification of the project.
 - 2) Description of affected work.
 - 3) Date and time the work will proceed.
 - 4) The reason for cutting, alteration or excavation.

- 5) Effect on the work of Owner or any separate contractor, or on the structural or weatherproof integrity of the affected area and project.
 - 6) Description of proposed work:
 - a) Scope of cutting, patching, alteration, or excavation.
 - b) Trades who will execute the work.
 - c) Products and methods proposed to be used.
 - d) Extent of refinishing to be done.
 - 7) Alternatives to cutting and patching.
 - 8) Cost proposal, when applicable.
 - 9) Written permission of any separate contractor whose work will be affected.
4. Recommendation Regarding Cutting and Patching:
- a. Should conditions of work, or schedule, indicate a change of materials or methods, submit written recommendation to Engineer including:
 - 1) Conditions indicating change.
 - 2) Recommendations for alternative materials or methods.
 - 3) Items required with substitution request, in accordance with the substitution request requirements of the Contract Documents and Section 01600 – Materials and Equipment.
5. Product Data: Submit manufacturer's product data for the protective compound to be applied to core-drilled surfaces and cut concrete surfaces, as well as means of protecting exposed reinforcement or other metal embedments.
6. Informational Submittal: Submit written indication designating the day and time that the construction associated with cutting and patching will be uncovered, to allow observation. Do not begin cutting or patching operations until submittal is accepted by Engineer.
7. Comply with submittal requirements of individual Specification Sections for patching materials.

1.05 SITE CONDITIONS

- A. Owner does not assume responsibility for the actual condition of structures and equipment to be demolished and removed.
- B. Existing Site conditions shall be maintained to the greatest extent possible by the Owner to the time of Notice to Proceed.
- C. Contractor shall perform investigations, explorations, and probes as necessary at the Site prior to initiating demolition Work to ascertain any required protective measures before proceeding with demolition and removal. The contractor shall give particular attention to shoring and bracing requirements to prevent damage to the Work and existing structures.
- D. Contractor shall verify measurements, dimensions and other conditions of each existing structure, system, equipment, and material indicated in the Contract Documents for new Work prior to ordering equipment and materials.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General:
 - 1. Comply with specifications and standards approved by Owner for each specific product involved.
 - 2. Provide materials and products in accordance with the individual Specification Sections and the Contract Documents.
 - 3. Provide materials and products that visually match existing adjacent surfaces to fullest extent possible for exposed surfaces.
 - 4. If not indicated in the Contract Documents, provide materials and products that are identical to existing materials and products affected by the Work.
 - 5. If identical materials and products are unavailable, provide materials and products that shall equal or exceed performance requirements of existing materials and products.
- B. Protective Coating Applied to Core-Drilled Surfaces and Cut Concrete Surfaces:
 - 1. All concrete surfaces exposed due to cutting or core drilling shall be coated with an epoxy resin coating such as Sikagard 62 by Sika Corporation, Durakote 240 by Tamms Industries or approved equal.

2. Reinforcement or other metal embedment exposed by concrete cutting or core drilling shall be burned back a minimum of ½ inch below surface and resulting void shall be filled with an epoxy resin binder.

PART 3 - EXECUTION

3.01 CONSTRUCTION ELECTRONIC DOCUMENTATION

A. Pre-Construction Documentation

1. Prior to beginning any construction, the Contractor shall prepare color audio/video documentation of all areas to be affected by or nearby the construction. The recorded documentation shall be submitted in digital format that is acceptable to the Engineer.
2. The audio/video documentation shall be done within the two-week period prior to placement of materials or equipment in the construction area and furnished one week prior to the start of construction.
3. To preclude the possibility of tampering or editing in any manner, all video recordings must, by electronic means, display continuously and simultaneously recorded digital information on the video, including the date and time of recording. The time information shall consist of hours, minutes, and seconds, separated by colons (i.e., 10:35:18).
4. The color audio/video recording shall consist of audio and video tracks that are recorded simultaneously. All tracks shall consist of original live recordings and thus shall not be copies of other audio and video recordings. The audio track shall contain a narrative commentary of what is being observed at the time of the recording.
5. Recorded coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio description. Audio description shall be made simultaneously with video coverage. Such coverage shall include, but not be limited to, all existing driveways, mailboxes, sidewalks, curbs, ditches, roadways, landscaping, trees, culverts, head walls and retaining walls, or buildings located within such zone of influence.
6. Houses and buildings shall be identified visually by house number, when visible, in such a manner that structures of the proposed system, i.e., manholes on a sewer system and hydrants on a water system can be located by reference. In all instances, locations shall be identified by audio or visual means at intervals not to exceed 100 lineal feet in the general direction of travel.
7. The rate of speed in the general direction of travel of the conveyance used during recording shall not exceed 48 feet per minute. Panning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that playback will produce clarity of the object viewed.

8. All recording shall be done during times of good visibility. No recording shall be done during period of visible precipitation, unless otherwise authorized by the Engineer. The Owner shall have the authority to designate what areas may be omitted or added for audio/video coverage.
9. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be less than eight feet (8') to insure proper perspective.
10. In some instances, audio/video recording coverage will be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance.

B. Construction Progress Documentation

1. Contractor shall document Work progress at locations and construction as directed by Engineer, at a minimum.
2. Contractor shall provide electronic documentation prior to and following any shutdown, switchover, demolition, de-commissioning, cutting, patching, repair, etc. Engineer and Owner reserve the right to be present during documentation.
3. Contractor shall document following exposure of buried utilities, piping, valve, appurtenances, and other underground elements.
4. Engineer reserves the right to provide construction progress documentation to confirm Contractor electronic documentation.

C. Post-Construction Documentation

1. Contractor shall take photographic and video documentation of the Site where Work has been completed and prior to Substantial Completion or partial utilization by Owner. Engineer and Owner reserve the right to be present during documentation.
2. Contractor shall provide both photographic and video documentation at grade-level and aerial of the Site following completion of the Work.

D. Submittal Requirements:

1. Documentation shall be time stamped for verification, including date and time.
2. Documentation shall be organized in a logical manner, such as by structure, building, physical site location, etc. for easy of comparison.
3. Photographic documentation shall be high resolution electronic versions.
4. Documentation shall be submitted to Engineer for review and approval prior to commence Work and at completion of the Work.

3.02 DEMOLITION

A. General:

1. Demolition work shall comply with the applicable provisions and recommendations of ANSI A10, Construction and Demolition Operations standards, all governing codes, and as specified in this Section.
2. Contractor shall furnish competent and experienced personnel for the various type of demolition and removal work. Demolition and removal work shall be performed with regard to the safety of Owner employees, individuals at the Site, and the public.
3. Contractor shall confirm absence of embedded utilities prior to cutting, coring, or demolishing existing concrete and facilities using non-invasive methods.
 - a. Contractor shall notify Engineer and Owner if embedded utilities are located during the investigation. Contractor shall clearly mark and document location of embedded utilities prior to performing the Work.
 - b. Contractor shall be responsible for repair and damages caused by exploration, investigation, and performance of the Work at no additional cost to Owner.
4. Contractor shall remove temporary work, such as enclosures, signs, guards, etc. when such temporary Work is no longer required or when directed at the completion of the Work.
5. Contractor shall perform patching, restoration, and work in accordance with individual Specification Sections and details shown on Contract drawings.
6. Contractor shall be responsible for damage caused by demolition Work to existing structures, equipment and materials indicated for reuse or to remain at no additional cost to Owner.
7. Contractor shall maintain a clean working environment during the demolition Work in accordance with Section 01560 – Temporary Environmental Control.
8. Contractor shall proceed with the demolition work in a sequence designed to maintain the plant in operation in accordance with Section 01520 – Maintenance of Utility Operations During Construction.
9. Excavation caused by demolition shall be backfilled with fill free from rubbish and debris. Select fill or structural fill shall be used where specifically required on Contract Drawings.
10. All debris resulting from the demolition and removal work shall be disposed of by the Contractor at a properly permitted facility as part of the work of this Contract. All regulations covering material handling and disposal shall be followed. Material designated by the Engineer to be salvaged shall be stored on the construction site

as directed. All other material shall be disposed of off-site by the Contractor at his expense. Burning of any debris resulting from the demolition will not be permitted at the site.

B. Protection during Demolition:

1. Contractor shall provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, occupants of the building, personnel engaged in demolition work, and adjacent construction.
2. Contractor shall provide and maintain weather protection at exterior openings to fully protect the interior premises against damage from the elements until such openings are closed by the work.
3. Contractor shall provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and Work is being done, connections made, materials handled, or equipment moved. Temporary protection shall be provided in accordance with Section 01530 – Protection of Existing Facilities.
4. Contractor shall take necessary precautions to prevent dust from rising by wetting demolished masonry, concrete, plaster, and similar debris. Unaltered portions of the existing buildings affected by the operations in the Contract Documents shall be protected by dust proof partitions and other adequate means. Dust control shall be provided in accordance with Section 01560 – Temporary Environmental Controls.
5. Contractor shall provide adequate fire protection in accordance with Section 01510 – Temporary Utilities and authorities having jurisdiction.
6. Contractor shall perform the demolition work with minimum traffic interference. Contractor shall not close or obstruct walkways, passageways, or stairways. Contractor shall not store or place materials in passageways, stairs, or other means of egress.
7. Contractor shall minimize disturbances to exterior walls and roofs to small sections that are readily repaired and patched to maintain watertight conditions in existing structures and buildings.

C. Performance of Demolition:

1. Equipment, piping, valves, and appurtenances:
 - a. Contractor shall drain equipment, piping, valves, and appurtenances prior to demolition work. Contractor shall be responsible for collection, transport, and disposal of drained contents at no additional cost to the Owner.

- b. Contractor shall provide line stops, plugs, blind flanges, etc. for equipment, piping, valves, and appurtenance required to remain in service during the Project. Contractor shall provide temporary or permanent supports in accordance with the Contract Documents.
 - c. Supports, pedestals and anchors shall be removed with the equipment and piping unless otherwise noted in the Contract Documents.
 - d. Concrete bases, anchor bolts and other supports shall be removed to approximately 1 inch below the surrounding finished area and the recesses shall be filled with epoxy resin binder.
 - e. Wall and roof openings shall be closed, and damaged surfaces shall be patched to match the adjacent areas, in accordance with the Contract Documents and as directed by the Engineer.
 - f. Wall sleeves, wall pipes, and wall castings shall be plugged or blanked off in accordance with the Contract Documents and as directed by the Engineer.
 - g. Openings in concrete shall be closed in accordance with the Contract Documents and as directed by the Engineer.
2. Electrical components and equipment:
- a. Contractor shall de-energize panelboards, lighting fixtures, switches, circuit breakers, electrical conduits, motors, limit switches, pressure switches, instrumentation such as flow, level and/or other meters, wiring, and similar electrical equipment prior to removal.
 - b. Contractor shall relocate or isolate electrical equipment and materials that serve equipment, piping, valves, and appurtenance that are to remain in service during the Project. Relocation or isolation Work shall be sequenced and scheduled in accordance with Section 01520 – Maintenance of Utility Operations During Construction.
3. Reused and relocated equipment:
- a. Contractor shall receive approval from Engineer prior to removal and relocation of equipment and material. Equipment and materials removed by Contractor prior to Engineer's approval that is required for Owner's operation of the facility shall be reinstalled at no cost to the Owner.
 - b. Prior to removal and relocation Work, equipment and materials indicated for reuse and relocation shall be operated by Owner with Contractor and Engineer present to witness existing functionality and operation.
 - c. Contractor shall provide personnel responsible for reinstallation of equipment and material for the removal Work.

- d. Contractor shall be responsible and provide storage and protection of equipment and materials in accordance with Section 01600 – Materials and Equipment until relocation and reinstallation Work is performed.
 - e. Contractor shall provide replacement equipment and material that is damaged during the removal Work at new cost to the Owner. Contractor shall be responsible to provide same type, model, electrical components, etc. equipment and material as approved by Engineer and Owner.
4. Structural removal:
- a. Contractor shall provide and install temporary shoring, struts, and bracing required for the demolition Work to ensure stability during entire demolition process.
 - b. Contractor shall cut and remove structural material at the interface of demolition Work and the existing structural element. Cutting and removal shall occur in small sections, including masonry units, to prevent instability of structural elements.
 - c. Contractor shall patch, repair, and refinish adjacent surfaces that remain following demolition Work.
 - 1) Adjacent surfaces shall be repaired and refinished to the condition prior to the demolition Work and in accordance with the Contract Documents.
 - 2) Adjacent surfaces shall be cleaned of dirt, grease, loose paint, etc., prior to refinishing.
 - d. Contractor shall limit cutting of existing roof areas designated to remain to the limits required for the proper installation of the Work.
 - 1) Cut and remove insulation, joists, flashing, membranes, shingles, and metals, etc. in accordance with the Contract Documents and as directed by the Engineer for installation of the Work.
 - 2) Provide temporary weather tight protection as required until new roofing and flashings are installed.
5. Architectural repairs and removal Work, not specifically shown on the Drawings, may include, but not limited to, the following:
- a. Brickwork: Re-pointing; removing and replacing broken, cracked, disintegrating and missing materials.
 - b. Windows: Removing cracked or disintegrating sealant material; replacing missing or broken glass; re-caulking and sealing frames; glazing sealants.

- c. Re-finishing: Removing rust, sealing, or peeling paint from surfaces by scraping, sanding or wire brushing; priming and repainting surfaces.
- d. Roofing: Patching and repairing membrane or built-up roofing; metal flashing repair; correcting roof pitch to eliminate ponding; cleaning and/or replacing roof drains.
- e. Masonry: Cutting and installing new expansion and control joints.
- f. Parapets: Removing and construction of new walls and copings; clean and patching of copings; replacing copings where broken.
- g. Concrete surfaces: Patching, cleaning, sealing and resurfacing floors, walls, lintels, sills, and trim. Replace lintels where broken. Patching or replacing broken, spalled, cracked and disintegrating concrete encased steel columns and piers.
- h. Openings: Cutting and modifying as required for new Work. Provide new lintels, doors, and frames.
- i. Doors: Patching and refinishing doors and frames.
- j. Ceilings: Patching, refinishing, and replacing.
- k. Guards, handrails, and appurtenances: Cleaning and repainting steel materials. Replacing steel material with new aluminum material.
- l. Demolished Exterior Openings: Remove window sash, frame, sill, stool and trim at exterior doors indicated for enclosure and sealing. Provide brick and/or masonry block for closure and sealing.

D. Maintenance during Demolition:

- 1. Contractor shall maintain the buildings, structures, and public properties free from accumulations of waste, debris and rubbish, generated by the demolition Work.
- 2. Contractor shall provide Project Housekeeping and Cleaning of demolition equipment and materials in accordance with Section 01560 – Temporary Environmental Control.

3.03 CUTTING AND CORING

A. General:

- 1. Contractor shall notify Engineer in writing and receiving Engineer's approval prior to cutting load bearing walls (concrete or masonry) and structural concrete floors.
- 2. Perform cutting and coring to limit extent of patching required.

3. Structural Elements: Do not cut or core structural elements in manner that would change structural element's load-carrying capacity or load deflection ratio.
4. Operating Elements: Do not cut or core operating elements in manner that would reduce capacity to perform as intended. Do not cut or core operating elements or related components in manner that would increase maintenance requirements or decrease operational life or safety.
5. Replace, patch, and repair materials and surfaces cut or damaged during cutting and coring Work. Contractor shall use methods that do not void required or existing warranties.
6. Provide temporary or permanent bypass provisions prior to cutting existing pipe, conduit, ductwork, or other utilities serving facilities scheduled to be removed or relocated in accordance with the Contract Documents.
7. Inspection: Examine and prepare surfaces prior to commencing Work. Contractor shall report unsatisfactory or questionable conditions to Engineer in writing. Contractor shall not proceed with the Work until unsatisfactory conditions are corrected.
8. Preparation:
 - a. Provide temporary support required to maintain structural integrity, to protect adjacent Work from damage, and to support the element(s) to be cut or cored.
 - b. Protection of Existing Construction During Cutting and Coring:
 - 1) Protect existing structures, equipment, and materials during cutting and coring to prevent damage.
 - 2) Provide protection from adverse weather conditions that will be exposed during cutting and coring Work; and maintain excavations free from water.
 - 3) Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
9. Execution:
 - a. Engage original manufacturer to perform cutting-and-patching of structural work and operational or pre-operational systems, or, if not available, engage only recognized experts. Perform alterations using only methods approved by Engineer.
 - b. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.

- c. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- d. Execute the fitting and adjustment of products to provide a finished installation in accordance with specified products, functions, tolerances, and finishes.
- e. Restore work which has been cut or removed or install new products to provide completed work in accordance with requirements of the Contract Documents.
- f. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- g. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1) For continuous surfaces, refinish to nearest intersection.
 - 2) For an assembly, refinish entire unit.

10. Restoration:

- a. Clean equipment, materials, piping systems, valves, conduit and appurtenances that were damaged due to the Work prior to applying paint or other finishing materials.
- b. Restore damaged pipe coverings, including insulation, to original condition.

B. Cutting:

1. General:

- a. Cut existing structures and appurtenances that provide surfaces for installation or repair of the Work. Cut existing construction using methods to minimize damage and disturbance to retained and adjoining construction elements.
- b. Cutting equipment used shall be hand or small power tools suitable for sawing or grinding. Avoid using hammering or chopping equipment for cutting Work.
- c. Cut holes and slots as small as possible and to size required for incorporation of the Work and in accordance with the Contract Documents.
- d. Cut or drill from exposed or finished side to concealed side to avoid marring finished surfaces.
- e. Provide adequate bracing of area to be cut prior to cutting.

- f. Provide equipment and material to remove cut spoils.
 - g. Provide temporary protection for cut openings where and when Work is not being performed.
2. Concrete and Masonry:
- a. Cut through concrete and masonry using concrete wall saw with diamond saw blades.
 - b. Provide control for slurry generated during sawing on both sides of element being cut.
 - c. After cutting concrete and before installing new Work on or through the opening, coat exposed concrete and steel with protective coating material specified in this Section. Apply protective coating in accordance with manufacturer's instructions.

C. Coring:

- 1. Core-drill holes through concrete and masonry walls, slabs, or arches, in accordance with the Contract Documents, unless written authorization is furnished by Engineer.
- 2. Protection: Protect existing structures, equipment, materials, utilities, and adjacent areas from water and other damage by core-drilling Work.
- 3. Coring:
 - a. Perform coring with non-impact rotary tool using diamond core-drills.
 - b. Size holes for pipe, conduit, sleeves, equipment, or mechanical seals, as required, to be installed through the penetration and in accordance with the Contract Documents.
 - c. After core-drilling and before installing equipment and material through the penetration, coat exposed concrete and steel with protective coating material specified in this Section. Apply protective coating in accordance with manufacturer's instructions.
- 4. Cleaning: Vacuum or otherwise remove slurry and tailings from the work area following core-drilling.

3.04 PATCHING

A. General:

- 1. Construction shall be patched by filling, repairing, refinishing, closing-up, and similar methods at completion of the Work.

2. Provide equipment and materials in accordance with the Contract Documents for patching Work. Comply with manufacturer's installation instructions.
3. Provide airtight connections to pipes, sleeves, ducts, conduit, and other penetrations through surfaces when patching the Work. Provide durable patching seams that minimize visual appearance.
4. Patched areas shall be tested to demonstrate integrity of installation as directed by the Engineer. Contractor shall provide testing equipment, material, and services for patch testing.

B. Restoration:

1. Restore exposed finishes of patched areas to minimize evidence of patching and refinishing.
2. Contractor shall extend refinishing and restoration into adjoining areas to blend patched areas with existing adjacent areas.
 - a. Refinish to nearest intersection for continuous surfaces.
 - b. Refinish the entire assembly and system for equipment and materials.
 - c. Repair and rehang existing ceilings to provide an even-plane surface of uniform appearance.
 - d. Apply plaster and finishes to match adjacent interior walls and partition areas for openings sealed with brick and/or masonry block.

3.05 PAVEMENT RESTORATION

- A. Existing paving, including under drains if any are encountered and broken into, shall be restored by the Contractor, and shall be replaced or rebuilt using the same type of construction as was in the original. Contractor shall be responsible for restoring all such work, including subgrade and base courses where present. Contractor shall obtain and bear the expense of such local or other governmental permits as may be necessary.

3.06 INSTALLATION

- A. Install equipment and materials in accordance with the Contract Documents, approved Shop Drawings, and manufacturer's installation instructions. When manufacturer's installation instructions conflict with the Contract Documents, obtain interpretation or clarification from Engineer before proceeding.
- B. Preparation of surfaces shall be performed prior to installation of equipment and material.
 1. New floor finishes: Repair and patch with concrete, asphalt latex type emulsion and underlayment as required for existing surfaces or new flooring surfaces.

2. Ceramic tile flooring or bases installed over concrete floors: Grind away cove, if present, for installation of new work.
- C. Concrete surfaces shall achieve compression strength in accordance with the Contract Documents prior to installation of equipment and materials.
1. Anchor bolts and templates shall be provided by Contractor and as specified in the individual Specification Sections.
 2. Concrete foundations shall be treated with sealer to prevent oil from seeping into concrete as specified in the individual Specification Sections.
- D. Maintain the work area in a broom-clean condition while installing materials and equipment.
- E. Contractor shall be responsible for equipment for hoisting, lifting, moving, rigging, etc. for installation of equipment and materials.
1. Contractor shall be responsible for design of temporary installation system used for the installation Work, unless otherwise indicated in the Contract Documents.
 2. Contractor shall be responsible for damage to existing structure, equipment, and material caused prior, during, and following installation of the Work with the Contractor furnished temporary installation system at no cost to Owner. Repairs shall be in accordance with the Contract Documents, shall return to condition prior to installation Work, and as directed by the Engineer.
 3. Owner's hoists, monorails, bridge cranes, rigging, etc. shall not be used by the Contractor unless written authorization is provided by Owner.
- F. Alteration or repair of new equipment and materials shall not be permitted without written authorization from Engineer.
- G. Field welding or burning of new equipment and materials shall not be permitted unless indicated in the Contract Documents or without written authorization from Engineer.
- H. Contractors shall install temporary shoring and bracing where necessary during installation of the Work where required:
1. System shall be provided in accordance with the Contract Documents and code requirements.
 2. Temporary system shall consist of adjustable sound timbers or rolled shapes easily removable following installation of the Work.
 3. Contractor shall be responsible for damage to existing structures and new Work during installation, utilization, and removal of the temporary system at new additional cost to the Owner.

- I. Manufacturer's Installation Services: Provide competent, qualified manufacturer's representatives of equipment and material for services specified in the individual Specification Sections, including, but not limited to:
 1. Supervising installation
 2. Checking the completed installation
 3. Adjusting and testing of equipment and materials
 4. Instructing Owner's operations and maintenance in accordance with Section 01730 – Operations and Maintenance Data.

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SECTION 01045

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Preparation of work plans and execution of cutting and patching operations of non-structural and structural elements of unexposed or exposed items. The Contractor shall be responsible for all cutting, fitting and patching, including inspection and attendant excavation and backfill, required to complete the Work or to:
1. Make its several parts fit together properly.
 2. Uncover portions of the Work to provide for installation of ill-timed work
 3. Remove and replace defective work.
 4. Remove samples of installed work as required for testing.
 5. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
 6. Cut and patch structural work in a manner with prior approval in writing by the ENGINEER.
 7. Cut and patch pre-operational and operational elements or systems in a manner which has prior approval in writing by the ENGINEER.
 8. Cut and patch work which is exposed on the visible portions of a building exterior or exposed in occupied spaces of a building in a manner that shall not result in a reduction in the aesthetic qualities and shall not result in obvious, substantial evidence of cut-and patch work, both as judged solely by the ENGINEER.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SUBMITTAL

- A. Submit a written request to the ENGINEER at least seven (7) days prior to executing any cutting or alteration which affects:
1. Function, useful design life or appearance of the Work.
 2. Work of the CITY or any separate contractor.
 3. Structural value or integrity of any element of the Project.
 4. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 5. Efficiency, operational life, maintenance or safety of operational elements.
 6. Visual qualities of sight-exposed elements.
- B. The written request shall include:

1. Identification of the project.
2. Description of affected work.
3. Date and time the Work will proceed.
4. The reason for cutting, alteration or excavation.
5. Effect on City infrastructure, or any separate contractor in the Work area or on the structural or weatherproof integrity of the affected area and project as a whole.
6. Description of the proposed work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products and methods proposed to be used.
 - d. Extent of refinishing to be done.
7. Alternatives to cutting and patching.
8. Cost proposal, when applicable.
9. Written permission of any separate contractor whose work will be affected.

3.2 MATERIALS

- A. Comply with specifications and standards approved by City for each specific product involved.

3.3 INSPECTION

- A. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products or performance of Work.
- C. Report unsatisfactory or questionable conditions to Engineer in writing; do not proceed with Work until Engineer has provided further instructions.

3.4 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.
- B. Provide devices and methods to protect adjacent portions of project from damage.
- C. Provide protection from the elements for that portion of the project which may be exposed by cutting and patching work; and maintain excavations free from water.

3.5 EXECUTION

- A. Engage original contractor to perform cutting-and-patching of structural work and operational or pre-operational systems, or, if not available, engage only recognized experts. Perform alterations using only methods approved by Engineer

- B. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.
- C. Execute excavating and backfilling by methods which will prevent settlement or damage to other work. Comply with trench safety requirements as applicable.
- D. Execute the fitting and adjustment of products to provide a finished installation in accordance with specified products, functions, tolerances and finishes.
- E. Restore work which has been cut or removed or install new products to provide completed work in accordance with requirements of the Contract Documents.
- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest joint, corner or intersection as approved by the Engineer.
 - 2. For an assembly, refinish entire unit.
- H. Acceptability of the finished Work is judged solely by the ENGINEER.

3.6 PAVEMENT RESTORATION

- A. Existing paving, including under drains if any are encountered and broken into, shall be restored by the CONTRACTOR and shall be replaced or rebuilt using the same type and thickness of construction materials as was in the original, unless otherwise directed by the ENGINEER. CONTRACTOR shall be responsible for restoring all such work, including subgrade and base courses where present. CONTRACTOR shall obtain and bear the expense of such local or other governmental permits as may be necessary.

-END OF SECTION-

SECTION 01050

SURVEYING AND FIELD ENGINEERING

I. SCOPE OF WORK

A. Provide surveying and field engineering services for the Project:

1. Professional surveying and mapping work required for execution of the contract, including verification of existing survey data, construction layout, and production of the As-Built Survey.
2. Civil, structural or other professional engineering services required by the Contract Documents or as required in order to execute the CONTRACTOR'S construction methods.

B. Survey Services

CONTRACTOR shall retain the services of a registered Surveyor and Mapper, who is licensed in the State of Florida and approved by the CITY SURVEYOR, to provide professional surveying and mapping services to maintain survey control, layout and stake the Work and perform the As-Built Survey during construction.

C. Field Engineering Services

1. Design for construction drawings (such as design of shoring, protection of existing structures and bracing for formwork) shall be designed, signed and sealed by a professional engineer licensed in the State of Florida.
2. When requested by the CONSTRUCTION MANAGER or as specified in the Contract Documents, inspections or tests shall be performed under the supervision of a licensed professional engineer. The licensed professional engineer shall sign and seal these inspections or tests.

II. IMPLEMENTATION

A. Qualifications of Surveyor and Mapper or Engineer

1. The Florida Licensed Professional Engineer(s) or Florida Registered Surveyor and Mapper(s), who are proposed by the CONTRACTOR to provide services for the Project, are subject to the approval of the ENGINEER and the CITY SURVEYOR. Prior to any services being performed, the CONTRACTOR shall submit the name and address of any proposed registered professional and a written acknowledgement from the Surveyor and Mapper stating that he has the hardware, software and adequate scope of services in his agreement with the CONTRACTOR to fully comply with the requirements of this specification. These submittals shall be provided to the CONSTRUCTION MANAGER prior to Notice to Proceed. It is recommended that the Surveyor and Mapper attend the Preconstruction meeting. It is mandatory that any Surveyor and Mapper who has not previously performed work for the City in the past attend the Preconstruction meeting.
2. The Florida Licensed Professional Engineer shall be qualified in the discipline required for the specific services required for the Project.

B. Project Survey Requirements

1. Locate, reference and preserve existing horizontal and vertical control points and property corners shown on the Drawings prior to starting any construction Work. If the Surveyor and Mapper performing the Work discovers any discrepancies that will affect the Project, the CONTRACTOR must immediately report these findings to the CONSTRUCTION MANAGER and the CITY SURVEYOR. All survey work shall meet the requirements as defined in Florida Administrative Code 61G17-6. Reference and preserve all survey points during construction. If survey points are disturbed, it is the responsibility of the CONTRACTOR'S Surveyor and Mapper to reset the points at the CONTRACTOR'S expense. Copies of the Surveyor and Mapper's field notes and/or electronic files for point replacement shall be provided to the CITY SURVEYOR through the CONSTRUCTION MANAGER.
 - a. The Surveyor and Mapper shall locate all improvements for the Project As-Built Survey using State Plane Coordinates as the horizontal datum and the benchmark referenced on the Drawings as the vertical datum. The CITY will provide electronic files of the Drawings to be used by the Surveyor and Mapper in complying with these specifications.
 - b. The construction layout shall be established from the reference points shown or listed on the Drawings. The accuracy of any method of staking shall be the responsibility of the CONTRACTOR. All construction layout staking shall be done such as to provide for easy verification of the Work by the CITY. Maintain stakes and or markings on the ground identifying the stations for the construction baseline at minimum 100-foot intervals or as required by the CONSTRUCTION MANAGER during construction.
2. Use survey control points to layout such work tasks as the following:
 - a. Clearing, grubbing, work limits, right-of-way lines and easements.
 - b. Foundations, column locations and all work associated with structures.
 - c. Locations for pipelines and all associated structures and appurtenances.
 - d. Road work:
 - i. Stakes for grading, fill, curbs, radii, sidewalks and all other work requiring specific horizontal and or vertical alignment.
 - ii. Gravity utility pipe slope and invert elevations to assure precise location.
 - e. Locations and elevations required for any other Project work.
 - f. A registered Surveyor and Mapper shall reference and replace any Project control points, boundary corners, benchmarks, section corners, and GIS monuments that may be lost or destroyed, at no additional cost to the CITY. Establish replacement points based on the original survey control or as directed by the CITY SURVEYOR. Copies of all reference field notes and/or electronic files for point replacement must be submitted to the CITY SURVEYOR through the CONSTRUCTION MANAGER.
3. Accuracy of all constructed improvements shall be within 0.125 feet ($\pm 1.5''$) horizontally and 0.0417 feet ($\pm 1/2''$) vertically of the location depicted on the Drawings, unless a more stringent

requirement is stated elsewhere in the Contract Documents, in which case the more stringent requirement shall take precedence. Notwithstanding the above, these construction tolerances do not change the requirement for the improvement's proper function or design intent. The tolerance for all slopes of Improvements specified in the Plans shall be within 10% of the proposed design slope, unless a more stringent requirement is stated elsewhere in the Contract Documents, in which case the more stringent requirement shall take precedence. The CONTRACTOR shall require the Surveyor and Mapper to include a statement on the As-Built Survey that all constructed improvements are within the specified tolerances unless specifically noted as not being within the construction tolerance. These variances shall be brought to the Owner's attention with an asterisk and note next to the as-built information shown on the As-Built Survey.

4. As-Built Survey Requirements

- a. The CONTRACTOR shall require the Surveyor and Mapper to locate all improvements for the Project As-Built Survey using State Plane Coordinates and the vertical datum referenced on the Drawings. The CONTRACTOR shall obtain an electronic copy of the Drawings from the CITY for use as a base for the As-Built Survey. The As-Built Survey shall clearly show the designed and constructed locations and elevations information for ease of comparison. This shall be accomplished by adding the As-Built information on a separate CAD level or layer, while keeping all the design call-outs and construct requirements visible. The As-Built information shall be labeled as such and be shown with a bolder text weight in order to be easily identifiable. The As-Built Survey shall include all storm and sanitary sewers and structures, clean-outs, potable and reclaimed water mains, meters, valves, force mains, gas mains, irrigation lines (2-inch and larger), process piping, electric and communication duct banks, traffic and pedestrian signals, pull boxes, cabinets, transformers, structures, drainage conveyance systems, retention ponds, fences, pavement, curbs, sidewalks, driveways, relocated utilities, appurtenances and buildings. All planned improvements referenced by station and offset on the Plans, shall also be referenced on the As-Built Survey in the same manner. All constructed improvements that have location and/or elevation information called-out on the Plans, shall have the same information identified on the As-Built Survey. If a structure information table was provided on the Plans, then the As-Built information shall be shown in the table. Design call-outs shall have a thin strike line through the design call-out and **all** As-Built information must be labeled (or abbreviated "AB") and be shown in a bolder text that is completely legible. Pavement and drainage flowline elevation shots shall be taken at minimum 25' intervals and grade breaks. As-Built Survey shots shall be taken at the same locations as shown on the Plans for ease of comparison. Any variations from required material sizes or types shall also be noted.
- b. The CONTRACTOR shall submit a copy of the current monthly updated As-Built Survey ("**Progressive As-Built Survey**") signed and sealed on each page and also submit identically matching electronic files in PDF format and the same CAD file format as the original design. The Progressive As-Built Survey shall be submitted to the CONSTRUCTION MANAGER with each Application for Payment and indicate the horizontal and vertical locations of all constructed improvements to date with sufficient information and notes to easily determine if the improvements were constructed in conformance with the Contract Documents. The Progressive As-Built Survey submittals shall include a cover sheet and include the surveyor's statement regarding the constructed improvements being within the specified tolerances or if not indicating the variances, as described above in paragraph II.B.3. The CONTRACTOR's submission of a Progressive As-Built Survey or Final As-Built Survey, as applicable, acceptable to the CONSTRUCTION MANAGER and CITY SURVEYOR, with its Application for

Payment, is a condition precedent to the ENGINEER's payment recommendation to the City pursuant to Article 14 of the General Conditions. If no construction has been performed during the period, the CONTRACTOR shall provide documentation of such in accordance with the requirements of the CONSTRUCTION MANAGER.

- c. The CONTRACTOR shall submit a minimum of three (3) signed and sealed sets of the final As-Built Survey incorporating all Work performed under the Contract Documents ("**Final As-Built Survey**") with the Application for Final Payment, as well as identically matching electronic files in PDF format and the same CAD file format as the original design (Microstation or AutoCAD). Electronic file submittals that have more than one file or a file for each plan sheet shall have an index and/or a logical filename containing a description of the file's contents. The final conformed Drawings shall be used as the basis for the As-Built Survey. The sets shall be in design plan format containing a complete set of all of the original plan sheets. The Surveyor and Mapper shall only sign and seal those sheets containing As-Built Survey information. Failure to provide accurate survey information in the proper format requested may result in the CITY determining the As-Built Survey is incomplete.
- d. At Final Completion of the Project, the CONTRACTOR shall submit field mark-up drawings showing all other constructed improvements not included in the As-Built Survey as required above. This includes improvements such as, but not limited to, irrigation lines smaller than 2-inch, sprinkler heads, miscellaneous wiring, site furnishings and traffic control loops, and only applies to variations from what is shown on the Drawings. These mark-up drawings shall be compiled on a clean set of the original Drawings.
- e. If unidentified utilities (not shown on the Drawings) are encountered during the installation of the Work, their horizontal and vertical location shall be included in the As-Built Survey. Provide the name and type of utility, the size and material type of pipe, conduit or structure and if known, the status (active or inactive) of the utility.
- f. The CONTRACTOR shall submit documentation to verify the accuracy of field surveying work at the request of the CONSTRUCTION MANAGER or CITY SURVEYOR.
- g. The CONTRACTOR shall submit certificate(s), signed by a licensed Professional Engineer or Registered Surveyor and Mapper, certifying that elevations and locations of improvements are in conformance with the Contract Documents, or, if not in conformance, certify as to variances from the Contract Documents.

-END OF SECTION-

SECTION 01070ABBREVIATIONSPART 1 – GENERAL

1.01 SUMMARY

- A. Definitions and terminology applicable to all the Contract Documents are included in the General Conditions and Supplementary Conditions.

1.02 ABBREVIATIONS AND ACRONYMS

- A. Common abbreviations that may be found in the Contract Documents are listed below:

Name	Abbreviation
alternating current	a-c
ampere	A
ante meridian	a.m.
average	avg
biochemical oxygen demand	BOD
brake horsepower	bhp
British thermal unit	Btu
Centigrade (or Celsius)	C
chlorinated polyvinyl chloride	CPVC
cubic inch	cu in
cubic foot	cu ft
cubic yard	cu yd, or CY
cubic feet per minute	cfm
cubic feet per second	cfs
degree Centigrade (or Celsius)	degrees C or °C
degrees Fahrenheit	degrees F or °F
diameter	dia
direct current	d-c
dollars	\$
each	ea
efficiency	eff
Fahrenheit	F
feet	ft
feet per hour	fph
feet per minute	fpm
feet per second	fps
figure	Fig

Name	Abbreviation
flange	flg
foot-pound	ft-lb
gallon	gal
gallons per hour	gph
gallons per minute	gpm
gallons per second	gps
gram	g
grams per liter	g/L
Hertz	Hz
horsepower	hp or HP
hour	hr
human-machine interface	HMI
inch	in.
inches water gage	in. w.g.
inch-pound	in.-lb
inside diameter	ID
iron pipe size	IPS
thousand pounds	kips
thousand pounds per square inch	ksi
kilovolt-ampere	kva
kilowatt	kw
linear foot	lin ft or LF
liter	L
maximum	max
mercury	Hg
milligram	mg
milligrams per liter	mg/l or mg/L
milliliter	ml
millimeter	mm
million gallons per day	mgd or MGD
million gallons	MG
minimum	min
national pipe threads	NPT
net positive suction head	NPSH
net positive suction head available	NPSHA
net positive suction head required	NPSHR
nominal pipe size	NPS
number	no.
operator interface terminal	OIT
ounce	oz

Name	Abbreviation
ounce-force	ozf
outside diameter	OD
parts per hundred	pph
parts per million	ppm
parts per billion	ppb
polyvinyl chloride	PVC
post meridian	p.m.
pound	lb
pounds per square inch	psi
pounds per square inch absolute	psia
pounds per square inch gauge	psig
pounds per square foot	psf
process control system	PCS
programmable logic controller	PLC
revolutions per minute	rpm
second	sec
specific gravity	sp gr or SG
square	sq
square foot	sq ft or sf
square inch	sq in.
square yard	sq yd or SY
standard	std
standard cubic feet per minute	scfm
total dynamic head	TDH

B. Abbreviations of organizations which may be used in these Specifications are:

Organization	Abbreviation
American Association of State Highway and Transportation Officials	AASHTO
Architectural Barriers Act	ABA
American Chemical Society	ACS
American Concrete Institute	ACI
Americans with Disabilities Act	ADA
Americans with Disabilities Act Accessibility Guidelines	ADAAG
American Gear Manufacturers Association	AGMA

Organization	Abbreviation
American Institute of Chemical Engineers	AIChE
American Institute of Steel Construction	AISC
American Iron and Steel Institute	AISI
American National Standards Institute	ANSI
American Public Health Association	APHA
American Railway Engineering Association	AREA
American Society for Testing and Materials	ASTM
American Society of Civil Engineers	ASCE
American Society of Mechanical Engineers	ASME
American Society of Heating, Refrigerating and Air Conditioning Engineers	ASHRAE
American Water Works Association	AWWA
American Welding Society	AWS
Code of Federal Regulations	CFR
Concrete Reinforcing Steel Institute	CRSI
Ductile Iron Pipe Research Association	DIPRA
Environmental Protection Agency	EPA
Florida Department of Environmental Protection	FDEP
Florida Department of Transportation	FDOT
Factory Manual	FM
Department of Health, Education and Welfare	HEW
Department of Health and Human Services	HHS
Institute of Electrical and Electronic Engineers	IEEE
Industrial Risk Insurance	IRI
Insurance Services Office	ISO
National Association of Architectural Metal Manufacturers	NAAMM
National Association of Railroad and Utilities Commissioners	NARUC
National Electric Code	NEC
National Electrical Manufacturers Association	NEMA

Organization	Abbreviation
National Fire Protection Association	NFPA
National Sanitation Foundation	NSF
Occupational Safety and Health Act	OSHA
Precast Concrete Institute	PCI
Sheet Metal and Air Conditioning National Association	SMACNA
Steel Structures Painting Council	SSPC
Underwriters Laboratories, Inc.	UL
United States Geological Survey	USGS
United States Public Health Service	USPHS
Water and Wastewater Equipment Manufacturers Association	WWEMA
Water Environment Federation	WEF

C. Definitions: Terminology used in the Specifications includes:

1. "Indicated" refers to graphic representations, notes, or schedules on the Drawings, or to other paragraphs or schedules in the Specifications and similar locations in the Contract Documents.
2. "Shown", "noted", "scheduled", and "specified" are used to help the user locate the reference without limitation on the location.
3. "Installer", "applicator", or "erector" is Contractor or another entity engaged by Contractor, either as an employee or subcontractor, to perform a particular construction activity, including installation, erection, application or similar Work. Installers shall be experienced in the Work that installer is engaged to perform.
4. "Experienced", when used with the term "installer" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; being familiar with Laws and Regulations; and having complied with requirements of authorities having jurisdiction, and complying with requirements of the Supplier of the material or equipment being installed.
5. Trades: Use of a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter", unless otherwise indicated in the Contract Documents or required by Laws or Regulations. Such terminology also

does not imply that specified requirements apply exclusively to trade personnel of the corresponding generic name.

6. "Assigned specialists" and similar terms: Certain Sections of the Specifications require that specific construction activities be performed by specialists recognized as experts in those operations. Engage said specialists for those activities, and their engagement is a requirement over which Contractor has no option. These requirements do not conflict with enforcement of building codes and other Laws and Regulations. Also, such requirements are not intended to interfere with local trade union jurisdictional settlements and similar conventions. Such assignments shall not relieve Contractor of responsibility for complying with the requirements of the Contract Documents.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 01090REFERENCE STANDARDSPART 1 – GENERAL

1.01 SUMMARY

- A. Definitions and terminology applicable to all the Contract Documents are included in the General Conditions and Supplementary Conditions.

1.02 REFERENCES

A. Reference Standards:

1. Refer to General Conditions, as may be modified by the Supplementary Conditions, relative to reference standards and resolving discrepancies between reference standards and the Contract Documents. Provisions of reference standards are in effect in accordance with the Specifications.
2. Copies of Standards: Each entity engaged in the Work shall be familiar with reference standards applicable to its construction activity. Copies of applicable reference standards are not bound with the Contract Documents. Where reference standards are needed for a construction activity, obtain copies of standards from the publication source.
3. Abbreviations and Names: Where reference standards, specifications, codes, manuals, Laws or Regulations, or other published data of international, national, regional, or local organizations are referred to in the Contract Documents, the organization issuing the standard may be referred to by their acronym or abbreviation only.
4. Following acronyms or abbreviations that may appear in the Contract Documents shall have the meanings indicated below. Listing is alphabetical by acronym.

Abbreviation	Name
AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACIFS	American Cast Iron Flange Standards

Abbreviation	Name
ACS	American Chemical Society
ADC	Air Diffusion Council
ADSC	International Association of Foundation Drilling.
AEIC	Association of Edison Illuminating Companies
AF&PA	American Forest and Paper Association
ABMA	American Bearing Manufacturers Association (formerly Anti- Friction Bearing Manufacturers Association (ABMA))
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHDGA	American Hot Dip Galvanizers Association
AI	Asphalt Institute
AIA	American Institute of Architects
AIChE	American Institute of Chemical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standards Committee
AMA	Acoustical Materials Association
AMCA	Air Movement and Control Association
AMP	National Association of Architectural Metal Manufacturers, Architectural Metal Products Division
ANSI	American National Standards Institute
APA	The Engineered Wood Association
API	American Petroleum Institute
APHA	American Public Health Association
AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers

Abbreviation	Name
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society for Non-Destructive Testing
ASQ	American Society for Quality
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials
AWCI	Association of the Wall and Ceiling Industry
AWI	Architectural Woodwork Institute
AWPA	American Wood Protection Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association
BOCA	Building Officials and Code Administrators
CBMA	Certified Ballast Manufacturers Association
CDA	Copper Development Association
CEMA	Conveyor Equipment Manufacturers Association
CGA	Compressed Gas Association
CISCA	Ceilings and Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CMAA	Crane Manufacturers Association of America
CPSC	Consumer Product Safety Commission
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute

Abbreviation	Name
DIN	Deutsches Institut für Normung eV (German Institute for Standardization)
DIPRA	Ductile Iron Pipe Research Association
EJCDC	Engineers Joint Contract Documents Committee
EJMA	Expansion Joint Manufacturers Association, Inc.
ETL	Intertek Testing Services, Inc. (formerly ETL Testing Laboratories, Inc.)
FCC	Federal Communications Commission
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FM	Factory Mutual (FM Global)
FRPI	Fiberglass Reinforced Plastics Institute
FS	Federal Specification
GA	Gypsum Association
GANA	Glass Association of North America
HEW	United States Department of Health, Education and Welfare
HI	Hydraulic Institute
HMI	Hoist Manufacturers Institute
HUD	United States Department of Housing and Urban Development
IBC	International Building Code
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IFI	Industrial Fasteners Institute
IFCEA	Insulated Power Cable Engineers Association
IRI	Industrial Risk Insurers

Abbreviation	Name
ISA	Instrumentation, Systems, and Automation Society (formerly Instrument Society of America)
ISO	Insurance Services Office
IOS	International Organization for Standardization
LPI	Lightning Protection Institute
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association
MS	Military Specifications
MSS	Manufacturers' Standardization Society
MMA	Monorail Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NAPF	National Association of Pipe Fabricators, Inc.
NARUC	National Association of Regulatory Utilities Commissioners
NBHA	National Builders Hardware Association
NBS	United States Department of Commerce, National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electric Code
NELMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NHPMA	Northern Hardwood and Pine Manufacturers Association
NIST	United States Department of Commerce, National Institute of Standards and Technology

Abbreviation	Name
NLGA	National Lumber Grades Authority
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NSSGA	National Stone, Sand, and Gravel Association
NTMA	National Terrazzo and Mosaic Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PEI	Porcelain Enamel Institute
PFI	Pipe Fabrication Institute
PPI	Plastics Pipe Institute
PGMC	Primary Glass Manufacturers Council
PS	Product Standards Section, United States Department of Commerce
RCSC	Research Council on Structural Connections (part of AISC)
RMA	Rubber Manufacturers Association
SAE	Society of Automotive Engineers
SBCCI	Southern Building Code Congress International, Inc.
SCAQMD	Southern California Air Quality Management District
SCPRF	Structural Clay Products Research Foundation
SCTE	Society of Cable Telecommunications Engineers
SDI	Steel Deck Institute
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturing Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SPI	Society of the Plastics Industry
SPIB	Southern Pine Inspection Bureau

Abbreviation	Name
SSPC	Society for Protective Coatings
SWI	Steel Window Institute
TCNA	Tile Council of North America
TEMA	Tubular Exchanger Manufacturers Association
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
USAB	United States Access Board
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
USGBC	United States Green Building Council
USGS	United States Geological Survey
USPHS	United States Public Health Service
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association
WCMA	Wood Component Manufacturers Association
MDMA	Window and Door Manufacturers Association
WWEMA	Water and Wastewater Equipment Manufacturers Association
WWPA	Western Wood Products Association

PART 2 – PRODUCTS (NOT USED)**PART 3 – EXECUTION (NOT USED)****- END OF SECTION -**

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SECTION 01100**POLLUTION AND NOISE CONTROLS****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The CONTRACTOR shall act to minimize or eliminate noise, vibration, and air pollution caused by construction activities. The CONTRACTOR shall control the generation and disposal of solid and hazardous wastes.

PART 2 - PRODUCTS (Not Applicable)**PART 3 - EXECUTION****3.1 CRITERIA**

- A. Noise Control: Noise Control shall be in accordance with Federal, State, and City regulations. The CONTRACTOR shall comply with all City Ordinances and regulations dealing with noise abatement. The CONTRACTOR'S equipment shall be adequately muffled to avoid creating a nuisance in public or private areas surrounding the Work site.
- B. Vibration Control: Vibration Control shall be in accordance with Federal, State, and City regulations. It is the CONTRACTOR'S sole responsibility to prevent damage from vibration to adjacent structures and property.
- C. Air Pollution Controls: Air Pollution Control by CONTRACTOR shall be in accordance with Federal, State, and City regulations and the following:
 - 1. Fugitive Dust
 - a. Take precautions to minimize dust emissions from operations involving demolition, excavation, grading, clearing of land and disposal of solid waste.
 - b. Do not cause or allow particulate matter to exceed 100 mg/m³ when determined as the difference between upwind and downwind samples collected on high volume samples at the property line for a minimum of five hours.
 - c. Take precautions to prevent visible particulate matter from being deposited upon public roadways or the adjacent property as a direct result of construction or hauling operations. Precautions shall include the removal of particulate matter from equipment before movement to paved streets, or the prompt removal of material from paved streets onto which such material has been deposited.
 - d. Take precautions to prevent dust and dirt from entering private property when work is being performed on CITY property or in the public rights-of-way.

- D. Solid and Hazardous Waste: Solid and Hazardous Waste Control shall be in accordance with Federal, State, and City regulations. The CONTRACTOR is solely responsible for the disposal of any solid or hazardous waste that is generated by the CONTRACTOR'S operation.

3.2 IMPLEMENTATION

- A. In order to implement the requirements of this Section, CONTRACTOR shall, at a minimum, use the following procedures and techniques:

- 1. For the Reduction of Air Pollution.

- a. Dust

- 1) Cover loads of materials, debris and soil transported to and from construction sites.
 - 2) Cover or water down stockpiled materials as needed to suppress dust.
 - 3) Daily water down and sweep streets which have heavy volumes of construction vehicles carrying debris and excavated materials.
 - 4) Establish regular cycles and locations for washing trucks which haul soil or other dusty materials from the site.
 - 5) Water down construction sites as needed to suppress dust, during handling of excavation soil or debris or during demolition.

- b. Burning of wastes on site is prohibited. Remove scrap and waste material and dispose of or recycle in accordance with laws, codes, regulations, ordinances and permits.

- c. Use construction equipment which has been designed and equipped to prevent or control air pollution in conformance with the regulations of the EPA, state and local authorities. CONTRACTOR shall have available evidence of such design and equipment shall be maintained and made available for inspection by CONSTRUCTION MANAGER.

- d. Establish and maintain records of the routine maintenance program for internal combustion engine powered vehicles and equipment used on the project. These records shall be held available for inspection by CONSTRUCTION MANAGER.

- 2. Solid and Hazardous Waste Disposal.

- a. Solid wastes may be disposed in a number of ways subject to the approval of the ENGINEER. Disposal methods may include reuse on the project, sale for fuel, through controlled incineration, donation or sale to another public or private project site, or by disposing in a public or private dump site, either free or for a fee. The method of disposal is restricted according to the classification of the waste material by 40 CFR parts 239 to 299, and by local requirements.
 - b. Hazardous material shall be disposed of in a waste disposal facility that has been permitted by the Florida Department of Environmental Protection for hazardous waste processing or disposal, has a current, active permit, is not currently under enforcement action and has been approved by the CONSTRUCTION MANAGER.
 - c. Haul routes for transporting solid or hazardous wastes are subject to the approval of CONSTRUCTION MANAGER.

-END OF SECTION-

SECTION 01150MEASUREMENT AND PAYMENTPART 1 – GENERAL

1.01 REQUIREMENTS INCLUDE

- A. Payment for all work done in compliance with the Contract Documents, inclusive of furnishing all manpower, equipment, materials, and performance of all operations relative to construction of this project, will be made under Pay Items. Work for which there is not a pay item will be considered incidental to the Contract and no additional compensation will be allowed.
- B. The Owner reserves the right to modify work as may be necessary and increase or decrease quantities of work to be performed, including deduction or cancellation of any one or more of the Pay Items. Changes in the work shall not be considered as a waiver of any conditions of the Contract nor invalidate any provisions thereof. When changes result in changes in the quantities of the work to be performed, the Contractor will accept payment according to Contract Unit Prices that appear in the original contract.
- C. The Contractor's attention is again called to the fact that the quotations for the various pay items of work are intended to establish a total price cost for completing the work in its entirety. Should the Contractor feel that the cost of any item of the work has not been established by the Bid Form, he shall include the cost for the work in another applicable bid item, so that his proposal for the project reflects his total price for completing the work in its entirety.
- D. The quantities for payment under this Contract shall be determined by actual measurement and payment of the completed items, in place, ready for service and accepted by the owner, in accordance with the applicable method of measurement therefore contained herein. A representative of the Contractor shall witness all field measurements.
- E. Work performed by the Contractor outside the limits of construction shall be at the Contractor's expense.

1.02 MEASUREMENT

- A. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the Owner, in accordance with the applicable method of measurement therefore contained herein.

1.03 PAYMENT ITEMS

A. Items are as enumerated on the bid form.

1. Bid Item No. 1: All Work Described in the Contract Documents Not Listed in Bid Items 2 through 9 Below
 - a. Payment for the work will be made at the lump sum Contract price, which price and payment shall be full compensation for all labor, material, testing, and services required for the construction as shown in the Contract Documents, and any component not included in other items herein. Payment will be based on the approved Schedule of Values and the percentage of work completed during the pay period at time of pay application to the nearest 5% complete, as mutually agreed to by the Contractor and City's Construction Manager. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.
2. Bid Item No. 2: Mobilization and Demobilization
 - a. Payment for Mobilization **and** Demobilization will be made at the Contract lump sum price for the item, which price and payment shall be full compensation for the preparatory work and operations in mobilizing for beginning Work on the project including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site, safety equipment and first aid supplies, sanitary and other facilities, as required by these Specifications, and State and local laws and regulations; and any other preconstruction expense necessary for the start of the Work; the cost of field engineering, including disposal of cleared and grubbed material and debris, permits and fees, construction schedules, preconstruction video and photographs, shop drawings, temporary facilities, silt fence, erosion control, tree protection, lay down storage area, construction aids, temporary fencing, erosion control, work associated with Contractor support during Owner/Engineer testing, reviews and inspection, re-inspection and any rework resulting from same, cleaning, survey, and operating and maintenance data. Payment will be made in accordance with the General Conditions. The lump sum price for this item shall not exceed 3% of the Total Base Bid Price. Demobilization shall include but not be limited to the following: Removal of all temporary construction facilities, removal of all equipment and excess materials, cleanup and site restoration. Payment will be made on a monthly basis in equal amounts up to the Lump Sum Pay Item amount. No additional payment will be made for demobilization and remobilization due to shutdowns or suspensions of work.

3. Bid Item No. 3: General Requirements

- a. Payment for General Requirements shall include all Insurance requirements costs, the costs of all bonds, Indemnification, and all administrative costs associated with acquiring and maintaining the necessary coverage as described in the Contract Documents. Payment shall be based on the lump sum price indicated on the Bid Form.

The subdivision of this Work into Schedule of Value line items shall be done to support the payment process. Unless otherwise approved by the City, payment shall be distributed as follows: 50% for the first progress payment and the balance spread evenly over the remaining payments.

4. Bid Item No. 4: Site Survey and Subsurface Utility Engineering to Locate Utilities in Advance of Construction

- a. Payment for the Site Survey and Subsurface Utility Engineering to Locate Utilities in Advance of Construction pay items will be made at the contract lump sum price for the item. Payment shall be full compensation for all labor, materials, and to determine precise horizontal and vertical positions (top and bottom), dimensions, material, and grade over utility of all public and private utilities. Payment will be based on the approved Schedule of Values and the percentage of the work completed during the pay period at time of pay application to the nearest 5% complete, as mutually agreed to by the Contractor and City's Construction Manager. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.

5. Bid Item No. 5: As-Built Survey

- a. Measurement for this item shall be based on satisfactory progress of the Contractor to provide Project As-Built Survey in accordance with the City's requirements and specifications. The lump sum price for this item shall be a minimum of 1% of the bid price for Bid Item No. 1.

Payment of the applicable lump sum for this item will be full compensation for furnishing all labor, materials and equipment as necessary to create the As-Built Survey in accordance with the City's requirements and specifications. Seventy five percent (75%) of the Total Lump Sum of this item will be divided into equal monthly payments based on the Contract Time and acceptance by City of the Progressive As-Built Survey drawings. The remaining twenty five percent (25%) of this item will be paid upon submittal and owner approval of the Final As-built Survey

6. Bid Item No. 6: EQ Pumping Equipment – Furnish and Install

- a. Furnish and install five EQ pumps as outlined in these Contract Documents. Measurement for the bid item includes the furnishing, installation, start-up, testing, training, commissioning and field services for all EQ pumps. This bid item includes furnishing and installation of electrical, instrumentation and controls, and all ancillary equipment furnished by the EQ pump manufacturer. Unless otherwise approved by the City, payment will be based on the following incremental payment schedule: 10% of bid item upon approval of Shop Drawings, 50% of bid item upon delivery of Equipment to the Site and suitably stored, 80% of bid item upon installation, 100% of bid item upon Final Acceptance. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.

7. Bid Item No. 7: Electrical Equipment – Furnish and Install

- a. This bid item includes furnishing and installation of all electrical equipment and electrical components as specified in Division 16 including, but not limited to, switchgear, motor control centers, VFD's, transformers and all equipment necessary for a fully functioning electrical system. Measurement for the bid item includes the furnishing, installation, start-up, testing, training, commissioning and field services for all items provided under this Bid Item. Unless otherwise approved by the City, payment will be based on the following incremental payment schedule: 10% of bid item upon approval of Shop Drawings, 50% of bid item upon delivery of Equipment to the Site and suitably stored, 80% of bid item upon installation, 100% of bid item upon Final Acceptance. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.

8. Bid Item No. 8: Instrumentation and Controls System – Furnish and Install

- a. Furnishing and installation of all instrumentation components as specified in Divisions 13 and 16 and as indicated on the Drawings. Bid item includes coordination with Owner on all programming. Payment will be based on percentage of work completed during the pay period at the time of the pay application to the nearest 5 percent complete as mutually agreed to by the Contractor and Construction Manager; the cumulative total shall not exceed the Lump Sum Bid Item price.

9. Bid Item No. 9: Permit Allowance

- a. Measurement for this item shall be based on satisfactory progress of the Contractor to obtain permits for the Project in accordance with the City's requirements and specifications including permitting and regulatory requirements.

Payment will be full compensation for Contractor's payment of fees necessary to obtain permits, in accordance with the City's requirements and specifications including permitting and regulatory requirements. Payment will be made based on documentation of the fees. If permit fees are less than the allowance amount, Contractor shall provide a credit to Owner. Reinspection fees shall not be included as part of the allowance and shall not be reimbursed.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01200**PROJECT MEETINGS****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The CONSTRUCTION MANAGER will schedule and administer a preconstruction conference, periodic project meetings, and any specially called meetings which shall be attended by the CONTRACTOR throughout the progress of the Work.
1. CONSTRUCTION MANAGER or its representatives will:
 - a. Prepare and distribute Notification of meeting to attendees for meetings.
 - b. Establish, prepare and distribute agenda with Notification.
 - c. Make physical arrangements for meetings.
 - d. Preside at meetings.
 - e. Prepare (or have designee prepare,) and distribute minutes of meetings.
 2. Representatives of CONTRACTOR, Subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

PART 2 - PRODUCTS (Not Applicable)**PART 3 - EXECUTION****3.1 PRECONSTRUCTION CONFERENCE**

- A. The preconstruction conference will be scheduled by CONSTRUCTION MANAGER as outlined in the General Conditions.
1. Location: A central site, convenient for all parties, designated by CONSTRUCTION MANAGER.
 2. Attendance (as applicable).
 - a. CITY and CONSTRUCTION MANAGER representatives, and their professional consultants.
 - b. DESIGN ENGINEER representatives and their professional consultants.
 - c. CITY MBE/WBE representative.
 - d. Other agency representatives (DER, EPA, City, County, etc.).
 - e. CONTRACTOR's representative and CONTRACTOR's professional consultants, including the CONTRACTOR's Field Engineer(s) and Surveyor and Mapper.
 - f. Contractors and Suppliers.
 - g. Others as appropriate or as requested by the CONSTRUCTION MANAGER.

3.2 PROJECT MEETINGS.

- A. CONSTRUCTION MANAGER will schedule regular meetings. The project meetings will be held every week, or as required by the CONSTRUCTION MANAGER considering the progress of the work, with the first meeting being held one week after the preconstruction meeting. CONSTRUCTION MANAGER (or designee) will prepare and distribute the minutes of the meeting at least 24 hours prior to the next project meeting.
1. Location: A central site, convenient for all parties, designated by CONSTRUCTION MANAGER.
 2. Attendance:
 - a. CONSTRUCTION MANAGER and other City Representatives as needed.
 - b. CONTRACTOR and his consultants as needed.
 - c. DESIGN ENGINEER and his professional Consultants as needed.
 - d. Subcontractors as appropriate to the agenda.
 - e. Suppliers as appropriate to the agenda.
 - f. Others as appropriate.
 3. CONTRACTOR's representative is to attend the project meetings and have the authority to act on behalf of the entity he represents on field related matters. CONTRACTOR's representative is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as minutes correction, deliveries of materials and equipment, progress of the Work, schedule, etc.
 4. The CONTRACTOR is to provide a current submittal log at each progress meeting in accordance with the General Conditions.
 5. The CONTRACTOR is to provide a two-week schedule at each project meeting in accordance with the General Conditions.

3.3 SPECIAL MEETINGS.

- A. Special meetings may be called as deemed appropriate by CONSTRUCTION MANAGER.
1. Location: A central site, convenient for all parties, designated by CONSTRUCTION MANAGER.
 2. Agenda: As necessary.
 3. Attendance: As requested by CONSTRUCTION MANAGER or as deemed necessary by CONTRACTOR.

-END OF SECTION-

SECTION 01300SUBMITTALSPART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Contractor shall provide submittals in accordance with the General Conditions as modified by the Supplementary Conditions, and this Section.
2. Contractor is responsible to confirm and correct dimensions at the Site, for information pertaining to the fabrication processes and techniques of construction, and for coordinating the work of all trades. Contractor's signature of submittal's stamp and letter of transmittal shall be Contractor's representation that Contractor has met their obligations under the Contract Documents relative to that submittal.

B. Related Sections:

1. Section 01600 – Materials and Equipment
2. Section 01730 – Operations and Maintenance Data.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Types of Submittals: When type of submittal is not specified in this Section, Engineer will determine type of submittal.

1. Action/Informational Submittals:

- a. Shop Drawings.
- b. Product data.
- c. Delegated design submittals in accordance with the General Conditions and as modified by the Supplemental Conditions.
- d. Collection system bypass plan.
- e. Samples.
- f. Testing plans, procedures, and testing limitations.
- g. Design data not sealed and signed by a design professional retained by Contractor, Subcontractor, or Supplier.

- h. Pre-construction test and evaluation reports, such as reports on pilot testing, subsurface investigations, potential Hazardous Environmental Conditions, and similar reports.
 - i. Supplier instructions, including installation data, and instructions for handling, starting-up, and troubleshooting.
 - j. Sustainable design submittals (other than sustainable design closeout documentation).
- 2. Closeout Submittals:
 - a. Maintenance contracts.
 - b. Operations and maintenance data.
 - c. Bonds, such as maintenance bonds and bonds for a specific product or system.
 - d. Warranty documentation.
 - e. Record documentation.
 - f. Sustainable design closeout documentation.
 - g. Software.
- 3. Maintenance Material Submittals:
 - a. Maintenance materials schedule and checklist.
 - b. Spare parts.
 - c. Extra stock materials.
 - d. Tools.
- 4. Quality Assurance Submittals:
 - a. Performance affidavits.
 - b. Certificates.
 - c. Source quality control submittals (other than testing plans, procedures, and testing limitations), including results of shop testing.
 - d. Field or Site quality control submittals (other than testing plans, procedures, and testing limitations), including results of operating and acceptability tests at the Site.

- e. Supplier reports.
- f. Special procedure submittals, including health and safety plans and other procedural submittals.
- g. Qualifications statements.

B. Submittal Requirements:

1. Contractor shall submit electronic copy of submittals for Engineer's review via Construction Management Software, unless otherwise specified in individual Specification Sections. Acceptable electronic formats are Adobe PDF, Microsoft Word, Autodesk DWF and AutoCAD.
2. Submittals shall be furnished in hard copy format, three-dimensional Revit file format and accompanied by two-dimensional PDF format.
3. Submittal shall be accompanied by letter of transmittal containing date, project title and number, Contractor's name and address, number and revision of each drawing submitted, title and log number of submittal, list of relevant Specification Sections, notification of deviations from Contract Documents, submittal log number, and other material required for Engineer's review.
4. Submittals with internet hyperlinks and other references to online content shall not be considered, reviewed, and included as part of the submittal review procedure. Hyperlinks and other electronic references shall not be used to comply with specified requirements of the Contract Documents, unless specifically stated in the individual technical Specification Section.

C. Scheduling:

1. Provide submittals well in advance of the work following Engineer's approval or acceptance of the associated submittal. Work covered by a submittal will not be included in progress payments until approval or acceptance of related submittals has been obtained in accordance with the Contract Documents.
2. Submittals shall be provided by Contractor with at least thirty (30) working days for review and processing.

1.03 SCHEDULE OF SUBMITTALS

A. Schedule of Submittals, as specified in this Section:

1. Timing:
 - a. Provide submittal within time frames specified in the Contract Documents.

- b. Provide updated Schedule of Submittals with each submittal of the updated Progress Schedule.
2. Content: In accordance with the General Conditions as modified by the Supplementary Conditions, and this Section. Requirements for content of preliminary Schedule of Submittals and subsequent submittals of the Schedule of Submittals are identical.
 - a. Identify submittals required in the Contract Documents. Updates of Schedule of Submittals shall show scheduled dates and actual dates for completed tasks. Indicate submittals that are on the Project's critical path.
 - b. Indicate the following for each submittal:
 - 1) Date when submittals are requested and received from Supplier.
 - 2) Date when certification is received from Supplier and when submitted to Engineer.
 - 3) Date when submittals are submitted to Engineer and returned with disposition from Engineer.
 - 4) Date when submittals are revised by Supplier and submitted to Engineer.
 - 5) Date when submittals are returned with "Furnish as Submitted" (FAS) or "Furnish as Corrected" (FAC) disposition from Engineer.
 - 6) Date when approved submittals are returned to Supplier.
 - 7) Date of Supplier scheduled delivery of equipment and material.
 - 8) Date of actual delivery of equipment and material.
 - 9) Whether submittal will be for a substitution or "equal". Procedures for substitutions and "or equals" are specified in the General Conditions and the Section 01600 – Materials and Equipment.
 - 10) For submittals for materials or equipment, date by which material or equipment must be at the Site to avoid delaying the Work and to avoid delaying the work of other contractors.
3. Prepare Schedule of Submittals using same software, and in same format, specified for Progress Schedules.
4. Coordinate Schedule of Submittals with the Progress Schedule.

5. Schedule of Submittals that is not compatible with the Progress Schedule, or that does not indicate submittals on the Project's critical path, or that places extraordinary demands on Engineer for time and resources, is unacceptable. Do not include submittals not required by the Contract Documents.
6. In preparing Schedule of Submittals:
 - a. Considering the nature and complexity of each submittal, allow sufficient time for review and revision.
 - b. Reasonable time shall be allowed for: Engineer's review and processing of submittals, for submittals to be revised and resubmitted, and for returning submittals to Contractor.
 - c. Identify and accordingly schedule submittals that are expected to have long anticipated review times.

1.04 ACTION/INFORMATIONAL SUBMITTALS

- A. Provide the following Submittals in accordance with the individual Specification Sections, including, but not limited to, the following:
 1. Product Data:
 - a. Materials and equipment lists, including for each item:
 - 1) Name and location of the supplier or manufacturer, trade name, catalog reference, size, finish, and all other pertinent data.
 - b. Catalog data sheets, cut-sheets, performance curves, diagrams, verification of conformance with applicable standards or codes
 - c. Descriptive bulletins/brochures/specifications
 - d. Material of construction data, including details on all components including applicable ASTM designations.
 - e. Lifting, erection, installation, and adjustment instructions, and recommendations.
 - f. Finish/treatment data, including interior and exterior shop coating systems.
 - g. Equipment/material weight/loading data, including total uncrated weight of the equipment plus the approximate weight of shipped materials. Support locations and loads that will be transmitted to bases and foundations following installation. Size, placement, and embedment requirements of anchor bolts.

- h. Complete information regarding location, type, size, and length of all field welds in accordance with "Standard Welding Symbols" AWS A2.0 of the American Welding Society. Special conditions shall be fully explained by notes and details.
 - i. Motor data including horsepower; enclosure type; voltage; insulation class; temperature rise and results of dielectric tests; service-rating; rotative speed; motor speed-torque relationship; efficiency and power factor at $\frac{1}{2}$, $\frac{3}{4}$, and full load; slip at full load; running, full load, and locked rotor current values; safe running time-current curves; motor protective devices; and interconnection diagrams.
 - j. Engineering design data, calculations, and system analyses
 - k. Digital system documentation
 - l. Operating sequence descriptions
 - m. Software/programming documentation
 - n. Manufacturer's instructions
 - o. For all equipment furnished, provide a list including the equipment name, address and telephone number of the supplier's representative and service company so that service and/or spare parts can be readily obtained.
2. Shop Drawings:
- a. Equipment and material layout drawings, including panel layout drawings.
 - b. System schematics and diagrams including, but not limited to, piping systems; HVAC and ventilation systems; process equipment systems; electrical operating systems; wiring diagrams; controls, alarm and communication systems.
 - c. Layout and installation drawings (interior and exterior) for all pipes, valves, fittings, sewers, drains, heating, and ventilation ducts, all electrical, heating, ventilating and other conduits, plumbing lines, electrical cable trays, lighting fixture layouts, and circuiting, instrumentation, interconnection wiring diagrams, communications, power supply, alarm circuits, etc.
 - d. Layout and installation drawings shall show connections to structures, equipment, sleeves, valves, fittings, etc.
 - e. Drawings shall show the location and type of all supports, hangers, foundations, etc., and the required clearances to operate valves, equipment, etc.

- f. Drawings for pipes, ducts, conduits, etc., shall show all 3 inch and larger electrical conduits and pressure piping, electrical cable trays, heating and ventilation ducts or pipes, structure, manholes or any other feature within four (4) feet (measured as the clear dimension) from the pipe duct, conduit, etc., for which the profile is drawn.
 - g. Equipment and material schedules.
 - h. Title block displaying project title and number, name of project building or structure, number and title of the shop drawing, date of shop drawing or revision, name of Contractor and Subcontractor submitting drawings, supplier/manufacturer, separate detailer when pertinent, specification title and number, and drawing number.
- 3. Construction Drawings:
 - a. When used in the Contract Documents, the term "construction drawings" shall be considered to include Contractor's plan for temporary structures such as temporary construction fencing, support of open cut excavation, support of utilities, ground water control systems, forming and false-work; for underpinning; and for such other work as may be required for construction but which does not become an integral part of the project.
 - b. Copies of construction drawings shall be submitted to Construction Manager at least 30 calendar days (unless otherwise specified by Construction Manager) in advance of their being required for work.
 - c. Construction drawings shall be signed by a registered Professional Engineer or Architect, currently licensed to practice in the State of Florida, and shall convey or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, construction drawings must have been reviewed without specific exceptions by Construction Manager, which review will be for general conformance and will not relieve Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks to new or existing work are assumed solely by Contractor. Construction Manager review of the construction drawing assumes no responsibility for construction drawing design or implementation by Construction Manager or City.
- 4. Shop Drawings shall complement design and construction drawings, but shall contain sufficient detail to clearly define all aspects of the construction. These drawings shall be complete and detailed.
- 5. If shop drawings show variations from Contract requirements because of standard shop practice or for other reasons, Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be

implemented where appropriate. If Contractor fails to describe such variations, Contractor shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such drawings have been reviewed.

6. Delegated design submittals, which include documents prepared, sealed, and signed by a design professional retained by Contractor, Subcontractor, or Supplier for materials and equipment to be incorporated into the completed Work. Delegated design submittals do not include submittals related to temporary construction unless specified otherwise in the related Specification Section. Delegated design submittals include: design drawings, design data including calculations, specifications, certifications, and other submittals prepared by such design professional.
7. Contractor will obtain an installation list from suppliers and equipment suppliers who propose to furnish equipment or products for submittal to Construction Manager along with the required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and has been in operation for a period of at least one year.

B. Samples:

1. General Requirements:

- a. Conform submittal of Samples to the General Conditions as modified by the Supplementary Conditions, this Section, and the Specification Section in which the Sample is specified.
- b. Furnish at the same time Samples and submittals that are related to the same unit of Work or Specification Section. Engineer will not review submittals without associated Samples and will not review Samples without associated submittals.
- c. Samples shall clearly illustrate functional characteristics of product, all related parts and attachments, and full range of color, texture, pattern, and material.
- d. Samples of finished materials shall have additional marking that will identify them under the finished schedules.

2. Submittal Requirements:

- a. Securely label or tag Samples with submittal identification number. Label or tag shall not cover, conceal, or alter appearance or features of Sample. Label or tag shall not be separated from the Sample.
- b. Each sample shall have a label indicating name of project, name of Contractor and Subcontractor, material or equipment represented, place of origin, name of producer and brand (if any), location of project, specification title and number, and submittal number.

- c. Submit number of Samples required in Specifications. If number of Samples is not specified in the associated Specification Section, provide at least two identical Samples of each item required for Engineer's approval. If Contractor requires Sample(s) for Contractor's use, notify Engineer in writing and provide additional Sample(s). Contractor is responsible for furnishing, shipping, and transporting additional Samples.
- d. Deliver one Sample to Engineer. Deliver balance of Samples to location directed by Engineer. Contractor shall prepay shipping charges on samples.
- e. Materials or equipment for which samples are required shall not be used in work until approved by Construction Manager.
- f. Contractor shall prepare a transmittal letter, in triplicate for each shipment of samples, containing the required information. Contractor shall enclose a copy of this letter with the shipment and send a copy of this letter to Construction Manager. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- g. Approved samples not destroyed in testing shall be sent to Construction Manager or stored at the site of the Work. Approved samples of the hardware in good condition will be marked for identification and may be used in the Work. Materials and equipment incorporated in the work shall match the approved samples. Samples which failed testing or were not approved will be returned to Contractor at his expense, if so requested at time of submission.

1.05 CLOSEOUT SUBMITTALS

- A. Provide the following Closeout Submittals in accordance with the individual Specification Sections, including, but not limited to, the following:
 - 1. Maintenance contracts
 - 2. Bonds for specific products or systems
 - 3. Warranty documentation
 - 4. Sustainable design closeout documentation.
 - 5. Software programming and documentation.
- B. On documents such as maintenance contracts and bonds, include on each document furnished original signature of entity issuing the document.
- C. Operations and Maintenance Data: Submit in accordance with Section 01730 – Operations and Maintenance Data.

- D. Disposition: Dispositions and meanings are the same as specified for Informational Submittals.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- A. For spare parts, extra stock materials, and tools, submit quantity of items specified in associated Specification Section. Furnish in accordance with Section 01600 – Materials and Equipment.
- B. Disposition: Dispositions and meanings are the same as specified for Informational Submittals.

1.07 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall review, coordinate, and verify submittals with Subcontractors, Manufacturers, and Suppliers, including field measurements at Site, in accordance with the General Conditions and as modified by Supplemental Conditions prior to submitting material for Engineer's review.
- B. Contractor shall clearly and concisely indicate and mark equipment and material being submitted to meet the intent of the Contract Documents. Equipment and material not being submitted shall be deleted, stricken through, or otherwise designated not being submitted. Equipment and material data sheets shall be included once with cross references throughout the submittal. Multiple equipment and material data sheets for the same item within a submittal may receive a rejected disposition until corrected.
- C. Contractor shall be responsible for and bear costs of damages which may result from the ordering of material or from proceeding with any part of work prior to the completion of the review by Construction Manager of the necessary submittals unless otherwise authorized by Construction Manager in writing.
 - 1. Individual Specification Sections require a Compliance, Deviations, and Exceptions (CD&E) letter to be included with the submittal. When specified, submittals provided without the CD&E letter shall receive a rejected disposition without review.
 - 2. CD&E letter requirements:
 - a. Include a copy of entire Specification section with each paragraph and subparagraph noted with "C", "D", or "E" to indicate if equipment and material being provided is in compliance (C), deviates (D), or exceptions (E) are taken with the Contract Documents.
 - 1) Compliance (C): Full compliance with the specified requirement.
 - 2) Deviation (D): Deviation from the specified requirement.
 - 3) Exception (E): Exception with the specified requirement.

- b. Include all comments, deviations and exceptions taken to the Contract Documents by the Contractor and Equipment Manufacturer/Supplier.
 - c. Any requirements with the letter "D" or "E" beside them shall be provided with a full typewritten explanation of the deviation/exception. Handwritten explanation of the deviations/exceptions is not acceptable.
 - d. Address deviations and exceptions taken to each Contract Drawing related to the Specification section.
- D. Contractor shall provide Contractor's stamp of approval certifying submittal material has been reviewed and conform to the Contract Documents prior to submitting material for Engineer's review.
- E. Contractor shall provide written notice of deviations or variations that submittal may have with the Contract Documents.
- F. Contractor shall provide bound, dated, labeled, tabulated, and consecutively numbered submittals as specified in the individual Specification Section. Label shall contain the following:
 - 1. Specification Section.
 - 2. Referenced Drawing number.
 - 3. Subcontractor or Supplier name.
 - 4. Type of equipment and/or materials.
- G. Contractor shall perform the following after receiving Engineer's review disposition:
 - 1. Order, fabricate, or ship equipment and materials included in the submittal (pending Engineer's review of source quality control submittals) with the following disposition:
 - a. "Furnish as Submitted" (FAS).
 - b. "Furnish as Corrected" (FAC).
 - c. "Furnish as Corrected – Confirm" (FACC), only portions of Work that do not require resubmittal for Engineer's review.
 - 2. Resubmittal requirements:
 - a. Partial resubmittal of "Furnish as Corrected – Confirm" (FACC) returned dispositions, until Engineer's disposition is either "Furnish as Submitted" (FAS) or "Furnish as Corrected" (FAC).

- b. Full resubmittal of material with Engineer's disposition of "Revise and Resubmit" (R&R), until Engineer's disposition is "Furnish as Submitted" (FAS), "Furnish as Corrected" (FAC), or "Furnish as Corrected – Confirm" (FACC) that requires a partial resubmittal.
- c. Contractor shall be responsible for Engineer's charges to Owner if submittals are not approved within the number of specified submittals in accordance with the General Conditions. Engineer's charges shall include, but not limited to, additional review effort, meetings, and conference calls with Contractor, Subcontractor, or Supplier.

1.08 ENGINEER'S REVIEW

- A. Engineer's review of the Contractor's submittal shall not relieve Contractor's responsibility under the Contract Document in accordance with the General Conditions and as modified in the Supplemental Conditions. An acceptance of a submittal shall be intended to mean the Engineer does not have specific objection to the submitted material, subject to conformance with the Contract Drawings and Specifications.
- B. Engineer's review of Contractor's submittal shall be confined to general arrangement and compliance with the Contract Documents, and shall not be for the purpose of checking dimensions, weights, clearances, fittings, tolerances, interferences, coordination of Subcontractor work, etc.
- C. No partial submittals will be reviewed. Submittals not complete will be returned to Contractor for resubmittal.
- D. Review Dispositions:
 - 1. "Furnish as Submitted" (FAS) – No exceptions are taken.
 - 2. "Furnish as Corrected" (FAC) – Minor corrections are noted for Contractor's correction.
 - 3. "Furnish as Corrected – Confirm" (FACC) – Corrections are noted and partial resubmittal shall be made as noted.
 - 4. "Revise and Resubmit" (R&R) – Corrections are noted and complete resubmittal shall be made. Submittal does not conform to applicable requirements of the Contract Documents and is not acceptable. Revise submittal and re-submit to indicate acceptability and conformance with the Contract Documents.
 - 5. "Receipt Acknowledged" (RA) –
 - a. Information included in submittal conforms to the applicable requirements of the Contract Documents and is acceptable. No further action by Contractor is required relative to this submittal, and the Work covered by the submittal may

proceed, and products with submittals with this disposition may be shipped or operated, as applicable.

- b. Information included in submittal is for Project record purposes and does not require Engineer's review or approval.
- 6. "Rejected" (R) – Information included in submittal does not conform to the applicable requirements of the Contract Documents and is unacceptable. Contractor shall submit products and materials as specified in the Contract Documents or provide required information for substitution as specified in the Contract Documents for consideration by Engineer.
- E. Electronic Submittal Return to Contractor: Electronic submittals shall be returned electronically with dispositions provided.
- F. Resubmittals will be handled in the same manner as first submittals. On resubmittals Contractor shall direct specific attention, in writing or on resubmitted drawings, to revisions other than the corrections requested by Construction Manager on previous submissions. Contractor shall make any additional corrections or clarifications required by Construction Manager.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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Section 01310

PROJECT SCHEDULING

I. SCOPE

- A. This work shall consist of developing, maintaining and providing a detailed time-scaled, computer generated Progress Schedule using the Critical Path Method, which demonstrates complete fulfillment of all work shown in the Contract Documents. The Contractor shall regularly revise and update the Progress Schedule, using it in planning, coordinating, and performing all work. Schedule activities shall accurately depict the entire scope of Work to be performed to complete the project including, but not limited to, all activities of the Contractor, Subcontractors, consultants, the City, and others, as required. The **accepted** Project Schedule shall be called the Baseline Schedule.

The Baseline Schedule shall be used by the Contractor and the City to coordinate ongoing work activities and track schedule impacts resulting from unknown or unforeseen conditions, including but not limited to activities of the Subcontractors, fabricators, the City, and other involved State agencies, authorities, and other entities such as utilities and municipalities.

- B. The Contractor shall prepare, furnish and maintain a computer-generated Baseline Schedule using the Critical Path Method (CPM), using software produced by the manufacturers of Primavera, Microsoft, or other City-approved commercial scheduling software program, capable of performing in accordance with all of the details in this specification.

II. **DEFINITIONS**

Activity – An element of work performed during the course of a project. An activity normally has an expected duration, and may have expected resource requirements. Each Activity shall have its own identifying number, and linked Activities shall be numbered in a manner as to provide consistency for the string of Activities. Activities are also referred to as tasks.

Actual Start date – The Actual Start date represents the point in time that meaningful work actually started on an activity.

Actual Finish date – At the activity level, the Actual Finish date represents the point in time that work actually ended on an activity. At the project level, the Actual Finish date represents the point in time that the Contractor completes all work on the project and it is accepted by the Engineer. This is also known as

Bid Date – The date the bids for the Project are opened by the City.

Constraint – A scheduling restriction imposed on the start or finish of an activity. Only contractual/City- designated constraints are allowed unless specifically authorized by this specification or the Engineer.

Construction Schedule Delay – A construction schedule delay is defined as an event, action or factor that impacts the critical path of the construction schedule and extends the time needed for completion of the Project.

Critical Path – In the Project Schedule, the critical path activities shall be defined as those activities being on the longest path, containing the least amount of total float. The critical path will generally change from time to time as activities are completed ahead of, or behind schedule.

Critical Path Method (CPM) – A network analysis technique used to predict project duration by analyzing which sequence of activities (path) has the least amount of scheduling flexibility (least amount of float). A scheduling technique utilizing activities, durations, and interrelationships/dependencies (logic), such that all activities are interrelated with logic ties from the beginning of the Project to the completion of the Project.

Data Date – The date entered in the Project Details which is used as the starting point to calculate the applicable schedule. For the Baseline Schedule, the Data Date shall be the Contract Award Date; for Monthly Progress Schedule update submissions, the Data Date shall be the date up to which the Contractor is reporting progress (generally the last working day for the corresponding contract payment period).

Duration – Activity durations shall be entered as the number of working days (not including holidays or non- working periods) to complete the selected activity; for certain activities such as concrete curing, or others approved by the Engineer, durations may reflect actual calendar days.

Final As Planned At Award Baseline Schedule – The original plan against which the Contractor's progress is measured. The Final As Planned at Award Baseline Schedule (Baseline Schedule) represents the original plan at the award of the contract, of what is expected to happen. Once the Baseline Schedule is accepted by the Engineer, it is saved and used as a basis to compare against Progress Schedule Updates.

Float Suppression – Utilization of zero free float constraints which allows an activity to start as late as possible by using its' available free float. This technique allows activities to appear more critical than if the activity's total float was based on early dates. Examples of float suppression techniques include preferential sequencing (arranging the critical path through activities more

susceptible to City-caused delay), extending activities durations, incorporating several activities that actually require a half day or less effort with Finish to Start relationships but showing each as full day durations where one activity would be appropriate, manipulating calendars, or any other such methodology.

Free Float – The amount an activity can slip without delaying the immediate successor activities. Free float is the property of an activity and not the network path.

Hammock Activity – Activities grouped by a single activity, usually for the purpose of determining overall length of activity string.

Initial Baseline Progress Schedule – The Contractor's schedule prior to submittal to the Engineer of the Final As Planned at Award Baseline Progress Schedule, reflecting the Contractor's plan to proceed with Work during the time period while the final baseline schedule is still in the development, review, and acceptance process.

Late Dates – The latest an activity can start or finish without delaying the day of completion. Also known as "Drop dead dates".

Milestone – A significant event, usually the beginning or end of a major stage or deliverable.

Notice of Award – The official written notice from the City to the Contractor notifying the Contractor that it has been awarded the Contract.

Notice to Proceed – The official written notice from the City to the Contractor notifying the Contractor of the date that it may begin Work. Contract Time is measured from this date.

Predecessor – An activity(s) that is required for the start of a given activity. Every activity must have a predecessor except for the first activity in the schedule.

Progress Schedule Update – Schedule that reflects the status of activities that have commenced or have been completed, including the following items: (a) actual activity start date and or completion date as appropriate; (b) actual remaining duration for activities commenced and not complete; (c) actual physical percent complete for activities commenced and not complete; and (d) actual activity suspend or resume dates for activities commenced and not complete.

Recovery Schedule – A schedule depicting the plan for recovery of significant time lost on the Project. This separate CPM schedule submission shall provide the resolution and include appropriate changes in network logic, calendar adjustments, or resource assignments.

Relationships Between Activities

Finish to Start – The successor activity can begin only when the current activity completes. **Finish to Finish** – The finish of the successor activity depends on the finish of the current activity. **Start to Start** – The start of the successor activity depends on the start of the current activity. **Start to Finish** – The successor activity cannot finish until the current activity starts.

Schedule Revision – Revisions to the Baseline Schedule to ensure it accurately reflects the current means and methods of how the Project is anticipated to progress, including modifications made to activities in the current Baseline Schedule in any of the following items: (a) activity duration; (b) changes in logic connections between activities; (c) changes in constraints; (d) changes to activity descriptions; (e) activity additions or deletions; (f) changes in activity code assignments; (g) changes in activity resource assignments; and (h) changes in calendar assignments.

Substantial Completion - That date when (a) the **Work** (or a specified part thereof) is complete in accordance with the **Contract Documents**, with the exception of the minor items identified during the inspection described in the Contract General Conditions, and (b) the **Work** can be utilized for the purposes for which it is intended, as may be evidenced by successful completion of all specified pre-operational start-up and demonstration tests and receipt of a Certificate of Occupancy, if applicable to this **Project**. The terms "substantially complete" and "substantially completed" as applied to any **Work** refer to **Substantial Completion** thereof.

Successor - An activity(s) that follows a given activity. Every activity must have a predecessor except for the last activity in the schedule.

Total Float – The amount of time an activity (or chain of activities) can be delayed from its early start without delaying the Contract completion date. Float is a mathematical calculation and can change as the Project progresses and changes are made to the Project plan. Total Float is calculated and reported for each activity in a network, however, Total Float is an attribute of a network path and not associated with any one specific activity along that path.

Working Day – A working day is a calendar day scheduled for active prosecution of the Work.

III. INTENT, RESPONSIBILITY, AND TIME

- A. The Contractor shall schedule the Work using such procedures and staging/phasing in accordance with the Contract Documents. Work designated as part of separate stages may be performed simultaneously where provided in the Contract Documents or where approved.
- B. The purpose of the Baseline Schedule shall be to: ensure adequate planning

and staffing during execution of the Work by the parties to the contract; ensure communication and coordination of activities among all affected parties; assist the Contractor and the City in monitoring the progress of the Work, and evaluating proposed changes to the contract and/or entitlement to additional time for Project completion; establish a standard methodology for time adjustment analysis based on the principles of the Critical Path Method of scheduling, for use in time-related dispute resolution; and determine appropriate extensions or reductions of Contract Time.

- C. The scheduling of activities is the responsibility of the Contractor. Therefore, it is the Contractor's responsibility to determine the most feasible order of Work commensurate with the Contractor's abilities and the requirements of the Contract Documents.
- D. The intent of the review of the Baseline Schedule by the Engineer is for apparent compliance with the contract requirements for time and phasing. Review of the Baseline Schedule by the Engineer is not intended to consider the reasonableness of the Contractor's plan. If, after the Baseline Schedule has been accepted by the Engineer, either the Contractor or the Engineer discover that any aspect of the schedule has an error or omission, the Contractor must correct it on the next Progress Schedule submission and note the changes in the Narrative Report.
- E. Acceptance of the Baseline Schedule by the Engineer shall not be construed to imply approval of any particular construction methods or sequence of construction or to relieve the Contractor from its responsibility to provide sufficient materials, equipment, and labor to guarantee the completion of the contract in accordance with the contract documents.
- F. Acceptance of the Baseline Schedule by the Engineer does not attest to the validity of assumptions, activities, relationships, sequences, resource allocations, or any other aspect of the progress schedule. Within the contractual constraints, the Contractor is solely responsible for the planning and execution of the work.
- G. Acceptance of the Baseline Schedule by the Engineer shall not be construed to modify or amend the Contract Documents or the date of Substantial Completion.
- H. Failure of the Contractor to include any element of the Work required by the Contract in the accepted Baseline Schedule does not relieve the Contractor from its responsibility to perform such work. Errors and omissions on schedules shall not relieve the Contractor from finishing all Work within the time limit specified for completion of the Contract.
- I. The Progress Schedule shall include all Work contained in the Contract Documents and all Work directed in writing by the Engineer, and not be limited to Work on the initial critical path. The Progress Schedule shall reflect the actual dates that Work activities started and completed in the field. If a Work

activity is suspended in the field and restarted at a later date, and the break between when the Work was suspended to when it was resumed is significant compared to the original activity duration, then the activity should be broken into multiple activities to reflect this discontinuity of the Work.

- J. The Contractor shall ensure that Progress Schedules prepared by the Contractor for submission to the Engineer are in general compliance with the Contract Documents and requirements of this specification. Schedule submissions and accompanying narratives shall be timely, complete, accurate, and in compliance with the Contract.

IV. IMPLEMENTATION

- A. The Baseline Schedule shall be prepared in the following stages:
 - 1. Initial Schedule: The Contractor is encouraged, but not required, to submit an Initial Baseline Schedule that demonstrates a sample of how the Contractor's proposed format and structure will conform to the detailed requirements of this section. The review and comment by the Engineer of the sample schedule should assist the Contractor in assuring the first submittal of the Baseline Schedule will be in general conformance with the requirements of the specification and other contract requirements, and that major rework of the Baseline Schedule will not be required. This submission shall reflect the Contractor's anticipated plan to complete the Work in accordance with the Contract Documents, as envisioned by the Contractor at the time of the bid. This submittal may be made any time following notice to the Contractor that he/she is the anticipated low bidder for the Contract. Critical items for this submittal should include, but are not limited to: anticipated start dates, major milestones, activity descriptions, activity durations, activity relationships, summary activities, submittal times, etc. The Initial Baseline Schedule will not be considered part of the Baseline Schedule submittal.
 - 2. Schedules submitted after the first Application for Payment shall be in accordance with all provisions of the General Conditions and the requirements contained in this Section. No work other than installation of the Engineer's Field Office, mobilization, procurement and administrative activities, installation of construction signs, installation of erosion control and pollution protection, clearing and grubbing, field measurements, and survey and stakeout will be permitted to start until the Baseline Schedule has been submitted to the Engineer, and the Engineer determines there are no deficiencies consistent with those defined in paragraph E.1
 - 3. Baseline Schedule: (As Planned at Award Baseline Schedule)

The Contractor shall ensure the schedule accurately reflects the proposed approach to accomplish the Work outlined in the Contract Documents and conforms to all requirements of this specification. The schedule shall define a complete logical plan that can realistically be accomplished to execute the Work in the Contract.

The schedule shall comply with the Work constraints and milestones defined in the Contract as well as other contractual terms and conditions. The schedule shall meet all interim milestone dates and shall not extend beyond the Substantial Completion date. The submission shall reflect the Contractor's plan at the time of Contract Award, and prior to the start of any work. Negative float is not allowed in the Baseline Schedule.

During the course of contract execution, Total Float generated due to the efficiencies of either party (City or Contractor) will generally be considered Project Float and is not for the sole use of the party generating the float; rather it is a shared commodity to be reasonably used by either party. Any party assigned activity responsibility within the schedule has the full use of the Project Float until it is depleted.

However, if the Contractor submits a request for an Early Completion that includes a revised Progress Schedule supplemented with resource allocations for each task activity and time-scaled resource histograms that is accepted by the Engineer, then Total Float actually resulting from additional Contractor resources, additional work shifts, longer work weeks or adoption of more aggressive scheduling and construction management practices of the Contractor's work activities may be considered Contractor Owned Float for the exclusive use of the Contractor.

Likewise, the City may accrue City Owned Float by generating Total Float through different means. This includes: change(s) to the Contract that relaxes restrictions on the Contractor or removes Contract Work; early completion of utility company activities; and early completion of the shop drawing reviews. City Owned Float is considered a resource for the exclusive use by the City. The Engineer documents City Owned Float by directing the Contractor to update the City Owned Float activity on the next Monthly Progress Schedule submission. The Engineer may use the City Owned Float to mitigate past, present, or future City delays by offsetting potential time extensions for contract change orders.

For either the City or the Contractor to reserve Total Float as City Owned Float or Contractor Owned Float, the party must document within the schedule submission narrative in advance of generating the Total Float the additional resources or measures that will be taken to shorten the Critical Path, and then document within the schedule submission narrative that immediately followed, when the Total Float was actually generated the City or Contractor Owned Float, based on entry of Actual Start and Actual Finish dates and percentage of work completed, and this must be agreed to by both parties in the next Progress Meeting. Without this timely documentation, any Total Float generated will be considered Project Float.

V. SUPPLEMENTARY REQUIREMENTS

- A. The Contractor shall ensure the Baseline Schedule accurately reflects the proposed approach to accomplish the Work outlined in the Contract Documents and conforms to all requirements of this specification. The Baseline Schedule shall be submitted in the original scheduling software file format. Pdf format or scanned electronic submissions are not acceptable.
- B. The Baseline Schedule shall define a complete logical plan that can realistically be accomplished, to execute the Work defined in the Contract.
- C. The schedule shall comply with the Work constraints and milestones defined in the Contract as well as all other contractual terms and conditions. The schedule shall meet all interim milestone dates and shall not extend beyond the Substantial Completion date. The Baseline Schedule submission shall reflect the Contractor's plan at the time of contract award, and prior to start of any work. No negative float is allowed in the Baseline Schedule submission. Tie-in sequence described in specification section 01014 shall be built into the Baseline Schedule.
- D. Detailed Schedule Requirements – As a minimum, the Contractor shall address the following in the Baseline Schedule:
 - a. Sufficient activities shall be included to assure that there is adequate planning for the entire Project. The appropriate number of activities will largely depend on the nature, size, and the complexity of the project. In addition to all of the site construction activities, network activities shall include: activities necessary to depict the procurement/submittal process including shop drawings and sample submittals, the fabrication and delivery of key and long-lead procurement elements; settlement or surcharge period activities; sampling and testing period activities; cure periods; burn-in periods; activities related to temporary structures or systems; activities assigned to Subcontractors, fabricators, or suppliers; activities assigned to the City and other involved State agencies and authorities, including final inspection; activities to perform punch list Work; and activities assigned to other entities

such as utilities, municipalities, County government/agencies, and other adjacent contractors. The Baseline Schedule shall indicate intended submittal dates, and depict the review and approval periods as defined in the Contract Documents for Department review.

- b. Activity ID – Include a unique identification number for each activity. Activity ID numbers shall not be changed or reassigned.
- c. Activity Name – Clearly and uniquely define each activity name with a description of the Work that is readily identifiable to inspection staff and the progress for each activity can be measured. Each activity shall have a narrative description consisting of a verb or work function (i.e. form, pour, excavate, grade, etc.), an object (i.e. slab, footing, wall, subgrade), and a location (i.e. station, bridge number, section, etc.). The Work related to each activity shall be limited to one Area of the contract, one stage of the contract, one phase of the contract, and one responsible party of the contract.
- d. Milestone Activities – Include activities for all contract Milestones that define significant contractual events such as Contract Award, Notice to Proceed, Substantial Completion, Contract Completion, and coordination points with outside entities such as utilities, State and County agencies, Authorities, municipalities, Time-Related Contract Provisions, etc. All Milestone activities in that schedule shall be assigned a calendar that reflects work being allowed 365 days a year and 24 hours per day (i.e. curing calendar).
- e. A “Contractor Start Work” start Milestone activity shall be included that has the actual date the Contractor started work authorized under the Contract.
- f. Activity Durations – Define the Original Duration of each activity in units of whole Work days. Except submittal/procurement, curing, and burn-in activities, durations shall not exceed 30 work days unless approved by the Engineer. Durations for City submittal reviews shall meet requirements set forth in the Contract Documents. If requested by the Engineer, the Contractor shall justify the reasonableness of planned activity time durations.
- g. Activity Relationships – Clearly assign predecessors and successors relationships to each activity, and assign appropriate logic ties between activities (Finish to Start, Start to Start, Finish to Finish, etc.) Do not have any open-ended activities, with the exception of the first and last activity in the schedule. An activity may only appear once as a predecessor or successor to another specific activity, but may be assigned as a predecessor or successor to many different activities. Do not include inappropriate logic ties with Milestone activities (i.e. a finish milestone activity and a predecessor assigned with a Finish to Start logic tie). Lag time may not exceed 10 days.
- h. Activity Constraint Dates – The Contractor shall not have any

- constrained activities, except contractual dates, unless the Engineer accepts such constraints in writing.
- i. Activity Dates – No Actual Start or Actual Finish dates shall be entered in the Baseline Schedule, except activities that were completed prior to the Contract Award.
 - j. Calendars – Use clearly defined calendars to account for contractually-defined, or anticipated shut-down periods (i.e. holidays, vacations, etc.). The Contractor shall identify the work days per week, holidays, number of shifts per day, and the number of hours per shift.
 - k. Clearly define significant interaction points between the Contractor, the City, and other entities including, but not limited to: Federal, State, and local agencies/authorities; and utilities. All activities of the City, utility companies, adjacent contractors, and other entities that affect the progress and influence any contract required dates including durations shall be shown in the schedule. This includes dates related to all permits and agreements. The schedule shall give special consideration to sensitive areas such as road closures and work restrictions, and shall indicate any time frames when work is restricted, as outlined in permits issued by regulatory agencies, and provided in the Contract Documents.
 - l. Activity Resources – Resource loading will be required. The City will assume when reviewing the Baseline Schedule that the Contractor's resources are unlimited, unless the Contractor either assigns equipment, labor and material resources to each activity in the Baseline Schedule (and performs resource leveling), or indicates in the Baseline Schedule narrative what resource limitations are present. If the Baseline Schedule is not resource loaded, it is the Contractor's responsibility to assure that the activity logic in the Baseline Schedule properly reflects any resource limitations. If the Contractor anticipates multiple crews for the same schedule activity, those resources shall be documented in the Baseline Schedule narrative. As an activity can have only one responsible party, no activity shall involve multiple crews comprised of the Contractor and a Subcontractor, or multiple subcontractors.
 - m. Revenue Loading – The Contractor shall assign revenue amounts to all major activities, or groups of activities (i.e. pile driving by bent, embankment per area, etc.), so that the sum of the revenue amounts equals the Contract Value. This information will be used to produce a cash flow curve.
 - n. Activity Codes – The Contractor shall include a well-defined activity coding structure that allows project activities to be sorted and filtered. Activity codes shall include, but not be limited to: Responsible Party; Stage; Area of Work; Type of Work; Phase; and additionally as required by the Engineer to meet the needs of the specific contract work to facilitate the use and analysis of the

- schedule.
- o. Activity Coding – For each activity, within the activity details the Contractor shall assign Activity Code values to identify the Responsible Party (i.e. Contractor, City, Utility, etc.) for the Work to be performed (only one responsible party shall be assigned to each activity), the Stage of the contract for the Work that will be performed, the Area where the Work will be performed, the Phase, and the Type of Work (i.e. procurement, embankment, paving, signage, etc.).
 - p. Narrative – Include a narrative in Microsoft Word, Adobe Acrobat or other City-approved format, that describes:
 - The Contractor's general approach to construct the Work outlined in the Baseline Schedule. Address the reasons for the sequencing of Work and describe any resource limitations, potential conflicts, and other salient items that may affect the Baseline Schedule and how they may be resolved.
 - A list of activities with durations exceeding thirty (30) calendar days and a description of the reason why a duration of thirty (30) days or shorter is not appropriate.
 - A list of all lags used and the reason for each lag.
 - A list of all constraints and the justification(s) for Contractor imposed activity constraints proposed in the Baseline Schedule.
 - A list of calendars used in the Baseline Schedule and a description of the reason for use of each calendar.
 - Describe the project critical path and challenges that may arise associated with the critical path.
 - Anticipated coordination issues related to the Work activities by other entities that require additional information from or action by the Engineer.
- E. Schedule Submission: Within fifteen (15) calendar days from Notice of Award, submit one hard copy and one electronic copy of the Baseline Schedule in a Critical Path Method (CPM) format for the Engineer's review and acceptance. The electronic copy of the Baseline Schedule shall be the original scheduling software file. Pdf format or scanned copies are not an acceptable electronic format.
- a. The Engineer will review the Baseline Schedule and return it, accept it with comments, or reject it within fourteen (14) calendar days following the date of receipt of the Contractor's submission.
 - b. If the Baseline Schedule is returned with comments, the Contractor shall address all comments and revise the schedule as necessary. The Contractor shall complete the Baseline Schedule and obtain the acceptance of the Engineer within forty-five (45) days from Notice of Award.
 - c. The Baseline Schedule must be "accepted" or "accepted as noted" by the Engineer prior to the City evaluating any Contractor disputes associated with time impacts. This does not preclude the

Contractor from submitting a dispute while the Baseline Schedule is being reviewed for acceptance.

- F. Monthly Progress Schedule Submissions – Following acceptance of the Baseline Schedule, the Contractor shall update the schedule using Actual Start and Actual Finish dates. The updated Baseline Schedule will be referred to as the Progress Schedule Update.
- a. First Monthly Progress Schedule Submission – Within three days following acceptance of the Baseline Schedule or the closing date for the first month's contract payment period whichever is later, the Contractor shall perform a Progress Schedule Update to reflect the status of all activities where Work was performed in the time period between the start of work and acceptance of the Baseline Schedule. This shall include the actual dates entered in the Actual Start and Actual Finish columns, and percentage of Work complete for uncompleted activities, in addition the Contractor shall incorporate any Progress Schedule Revisions that reflect any changes in how future work activities are to be completed.
 - b. Subsequent Monthly Progress Schedule Update Submissions – On a monthly basis, the Contractor shall submit a copy of the current Progress Schedule Update that includes all Schedule Revisions and Progress Schedule Updates to reflect the actual and planned prosecution and progress of the Contract Work. Progress Schedule Updates shall reflect the status of activities that have commenced or have been completed, including the following items: (a) actual dates in activity Actual Start and Actual Finish columns as appropriate; (b) actual remaining duration for activities commenced and not complete; (c) actual physical percent complete for activities commenced and not complete; (d) actual activity suspend or resume dates for activities commenced and not complete; and (e.) Total Float for all activities. Schedule Revisions reflect modifications made to activities in the current project Baseline Schedule in any of the following items: (a) activity duration; (b) changes in logic connections between activities; (c) changes in constraints; (d) changes in activity descriptions; (e) activity additions or deletions; (f) changes in activity code assignments; (g) changes in activity resource assignments; (h) changes in calendar assignments; (i) changes in total float; (j) changes in critical path. When preparing a formal submission of the Progress Schedule Update, the Contractor shall make a copy of the current Progress Schedule and name it according to the file naming convention provided by the City.
 - c. Additional Schedule Requirements – In addition to the schedule requirements detailed for the submission of the Baseline Schedule, the following shall be provided by the Contractor:
 - i. Activities with suspended Work – When Work has been suspended on a schedule activity, the Engineer may require the Contractor to break that activity into two or

- more activities to accurately reflect the actual start and finish of that Work in the field and to more accurately reflect the relationship to other work activities.
 - ii. Schedules will only be considered complete when all documents and data have been provided.
 - iii. Schedules shall be submitted in acceptable electronic format, to the Engineer for review and acceptance. The Engineer may periodically request additional reports, graphs, etc., produced from the scheduling software. The Contractor will provide that data to the Engineer in a timely manner.
 - iv. Use of Progress Override is not permitted. Only Retained logic will be permitted.
- G. Progress Schedule Narrative – For each Monthly Progress Schedule submission, the Contractor shall submit a narrative in Microsoft Word, Adobe Acrobat or other City-approved format that includes, but is not limited to:
- a. The City project number, project name, project location, Contractor name.
 - b. Current contract completion date, and schedule completion of all Project Work.
 - c. Any contract interim Milestone dates, and scheduled start and finish dates for those Milestone activities.
 - d. List all activities on the Critical Path (include Activity ID's and descriptions) where Work is currently being delayed, and for each such activity, provide detailed information including:
 - i. the events that caused the delay
 - ii. the number of days the activity has been delayed (negative float)
 - iii. the activities in the construction schedule affected by the events
 - iv. the reasonable steps needed to minimize the impacts of the delay
 - e. List all activities for procurement of long lead time materials that are behind schedule and the reason(s) why.
 - f. For major work items, describe the differences between the actual work performed and the work planned for the period as represented in the preceding Progress Schedule submission, including explanations for the deviations.
 - g. For all suspended work activities that could otherwise logically be progressed, detail the reason for suspension.
 - h. Description of any changes to the critical path since the last Monthly Progress Schedule submission and the impacts of such changes.
 - i. Explain changes in total float and logic ties, and reasons for and impact of all activities added or removed from the schedule
 - j. List of all added or deleted activities and the reason for and impact of such changes.
 - k. List all changes in activity durations and the reason(s) for and the

impact(s) of such changes.

- l. List all changes in relationships between activities and the reason for and impact of such changes.
- m. List any addition or deletion of activity or project constraints and the reason for and impact of such changes.
- n. List all changes to the project calendars and the reason for and impact of such changes.
- o. The major Work elements to be accomplished during the next monthly work period.
- p. List all potential time delays and the activities that would be affected.
- q. Provide a cash flow curve based on actual revenue earned.

The Engineer will prepare a written response to the Progress Review/Status Report and the Contractor's Monthly Progress Schedule submission, accepting, accepting with comments, or returning for resubmission within five (5) calendar days following receipt of the Contractor's submission. The Engineer's review of Progress Schedule Updates is subject to the same terms identified for the Engineer's review of the Baseline Schedule in Section III above.

- H. The Contractor shall submit a Revised Baseline Schedule for review and approval by the Engineer for any of the following reasons:
 - a. The Engineer directs a change that affects the date(s) specified in the Agreement, or alters the length of the Critical Path. This submittal shall be provided within 15 calendar days from the date the Engineer requests the revision. Progress Payments will not be made until the submittal is accepted by the Engineer.
 - b. Contractor elects to change the sequencing so as to affect the length of the Critical Path in the accepted Progress Schedule.
 - c. The Engineer directs the Contractor to provide a Recovery Schedule. This submittal shall be provided within 15 calendar days from the date the Engineer requests the revision. Progress Payments will not be made until the submittal is accepted by the Engineer.
- I. If, prior to agreement on an equitable adjustment to the Contract Time, Engineer requires revision to the Progress Schedule in order to evaluate planned progress, Contractor shall add activities showing the change effect(s) as directed.

End of Section

SECTION 01370

SCHEDULE OF VALUES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. General requirements for preliminary and final Schedule of Values.
2. Schedule of Values and the Progress Schedule updates specified in Section 01320 – Construction Progress Schedule, shall be basis for preparing each Application for Payment. Schedule of Values may be used as a basis for negotiating price of changes, if any, in the Work.

1.02 ADMINISTRATIVE REQUIREMENTS

A. General Requirements:

1. Schedule of Values shall include breakdown of costs for materials and equipment, installation, and other costs used in preparing the Bid by Contractor and each Subcontractor. List purchase and delivery costs for materials and equipment for which Contractor may apply for payment as stored materials.
2. Include separate amounts for each Specification Section in the Contract Documents by structure, building, and work area.
3. Identify each line item with number corresponding to the associated Specification Section number. List sub-items of major products or systems, as appropriate or when requested by Engineer.
4. Include in Schedule of Values unit price payment items with their associated quantity. Provide in the Schedule of Values detailed breakdown of unit prices when required by Engineer.
5. Include in Schedule of Values itemized list of Work for each major part of the Contract, for each payment item specified in Section 01150 – Measurement and Payment.
6. Sum of individual values shown on the Schedule of Values shall equal the total of associated payment item. Sum of payment item totals in the Schedule of Values shall equal the Contract Price.

B. Specific Requirements:

1. Include in each line item a directly proportional amount of Contractor's overhead and profit. Do not include overhead and profit as separate item(s).
 2. Include separate line item for each allowance, and for each unit price item
 3. Include line item for bonds and insurance.
 4. Include items for the General Conditions, permits (when applicable), construction Progress Schedule, and other items required by Engineer. Include such items in Applications for Payment on schedule accepted by Engineer
 5. Line items for Site maintenance such as dust control, snow removal, compliance with storm water pollution prevention plans and permits, spill prevention control and countermeasures plans, and for construction photographic documentation; temporary utilities and temporary facilities, field offices, temporary controls, field engineering, and similar Work shall be included in the Schedule of Values and proportioned in Applications for Payment throughout duration of the Work.
 6. Include separate line items under each appropriate payment item for mobilization and demobilization. Document for Engineer the activities included in mobilization and demobilization line items.
 - a. Mobilization will be limited to no more than 3 percent of the Contract Price.
 - b. Demobilization shall be at least one percent of the Contract Price and shall be included with the Application for Payment following Substantial Completion, or other schedule accepted by Engineer.
- C. Preliminary Schedule of Values: Submit preliminary Schedule of Values to Engineer for initial review. Contractor shall incorporate Engineer's comments into the Schedule of Values and resubmit to Engineer. Engineer may require corrections and re-submittals until Schedule of Values is acceptable.
- D. Time Frame for Submittals:
1. Submit preliminary Schedule of Values within ten days of date that the Contract Times commence running in accordance with the Notice to Proceed.
 2. Submittal of the Schedule of Values shall be in accordance with the General Conditions. Engineer will not accept Applications for Payment without an acceptable Schedule of Values.
 3. When required by Engineer, promptly submit updated Schedule of Values to include cost breakdowns for changes in the Contract Price.

1.03 SUBMITTALS

- A. Submit the following:

1. Seven copies of preliminary Schedule of Values.
2. Seven copies of Schedule of Values.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

Section 01380

COLOR AUDIO/VIDEO DOCUMENTATION OF
CONSTRUCTION AREA

Prior to beginning any construction, the Contractor shall prepare color audio/video documentation of all areas to be affected by or nearby the construction. The recorded documentation shall be submitted on a 3.0 USB flash drive that is acceptable to the Engineer. An additional 3.0 USB flash drive shall be provided to the Water Reclamation Facility Manager.

The audio/video documentation shall be done within the two-week period prior to placement of materials or equipment in the construction area and furnished one week prior to the start of construction.

To preclude the possibility of tampering or editing in any manner, all video recordings must, by electronic means, display continuously and simultaneously recorded digital information on the video, including the date and time of recording. The time information shall consist of hours, minutes and seconds, separated by colons (i.e., 10:35:18).

The color audio/video recording shall consist of audio and video tracks that are recorded simultaneously. All tracks shall consist of original live recordings and thus shall not be copies of other audio and video recordings. The audio track shall contain a narrative commentary of what is being observed at the time of the recording.

Recorded coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio description. Audio description shall be made simultaneously with video coverage. Such coverage shall include, but not be limited to, all existing driveways, mailboxes, sidewalks, curbs, ditches, roadways, landscaping, trees, culverts, head walls and retaining walls, or buildings located within such zone of influence.

Houses and buildings shall be identified visually by house number, when visible, in such a manner that structures of the proposed system, i.e., manholes on a sewer system and hydrants on a water system can be located by reference. In all instances, locations shall be identified by audio or visual means at intervals not to exceed 100 lineal feet in the general direction of travel.

The rate of speed in the general direction of travel of the conveyance used during recording shall not exceed 48 feet per minute. Panning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that playback will produce clarity of the object viewed.

All recording shall be done during times of good visibility. No recording shall be done during period of visible precipitation, unless otherwise authorized by the Engineer. The Owner shall have the authority to designate what areas may be omitted or added for

audio/video coverage.

When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be less than eight feet (8') to insure proper perspective.

In some instances, audio/video recording coverage will be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance.

AERIAL PHOTOS

Provide monthly aerials containing at least four (4) views of project site. At final completion, provide three (3) 24" x 36" framed photos showing the chronological sequence of monthly aerials with the centered final aerial of one of the selected views. The proof of the final completion aerial shall be submitted to the OWNER and ENGINEER for review.

End of Section

SECTION 01400QUALITY CONTROLPART 1 – GENERAL

1.01 SUMMARY

- A. This specification addresses requirements for testing services specifically required to be provided by the Contractor. This section does not apply to any testing required to be provided by the Owner or Owner's representative.
- B. Contractor shall employ and pay for independent testing entity to perform specified services covered by this specification. Entity selected shall be subject to approval by Engineer.
- C. Inspection, sampling, and testing shall be as specified in the individual Specification Sections.
- D. Related Sections, but not limited to, the following:
 - 1. Section 01470 – Watertightness Testing of Concrete Structures
 - 2. Section 03200 – Reinforcing Steel
 - 3. Section 03300 – Cast-in-Place Concrete

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Contractor's Responsibilities:
 - 1. Provide to laboratory representative samples of materials to be tested, in required quantities.
 - 2. Provide labor and facilities:
 - a. To provide access to the Work to be tested, and where required, to Suppliers' operations.
 - b. To obtain and handle samples at the Site.
 - c. To facilitate inspections and tests.
 - d. For testing entity's exclusive use for storage and curing of test samples.
 - e. Forms for preparing concrete test beams and cylinders.

3. Notify testing entity and Engineer sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
4. Arrange with testing entity and pay for additional services, sampling, and testing required for Contractor's convenience.
5. Provide to testing entity the preliminary design mix proposed for concrete, and other material mixes that require testing by the testing laboratory.

B. Testing Entity's Responsibilities:

1. Cooperate with Contractor and Engineer and provide qualified personnel promptly when notified.
2. Perform specified inspections, sampling, and testing of materials and methods of construction; comply with applicable standards; ascertain compliance with requirements of the Contract Documents.
3. Promptly notify Engineer and Contractor of irregularities or deficiencies in the Work observed during performance of services.
4. Submit specified quantity of report copies of inspections and tests to Contractor and Engineer.
5. Perform additional tests and services as required to ensure compliance with the Contract Documents.

C. Report Requirements:

1. Electronic Submittal of testing reports.
2. Include the following information:
 - a. Date issued.
 - b. Project title, number, and name of the Site.
 - c. Testing laboratory name and address.
 - d. Name and signature of inspector or person obtaining samples.
 - e. Date of inspection or sampling.
 - f. Record of temperature and weather.
 - g. Date of test.
 - h. Identification of material or product tested and associated Specification Section.

- i. Location in the Project.
- j. Type of inspection or test.
- k. Results of tests and observations regarding compliance with the Contract Documents.

1.03 SUBMITTALS

- A. Submit copies of material and product test reports where required by the Contract Documents and as requested by Engineer.
- B. Quality Assurance Submittals:
 - 1. Qualifications statement indicating experience and facilities for tests required under the Contract Documents.
 - 2. Copy of report of inspection of facilities during most recent NIST inspection tour. Include memorandum of remedies of deficiencies reported during inspection.
 - 3. Copy of certificate of calibration for each instrument or measuring device proposed for use, by accredited calibration agency.

1.04 QUALIFICATIONS

- A. Comply with applicable requirements of ASTM E329, Specification for Agencies Engaged in Construction Inspection and/or Testing.
- B. Laboratory shall be authorized to operate in the same State or Commonwealth as the Site. Where applicable, laboratory shall be certified by the authority having jurisdiction for the types of testing required.
- C. Testing equipment used by laboratory will be calibrated at maximum twelve month intervals by devices of accuracy traceable to either NIST's Standard Reference Materials (SRM), ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories, or certified by State, Commonwealth, or local bureau of weights and measures, or values of natural physical constants generally accepted in the engineering and scientific community.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 01410**TESTING AND TESTING LABORATORY SERVICES****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. CITY will employ and pay for the services of an independent testing laboratory to perform certain inspection and testing as required by the Contract Documents. This may include, but is not limited to, audio-visual surveillance of piping, holiday testing of linings and coatings, testing of soil, concrete, or structural connections and other such tests which CITY deems necessary.
- B. CONTRACTOR shall cooperate with the laboratory to facilitate the execution of its required services.

PART 2 - PRODUCTS (Not Applicable)**PART 3 - EXECUTION****3.1 PROJECT TESTING****A. City Responsibility:**

- 1. CITY will retain a testing laboratory for the on-site testing of piping, soil, asphalt, concrete and any other material processes or activities deemed necessary, or as required, by the Contract Documents. CITY will be responsible for deciding what off-site testing is required.
- 2. On-site testing laboratory services will be supplied by, and evaluated by, CITY.
- 3. The CITY will provide copies of testing results to the CONTRACTOR if requested.

B. Laboratory Responsibilities:

- 1. Meet "Recommended Requirements for Independent Laboratory Qualifications" latest edition, published by American Council of Independent Laboratories and be authorized /certified to perform work in the state of Florida.
- 2. Cooperate with ENGINEER and CONTRACTOR; provide qualified personnel promptly on notice.
- 3. Perform specified inspections, sampling, cylinder breaks and testing of materials and methods of construction:
 - a. Comply with specific standards; ASTM, and other recognized authorities.
 - b. Ascertain compliance with requirements of Contract Documents.
- 4. Promptly notify ENGINEER and CONTRACTOR of irregularities or deficiencies of work which are observed during performance of services.

5. Promptly submit an electronic copy, in PDF or other approved format, of reports of inspections and tests to ENGINEER, including:
 - a. Date issued.
 - b. Project title and Engineer's job number.
 - c. Testing laboratory name and address.
 - d. Name and signature of inspector.
 - e. Date of inspection or sampling.
 - f. Record of temperature and weather.
 - g. Date of test.
 - h. Identification of product.
 - i. Location in project.
 - j. Type of inspection or test.
 - k. Observations regarding compliance with Contract Documents.
 - l. Whether the test is an initial test or retest.
6. Perform additional services as required by CITY.
7. Laboratory will not be authorized to:
 - a. Release, revoke, alter, or enlarge on requirements of Contract Documents.
 - b. Approve or accept any portion of Work.
 - c. Perform any duties of the CONTRACTOR.

C. CONTRACTOR's Responsibilities:

1. Cooperate with laboratory personnel; provide access to work and to Subcontractor's and Suppliers operations.
2. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
3. Provide to the laboratory the preliminary design mix proposed to be used for concrete, asphalt and other materials mixes which require control or testing by the testing laboratory.
4. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. ENGINEER may require CONTRACTOR to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full compliance with the approved specifications for quality and workmanship. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the CONTRACTOR, and no extra charge to the CITY shall be allowed on account of such testing and certification.
5. Furnish incidental labor and facilities:
 - a. To provide access to work to be tested.
 - b. To obtain and handle samples at the project site or at the source of the product to be tested.
 - c. To facilitate inspections and tests.
 - d. For storage and curing of test samples.
6. Notify laboratory and ENGINEER sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

-END OF SECTION-

SECTION 01510
TEMPORARY UTILITIES

PART 1 – GENERAL

1.01 SUMMARY

- A. Contractor shall provide temporary utilities required for the Project and to complete the Work.
1. Make arrangements with utility service companies for temporary services and obtain required permits and approvals for temporary utilities.
 2. Pay utility service costs, including connection fees, required for the Work as needed.
 3. Continuously maintain adequate utilities for all purposes during the Project, until removal of temporary utilities and temporary facilities. At minimum, provide and maintain temporary utilities through Substantial Completion.
 4. Should Owner occupy part of the Project prior to Substantial Completion of the entire Work, cost of utilities consumed via temporary utilities serving the portion occupied by Owner will be shared proportionately between Owner and Contractor as mutually agreed to by the parties.
 5. Maintain, including cleaning, temporary utilities and continuously provide consumables as required.
 6. Temporary utilities and temporary facilities shall be adequate for personnel using the Site and requirements of Project.
 7. Provide temporary utilities and temporary facilities in compliance with Laws and Regulations and, when applicable, requirements of utility owners.
- B. Provide the following temporary utilities which may include, but are not necessarily limited to, the following:
1. Telephone and communications
 2. Storage sheds
 3. Water service
 4. Sanitary facilities
 5. Lighting and electrical service
 6. Fire protection

7. First-aid facilities
8. Heating
9. Safety and Visitor Protection

1.02 ADMINISTRATIVE REQUIREMENTS

A. Use of Owner's System:

1. Existing Utility Systems: Do not use systems in existing buildings or structures for temporary utilities without Owner's written permission and mutually acceptable basis agreed upon by the parties for proportionate sharing of costs between Owner and Contractor.
2. Use of Permanent Utility Systems Provided Under the Project:
 - a. Permanent lighting, water, heating, ventilating, and fire protection systems and first-aid facilities may be used to provide temporary utilities and temporary facilities if the following are met:
 - 1) Obtain Owner's written permission to use permanent systems.
 - 2) Permanent systems to be used for temporary utilities or temporary facilities shall have achieved Substantial Completion, including complete functionality of all controls.
 - 3) Contractor shall pay all costs while using permanent system, including operation, maintenance, replacement of consumables, and provide replacement parts.
 - b. Do not use the following permanent facilities:
 - 1) Telephone and communication facilities.
 - 2) Sanitary facilities.

1.03 SYSTEM DESCRIPTION

A. Electricity and lighting:

1. Contractor shall furnish, install, and maintain adequate temporary lighting and electric power service for construction needs throughout construction period. **ALL TEMPORARY ELECTRICAL FACILITIES SHALL MEET THE REQUIREMENTS OF ALL PERTINENT BUILDING CODES.** The work may include the following:

- a. Power centers for miscellaneous tools and equipment used in construction work.
 - 1) Provide step down transformer(s) for converting the power supply to 120-volt power.
 - 2) Provide circuit breaker protection for each outlet.
 - 3) Provide equipment grounding continuity for entire system.
 - 4) Users shall provide grounded, UL approved extension cords from power center to point of operations.
 - 5) Comply with N.E.C. regarding ground fault protection.
 - b. Power for testing and checking equipment and systems.
 - c. Power for welding units and for other equipment having special power requirements.
 - d. Emergency power for those situations involving work on existing facilities where loss of construction power would be detrimental to the facility.
2. Capacity:
- a. Contractor shall provide adequate electrical service distribution for construction use by all trades during construction period.
 - b. Contractor shall notify Owner if unusually heavy loads, such as welding and other special power requirements, will be connected.
 - 1) Contractor shall provide special circuits for heavy load requirements.
 - 2) Do not overload any circuit.
3. General 120/240 V service requirements:
- a. Contractor shall provide 120/240 V, single phase, 3-wire temporary system for small power requirements and general lighting.
 - b. Contractor shall provide main disconnect, overcurrent protection, meter outlet, branch circuit breakers, and wiring for temporary service to the Contractor's field office service connections. Contractor shall provide equipment and appurtenances in accordance with electricity service provider and applicable standards and codes.

- c. Contractor shall register the 120/240 V electrical service meter in the Contractor's name and shall be responsible for electrical charges at no additional cost to the Owner.
 - d. Contractor shall provide electrical service other than 120/240 V, single phase, 3-wire service as required for the Work at the Contractor's own expense.
- 4. General lighting requirements:
 - a. Contractor shall provide a minimum of 10-foot candles for enclosed and partially enclosed structures for performing the Work.
 - b. Contractor shall provide a night lighting circuit for security. Light intensity shall be a minimum of 2-foot candles.
- 5. Contractor shall energize the electrical system 15-minutes prior to and following regular workday hours at the Site. Required from Monday through Friday, all inclusive.
- 6. Contractor shall energize the night lighting system at end of typical working day and de-energize at start of typical working day. System shall be continuously energized on Saturdays, Sundays, and holidays.
- 7. Contractor shall provide an independent grounding cable connected directly to the structure, building, and equipment for erection and fabrication by electrical welders. Grounding by adjacent conduit, piping, etc. shall be prohibited at the Site.
- 8. Contractor shall coordinate usage of temporary electrical system with Subcontractors, Suppliers, and Owner including the following:
 - a. Usage is suitable for 120V, single phase, 60 Hz operation with a maximum operating input of 1,500 volt-amperes.
 - b. One unit connected to a single outlet.
 - c. Restrict usage in case of overloading circuits to correct loading.
- 9. Contractor shall pay costs of, installation, maintenance and removal of temporary electrical services used.
- 10. Requirements of Regulatory Agencies:
 - a. Contractor shall obtain and pay for permits as required by governing authorities.
 - b. Contractor shall comply with applicable codes:
 - 1) National Electrical Code.

- 2) National Electrical Safety Code.
 - 3) National Fire Protection Association Pamphlet.
 - 4) Federal, state and local codes and utility company regulations.
11. Contractor shall provide night security lighting at secured areas within construction limits at storage facilities and excavated areas.
- B. Telephone and communications: Contractor shall provide temporary telephone and communications required for its operations at the Site and for summoning emergency medical assistance.
- C. Heating:
1. Contractor shall provide temporary heating, ventilation coverings and enclosures necessary to protect the Work and materials against wetness and temperature damage, to dry out the Work, and to facilitate the Work in structures.
 2. Equipment, fuel, materials, personnel and methods used shall be adequate to maintain critical installation temperatures and ventilation of Work at all times in areas where necessary to perform the Work.
 3. Enclosed structures shall have a minimum temperature of 50°F, unless otherwise specified, where Work is performed.
 4. Contractor shall provide sufficient heat to maintain a minimum temperature of 65°F before and during application of interior finishing, painting, coating, etc.
 5. Contractor shall replace any Work damaged by dampness or insufficient/abnormal heating at no cost to the Owner.
- D. Sanitary facilities:
1. Contractor shall provide suitably enclosed chemical or self-contained toilets for Contractor's employees and visitors to the Site. Location of temporary toilets shall be acceptable to Owner and screened from public observation.
 2. Facilities shall be maintained and provided in accordance with State or Commonwealth Labor Regulations and local ordinances. Contents shall be removed and disposed in accordance with local and state or commonwealth regulations as required.
 3. Contractor shall be prohibited from committing nuisances within, on, or in the vicinity of the Site.

4. Facility locations shall be:
 - a. Within the project site.
 - b. Drinking water: Convenient to work stations.
 - c. Toilet and washing facilities:
 - 1) Secluded from public observation.
 - 2) Convenient for use of personnel in relation to work stations.
 - d. Contractor shall obtain acceptance of Construction Manager for locations of facilities.
 5. Enclosure for Toilet Facilities shall be:
 - a. Weatherproof, sight proof, sturdy, temporary enclosures.
 - b. Insect-proof screening, adequate natural ventilation.
 6. Requirements of Regulatory Agencies:
 - a. Obtain and pay for permits as required by governing authorities.
 - b. Comply with federal, state, and local codes, and utility company regulations.
- E. Water service:
1. Contractor shall furnish and install temporary water service for use throughout construction period.
 - a. Water for construction purposes.
 - b. Water for other purposes:
 - 1) Testing
 - 2) Temporary sanitary facilities
 - 3) Cleaning
 - 4) Fire protection
 - c. Drinking water.
 2. Maintain adequate volume of water for all purposes.

3. Provide separate supply of potable water. If supplied from City source, the system shall be protected by approved back flow devices.
 4. Maintain strict supervision of use of temporary services:
 - a. Enforce conformance with applicable codes and standards.
 - b. Enforce sanitary practices.
 - c. Prevent abuse of services.
 - d. Prevent wasteful use of water.
 5. Cost of Installation and Operation: Pay costs for temporary water supply used by all trades, including costs of installation, maintenance, and removal of pipe and equipment.
 6. Requirements of Regulatory Agencies:
 - a. Obtain, pay for permits, fees, deposits required by governing authorities.
 - b. Comply with federal, state, and local codes.
 7. Contractor shall provide potable water for Contractor's personnel either by portable containers or drinking fountains.
 8. Contractor shall provide temporary hose bibs, hoses, and watertight barrels for the distribution of water.
 9. Contractor shall provide freeze protection for water service.
- F. First-aid facilities:
1. Contractor shall provide temporary first-aid stations at or immediately adjacent to the Site's major work areas. Locations of first-aid stations shall be determined by Contractor's safety representative.
 2. Contractor shall provide list of emergency telephone numbers at each hardwired telephone at the Site. List shall be in accordance with the list of emergency contact information required in Section 01200 – Project Meetings.
- G. Fire protection:
1. Contractor shall comply with NFPA 241, Safeguarding Building Construction, Alteration, and Demolition Operations, and requirements of fire marshals and authorities having jurisdiction at the Site.

2. Contractor shall provide temporary fire exits, fire extinguishers, hoses and safety devices as required by authorities having jurisdiction.
3. Contractor shall notify Engineer, Owner, and fire marshals in the event of fire at the Site including, but not limited to, fuel tanks and similar hazardous utilities and devices. Contractor shall cooperate with Owner of fuel tank and utilities to prevent occurrence of fire or explosion.
4. Contractor shall perform safety precautions and comply with fire marshal's instructions in the event of fire.

PART 2 – PRODUCTS

2.01 EQUIPMENT

- A. Materials and equipment for temporary systems may be new or used but shall be adequate for purposes intended and shall not create unsafe conditions and shall comply with Laws and Regulations.
- B. Provide required materials, equipment, and facilities, including piping, wiring, and controls.
- C. Electrical system requirements: System shall consist of wiring, switches, insulated supports, poles, fixtures, sockets, receptacles, lamps, guards, cutouts and fuses as required for completion of the Work.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install temporary facilities in neat, orderly, manner, and make structurally, mechanically, and electrically sound throughout.
- B. Location of Temporary Utilities and Temporary Facilities:
 1. Locate temporary systems for proper function and service.
 2. Temporary systems shall not interfere with or provide hazards or nuisances to: the Work under this and other contracts, movement of personnel, traffic areas, materials handling, hoisting systems, storage areas, finishes, and work of utility companies.
 3. Do not install temporary utilities on the ground, with the exception of temporary extension cords, hoses, and similar systems in place for short durations.
- C. Modify and extend temporary systems as required by progress of the Work.

3.02 MAINTENANCE

- A. Maintain temporary systems to provide safe, continuous service as required.
- B. Properly supervise operation of temporary systems:
 - 1. Enforce compliance with Laws and Regulations.
 - 2. Enforce safe practices.
 - 3. Prevent abuse of services.
 - 4. Prevent nuisances and hazards caused by temporary systems and their use.
 - 5. Prevent damage to finishes.
 - 6. Ensure that temporary systems and equipment do not interrupt continuous progress of construction.
- C. At end of each work day, check temporary systems and verify that sufficient consumables are available to maintain operation until work is resumed at the Site. Provide additional consumables if the supply on hand is insufficient.
- D. Contractor shall replace broken and burned out lamps, blown fuses, and damaged wiring and appurtenances as required to maintain adequate and safe operating conditions.
- E. Contractor shall permit subcontractors and others at a mutually agreed arrangement to use temporary electrical system that meet the following requirements:
 - 1. Equipment are suitable for 120 V, single phase, 60 Hz operation.
 - 2. Operating input does not exceed 1,500 volt-amperes.
 - 3. Single piece of equipment connected to one outlet.
 - 4. Contractor shall restrict use of equipment as required to prevent overloading circuits.

3.03 CLOSEOUT ACTIVITIES

- A. Completely remove temporary utilities, facilities, equipment, and materials when no longer required. Repair damage caused by temporary systems and their removal and restore the Site to condition required by the Contract Documents; if restoration of damaged areas is not specified, restore to preconstruction condition.
- B. Contractor is responsible for and shall return to original condition those portions of permanent electric system used in completing the Work.

- C. Where temporary utilities are disconnected from existing utility, provide suitable, watertight or gastight (as applicable) cap or blind flange, as applicable, on service line, in accordance with requirements of utility owner.
- D. When permanent utilities and systems that were used for temporary utilities, upon Substantial Completion replace all consumables such as filters and light bulbs and parts used during the Work.

- END OF SECTION -

SECTION 01520

MAINTENANCE OF UTILITY OPERATIONS DURING CONSTRUCTION

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Requirements for coordinating with Owner's operations during the Work and included requirements for tie-ins and shutdowns necessary to complete the Work without impact on Owner's operations except as allowed in this Section.
2. Contractor shall provide labor, materials, tools, equipment, and incidentals shown, specified and required to coordinate with Owner's operations during the Work.

B. General Requirements:

1. Except for shutdowns specified in this Section, perform the Work such that Owner's facility remains in continuous satisfactory operation during the Project. Schedule and conduct the Work such that the Work does not: impede Owner's production or processes, create potential hazards to operating equipment and personnel, reduce the quality of the facility's products or effluent, or cause odors or other nuisances.
2. Work not specifically covered in this Section or in referenced Sections may, in general, be completed at any time during regular working hours in accordance with the General Conditions and Supplementary Conditions, subject to the requirements in this Section.
3. Contractor has the option of providing additional temporary facilities that can eliminate or mitigate a constraint without additional cost to Owner, provided such additional temporary facilities: do not present hazards to the public, personnel, structures, and equipment; that such additional temporary facilities do not adversely affect Owner's ability to comply with Laws and Regulations, permits, and operating requirements; that such temporary facilities do not generate or foster the generation of odors and other nuisances; and that requirements of the Contract Documents are fulfilled.
4. Coordinate shutdowns with Owner and Engineer. When possible, combine multiple tie-ins into a single shutdown to minimize impacts on Owner's operations and processes.
5. Do not shut off or disconnect existing operating systems, unless accepted by Engineer in writing. Operation of existing equipment will be by Owner unless otherwise specified or indicated. Where necessary for the Work, Contractor shall seal or bulkhead Owner-operated gates and valves to prevent leakage that may

affect the Work, Owner's operations, or both. Provide temporary watertight plugs, bulkheads, and line stops as required. After completing the Work, remove seals, plugs, bulkhead, and line stops to satisfaction of Engineer.

C. Related Sections:

1. Section 01010 – Summary of Work
2. Section 01040 – Coordination

1.02 REFERENCES

- A. Definitions: A "shutdown" is when a portion of the normal operation of Owner's facility, whether equipment, systems, piping, or conduit, has to be temporarily suspended or taken out of service to perform the Work.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Review installation procedures under other Specification sections and coordinate Work that must be performed with or before the Work specified in this Section.
2. Notify other contractors in advance of Work requiring coordination with Owner's operations, to provide other contractors sufficient time for work included in their contracts that must be installed with or before Work specified in this Section.
3. When possible, combine multiple tie-ins into a single shutdown to minimize impacts on Owner's operations and processes.

- B. Pre-Shutdown Meetings: Contractor shall schedule and conduct meeting with Owner and Engineer prior to scheduling shutdown. Meeting shall be scheduled a minimum of one week in advance of proposed shutdown date.

C. Sequencing:

1. Perform the Work in the specified sequence. Certain phases or stages of the Work may require working 24-hour days or work during hours outside of regular working hours. Work may be accelerated from a later stage to an earlier stage if Owner's operations are not adversely affected by proposed sequence change, with Engineer's acceptance. Stages specified in this Section are sequential in performance of the Work.

D. Scheduling:

1. Work that may interrupt normal operations shall be accomplished at times convenient to Owner.

2. Furnish at the Site, in close proximity to the shutdown and tie-in work areas, tools, equipment, spare parts and materials, both temporary and permanent, necessary to successfully complete the shutdown. Complete to the extent possible, prefabrication of piping and other assemblies prior to the associated shutdown. Demonstrate to Engineer's satisfaction that Contractor has complied with these requirements before commencing the shutdown.
3. If Contractor's operations cause an unscheduled interruption of Owner's operations, immediately re-establish satisfactory operation for Owner.
4. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of Owner's facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by Contractor if, in Engineer's opinion, Contractor did not conform to the requirements of the Contract Documents, or was negligent in the Work, or did not exercise proper precautions in conducting the Work.
5. Work requiring service interruptions for tie-ins shall be performed during scheduled shutdowns.
6. Temporary, short-term shutdowns of smaller piping, conduits, equipment, and systems may be required. Coordinate requirements for such shutdowns with Engineer and Owner.
7. Contractor to put together a proper bypass plan for shutdowns and shall be approved by the engineer in advance of shutdown.

1.04 SUBMITTALS

A. Action/Informational Submittals:

1. Substitute Sequence Submittal: When deviation from specified sequence is proposed, provide submittal explaining in detail the proposed sequence change and its effects, including evidence that Owner's operations will not be adversely affected by proposed change. List benefits of proposed sequence change, including benefits to Progress Schedule. Submit in accordance with Section 01600 – Materials and Equipment.
2. Shutdown Planning Submittal:
 - a. For each shutdown, submit an inventory of labor and materials required to perform the shutdown and tie-in tasks, an estimate of time required to accomplish the complete shutdown including time for Owner to take down and start up existing equipment, systems, or conduits, and written description of steps required to complete the Work associated with the shutdown.

- b. Furnish submittal to Engineer at least thirty (30) days prior to proposed shutdown start date. Do not start shutdown until obtaining Engineer's acceptance of shutdown planning submittal.
3. Shutdown Notification: After acceptance of shutdown planning submittal and prior to starting the shutdown, provide written notification to Owner and Engineer of date and time each shutdown is to start. Provide notification at least 72 hours in advance of each shutdown.

1.05 SITE CONDITIONS

- A. General Constraints: Specified in the Contract Documents are the sequence and shutdown durations, where applicable, for Owner's equipment, systems, and conduits that are to be taken out of service temporarily for the Work. New equipment, materials, and systems may be used by Owner after the specified field quality controls and testing are successfully completed and the materials or equipment are Substantially Complete.
- B. The following constraints apply to coordination with Owner's operations:
 1. Operational Access: Owner's personnel shall have access to equipment and areas that remain in operation.
 2. Schedule and perform equipment and system start-ups for Tuesday through Thursday. Equipment and systems shall not be placed into operation on Monday, Friday, Saturday, and Sunday without prior approval of Owner.
 3. Dead End Valves or Pipe: Provide blind flanges, watertight bulkheads, or valves at temporary and permanent terminuses of pipes and conduits. Blind flanges and bulkheads shall be suitable for the service and braced and blocked, as required, or otherwise restrained as directed by Engineer. Temporary valves shall be suitable for their associated service. Where valve is provided at permanent terminus of pipe or conduit, also provide on downstream side of valve a blind flange with drain/flushing connection.
 4. Electrical, Control, Communication, and Monitoring Systems:
 - a. Owner's existing SCADA system and fiber optic network shall remain functional, subject to the constraints herein.
 - b. Fiber optic communications and network connectivity to the Division Maintenance Building and the Electrical Maintenance Building shall remain operational during the hours of 7:00AM and 5:00PM Monday-Friday.
 - c. If applicable, each process area shall be permitted to have a single, non-concurrent, scheduled outage for the purpose of making PLC panel hardware modifications, loading the associated PLC logic, and its field testing/demonstration. Field testing and demonstration shall immediately

follow modifications in an effort to keep scheduled shutdowns as short as possible. A 14-day day period of no SCADA outage shall proceed each scheduled shutdown.

1.06 SUGGESTED SEQUENCE OF WORK

- A. Perform the Work in the specified sequence or as otherwise approved by Engineer. Certain phases or stages of the Work may require working 24-hour days or work during hours outside of regular working hours. Work may be accelerated from a later stage to an earlier stage if Owner's operations are not adversely affected by proposed sequence change, and with Engineer's acceptance. Stages specified in this Section are sequence-dependent.
 - 1. Stage 1: Establish bypass plan.
 - 2. Stage 2: Demolition of existing system and infrastructure.
 - 3. Stage 3: Installation of proposed system and infrastructure.
 - 4. Stage 4: Testing and commissioning of new system.

1.07 SHUTDOWNS

- A. General:
 - 1. Work that may interrupt normal operations shall be accomplished at times convenient to Owner.
 - 2. Furnish at the Site, in close proximity to the shutdown and tie-in work areas, tools, equipment, spare parts and materials, both temporary and permanent, necessary to successfully complete the shutdown. Complete to the extent possible, prefabrication of piping and other assemblies prior to the associated shutdown. Demonstrate to Engineer's satisfaction that Contractor has complied with these requirements before commencing the shutdown.
 - 3. If Contractor's operations cause an unscheduled interruption of Owner's operations, immediately re-establish satisfactory operation for Owner.
 - 4. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of Owner's facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by Contractor if, in Engineer's opinion, Contractor did not conform to the requirements of the Contract Documents, or was negligent in the Work, or did not exercise proper precautions in conducting the Work.
- B. Shutdowns of Electrical Systems: Comply with Laws and Regulations, including the National Electric Code. Contractor shall lock out and tag circuit breakers and switches operated by Owner and shall verify that affected cables and wires are de-energized to

ground potential before shutdown Work is started. Upon completion of shutdown Work, remove the locks and tags and notify Engineer that facilities are available for use.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01525TEMPORARY PUMPING SYSTEMSPART 1 -- GENERAL

1.01 THE REQUIREMENT

- A. Furnishing, installing, testing, operating, and maintaining temporary pumping systems.
- B. The temporary pumping system contractor must have a service or operations center within 180 miles of the project site to be eligible to perform the work. This requirement will not be waived. The temporary pumping system contractor shall also provide 5 references for projects that have been successfully completed in the last 5 years with firm capacities equal to or greater than that specified herein. The reference information shall include contact information for the Owner and the Contractor that the temporary pumping system contractor provided the services for. The number and size of the pumps; the size and length of the force mains and the duration of the temporary pumping system service shall also be included with the reference contact information. All the reference materials shall be submitted prior to any bypass pumping submittals. Contractors may submit this information prior to bidding if there is any concern of eligibility.
- C. Equipment shall be provided in accordance with the requirements of Section 01014 Construction Sequencing and Constraints and Section 11000 – Equipment General Provisions.
- D. Provide all materials, labor, equipment, power, maintenance, associated items and superintendence to implement temporary pumping systems for diverting flow as required to maintain continuous operation of existing facilities during construction. Section 01520 Maintenance of Utility Operations During Construction identifies specified outages that may require temporary pumping. Provide all additional temporary pumping systems needed using Contractor's means and methods at no additional cost to Owner.

1.02 DEFINITIONS

- A. Bypass Pumping System: The bypass pumping system shall consist of all equipment, piping, valves, plugs, power supply, instrumentation, controls, and lines and other appurtenances required to divert flows from the facilities being rehabilitated to the discharge location illustrated on the drawings. The bypass pumping system shall be comprised of pumping setups in addition to all bypass piping necessary for bypass pumping. Temporary and bypass pumping systems are terms used to describe the same facilities in this specification. Temporary bypass pumping system contractor and supplier also have the same meaning in this specification.
- B. Bypass Pipe: The bypass pipe shall consist of the pipe, valves and other appurtenances including, but not limited to, air relief valves and dewatering connections. The bypass pipe includes both the suction and discharge pipe for each bypass pump setup.

- C. Primary Pump(s): The primary pump(s) is/are the main pump(s) located at each setup. The primary pump(s) shall be capable of pumping the peak flow, be connected to the bypass pipe, be isolated with valves, and be complete with power supplies.
 - D. Standby Pump(s): The standby pump(s) shall be located within 30 minutes of the project site. The standby pump(s) shall be capable of pumping the peak flow and be able to be connected to the bypass pipe at each setup. The standby pump(s) shall have the capacity of the largest pump at each location.
 - E. Discharge Connection: The discharge connection is where the pumped flow exits the bypass pipe and flows onward into a gravity system or force main.
 - F. Interruption in Operations: Any activity that will result in a change in the current method of operation of an existing facility being bypassed. Contractor shall request such "interruption of operations" from the Owner in writing no less than three (3) weeks in advance with a subsequent written confirmation of date and time ninety-six (96) hours in advance of the "interruption of operations". Owner may reject the request if the change will increase project costs or negatively impact the operation of any existing facilities.
 - G. Partial Utilization, Substantial Completion, and Warranty Period for Items in Continuous Service: Refer to the Contract Documents for definition.
 - H. The terms "open, close, start, stop, operate, verify, energize, de-energize, transfer, switchover, etc." when used in conjunction with equipment that is in service or about to be placed in service are understood to mean: The Owner's operation or maintenance staff shall perform the operation upon written request from the Contractor.
 - I. Operational Test: The period of specified duration that the installed system is tested to verify operational integrity of a system prior to placing the system in service. Operational testing requires that representatives of the equipment manufacturers be on site for timely identification and resolution of system issues.
 - J. Firm Capacity: Shall be the capacity of the bypass pumping system with the largest pump included in the system out of service.
 - K. Cycling Pump Control: Shall mean the use of starting and stopping of single speed and output pumps to achieve the bypass pumping requirements.
 - L. Variable Pump Control: Utilizes variable speed and output pumps in the design of the system to try and match the output of the system with the variable flow conditions of the application.
- 1.03 RELATED WORK SPECIFIED ELSEWHERE
- M. Section 01014 – Construction Sequencing & Temporary Pumping

1.04 RESOURCES

A. Publications are referred to in the text by basic designation only.

1. American Society for Testing and Materials (ASTM)
 - a. D1248 Polyethylene Plastics Extrusion Materials for Wire and Cable
 - b. D2657 Heat Fusion Joining of Polyolefin Pipe and Fittings
 - c. D3261 Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

1.05 PERFORMANCE REQUIREMENTS

- A. Design the installation and operation of temporary pumping systems in accordance with Federal, State or Commonwealth, and Local Municipality Laws and Regulations, including local noise and light ordinances.
- B. The temporary pumping system shall be designed by the Contractor and provide uninterrupted service throughout construction of the EQ Pump Station.
- C. For all bypass pump arrangements, multiple pumps are necessary.
1. One standby pump shall be required for each system. If the standby pump is placed in operation, an additional standby pump shall be delivered to the bypass pumping site within 30 minutes.
 2. The primary and standby pumps shall be piped into the suction and discharge headers and shall have the capability of being brought online in the piping system by operating installed isolation valves.
- D. The system shall be designed to pump the following flows:

Location	Service	Firm Capacity Required (gpm)	Annual Average Flow (gpm)	Minimum Flow (gpm)	Variable flow or cycling pump controls
From the existing equalization pump room to the new preliminary treatment system	Equalization Tank to Preliminary Treatment	36,000	14,290	3,252	Variable

- E. The temporary pumping system must be monitored during plant peak hours (6 AM to 9 AM and 5 PM to 8 PM daily) during operation by a representative of the Contractor trained and certified by the pump supplier.
- F. Install, test, and maintain remote telemetry to monitor operation of the pumps and wet well water levels. The telemetry system shall first notify the Contractor's local representative

designated to monitor the pumps, then other individuals so designated by the Contractor and finally up to two individuals so designated by the Owner.

- G. In the event of a pump failure or a leak in the temporary bypass pipeline, the Contractor's local representative must remain on-site during temporary pumping. The representative shall ensure timely repairs or corrective actions to minimize operational disruptions and mitigate potential environmental impacts.
- H. Temporary pumping systems shall be equipped with noise reduction features that limit the noise output to 65 db[A] within 50 feet of the equipment or to 60 db[A] at the nearest property line, whichever is less. Diesel-driven engines shall be equipped with critical-rated mufflers.
- I. Provide pressure and vacuum gauges on the suction and discharge headers.
- J. Provide level controls to start and stop the pumps. Each pump shall be equipped with a separate control panel, calibrated pressure and vacuum gauges. All pumps provided shall be variable speed and output type pumps such that the system design may operate as continuously as possible and spikes in flow conditions are minimized by the design. Cycling pumps shall not be an acceptable design.

1.06 SUBMITTALS

- K. Bypass Pumping Plan: The Contractor shall submit to the Engineer for review and approval detailed drawings and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing flows. The plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to insure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No temporary pumping shall begin until all provisions and requirements have been reviewed and approved by the Engineer, all materials are onsite, and testing has been completed.
- L. All the descriptive terms used in the presentation of the plan shall be as defined in this specification. No other terms with similar meaning shall be used to prevent miscommunication of the prescribed plan.
- M. Submit a specific detailed description of each proposed temporary pumping system at least 30 days prior to intended use. The submittal shall include, but not be limited to, the following:
 - 1. A written description of the plan.
 - 2. Quantity, capacity, dimensions and location of all pumping equipment.

3. The size, type and routing of all suction and discharge pipe and the means of connecting the system.
 4. Calculations of static lift, frictional losses, all pipe velocities, total dynamic head (TDH) requirements, and net positive suction head available (NPSH_a).
 5. Existing facility plugging or bulkheading plan, including type, location and manufacturer of plugs with emergency release procedures.
 6. Thrust and restraint block sizes and locations, if necessary.
 7. Any temporary pipe supports, location, and anchoring requirements.
 8. Description of controls, monitoring, mode of operation, sequence of starting and stopping pumps, and emergency power source.
 9. Method of noise control for each pump and/or generator for all operations.
 10. Show force main pipe material and thickness can withstand all normal operating and surge pressures with a safety factor of 2.0.
 11. Denote any conditions that will cause pumps to lose suction lift (prime) and describe procedures to rectify.
 12. Show that the emergency switchover from primary to secondary pumping will be automatic should equipment fail.
 13. Show emergency plan to be used if flooding occurs at work site.
 14. Show suction and discharge piping is protected from possible damage from varying flood levels and construction activities.
 15. Show any planned shifting of bypass equipment during construction.
 16. Complete information on instruments, including calibration certificates.
 17. Qualifications of pump supplier on-site operators.
 18. Emergency contact telephone numbers.
- N. The plan must be signed and sealed by a Professional Engineer registered in the State or Commonwealth where the system will be installed and operated.
- O. Sequence of Construction Plan: Furnish in accordance with Section 01300 Submittals and Section 01520 Maintenance of Utility Operations During Construction.
1. Contractors Sequence of Construction defining work to be performed, including the following items:

- a. Definition of the start date, duration, and end date
- b. Define activities to be performed by or witnessed by the Owner and date on which these activities are to be performed.
- c. Scheduling/timing of manufacturers field services required to train all personnel that will be responsible for the operation of the bypass system and to verify that all system components are installed as recommended by the manufacturer.

1.07 SPECIAL PRECAUTIONS AND LIABILITIES

- A. Contractor is responsible for fines levied on Owner by state/commonwealth, federal, and/or other agencies due to spills caused by failure of temporary pumping systems. The Contractor shall also be responsible for repairing any damage to existing facilities including erosion of soils or contamination caused by a spill that is a direct result of the bypass pumping system failure. The cost of all repair and the immediate action required to facilitate the repairs are also the responsibility of the Contractor. This liability is limited to the firm capacity of the bypass pumping system as defined by this specification.
- B. The Owner is not responsible for any damage to the bypass pumping system under any circumstance. The bypass pumping system supplier by submitting a design for approval accepts that temporary pumping facilities for collection and treatment facilities have unknown materials and debris in them and that any damage to any of the bypass pumping equipment due to unknown materials are the responsibility of the supplier. It shall be the responsibility of the supplier to take precautions as deemed necessary by the supplier against any and all materials that may be present in the liquid pumped by the system to prevent damage to the equipment and to prevent failures that may cause a spill.
- C. Provide barriers in all locations where temporary pumps, pipe and other accessories are in roadways, driveways, and other vehicle-accessed areas.
- D. When overnight pumping is necessary, provide security fencing for all temporary pumps when not located within a secured area to prevent tampering.
- E. Contractor to de-rag pumps daily.

PART 2 – PRODUCTS

2.01 PUMPS

- A. The pumps and drives shall be rated for continuous duty and shall be capable of pumping the required flow ranges without surging, cavitation, or vibration. Pumps shall not overload drives at any point on the pump operating curve.
- B. Pumps shall be suitable for the service specified and the debris contained within it.

- C. Pumps shall be self-contained units designed for temporary use.
- D. Pumps shall have fully automatic self-priming units that do not require the use of foot-valves, vacuum pumps, or diaphragm pumps in the priming system, or they shall be submersible.
- E. All pumps must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of flows.
- F. Provide the necessary start/stop/variable speed and level controls for each pump.
- G. The primary pumps shall be diesel powered.
 - 1. Contractor shall be responsible for providing and storing a sufficient quantity of diesel fuel on site to continually operate the pumps for the duration of the temporary bypass pumping period. If this is impractical for industry available fuel storage devices, a refueling plan shall be developed and submitted as part of the bypass pumping submittal. There shall be no excuses for not providing fuel to the bypass pumping system including any natural disaster or weather event. Once started the Contractor shall provide fuel until all work is complete and bypass pumping is no longer needed. Diesel-powered pumps shall have adequate fuel storage capacity to operate continuously for 24 hours without refueling.
 - 2. Contractor to add a diesel pump and fuel storage containment area. Contractor is responsible for containing and remediating any spills resulting from bypass pumping.
 - 3. Contractor shall check the pump fuel levels and shall refill the tanks to full capacity at a frequency based on fuel consumption but not less than daily. Fuel deliveries shall only be made during normal daytime working hours.
 - 4. Each pump and drive shall be rated for continuous duty operation over the specified range of conditions without cavitating or overheating, and without excessive vibration or noise. In addition, each pump and drive shall be rated to operate intermittently at shutoff head against a closed discharge valve for periods of not less than 5 minutes without excessive cavitation, overheating, or vibration.
 - 5. All pumps are to be Godwin Dri-Prime Automatic self-priming pumps as manufactured by Xylem Dewatering Solutions, Inc., or Engineer approved equal.
 - 6. Furnish each pump with the necessary stop/start controls.
 - 7. Contractor will not be permitted to stop or impede the main flows under any circumstances except as otherwise defined under in Section 01014 Construction Sequencing and Constraints

2.02 PIPE

- A. In order to prevent accidental spillage, all temporary pipe must be constructed of rigid or semi-rigid pipe with positive, leak proof connections. All pipe materials and joints for temporary pipe systems must be High Density Black Polyethylene Pipe - ANSI/ASTM D1248, butt heat fusion type joint fittings shall conform to ASTM D2657 and D3261. Flexible hose of any type shall not be permitted.
- B. Pump discharge piping shall be valved and manifolded so that pumped liquid can be conveyed to the dedicated discharge location. Provide check valves for each pump discharge. Air-relief valves shall be provided at high points in the discharge piping as required. Air-relief valves shall expel air upon pipe filling, admit air upon pipe dewatering, and release small amounts of entrained air during operation. Air-relief valves shall be suitable with the specified service.
- C. Different pipe diameter sizes can be used, as long as the maximum discharge pipe velocity at the exit does not exceed 10 feet per second.
- D. The bypass system pipe shall be rated for at least 3 times the shut off head of the largest pump supplied in the system. The rating of the pipe with supporting calculations and pump curves shall be part of the bypass pumping system submittal.
- E. The bypass pumping supplier shall provide a plan for freeze protection of all exposed piping that may be subject to freezing. The method and materials of freeze prevention will be the responsibility of the temporary pumping system supplier. Damage or spills caused by freezing piping shall be the sole responsibility of the bypass pumping system supplier.

2.03 TEMPORARY PLUGS AND BULKHEADS

- A. Provide temporary plugs and bulkheads, as required, for successful operation of the temporary pumping systems. Acceptable temporary plugs and bulkheads include inflatable dams specifically designed for such service, brick bulkheads, timer bulkheads, sandbags, and other bulkhead methods suitable for the specified service.
- B. Plugs shall be designed for the specific purpose of providing temporary plugging of active pipes. Each plug and temporary bulkhead shall be suitable for the maximum pressure encountered.
- C. All plugs shall be firmly attached to a stationary object at ground level by a cable in order to prevent loss of plugs in pipelines.
- D. Piping plugs shall be capable of accommodating the maximum allowable surcharge heads within the gravity system that may be experienced during construction. All plugs shall be designed with a minimum factor of safety of 1.5. Where temporary plugs and bulkheads are under pressure or surcharged, provide either two plugs or a plug and a temporary bulkhead.

- E. The plugs shall be readily removed from the system during emergency shutdowns and shall be operated pneumatically.

2.04 PIPE SUPPORTS

- A. Pipe supports shall be provided for all pipe that is elevated above the ground.
- B. The design, construction and dismantling of all temporary pipe supports shall be the responsibility of the Contractor. All pipe supports shall be designed using the required building codes and regulations and accounting for all potential loads including flood water hydrostatic and flotation loads.
- C. All piping systems shall be designed to resist all forces associated with liquid pumping. The pipe and supports shall resist all of these forces or the Contractor shall provide supports, thrust blocks or any other facility required to prevent damage to the bypass pumping system.

2.05 ALARM SYSTEMS

- A. The minimum acceptable alarm system shall consist of high-water float(s) and automatic dialer with a battery backup. The alarm system design shall be the responsibility of the bypass pumping system supplier. The alarm system must be capable of full operation in the absence of electrical power and must provide redundancy in case of alarm system component failure.
- B. The automatic dialer system shall be provided with either cellular or satellite phone as appropriate to provide reliable contact during any failures.

PART 3 – EXECUTION

3.01

- A. Install, operate and maintain temporary pumping systems and appurtenances, including but not limited to, associated pipe, valves, instrumentation, controls and accessories, in accordance with the manufacturer's instructions for each component and as required by the approved bypass pumping submittal.
- B. Provide all oil, fuel, grease, lubricants, tools and spare parts required for operation and maintenance of the temporary pumping systems for the duration of use. Spill containment around diesel-powered pumps, including filling operations, shall be provided per applicable regulations.
- C. Adequate hoisting equipment for each pump and accessory shall be maintained on Site.
- D. Temporary pumping systems shall remain operable until all components of new work requiring temporary pumping systems have successfully completed all required testing and have been accepted by the Owner.

- E. The design of the bypass pumping system must allow for prompt dewatering of the system during periods of non-use or if leakage occurs.
- F. The sewer system shall be returned to gravity flow during periods when bypass pumping is not necessary for the installation of work.
- G. The Contractor will not be permitted to stop or impede the sewer flow under any circumstances without having the primary setups operational.
- H. Before placing the system in operation, it shall be tested for at least 8 hours of continuous operation.
- I. The Contractor shall be responsible for the provision of temporary fall-protection devices around all removed manhole covers, grating, openings, etc.
- J. The Contractor shall assemble a list of 24-hour emergency telephone numbers that shall include the Contractor's project manager, the Contractor's foreman, and a responsible representative from the pump supplier, and submit it to the Engineer for review and approval.

3.02 SITING OF FACILITIES

- A. In all instances, unobstructed roadway access must be maintained as shown on the drawings. All driveways and connections to roadways must be kept clear.
- B. The pumps shall be placed in the locations designated on the drawings. All suction piping shall also be in this designated area and shall be routed to the existing Preliminary Treatment Structure as required to complete the bypass pumping system installation.
- C. A corridor for all bypass system piping has been delineated on the drawings and all piping and supports must be installed within this corridor.
- D. The discharge of the bypass pumping system shall be placed and designed in such a way to facilitate proper flow momentum on the direction of normal flow in the receiving facility structure. The bypass pumping contractor will be responsible for the design of the discharge piping and ensuring that no spills occur as a direct result of the design of the discharge.

3.03 PREPARATION

- A. The Contractor is responsible for locating any existing utilities in the area selected for installation of the bypass pumps and pipelines. The Contractor shall minimize the disturbance to existing utilities and shall obtain approval from the Owner for any relocation of the bypass pipeline. All costs associated with the relocation of utilities and obtaining approvals shall be included in the contract price.
- B. During all bypass pumping operations, the Contractor shall protect the bypass pumping facilities and existing collection system from damage inflicted by equipment. The

Contractor shall be responsible for all intentional or accidental physical damage to the bypass pumping system caused by human or mechanical failure or interference.

- C. During installation of the bypass pumping pipes, the Contractor shall make every effort to minimize the disruption of normal facility flows and pump station operation.
- D. The Contractor shall protect all mature vegetation and structures or other obstacles in the path of the pipeline from damage through use of shields and buffering devices. All private property that must be relocated to construct the work must be stored at a location acceptable to the property owner.
- E. In instances where fences must be disturbed for the construction of the pipeline, temporary fencing shall be required.
- F. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharge or damage to tributary sewers and that will protect public and private property from damage.
- G. Temporarily burying the bypass piping may be required to provide access over the piping during operations. All fittings and costs associated with this temporary piping location shall be the responsibility of the Contractor. All locations where temporary burying of the pipe will be required shall be included in the bypass pumping system submittal. Rehabilitation and returning the area of temporary burying back to the original condition including paving or seeding or any other item removed to facilitate pipe installation shall also be the responsibility of the Contractor.

3.04 INSTALLATION AND REMOVAL

- A. The Contractor shall pipe sections or make connections to the existing piping systems and construct temporary bypass pumping structures only at the access location and as may be required to provide an adequate suction conduit.
- B. The temporary bypass pumping system shall be tested before placing the system in operation. Testing periods shall occur only between the hours of 8:30 a.m. and 3:00 p.m., Monday through Thursday. Testing of bypass pumping system shall NOT be allowed Friday through Sunday, on the Owner's scheduled Holidays, or on the day immediately prior to an Owner's scheduled Holiday. In addition, testing of bypass pumping system shall only be performed during the Owner's normally scheduled work days. Testing shall include leakage testing, pressure testing, operational testing, and alarm testing.
- C. Leakage and pressure test: Contractor shall perform leakage and pressure testing for a minimum of two (2) hours on the pump duty suction piping and duty discharge piping in accordance with Article 3.05, Paragraph A. Contractor shall then remove the duty piping and shall install the standby suction piping and standby discharge piping and perform the same test for an additional two (2) hours.

- D. Operation test: Contractor shall operate the temporary bypass pumping system for as long as necessary, but no less than 8 hours, without failure to demonstrate reliable operation of the entire system, including but not limited to pumps and controls, to the satisfaction of the Owner.
- E. Plugging or blocking of flows shall incorporate primary and secondary plugging devices. When plugging or blocking is no longer needed for performance of the work, the plugs are to be removed in a manner that permits the flow to slowly return to normal without surge, surcharging, or causing other major disturbances upstream or downstream.
- F. The Contractor shall remove manhole sections or make connections to the existing gravity conveyance system and construct temporary bypass pumping structures only as the access locations indicated on the Contract Drawings and as may be required to provide adequate suction conduit.
- G. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline within public right of ways.
- H. Upon system removal, all wastewater must be discharged into the wastewater collection system and pipes flushed using potable water supplied by the Contractor.

3.05 QUALITY CONTROL AND MAINTENANCE

- A. Testing: Contractor shall perform leakage and pressure tests of the bypass pump suction and discharge piping using potable or approved surface water prior to actual operation. Low pressure air test shall be conducted at a test pressure of 15 psi before any liquid is pumped to ensure the system is assembled correctly. The system will pass the low-pressure air test if it holds the test pressure for 2 hours. The Engineer shall be given 24 hours' notice prior to testing. The force main shall be tested to 1.5 times the normal working pressure of the system at the firm capacity specified and will be considered ready for service if the pressure is held for 2 hours. Surface water or potable water shall be supplied and used by the Contractor for this test.
- B. Once installation and testing of the temporary pumping systems are complete, a trained representative from the pump supplier shall inspect the installation and verify in writing that the installation is complete in all aspects and ready to run as intended on a continuous basis.
- C. Inspection: during operation of the temporary pumping system the Contractor shall inspect all components every two (2) hours to ensure that the system is working correctly and shall keep a written log of the system inspection results. Contractor shall inspect the bypass pumping fuel system a minimum of either one (1) time per day or as often as necessary to ensure full fuel tanks for the bypass pumps.
- D. Maintenance service: Contractor shall ensure that the temporary pumping system is properly maintained, and a responsible and competent mechanic/operator shall be on call

at all times. The Contractor shall supply all necessary lubrication, fuel, and supplies necessary to maintain the entire installation.

- E. Besides the Owner and the Engineer, only employees of the Contractor or the system supplier are allowed on site.
- F. If the system must be operated continuously, then an operator that can troubleshoot failure and make repairs to the system must be on site while the system is in operation. The temporary pumping system must be monitored during plant peak hours (6 AM to 9 AM and 5 PM to 8 PM daily) during operation by a representative of the Contractor trained and certified by the pump supplier.

3.06 SEQUENCE OF CONSTRUCTION

- A. Contractor shall propose a Sequence of Construction incorporating all constraints detailed in this Section and shall secure concurrence of Owner prior to starting work. Contractor shall reference Section 01520 – Maintenance of Utility Operations During Construction for sequences or constraints that may dictate operations or effect bypass pumping operations.
- B. The Contractor shall submit a construction plan and schedule, which details the methods, means, techniques, and sequences to be used to establish a base element of surety against a spill, to the Engineer for review and approval by the Owner as part of the bypass pumping system submittal. One month prior to connections being made to existing structures or pipes, a coordination meeting shall be held between the Contractor, Engineer, and Owner to discuss the construction plan previously submitted by the Contractor. A detailed schedule of all construction activities requiring bypass pumping system operations shall be delivered in the meeting with the intention of discussing all major milestones. No temporary pumping shall take place until after satisfactory completion of the coordination meeting.
- C. Schedule of construction, interconnection details, and other revisions necessary for proper interfacing of the Work are to be subsequently modified by Contractor accounting for results of said coordination meeting. The Engineer and Owner are to be notified 96 hours prior to any actual interruptions or connections being made. No work shall be undertaken prior to securing Owner's approval of respective connection plan and work schedule.

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SECTION 01530PROTECTION OF EXISTING FACILITIESPART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Protection of existing utilities and structures.
2. Protection of installed equipment and materials.
3. Protection during inclement weather.
4. Reporting of accidents.
5. Barricades and warning signals.

B. Contractor shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect the Work and all public and private property and facilities from damage, as specified in the General Conditions, Supplementary Conditions, and this Section.

C. To prevent damage, injury, or loss, Contractor's actions shall include the following:

1. Storing apparatus, materials, supplies, and equipment in an orderly, safe manner that does not unduly interfere with progress of the Work or work of other contractors or utility companies.
2. Providing suitable storage facilities for equipment and materials subject to damage or degradation by exposure to weather, theft, breakage, or other cause.
3. Placing upon the Work or any part thereof only loads consistent with the safety and integrity of that portion of the Work and existing construction.
4. Frequently removing and disposing of refuse, rubbish, scrap materials, and debris caused by Contractor's operations so that, at all times, the Site is safe, orderly, and workmanlike in appearance.

D. Contractor has full responsibility for preserving public and private property and facilities on and adjacent to the Site. Direct or indirect damage done by, or on account of, any act, omission, neglect, or misconduct by Contractor in executing the Work, shall be restored by Contractor, at their expense to condition equal to that existing before damage was done.

- E. Contractor shall comply with safety regulations required by Owner or authorities having jurisdiction. Contractor shall comply with and correct unsafe conditions created or caused by Contractor's personnel. In the event Contractor fails to comply, Owner receives the right to take necessary measures to correct conditions or practices for reimbursement by Contractor.

1.02 REFERENCES

A. Definitions:

1. "Existing utilities" shall refer to both publicly owned and privately-owned utilities such as, but are not limited to, electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.
2. "Surface structures" are existing buildings, structures, and other facilities at or above ground surface, including their foundations or any extension below ground surface. Surface structures include, but are not limited to, buildings, tanks, walls, channels, open drainage, exposed piping and utilities, poles, exposed wires, posts, signs, markers, curbs, walks, fencing, and other facilities visible at or above ground surface.

1.03 SITE CONDITIONS

A. Location of Existing Utilities and Structures:

1. Contractor shall confirm and verify location of existing utilities and structures at the Site prior to commencing the Work.
2. Contractor shall notify and obtain approval from authority having jurisdiction prior to performing the Work in the vicinity of the existing utilities and structures.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PROTECTION OF EXISTING UTILITIES AND STRUCTURES

A. General:

1. Contractor shall satisfy Engineer that methods and procedures for protection have been approved by authorities having jurisdiction prior to proceeding with the Work.
2. Contractor shall provide temporary support and protection, as required, to existing utilities and structures during the Work, including support of excavation.

- a. Temporary support and protection of existing utilities shall be provided in accordance with requirements of the authority having jurisdiction.
 - b. Temporary support and protection of existing structures shall be provided as required to ensure structural integrity is not compromised.
3. Contractor shall be responsible for costs incurred for temporary support or protection provided by a third-party or authority having jurisdiction to insure safety of the existing utility, Owner, and public and private parties.

B. Existing Buried Utilities:

1. Contractor shall perform field investigation to identify conflicts or interferences between existing utilities and utility Work prior to excavation Work.
 - a. Investigation of conflicts and interferences shall be performed on Site locations, elevations, slopes, etc. of the existing utilities determined during the field investigations.
 - b. Contractor shall notify Engineer and Owner in writing of identified conflicts or interferences. Contractor shall not proceed with the Work until written authorization is provided by the Engineer.
 - c. Identified conflicts and interferences shall be handled in accordance with the Contract Documents. If required, potential modification to the Contract Documents shall be performed in accordance with Section 01035 – Modification Procedures.
2. Contractor shall perform the Work to prevent disruption of existing service and damage to existing utilities.
 - a. Temporary connections shall be provided, as required, to provide uninterrupted service of existing utilities.
 - b. Contractor shall repair damage to existing utilities as directed by the Engineer or the authority having jurisdiction at Contractor's own expense.
 - c. Contractor shall be responsible for damages and repair costs to the authority having jurisdiction if third-party or authority having jurisdiction personnel repair damaged existing utilities.

C. Protection of Existing Structures:

1. Contractor shall sustain existing surface structures in existing place and protect from direct or indirect injury located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure or facility.

2. Contractor shall bear all risks attending the presence or proximity of all surface structures within or adjacent to limits of the Work, in accordance with the Contract Documents.
 3. Contractor shall be responsible for damage and expense for direct or indirect injury caused by their Work to structures and facilities.
 4. Contractor shall repair immediately damage caused by their Work, to the satisfaction of owner of damaged structure or facility at no cost to the Owner.
 5. Contractor shall provide temporary weather protection for existing structures and buildings where exterior walls or roofs are modified or disturbed in the Work. Contractor shall be responsible for damages due to inadequate protection of existing structures and building.
- D. Relocation of Surface Structures: Existing surface facilities, including but not limited to guard rails, posts, guard cables, signs, poles, markers, curbs, and fencing, that are temporarily removed to facilitate the Work shall be replaced and restored to their original condition at Contractor's expense.
- E. Specific requirements:
1. Protection of existing discharge header, valves and other mechanical, electrical and HVAC appurtenances not demolished as part of this project shall be ensured when performing demolition work.

3.02 PROTECTION OF INSTALLED EQUIPMENT AND MATERIALS

- A. Contractor shall protect installed equipment and materials to prevent damage, injury or loss from subsequent operations. Remove protection facilities when no longer needed prior to completion of the Work.
- B. Control traffic to prevent damage to equipment, materials, and surfaces.
- C. Coverings: Provide coverings to protect materials and equipment from damage.

3.03 PROTECTION DURING INCLEMENT WEATHER

- A. Contractor shall not perform Work during inclement or unsuitable weather that will affect the quality of the completed Work.
- B. Contractor shall take necessary precautions in the event of impending inclement weather to protect equipment, materials and Work from damage or deterioration due to floods, driving rain, wind, or snowstorms.
 1. Owner reserves the right to require additional protection measures beyond Contractor's proposed protection measures to protect the Work.

2. Contractor shall not claim additional compensation for additional protection measures required by Owner nor for damages to equipment, material, or Work due to the inclement weather.
- C. When directed by Engineer, Contractor shall stop Work and protect new Work by protective covering during rainstorms for, but not limited to, the following:
1. Concrete mixing and placement.
 2. Paving placement.
 3. Masonry installation.
 4. Piping, valve, and appurtenance installation.
 5. Additional inclement weather requirements and limitations are specified in individual Specification Sections.

3.04 REPORTING OF ACCIDENTS

- A. Contractor shall immediately report, in writing, to Engineer and Owner accidents out of, or in conjunction with, the performance of Work.
1. Accident reporting includes on Site and adjacent to Site, which cause death, personal injury, or property damage.
 2. Written report shall provide full details and witness statements.
 3. If claim is made against Contractor, Supplier, or Subcontractor due to accident, Contractor shall promptly report facts, in writing, to Engineer and Owner, with full account of the claim.
- B. Contractor shall immediately report death, serious injury, or serious damage caused by telephone or messenger to Engineer and Owner.

3.05 BARRICADES AND WARNING SIGNALS

- A. General:
1. Where the Work is performed on or adjacent to roadway, access road, right-of-way, or public place:
 - a. Provide barricades, fences, lights, warning signs, danger signals, watchmen, and take other precautionary measures for protecting persons, property, and the Work.
 - b. Paint barricades to be visible at night.

- c. From sunset to sunrise, furnish and maintain at least one light at each barricade.
 - d. Erect sufficient barricades to keep vehicles from being driven on or into Work under construction.
 - e. Furnish watchmen in sufficient numbers to protect the Work.
- B. Provide temporary barricades to protect personnel and property for Work not in or adjacent to vehicular travel areas, including indoor work, in accordance with Laws and Regulations.
- C. Contractor's responsibility for maintaining temporary barricades, signs, lights, and for providing watchmen shall continue until the Work is accepted in accordance with the Contract Documents.

- END OF SECTION -

SECTION 01550SITE ACCESS AND STORAGEPART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Contractor shall provide and maintain temporary laydown and employee parking areas and appurtenances required during the Project for use by Contractor, other contractors employed on the Project, Owner's, and emergency vehicles.
2. Laydown and employee parking areas shall be designed and maintained by Contractor and shall be fully passable to vehicles in all weather conditions.

B. General requirements of storing and protecting equipment and materials.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Access roads:

1. Contractor shall construct and maintain such temporary access roads as required to perform the Work.
2. Contractor shall construct access roads, where possible, in locations over the areas of future road systems.

B. Site security:

1. Contractor shall safely guard all the Work, the Project, products, equipment, and property from loss, theft, damage, and vandalism until Substantial Completion. Contractor's duty includes safely guarding Owner's property in vicinity of the Work and Project, and other private property in the vicinity of the Project from injury and loss in connection with performance of the Project.
2. Employ watchmen as required to provide required security and prevent unauthorized entry.
3. Costs for security required under this Section shall be paid by Contractor.
4. Make no claim against Owner for damage resulting from trespass.
5. Pay full compensation for, or repair or replace, damage to property of Owner and others arising from failure to furnish adequate security.
6. Provide temporary fencing in accordance with the Contract Documents.

7. Security requirements specified in the Section shall begin as soon as the contractor delivers materials to the Site and/or begins work, and shall continue until the date of Final Completion.
8. Procedures:
 - a. Contractor shall conform to Owner's security procedures and access restrictions at Site throughout entire Project.
 - b. Contractor, including Subcontractors and Suppliers, shall comply with the following:
 - 1) Parking: Prepare and maintain parking area as required. Personal vehicles are not allowed outside Contractor parking area.
9. Contractor shall provide and maintain temporary security fencing if existing security fencing or barriers are breached or temporarily removed for the Project at no additional cost to the Owner. Temporary security fencing shall be equal to existing, unless otherwise specified, and provided and maintained in a manner satisfactory to Engineer and Owner.

1.03 STORAGE

- A. Store and protect materials and equipment in accordance with manufacturer's recommendations and the Contract Documents.
- B. Contractor shall make all arrangements and provisions necessary for, and pay all costs for, storing materials and equipment. Construction equipment, and materials and equipment to be incorporated into the Work shall be placed to avoid injuring the Work and existing facilities and property, and so that free access is maintained at all times to all parts of the Work and to public utility installations in vicinity of the Work. Store materials and equipment neatly and compactly in locations that cause minimum inconvenience to Owner, other contractors, public travel, and owners, tenants, and occupants of adjoining property. Arrange storage in manner to allow easy access for inspection.
- C. Areas available at the Site for storing materials and equipment are shown or indicated in the Contract Documents, or as approved by Engineer.
- D. Store materials and equipment to become Owner's property to facilitate their inspection and ensure preservation of quality and fitness of the Work, including proper protection against damage by freezing, moisture, and high ambient temperatures. Store in indoor, climate-controlled storage areas all materials and equipment subject to damage by moisture, humidity, heat, cold, and other elements, unless otherwise acceptable to Owner.
- E. Contractor shall be fully responsible for loss or damage (including theft) to stored materials and equipment.

- F. Do not open manufacturer's containers until time of installation, unless recommended by the manufacturer, directed by Engineer or otherwise specified in the Contract Documents.
- G. Do not store materials or equipment in structures being constructed unless approved by Engineer in writing.
- H. Do not use lawns or other private property for storage without written permission of the owner or other person in possession or control of such premises.
- I. Contractor shall not store unnecessary equipment and materials at the Site.
- J. Contractor shall prevent structures from being loaded with a weight that endanger its security and/or safety of persons.
- K. Stored equipment and materials shall not be placed within 10 feet of fire hydrants.
- L. Gutters, drainage channels and inlets shall be kept unobstructed at all times.

1.04 STORAGE AND PROTECTION REQUIREMENTS

- A. Contractor shall furnish a covered, weather-protected storage structure providing a clean, dry, noncorrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this project. Storage and maintenance of stored equipment shall be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including connection of heaters, placing of storage lubricants or moisture protection in equipment, etc. Corroded, damaged or deteriorated equipment and parts shall be replaced before acceptance of the project.
- B. Equipment and materials not properly stored will not be included in application for payment.
- C. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weathertight enclosures.
 - 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
 - 3. Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration or discoloration with impervious sheet covering; provide adequate ventilation to avoid condensation.
 - 4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

- D. All materials and equipment to be incorporated in the Work shall be handled and stored by Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.
- E. Cementitious and other products sensitive to moisture damage shall be stored under a roof, off the ground and shall be kept completely dry at all times. All structural and miscellaneous steel, and reinforcing steel shall be stored off the ground to prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete beams shall be handled and stored in a manner to prevent staining, chipping or cracking or accumulations of dirt, and standing water. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking and spalling, to a minimum.
- F. All materials which, in the opinion of Engineer, have become so damaged as to be unfit for the use intended shall be promptly removed from the site of the Work, and Contractor shall receive no compensation for the damaged material, its removal or its replacement.
- G. 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.
- H. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove covering when no longer needed.
- I. Contractor shall be responsible for all material, equipment and supplies sold and delivered to City under this Contract until final inspection of the Work and acceptance by the Engineer. In the event any such material, equipment and supplies are lost, stolen, or become defective prior to final inspection and acceptance, Contractor shall replace same without additional cost to Owner.
- J. Should Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within ten days after written notice to do so has been given, Owner retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from Contractor's next progress payment. These costs may be comprised of expenditures for labor equipment usage, administrative, clerical, Engineering and any other costs associated with making the necessary corrections.

1.05 SPECIAL TOOLS

- A. Manufacturers of equipment and machinery shall furnish any special tools (including grease guns or other lubricating devices) required for normal adjustment, operations and maintenance, together with instructions for their use. Contractor shall preserve and deliver

to Engineer these tools and instructions in good order prior to Engineer's acceptance of said equipment.

1.06 STORAGE AND HANDLING OF EQUIPMENT ON SITE

A. Special attention shall be given to the storage and handling of equipment on site. As a minimum, the procedure outlined below shall be followed:

1. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity-controlled building approved by Engineer, until such time as the equipment is to be installed.
2. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
3. Manufacturer's storage instructions shall be carefully studied by Contractor and reviewed with Engineer. These instructions shall be carefully followed and a written record of this kept by Contractor.
4. Moving parts shall be rotated (in accordance with the manufacturer's instructions) a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, Contractor shall (run) start the equipment (in accordance with the manufactures instructions), at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
5. Lubricants shall be changed upon completion of installation and as frequently as required by the installation environmental conditions (dust etc.) or manufactures instructions thereafter during the period between installation and acceptance. Mechanical equipment to be used in the Work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed, and lubricated prior to testing and startup, at no extra cost to Owner.
6. Prior to acceptance of the equipment, Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer, shall document that the equipment is in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at Contractor's expense.

1.07 PROTECTION

A. Contractor shall provide temporary storage containers/facilities, if required, to protect equipment and materials at the Site.

- B. Equipment to be incorporated into the Work shall be boxed, crated, or otherwise completely enclosed and protected during shipping, handling, and storage, in accordance with Section 01600– Materials and Equipment.
- C. Store all materials and equipment off the ground (or floor) on raised supports such as skids or pallets.
- D. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Painted equipment surfaces that are damaged or marred shall be repainted in their entirety in accordance with equipment manufacturer and paint manufacturer requirements, to the satisfaction of Engineer.
- E. Maintenance of Storage: On scheduled basis, periodically inspect stored materials and equipment to ensure that:
 - 1. Condition and status of storage facilities is adequate to provide required storage conditions.
 - 2. Required environmental conditions are maintained on continuing basis.
 - 3. Materials and equipment exposed to elements are not adversely affected.

1.08 RECORDS

- A. Keep up-to-date account of materials and equipment in storage to facilitate preparation of Applications for Payment, if the Contract Documents provide for payment for materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Contractor shall determine if and where temporary fencing is necessary, unless existing security fencing is damaged, which will be determined by Engineer and Owner.
- B. Install temporary fencing used for site security in accordance with the Contract Documents and fence manufacturer's instructions. Provide temporary fencing for site security so that integrity of site security is maintained throughout the Project.
- C. Maintain temporary fencing. Repair damage to temporary fencing and replace fencing when required to maintain site security.

- D. Remove temporary fencing when permanent site security fencing is in place and fully functional, or when otherwise directed by Owner or Engineer.

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SECTION 01560TEMPORARY ENVIRONMENTAL CONTROLS AND PROJECT HOUSEKEEPINGPART 1 – GENERAL

1.01 SUMMARY

- A. Contractor shall provide and maintain methods, equipment, and temporary construction as required to control environmental conditions at the Site and adjacent areas.
- B. Maintain controls until no longer required.
- C. Temporary controls include, but are not limited to, the following:
 - 1. Dust control.
 - 2. Noise controls.
 - 3. Vibration Control
 - 4. Pest and rodent control.
 - 5. Pollution control.
- D. Maintain construction cleanliness during progress of the Work and perform final cleaning at completion of the Work, and as required by conditions of the Contract. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.
- E. Materials
 - 1. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
 - 2. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
 - 3. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 DUST CONTROL

- A. Contractor shall take measures to control dust from Contractor's operations and prevent spillage of excavated materials on public roads.
- B. Contractor shall remove spillage of excavated materials, debris and dust from public roads by methods approved by Engineer.
- C. Contractor shall provide temporary dust-proof partitions where required to protect unaltered portions of existing structures and facilities and as directed by Engineer or Owner. Temporary partitions shall be provided where demolition Work is required, to protect equipment and material, and shall consist of the following:
 - 1. Wood studs with plywood on both sides and extend from floor to ceiling.
 - 2. Closure plate at floor and ceiling.
 - 3. One door (minimum) with hardware.
- D. Contractor shall refer to applicable sections of local and state/commonwealth regulations on dust control for additional guidance.
 - 1. Contractor shall apply water at locations, quantities, and frequencies required by Engineer to control dust for nuisance prevention to Owner, Engineer, and properties in the vicinity of the Site.
 - 2. Dust control and cleaning measures shall be provided at no additional cost to the Owner.
- E. Contractor shall not cause or allow the emissions from any transport, handling, construction, or storage activity to remain visible in the atmosphere beyond the property line of the emission source.
- F. Contractor shall not cause or allow particulate matter to exceed 100 mg/m³ when determined as the difference between upwind and downwind samples collected on high volume samples at the property line for a minimum of five hours.
- G. Contractor shall use the following procedures and techniques to minimize dust pollution:
 - 1. Cover loads of materials, debris and soil transported from construction sites.
 - 2. Daily water down and sweep streets which have heavy volumes of construction vehicles carrying debris and excavated materials.
 - 3. Establish regular cycles and locations for washing trucks which haul soil from the site.

4. Water down construction sites as needed to suppress dust, during handling of excavation soil or debris or during demolition.

3.02 NOISE CONTROL

- A. Contractor's vehicles and equipment shall minimize noise emissions to greatest degree practicable. Provide mufflers, silencers, and sound barriers when necessary.
- B. Noise levels shall comply with Laws and Regulations, including OSHA requirements and local ordinances.
- C. Noise emissions shall not interfere with the work of Owner or others.

3.03 VIBRATION CONTROL

- A. Vibration Control shall be in accordance with Federal, State, and City regulations. It is the Contractor's sole responsibility to prevent damage from vibration to adjacent structures and property.

3.04 PEST AND RODENT CONTROL

- A. Provide rodent and pest control as required to prevent infestation of the Site and storage areas.
- B. Employ methods and use materials that do not adversely affect conditions at the Site or on adjoining properties.
- C. In accordance with laws and regulations, promptly and properly dispose of pests and rodents trapped or otherwise controlled.

3.05 POLLUTION CONTROL

- A. General:
 1. Provide means, methods, and facilities required to prevent contamination of soil, water, and atmosphere caused by discharge of noxious substances from construction operations.
 2. Equipment used during construction shall comply with Laws and Regulations.
- B. Spills and Contamination:
 1. Provide equipment and personnel to perform emergency measures required to contain spills and to remove contaminated soils and liquids.
 2. Excavate contaminated material and properly dispose of off-site, and replace with suitable compacted fill and topsoil.

- C. Protection of Surface Waters: Implement special measures to prevent harmful substances from entering surface waters. Prevent disposal of wastes, effluents, chemicals, and other such substances in or adjacent to surface waters and open drainage routes, in sanitary sewers, or in storm sewers.
- D. Atmospheric Pollutants:
 - 1. Provide systems for controlling atmospheric pollutants related to the Work.
 - 2. Prevent toxic concentrations of chemicals and vapors.
 - 3. Prevent harmful dispersal of pollutants into atmosphere.
 - 4. Use construction equipment which has been designed and equipped to prevent or control air pollution in conformance with the regulations of the EPA, state and local authorities. Contractor shall have available evidence of such design and equipment shall be maintained and made available for inspection by Construction Manager.
 - 5. Establish and maintain records of the routine maintenance program for internal combustion engine powered vehicles and equipment used on the project. These records shall be held available for inspection by Construction Manager.
- E. Solid Waste:
 - 1. Provide systems for controlling and managing solid waste related to the Work.
 - 2. Prevent solid waste from becoming airborne, and from discharging to surface waters and drainage routes.
 - 3. Properly handle and dispose of solid waste.
 - 4. Burning of wastes on site is prohibited. Remove scrap and waste material and dispose of in accordance with laws, codes, regulations, ordinances, and permits.

3.06 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the Work, the site, access ways, streets and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.
- B. Provide on-site containers for the collection of waste materials, debris and rubbish containers must be emptied daily or as frequently as necessary to contain disposals
- C. Remove waste materials, debris, and rubbish from the site periodically and dispose of at legal disposal areas away from the site.
- D. Schedule operations so that dust and other contaminants resulting from cleaning process shall not fall on wet or newly-coated surfaces.

3.07 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of all work areas, to verify that the entire Work is clean.

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SECTION 01590**ENGINEER'S FIELD OFFICE****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Furnish, install, and maintain a field office space for the ENGINEER and Field Representatives. Locate office near CONTRACTOR's office in a place approved by ENGINEER. Provide office and furnishings complete within two weeks after commencement of Contract Time.
- B. Allocate four (4) reserved parking spaces for use of the ENGINEER or ENGINEER's representative.

PART 2 - PRODUCTS (Not Applicable)**PART 3 - EXECUTION****3.1 FIELD OFFICE MINIMUM CONSTRUCTION STANDARDS**

- A. General Requirements:
 - 1. Structurally sound foundation and superstructure.
 - 2. Completely weather tight and insulated.
 - 3. Exterior finish acceptable to ENGINEER.
 - 4. All new interior finishes acceptable to ENGINEER.
 - 5. Resilient floor covering in first class condition.
 - 6. Area: 1200 square feet.
 - 7. Windows: 10 percent of floor area with operable sash and screens.
- B. Optional Construction:
 - 1. Mobile office trailer in first class condition acceptable to ENGINEER, which is specifically designed for this type of use and conforms to requirements above and below.
- C. Minimum Services:
 - 1. CONTRACTOR shall obtain the necessary permits and pay for all fees, deposits or other costs required by governing authorities and utility provider for connecting the required utilities to the ENGINEER's office. CONTRACTOR shall pay all monthly charges associated with providing utility, phone and internet service to the ENGINEER's office.
 - 2. Interior lighting of 50-foot candles at desk top height.
 - 3. Exterior light at entrance.
 - 4. Automatic heating to maintain 65F in winter. CONTRACTOR to furnish and pay for all fuel as required.

5. Automatic cooling to maintain 75F in summer.
6. Electrical service.
7. Four electric wall outlets.
8. Two Internet accounts for CITY use for the full duration of the contact.
9. Private telephone services including four (4) separate lines.
10. Chilled drinking water.
11. Private sanitary facilities with one water closet and one lavatory and medicine cabinet.
12. All plumbing facilities and sewers required. Protect from freezing.
13. Office shall be cleaned a minimum of once per week or as directed by the ENGINEER.

D. Minimum Furnishings:

1. One 5 drawer desk per room.
2. One swivel desk chair per room.
3. Two side chairs per room.
4. One drafting table with built-in drawer, drafting stool and light.
5. One plan rack to hold 8 racks of drawings.
6. One 4 drawer file cabinet per room.
7. One 2 door storage cabinet per room.
8. Book shelving per room.
9. Two wastebaskets per room.
10. Three (3) fire extinguishers or as required by code.
11. Identifying exterior sign acceptable to ENGINEER.
12. First aid kit.
13. Copy machine/printer acceptable to the ENGINEER, and supply of copy papers for the duration of the contract.
14. One four (4) foot by six (6) foot white board per room.

- END OF SECTION -

SECTION 01600MATERIALS AND EQUIPMENTPART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Common requirements for products.
2. Contractor's options for selecting products.
3. Requirements for consideration of "or equal" products.
4. Procedural requirements for product substitutions.
5. Procedural requirements for substitute construction methods or procedures, when construction methods or procedures are specified.
6. General requirements for preparing for shipping, delivering, and handling materials and equipment.
7. Contractor shall make all arrangements for transporting, delivering, and handling of materials and equipment required for prosecution and completion of the Work.
8. Warranty requirements of products.

B. Requests for substitutions of equipment and material shall conform to the requirements of the General Conditions and Supplemental Conditions.

C. Procedure for substitution requests and review including evaluation, reimbursement, acceptance, and determination shall be in accordance with General Conditions and Supplemental Conditions.

1.02 SCOPE OF WORK

A. Contractor is responsible for furnishing and installing the material and equipment as required by the Contract Documents. Proper approval of submittals and substitutions are required. Furnished material and equipment shall be properly transported, handled, stored, and protected in accordance with manufacturer's instructions; federal, state or local regulations, or as approved by Engineer.

1. Material and equipment incorporated into the Work:

- a. Shall not be defective.
- b. Shall comply with size, make, type and quality as specified in the Contract Documents, or as specifically approved in writing by Engineer.

- c. Shall not be used for any purpose other than that for which is designed or is specified.
- 2. Manufactured and fabricated products:
 - a. Design, fabricate and assemble in accordance with the best Engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Two or more items of the same kind shall be identical, supplied by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or a specified shall be adhered to unless variations are specifically approved in writing.
- 3. Approval of Materials
 - a. Only new materials and equipment shall be incorporated in the Work unless otherwise specified in the Contract Documents or approved by Engineer. All materials and equipment furnished by Contractor shall be subject to the inspection and approval of Engineer. No material shall be delivered to the Work without prior written approval of Engineer.
 - b. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by Contractor. If required by the Contract Documents or as requested by Engineer, either prior to beginning or during the progress of the Work, Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the approved specifications. Such samples shall be furnished, in accordance with the General Conditions.
 - c. In order to demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes and surfaces, Contractor shall provide such samples of workmanship or finish as may be required.
 - d. The materials and equipment used on the Work shall correspond to the approved samples or other data.

1.03 REFERENCES

A. Definitions:

- 1. "Acceptable Manufacturers" considered for substitution include Suppliers of equipment and material of proven reliability, and as manufactured by reputable manufacturers having experience in the production of specified equipment and

material. Equipment furnished shall be designed, constructed, and installed in accordance with the industry accepted practices and shall operate satisfactorily when installed in accordance with the Contract Documents.

2. "Products" includes materials, equipment, machinery, components, fixtures, systems, and other goods incorporated in the Work. Products do not include machinery and equipment used for preparing, fabricating, conveying, erecting, or installing the Work. Products include Owner-furnished goods incorporated in the Work where use of such goods is specifically required in the Contract Documents.
3. "Special Warranties" includes additions or modifications to standard warranty requirements specified in the Contract Documents.

1.04 SUBMITTALS

- A. Refer to individual Specification Sections for submittal requirements relative to delivery and handling materials and equipment.
- B. Warranty Log Book:
 1. Submit warranty log book prepared specifically for this Project. Submittal shall include a summary listing of all equipment and material warranties furnished in the Contract, date received, and start/end date of warranty period. Individual warranty documentation shall be provided in the submittal.
 2. Submit prior to submittal of final application for payment.
- C. Patent Documentation: Submit licensing arrangement and agreement documentation.

1.05 PRODUCT REQUIREMENTS

- A. Common Products:
 1. Provide products that have not been previously incorporated into another project or facility unless otherwise indicated in the Contract Documents.
 2. Provide products of the same generic kind from a single source.
 3. Provide products complete with accessories, trim, finish, fasteners, and other items shown, indicated, or required for a complete installation for the indicated use and performance.
 4. Standard Products: When available, and unless custom or nonstandard options are specified or indicated, provide standard products of types that have been produced and used successfully in similar situations on other projects.

5. Visual Matching: Where required in the Contract Documents, provide products that match referenced existing construction, approved mock-ups, or approved Sample, as determined by Engineer.
 6. Where the Contract Documents include the phrase “as selected” for product color, finish pattern, option, or similar phrase, provide products selected by Engineer as follows:
 - a. Standard Range: Where the Contract Documents include the phrase “standard range of colors, patterns, textures” or similar phrase, provide color, pattern, density, or texture selected by Engineer from manufacturer’s product line that does not include premium items.
 - b. Full Range: Where the Contract Documents include the phrase “full range of colors, patterns, textures” or similar phrase, Engineer will select color, pattern, density, or texture from manufacturer’s entire product line, including standard and premium items.
- B. Product Compatibility:
1. Similar products by the same Supplier shall be compatible with each other, unless otherwise indicated in the Contract Documents.
 2. Provide products compatible with products previously selected or installed on the Project.
- C. Product Options:
1. For products specified only by reference standard or description, without reference to Supplier, provide products meeting that standard, by a Supplier or from a source that complies with the Contract Documents.
 2. For products specified by naming one or more products or Suppliers, provide the named products that comply with the Contract Documents, unless an “or equal” or substitute product is approved by Engineer.
 3. For products specified by naming one or more products or Suppliers and the term, “or equal”, when Contractor proposes a product or Supplier as an “or equal”, submit to Engineer a request for approval of an “or equal” product or Supplier.
 4. For products specified by naming only one product or manufacturer and followed by words indicating that no substitution is allowed, there is no option and no substitution will be allowed.

D. Concerning Patents:

1. Owner shall be provided a guarantee by Contractor and equipment Supplier that equipment and material furnished in accordance with the Contract Documents is not the subject of patent litigation.
2. Patent litigation or controversy shall include, but not limited to, the following:
 - a. Actual furnished equipment and material is subject or could be subject to patent litigation or is known to infringe on a patent.
 - b. Furnished equipment and material that may result in a process that use of equipment and material in a manner that infringes upon or violates a patent.
3. When patent infringement may occur, Contractor and Supplier shall submit license arrangements among parties, including Contractor, Supplier, and patent owner (controller of patent) at a minimum, which shall permit use of equipment and material as specified in the Contract Documents.
4. Supplier shall indemnify and hold harmless Owner and Engineer against all claims, costs, losses, and damages arising out of or relating to any infringement or patent rights or copyrights incident to the use of equipment and material specified in the Contract Documents and as required in General Conditions and as modified in the Supplemental Conditions.

E. "Or Equal" Products:

1. For proposed products not named in the Contract Documents and considered as an "or equal" as defined in the General Conditions, Contractor shall request in writing Engineer's approval of the "or equal". Request for approval of an "or equal" product shall accompany the Shop Drawing or product data submittal for the proposed product and shall include:
 - a. Contractor's request that the proposed product be considered as an "or equal" in accordance with the General Conditions, accompanied by Contractor's certifications required in the General Conditions.
 - b. Documentation adequate to demonstrate that proposed product does not require revisions to the Contract Documents, that proposed product is consistent with the Contract Documents, and that proposed product will produce results and performance required in the Contract Documents, and that proposed product is compatible with other portions of the Work.
 - c. Detailed comparison of significant qualities of proposed product with the products and manufacturers named in the Contract Documents. Significant qualities include attributes such as performance, weight, size, durability, visual

effect, performance and specific features and requirements shown or indicated.

- d. Evidence that proposed product manufacturer will furnish warranty equal to or better than specified, if any.
- e. List of similar installations for completed projects with project names and physical addresses of installation along with the names, telephone numbers, email addresses and physical address of design professionals and owners associated with the referenced installation, if requested.
- f. Samples, if requested.
- g. Other information requested by Engineer.

1.06 ADMINISTRATIVE REQUIREMENTS

A. Contractor's Responsibilities: In submitting request for substitution, Contractor represents that:

- 1. Contractor has investigated proposed substitution and determined that it is equivalent to item, product, method, or procedure specified, as applicable.
- 2. Contractor will provide the same or better guarantees or warranties for proposed substitution as for the specified product, manufacturer, method, or procedure, as applicable.
- 3. Contractor waives all Claims for additional costs or extension of time related to proposed substitution that subsequently may become apparent.
- 4. Contractor shall submit a minimum of five (5) successful installations of the manufacturer's equipment of the same model, size, and type as specified in the Contract Documents.
- 5. All costs associated with incorporation of a substitution shall be borne by the Contractor, including but not limited to, the cost of redesign and construction provisions.

B. Engineer's Review: A proposed substitution will not be accepted for review if:

- 1. Approval would require changes in design concept or a substantial revision of the Contract Documents.
- 2. Approval would delay completion of the Work or the work of other Contractors.
- 3. Substitution request is indicated or implied on a Shop Drawing or other submittal, or on a request for interpretation or clarification, and is not accompanied by Contractor's formal request for substitution.

4. If the substitution is not clearly substantiated by performance criteria as providing an equivalent or superior performing installation.
 5. All costs associated with Engineer's review of a substitution shall be recorded by Engineer, submitted to Owner, and charged to Contractor.
- C. If Engineer does not approve the proposed substitute, Contractor shall provide the specified product, manufacturer, method, or procedure, as applicable.
- D. Approval of a substitution request will not relieve Contractor from requirement for submitting Shop Drawings as set forth in the Contract Documents.
- E. Product Substitutions Procedure:
1. Requests for approval of substitute products or items will be considered for a period of 30 days after the Effective Date of the Agreement. After end of specified period, requests will be considered only in case of unavailability of a specified product or other conditions beyond Contractor's control.
 2. Submit copies of request for substitution.
 3. Submit separate request for each substitution.
 4. In addition to requirements of the General Conditions and information required on substitution request forms, include with request the following:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature with product description, performance and test data, and reference standards with which product complies.
 - c. Samples, if appropriate.
 - d. Name and address of similar projects on which product was used, and date of installation.
 - e. Certified tests, where applicable, by an independent laboratory attesting the proposed substitution is equal.
 - f. Cost information for the proposed substitution and the specified products.
 - g. Lead time information for the proposed substitution and specified products.
 - h. All other submittal requirements indicated in the individual Specification Sections associated with the specified equipment and material.

F. Construction Methods Substitutions Procedures:

1. Where construction methods or procedures are specified, for a period of 30 days after the Effective Date of the Agreement, Engineer will consider Contractor's written requests for substitute construction methods or procedures specified.
2. Submit copies of request for substitution.
3. Submit separate request for each substitution.
4. In addition to requirements of the General Conditions and information required on substitution request forms, include with request the following:
 - a. Detailed description of proposed method or procedure.
 - b. Itemized comparison of the proposed substitution with the specified method or procedure.
 - c. Drawings illustrating method or procedure.
 - d. Other data required by Engineer to establish that proposed substitution is equivalent to specified method or procedure.

1.07 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain, and distribute copies of such instructions to parties involved in the installation, including five copies to Engineer.
 1. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instruction.
 2. Do not proceed with work without clear instructions.
 3. Do not omit any preparatory step or installation procedure unless specifically approved by Engineer.

1.08 SHIPMENT REQUIREMENTS

- A. When practical, factory-assemble materials and equipment. Match 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 materials and equipment to facilitate handling, and protect materials and equipment from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate the associated purchase order number, bill of lading number, contents by name, Owner's contract name and number, Contractor name, equipment number, and approximate weight. Include complete packing lists and bills of materials with each shipment.
- C. Protect materials and equipment from exposure to the elements and keep thoroughly dry and dust-free at all times. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Lubricate bearings and other items requiring lubrication in accordance with manufacturer's instructions.
- D. Advance Notice of Shipments:
 - 1. Keep Engineer informed of delivery of all materials and equipment to be incorporated in the Work.
- E. Do not ship materials and equipment until:
 - 1. Related Shop Drawings, Samples, and other submittals have been approved or accepted (as applicable) by Engineer, including, but not necessarily limited to, Submittals associated with the materials and equipment being delivered.
 - 2. Manufacturer's instructions for handling, storing, and installing the associated materials and equipment have been submitted to and accepted by Engineer in accordance with the Specifications.
 - 3. Results of source quality control testing (factory testing), when required by the Contract Documents for the associated materials or equipment, have been reviewed and accepted by Engineer.
 - 4. Facilities required for handling materials and equipment in accordance with manufacturer's instructions are in place and available.
 - 5. Required storage facilities have been provided.

1.09 DELIVERY REQUIREMENTS

- A. Scheduling and Timing of Deliveries:
 - 1. Arrange deliveries of materials and equipment in accordance with the accepted Progress Schedule and in ample time to facilitate inspection prior to installation.
 - a. Equipment and material shall not be delivered to the Site prior to 90 days in advance of scheduled installation.
 - b. Partial payment requests will not be processed for materials delivered prior to 90 days before installation or for materials that are improperly stored.

2. Schedule deliveries to minimize space required for and duration of storage of materials and equipment at the Site or delivery location, as applicable.
3. Coordinate deliveries to avoid conflicting with the Work and conditions at Site, and to accommodate the following:
 - a. Work of other Contractors and Owner.
 - b. Owner's operations and maintenance.
 - c. Storage space limitations.
 - d. Availability of equipment and personnel for handling materials and equipment.
 - e. Owner's use of premises.
4. Deliver materials and equipment to the Site during regular working hours.
5. Deliver materials and equipment to avoid delaying the Work and the Project, including work of other Contractors, as applicable. Deliver anchor system materials, including anchor bolts to be embedded in concrete or masonry, in ample time to avoid delaying the Work.

B. Deliveries:

1. Shipments shall be delivered with Contractor's name, Subcontractor's name (if applicable), Site name, Project name, and contract designation clearly marked.
2. Site may be listed as the "ship to" or "delivery" address; but Owner shall not be listed as recipient of shipment unless otherwise directed in writing by Engineer.
3. Provide Contractor's telephone number to shipper; do not provide Owner's telephone number.
4. Arrange for deliveries while Contractor's personnel are at the Site. Contractor shall receive and coordinate shipments upon delivery. Shipments delivered to the Site when Contractor is not present will be refused by Owner, and Contractor shall be responsible for the associated delays and additional costs, if incurred.

C. Containers and Marking:

1. Have materials and equipment delivered in manufacturer's original, unopened, labeled containers.
2. Clearly mark partial deliveries of component parts of materials and equipment to identify materials and equipment, to allow easy accumulation of parts, and to facilitate assembly.

D. Inspection of Deliveries:

1. Immediately upon delivery, Contractor shall inspect shipment to verify that:
 - a. Materials and equipment comply with the Contract Documents and approved or accepted (as applicable) submittals.
 - b. Quantities are correct.
 - c. Materials and equipment are undamaged.
 - d. Containers and packages are intact and labels are legible.
 - e. Materials and equipment are properly protected.
2. Promptly remove damaged materials and equipment from the Site and expedite delivery of new, undamaged materials and equipment, and remedy incomplete or lost materials and equipment to furnish materials and equipment in accordance with the Contract Documents, to avoid delaying progress of the Work.
3. Advise Engineer in writing when damaged, incomplete, or defective materials and equipment are delivered, and advise Engineer of the associated impact on the Progress Schedule.

1.10 HANDLING REQUIREMENTS

- A. Provide equipment and personnel necessary to handle materials and equipment, including those furnished by Owner, by methods that prevent soiling or damaging materials and equipment and packaging.
- B. Provide additional protection during handling as necessary to prevent scraping, marring, and otherwise damaging materials and equipment and surrounding surfaces.
- C. Handle materials and equipment by methods that prevent bending and overstressing.
- D. Lift heavy components only at designated lifting points.
- E. Handle materials and equipment in safe manner and as recommended by the manufacturer to prevent damage. Do not drop, roll, or skid materials and equipment off delivery vehicles or at other times during handling. Hand-carry or use suitable handling equipment.

1.11 STORAGE AND PROTECTION REQUIREMENTS

- A. Storage and protection requirements shall be per Section 01550 Site Access and Storage.

1.12 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Spare parts and maintenance materials shall be supplied in accordance with the Contract Documents. Contractor shall collect and store all spare parts in an area to be designated by Engineer. In addition, Contractor shall furnish to Engineer an inventory listing all spare parts and maintenance materials, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

1.13 GREASE, OIL AND FUEL

- A. All grease, oil and fuel required for testing and initial operation of equipment shall be furnished by Contractor.
- B. Contractor shall be responsible for changing the oil in all (gear compartments) drives of mechanical equipment, after initial break-in of the equipment, which in no event shall be any longer than three weeks of operation.

1.14 WARRANTY

- A. Warranties specified for products shall be in addition to, and run concurrent with, Contractor's general warranty and guarantee and requirements for the required correction period. Disclaimers and limitations in specific product warranties do not limit Contractor's general warranty and guarantee. Further warranty requirements are specified in Section 01740 – Warranties and Bonds.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01650CHECKOUT AND STARTUP PROCEDURESPART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Checkout of products and equipment.
2. Startup procedures of products and equipment

B. Contractor shall initially start up and place equipment installed under the Contract into successful operation, in accordance with the equipment manufacturer's written instructions and as instructed by Supplier at the Site.

C. Provide all material, labor, tools, and equipment required to complete equipment checkout and start-up.

D. Provide chemicals, lubricants, and other required operating fluids.

E. General activities include:

1. Cleaning, as required under other provisions of the Contract Documents.
2. Removing temporary protective coatings.
3. Checking and correcting (if necessary) leveling plates, grout, bearing plates, anchorage devices, fasteners, and alignment of piping, conduits, and ducts that may place stress on the connected equipment.
4. All adjustments required.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate checkout and start-up with other contractors performing Work at the Site.
2. Do not start up system or subsystem for continuous operation until all components of that system or subsystem, including instrumentation and controls, have been tested to the extent practicable and proven to be operable as intended by the Contract Documents.
3. Responsibility for proper operation is by Contractor.

4. Refer to Section 11000 for additional requirements for testing and training.
5. Supplier shall be present during checkout, start-up, and initial operation, except as otherwise specified.
6. Do not start up system, unit process, or equipment without submitting acceptable preliminary operations and maintenance manuals by Contractor, in accordance with Section 01730 – Operations and Maintenance Data.

B. Contractor's Requirements Prior to Owner's Responsibility:

1. Owner will assume responsibility for the equipment upon Substantial Completion.
2. Prior to turning over to Owner responsibility for operating and maintaining system or equipment shall be in accordance with this Section and the following requirements:
 - a. Submit acceptable final operations and maintenance manuals in accordance with Section 01730 – Operations and Maintenance Data.
 - b. Complete system field quality control testing in accordance with the Contract Documents including, but not limited to, the following:
 - 1) Start-up certification shall be performed and completed by the equipment Supplier for the equipment and material prior to be placed into intended use by Owner as specified in the Contract Documents.
 - 2) Equipment and material shall be operated for a minimum 30-day operational period to verify performance. In addition to specific requirements specified in the individual specification sections, process data that is recorded in the PLC shall be submitted to the Engineer in tabular format showing hourly process performance data. A log of all alarms shall also be submitted, along with notes describing corrective measures applied in response to alarm condition.
 - 3) If equipment and material does not perform satisfactorily during the 30-day operational period, then the warranty period start shall be delayed until satisfactorily performance is verified.
 - a) Contractor shall repair or replace equipment and material that does not perform satisfactorily at no cost to Owner.
 - b) Contractor shall furnish all equipment and material, labor, and incidentals necessary to provide equipment and material to the performance level required by the Contract Documents.
 - c. Obtain from Engineer final certificate of Substantial Completion for either entire Work or the portion being turned over to Owner.

1.03 SUBMITTALS

- A. Start-up Certification: Prior to start-up of a system, successfully complete all the testing required of the individual components of the system. Submit five copies of Demonstration/Start-Up Certification (attached to this section) signed by Contractor, Subcontractor and the manufacturer's representative. All copies shall be provided with the respective copies of the Operation and Maintenance Manual. This form shall be completed and submitted before Instruction in Operation to Engineer or a request for final inspection.
- B. Startup Schedule: Detailed summary of schedule, duration, manpower requirement, and Contractor's means and methods for startup.
- C. Closeout Submittals: Manufacturer's certification of installation in accordance with this Section.
- D. Startup testing and operational demonstration performance data.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PRELIMINARY REQUIREMENTS

- A. Prior to the start-up of the facilities, Contractor shall have prepared and tested all equipment, subsystems and systems in accordance with the requirements of the individual Specification Section to check its ability for sustained operation, including inspections and adjustments by Manufacturer's representative.
- B. Contractor shall demonstrate to Engineer and Design Engineer that all of the components of the system are operating under their own controls as designated.
- C. Contractor shall coordinate start-up activities with Owner's operating personnel, the Manufacturer's Representative and with Engineer prior to commencing start-up of a system.
- D. Contractor shall develop and submit schedule in accordance with this Section.
- E. After the facilities are sufficiently complete to permit start-up, Contractor shall furnish competent personnel and pump manufacturers to start-up the facilities. Contractor will be responsible for startup of all facilities constructed under this Contract. During the initial start-up period the Contractor shall check and provide for mechanical operation in accordance with the Contract Documents.

3.02 FIELD QUALITY CONTROL

A. Manufacturers' Field Services:

1. When specified, furnish services of factory trained representatives of material and equipment manufacturers as specified, including supervising installation, adjusting, checkout, start-up, and testing of materials and equipment.
2. Certification:
 - a. When services by manufacturer are required at the Site, within 14 days after first test operation of equipment, submit to Engineer a letter from manufacturer, on manufacturer's letterhead, stating that materials and equipment are installed in accordance with manufacturer's requirements and installation instructions, and in accordance with the Contract Documents.
 - b. Include in the final operations and maintenance manual for the associated equipment a copy of the letter or completed form, as applicable.
3. Manufacturer shall bring any discrepancies to the immediate attention of the Contractor for correction. Contractor shall promptly correct any discrepancies noted by the Manufacturer. Manufacturer shall coordinate correction of discrepancies with the Contractor. Discrepancies and their correction shall be noted in inspection records and in all required reports. Any corrections that result in changes to the work as shown on the Contract Documents shall be approved by the Engineer prior to their execution.

3.03 SYSTEM START-UP

- A. Equipment and materials shall be provided in conformance with the manufacturer's installation instructions and in accordance with the Contract Documents.
- B. Provide start-up services as specified in the individual Specification Sections.
- C. Contractor shall furnish consumables required for startup including, but not limited to, electricity, water, chemicals, and lubrication. Contractor shall provide a plan for disposal of water used for testing unless otherwise specified in the Contract Documents.
- D. Confirm that all equipment in a system is properly energized, prior to start-up.
- E. Initiate start-up of each system in accordance with the Operation and Maintenance Manual.
- F. Observe the system operation and make adjustments as necessary to optimize the system performance.
- G. Coordinate with Engineer and Design Engineer for any adjustments desired or operational problems requiring debugging.

- H. Acceptability of each system's performance will be based on the system performing as specified, under actual operating conditions. The intent of the start-up is to demonstrate to Engineer that each system will function as a complete and operable system under normal as well as emergency operating conditions and is ready for acceptance.
- I. Confirm that the pump vibrations are within acceptable limits.
- J. Check for adequate and proper lubrication.
- K. General system requirements:
 - 1. Start-up by Contractor shall include all mechanical systems, including but not limited to, pumps, and like equipment, and electrical systems.
 - 2. Cleaning as required under provisions of the Contract Documents.
 - 3. Flushing and replacing greases and lubricants as required by Manufacturer.
 - 4. Lubrication.
 - 5. Verify the following:
 - a. Shaft and coupling alignments and reset where needed.
 - b. Set motor, pump and other equipment rotation, safety interlocks, and belt tensions.
 - c. Leveling plates, grout, bearing plates, anchor bolts, fasteners, and alignment of piping, conduits and ducts that may apply stress on equipment.
 - 6. Valves:
 - a. Tighten packing glands to ensure no leakage but allow valve stems to operate without galling.
 - b. Replace packing in valves to retain maximum adjustment after system is determined to be complete.
 - c. Replace packing on valves that continue to leak.
 - d. Remove and repair bonnets that leak.
 - e. After cleaning, coat packing gland threads and valve stems with surface preparation of "Molycote" or "Fel-Pro".
 - 7. Verify that control valve seats are free of foreign matter and are properly positioned for intended service.
 - 8. Tighten flanges and other pipe joints after system has been placed in operation.

9. Replace gaskets that show signs of leakage after tightening.
10. Inspect all joints for leakage:
 - a. Promptly remake each joint that appears to be faulty; do not wait for rust or corrosion to form.
 - b. Clean threads on both parts and apply compound and remake joints.
11. After system has been placed in operation, clean valve seats and headers in fluid system to ensure freedom from foreign matter.
12. Remove rust, scale, and foreign matter from equipment and renew defaced surfaces.
13. Repair damaged insulation.
14. Certificate of Completed Start-Up Demonstration:
 - a. Submit five copies of Certificate of Completed Start-Up Demonstration memo signed by Contractor, Subcontractor and Engineer and insert one copy in each Operation and Maintenance Manual.

(Continued on Next Page)

MANUFACTURER'S CHECK CERTIFICATION

___ CITY OF ORLANDO:	No. Copies ___
___ ENGINEER	No. Copies ___
___ DESIGN ENGINEER:	No. Copies ___
___ CONTRACTOR	No. Copies ___
___ FIELD:	No. Copies ___
___ OTHER:	No. Copies ___

PROJECT DATA AND CONTRACT DATA

NAME OF PROJECT: _____ PROJECT NUMBER _____

LOCATION: _____ DATE: _____

CITY: _____ DRAWING NO.: _____

OTHER: _____

SYSTEM DESCRIPTION: _____

Name of equipment checked: _____

Name of manufacturer or equipment: _____

1. The equipment furnished by us has been checked on the job by us. We have reviewed (where applicable) the performance verification information submitted to us by Contractor.
2. The equipment is properly installed, except for items noted below.*
3. The equipment is operating satisfactorily, except for items noted below.*
4. The written operating and maintenance information (where applicable) has been presented to CONTRACTOR, and has been reviewed with him in detail. Five (5) copies of all applicable operating and maintenance information and parts lists have been furnished to CONTRACTOR for insertion in each of the Equipment Brochures.

MANUFACTURER'S CHECK CERTIFICATION**SIGNATURE PAGE****MANUFACTURER*****CONTRACTOR**

Checked By: _____

Name of Mfgr's Rep. _____

Address & Phone # of Rep. _____

Authorized Sign/Title/Date_____
Name of CONTRACTOR_____

Address & Phone # of Contractor _____

Authorized Sign/Title/Date**SUBCONTRACTOR****DATE OF CERTIFICATION CHECK**_____
Name of Subcontractor Making Check_____
Date_____

Address & Phone # of Subcontractor _____

Authorized Sign/Title/Date

***Manufacturer's Representative Notations: Exceptions noted at
time of check were:**

**Manufacturer's Representative to note adequacy of related equipment that directly affects operation,
performance or function of equipment checked. (No comment presented herein will indicate adequacy
of related systems or equipment):**

DEMONSTRATION / START-UP CERTIFICATION

___ CITY OF ORLANDO:	No. Copies ___
___ ENGINEER:	No. Copies ___
___ DESIGN ENGINEER:	No. Copies ___
___ CONTRACTOR:	No. Copies ___
___ FIELD:	No. Copies ___
___ OTHER:	No. Copies ___

PROJECT DATA AND CONTRACT DATA

NAME OF PROJECT: _____ PROJECT NUMBER _____

LOCATION: _____ DATE: _____

CITY: _____ DRAWING NO.: _____

OTHER: _____

SYSTEM DESCRIPTION: _____

NOTE TO CONTRACTOR:

Submit five (5) copies of all information listed below for checking at least one week before scheduled start-up demonstration of the system. After all information has been approved by ENGINEER, give CITY a start-up demonstration as specified and have the CITY sign five copies of this form. After this has been done, a written request for a final inspection of the system shall be made.

MEMORANDUM:

This memo is for the information of all concerned that the CITY has been given a start-up demonstration on the system described above. This start-up demonstration consisted of the system operation, during which all major items of equipment were explained and demonstrated, and the following items were given to the CITY:

- (a) CITY's copy of Operation and Maintenance Manual for the system containing approved submittal sheets on all items, including the following:
 - (1) Maintenance information published by manufacturer on equipment items.
 - (2) Printed warranties by manufacturers on equipment items.
 - (3) Performance verification information as recorded by CONTRACTOR.

- (4) Check-out Memo on equipment by manufacturer's representative.
 - (5) Written operating instructions on any specialized items.
 - (6) Explanation of guarantees and warranties on the system.
-
- (b) Prints showing actual "As-Built" conditions.
 - (c) A demonstration of the system in operation and of the maintenance procedures which will be required.

(Name of CONTRACTOR)

By: _____
(Authorized Signature, Title & Date)

(Name of Subcontractor)

By: _____
(Authorized Signature, Title & Date)

Operation and Maintenance Manual, Instruction Prints, Start-Up Demonstration and Instruction in Operation Received:

(CITY OF ORLANDO)

By: _____
(Authorized Signature, Title & Date)

- END OF SECTION -

SECTION 01700
PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Substantial Completion.
2. Final inspection.
3. Request for final payment.

1.02 REFERENCES

A. Definitions:

1. Substantial completion procedures for requesting and documenting are in the General Conditions, as modified by Supplemental Conditions.
2. Final inspection procedures for requesting and documenting are in the General Conditions, as modified by Supplemental Conditions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Request for Final Payment:

1. Procedure: Submit request for final payment in accordance with the Agreement and General Conditions, as may be modified by the Supplementary Conditions.

B. Request for final payment shall include:

1. Documents required for progress payments.
2. Documents required in the General Conditions, as may be modified by the Supplementary Conditions.
3. Releases or Waivers of Lien Rights:
 - a. Provide a final release or waiver by Contractor and each Subcontractor and Supplier that provided Contractor with labor, material, or equipment totaling \$10,000 or more.
 - b. Provide list of Subcontractors and Suppliers for which release or waiver of Lien is required.

- c. Each release or waiver of Lien shall be signed by an authorized representative of the entity submitting release or waiver to Contractor, and shall include Subcontractor's or Supplier's corporate seal, when applicable.
 - d. Release or waiver of Lien may be conditional upon receipt of final payment.
 - e. Manufacturer's Affidavit of Release of Liens – furnish a separate, completed form from the manufacturer.
4. Consent of Surety Company to Final Payment.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01730**OPERATION AND MAINTENANCE DATA****PART 1 GENERAL****1.01 SUMMARY**

- A. Section includes: Preparation and submittal of Manual and Electronic Operation and Maintenance Manuals.
- B. Related sections:
 - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
 - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of the Contractor's Work.
 - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that completed Work complies accurately with the requirements of the Contract Documents.
 - a. Section 01200 - Project Meetings.
 - b. Section 01300 - Drawings and Submittals.
 - c. Section 01650 - Start-up/Checkout.
 - d. Section 01700 - Project Closeout.

1.02 SUBMITTALS

- A. Submit six (6) hard copies and one (1) electronic copy of draft Operation and Maintenance Manuals to Engineer for review and acceptance. Draft Operation and Maintenance Manuals shall be submitted to the Engineer prior to shipment of equipment to the jobsite.
- B. Resubmit manual, as required, for each piece of equipment or system, and receive acceptance at least 30 calendar days before scheduled training of City's personnel on each piece of equipment or system. Submit six (6) hard copies and six (6) electronic copies on flash drive of final accepted manuals within 21 calendar days of acceptance of equipment or systems. Final manuals shall include all previous Operation and Maintenance manual submittal information, all source quality control testing data, field quality control test results, startup reports, training materials, and detailed course outlines that could not be included prior to start-up, testing, and training.
- C. Identify all Operations and Maintenance materials and provide transmittals as indicated in Section 01420.
- D. Make additions and revisions to the manuals in accordance with Engineer's review comments. Make final accepted manuals available at project site for use by construction personnel and Engineer.
- E. Instructions of City's personnel

1. Prior to final inspection or acceptance, the manufacturer's representative shall fully instruct City's designated operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment, and systems.
2. Operating and maintenance manual shall constitute the basis of instruction.
 - a. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

1.03 OPERATION AND MAINTENANCE MANUALS

- A. Preparation:
 1. Provide draft hardcopy Operations and Maintenance Manuals on 8 1/2-inch by 11-inch paper, 20 pound minimum white, for typed pages.
 2. Drawings not suitable for 8 1/2-inch by 11-inch format shall be 11-inch by 17-inch (do not use drawing prints larger than 14 inches by 17 inches) and provided with clear plastic pockets labeled with the appropriate drawing number.
 3. Three-hole punch and bind draft manual with screw posts and clear plastic covers. Utilize numbered tab sheets to organize information.
 4. Final hard copy manuals shall be in 3-ring binders with clear overlays front, spine, and back, with cover information inserted on the front and spine.
 5. Provide original and clear text on reproducible non-colored paper.
 6. Provide all dimensions in English units.
- B. Contents of Operation and Maintenance Manuals:
 1. Cover page. Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS".
 - a. As space allows, provide:
 - 1) Equipment name.
 - 2) Equipment tag number(s).
 - 3) Project name.
 - 4) CITY's name.
 - 5) Specification number.
 - 6) Model number.
 - 7) Engineer.
 - 8) Contractor. Name of responsible principal, address and telephone number.
 - 9) Appropriate date.
 2. Table of Contents:
 - a. Provide a general description of information provided within each tab section.
 3. Equipment Summary Form:
 - a. Completed form in the format shown in Appendix A.
 - b. The manufacturer's standard form will not be acceptable.
 4. Lubrication information:
 - a. Required lubricants and lubrication schedules.
 5. Control diagrams:
 - a. Internal and connection wiring, including logic diagrams, color coded wiring diagrams for control panels, ladder logic for computer based systems, and connections between existing systems and new additions, and adjustments such as calibrations and set points for relays, and control or alarm contact settings.
 - b. Complete set of 11-inch by 17-inch drawings of the control system.

- c. Complete set of control schematics.
6. Programming:
 - a. Copies of all Contractor-furnished programming.
7. Start-up procedures:
 - a. Recommendations for installation, adjustment, calibration, and troubleshooting.
8. Operating procedures:
 - a. Step-by-step procedures for starting, operating, and stopping equipment under specified modes of operation.
 - b. Include safety precautions and emergency operating shutdown instructions.
9. Preventative maintenance procedures:
 - a. Recommended steps and schedules for maintaining equipment.
10. Overhaul instructions:
 - a. Directions for disassembly, inspection, repair, and reassembly of the equipment; safety precautions; and recommended tolerances, critical bolt torques, and special tools that are required.
11. Parts list:
 - a. Complete parts list for all equipment being provided.
 - b. Provide name, address, and telephone number of manufacturer's representatives, parts, and service facilities.
 - c. Catalog data for all products or equipment furnished including generic title and identification number of each component part of equipment.
 - 1) Include bearing manufacturer, model and ball or roller pass frequencies for every bearing.
 - d. Local source of supply for parts and replacements
12. Spare parts list:
 - a. Recommended number of parts to be stored at the site and special storage precautions.
13. Drawings:
 - a. Exploded view or plan and section views with detailed callouts.
 - b. Complete set of 11-inch by 17-inch drawings of equipment.
 - c. Provide electrical and instrumentation schematic record drawings.
 - d. Do not use Record Documents as maintenance drawings. However, coordinate with information in the Record Drawings to assure correct illustration of completed installation.
14. Source (factory) quality control test results:
 - a. Provide copies of factory test reports as specified in Section 15958 or the equipment section.
15. Field quality control test results:
 - a. After field-testing is completed, insert field test reports as specified in Section 15958 or the equipment section.
16. Mark each page to clearly identify specific products, component parts, and data applicable to the installation on the Project. Delete or cross out information that does not specifically apply on individual pages. If an entire page or several pages are not applicable, they shall be deleted.
17. Copy of each warranty, bond, and service contract issued. Provide information sheet for City's personnel proper procedures in event of failure and instances which might affect validity of warranties or bonds.
18. Completed Asset Form as described below.

1.04 FORMAT OF ELECTRONIC OPERATION AND MAINTENANCE MANUALS

A. General:

1. All Operation and Maintenance Manuals shall be provided on an external hard drive in the appropriate file format as specified in this Section.
2. Electronic submittals must include all information required for the hard copy submittal, and be arranged in the same order.
3. After the documents are in correct digital format as specified herein, one (1) copy shall be given to the Engineer on an external hard drive compatible with Microsoft® Windows. Do not password protect or otherwise lock the PDF document.
4. External hard drive shall be labeled with the project name, project number, and a brief description of the contents.
5. Portable Document Format (PDF) file settings:
 - a. Bookmarks:
 - 1) Each section (tab) and heading shall be bookmarked.
 - 2) Each bookmark must reflect the structure of the Manual.
 - 3) All levels of bookmarks must appear in a collapsed and visible state when the file is opened.
 - b. PDF files shall have embedded thumbnails and be optimized for fast web view.
6. One single PDF document, including drawing files as necessary, is preferred.
 - a. If an equipment manual is broken into multiple volumes due to the large size of the hardcopy version, a single PDF file for the digital version shall be submitted.

B. Documents:

1. All technical information shall be provided in Adobe Acrobat PDF format.
2. PDF files shall be created from the native format of the document (Microsoft® Word, graphics programs, etc.) wherever possible.
 - a. Materials not available in original digital format (available only in paper format) shall be scanned into a digital format and cleaned to remove smudges, fingerprints, artifacts, and other extraneous marks as specified in this Section.
3. Text shall appear and paginate as it would in a hardcopy.
4. Text shall be searchable.
5. Any items or options not provided in the supplied equipment or system shall be deleted.
6. Where a packaged control system is provided with equipment, provide completely annotated ladder logic for PLC in both printed (hard copy) and electronic (digital) format.

C. Drawings:

1. Drawing shapes shall not degrade when closely zoomed.
2. Screening effects intended to de-emphasize detail in the drawing must be preserved.
3. Any items or options not provided in the supplied equipment or system shall be deleted.
4. Converting hardcopy record drawings:

- a. Record drawings that exist in hardcopy only shall be provided as one Image PDF or Searchable Image PDF file. The following section details the requirements for scanning and conversion for hardcopy drawings to PDF format.
 - b. Converting the sections of a hardcopy record drawing:
 - 1) Each set of drawings shall be provided as one multi-page PDF file.
 - 2) The cover of the drawing set shall be page 1 of the PDF file.
 - 3) When the PDF file opens, the entire cover shall be visible.
 - 4) Shall be scanned at 200 to 300 DPI B&W Group IV Compression.
 - 5. When a photo is present in the background of the drawing, scan at 400 DPI B&W Group IV to provide enough resolution to appear as a grayscale image.
 - 6. Bookmarks:
 - a. Bookmark, at a minimum, each discipline, area designation, or appropriate division of the drawing set.
- D. Asset Form: Completed Asset Form in Microsoft® Excel format as described below.
- E. Converting documentation to digital formats:
- 1. Documentation falls into one of the following two classifications: (1) Archival or (2) Living.
 - a. Archival documentation. Typically does not require updating to remain valid and should be stored in a format that preserves the document and limits one's ability to make changes. The following is a list of archival type documentation:
 - 1) Record drawings.
 - 2) Reports.
 - 3) Specifications/shop drawings.
 - 4) Equipment manuals.
 - 5) Photos.
 - 6) Demonstration and training videos.
 - 7) Other documents.
 - b. Living documentation. Requires periodic updates to remain valid and should be stored in formats that allow for easy updating. The following is a list of living type documentation:
 - 1) Facility O&M Manuals.
 - 2) Standard Operating Procedures.

1.05 ASSET FORM

- A. Contractor shall complete and submit to the City of Orlando project representative the below New Asset Form on a "flash drive" in Microsoft® Excel format for all equipment and products furnished and installed under this Contract. An up-to-date New Asset Form shall be provided with each Pay Application, which shall include all equipment and products provided during the pay period. A complete New Asset Form shall also be included in the Operating and Maintenance Manual submitted for the project. An electronic New Asset Form will be provided to the Contractor at the Pre-Construction Conference.

CITY OF ORLANDO
NEW ASSET FORM

Location	Classification (type of asset)	Name (be descriptive)	Model	Serial Number	Vendor	Manufacturer	Warranty end date	Purchase Date	Purchase Cost	Installed Date

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01740WARRANTIES AND BONDSPART 1 – SCOPE OF WORK

1.01 CONTRACTOR'S RESPONSIBILITY SHALL BE TO

- A. Compile warranties and bonds, as required in the Contract Documents and as specified herein.
- B. Co-execute submittals when requested by Engineer.
- C. Review submittals to verify compliance with Contract Documents.
- D. Submit Warranties and Bonds to Engineer for review and transmittal to Owner.

PART 2 – IMPLEMENTATION

2.01 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and Subcontractors.
- B. Quantity: Two original signed copies are required.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
 - 1. Product of work item.
 - 2. Firm, with name of principal, address, and telephone number.
 - 3. Scope.
 - 4. Date of beginning of warranty, bond or service and maintenance contract.
 - 5. Duration of warranty, bond, or service maintenance contract.
 - 6. Contractor, name of responsible principal, address, and telephone number.

2.02 FORMAT OF SUBMITTALS

- A. Prepare in duplicate packets:
 - 1. Paper: Size 8-1/2 inches x 11 inches, punch sheets for standard three-post binder.

- a. Fold larger sheets to fit into binders.
2. Cover: Identify each packet with typed or printed title 'Warranties and Bonds'. List:
 - a. Title of Project.
 - b. Name of Contractor.
3. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of two inches.

B. Warranties and Bonds

1. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with Contractor's for one (1) year, unless otherwise specified. Durations of systems' (i.e. moisture protection, conveyance, etc.) warranties shall be as specified elsewhere in the Contract Documents. One (1) year warranty period will commence the date of Final Acceptance.
2. Contractor shall be responsible for obtaining certificate for equipment warranty for all major equipment provided which has at least 1 hp motor or which lists for more than \$1,000. Engineer reserves the right to request warranties for equipment not classified as major. Contractor shall still warrant equipment not considered to be "major" in Contractor's one-year warranty period even though certificates of warranty may not be required.
3. In the event that the equipment manufacturer or supplier is unwilling to provide a one-year warranty concurrent with the Contractor's for one (1) year, Contractor shall obtain from the manufacturer a two-year warranty commencing at the time of equipment delivery to the job site. This two-year warranty from the manufacturer shall not relieve Contractor of the one-year warranty.
4. Contractor shall be responsible for all costs of repairs of work which becomes defective during construction and the following warranty period.
5. Warranty shall cover all necessary labor, equipment and replacement parts resulting from faulty or inadequate design, improper assembly or erection, defective workmanship and materials, leakage, breakage, or other failure of any or all equipment and components furnished by the manufacturer.
6. Requirements for Special Warranties: Provide written special warranty document that contains appropriate terms and identification, ready for execution by product manufacturer and Owner. Submit draft warranty with submittals required for product.

- a. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed by product manufacturer and other parties as appropriate.
 - b. Specified Form: When specified forms are included in the Contract Documents, prepare written document, properly executed by product manufacturer and Owner, using appropriate form.
 - c. Refer to Specifications for content and requirements for submitting special warranties.
7. Submit product manufacturer's warranties and special warranties as submittals in accordance with Schedule of Submittals accepted by Engineer.

- END OF SECTION -

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SECTION 01750

WEATHER DAYS

A RAIN EVENT is calculated as $\frac{1}{2}$ inch or greater in a 24-hour period on the project.

The Contractor shall include in their project schedule the average number of RAIN EVENTS per month (MONTHLY AVERAGE) based on the 10-year NOAA average rainfall data at the closest airport to the project (OIA or OEA). After the MONTHLY AVERAGE number of RAIN EVENTS has taken place on the project as measured by the project rain gauge, the Contractor may request a WEATHER DAY. A WEATHER DAY is defined as weather impact to a Controlling Item of work (defined as Critical Path Activities) which effects $\frac{1}{2}$ of a day's production or greater.

The Contractor shall provide a Rain Gauge on site, which shall be reviewed by the Contractor and verified by the CITY INSPECTOR on a daily basis. The Contractor is required to track and provide the rain gauge data to the CITY INSPECTOR on a daily basis. If the Contractor fails to provide the information in a timely fashion, a requested WEATHER DAY will not be considered by the CITY.

An EXTREME RAIN EVENT is defined as a weather event that exceeds 5.6 inches of rain sustained for 30 minutes or more, based upon the 3 closest City Rain Gauge Locations. Additional Weather Days will be determined by the CONSTRUCTION MANAGER based on the impact to the project by the EXTREME RAIN EVENT.

SECTION 02050

DEMOLITION

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall furnish all labor, materials, and equipment in accordance with the requirements of applicable sections of Divisions 1 and 2.
- B. In addition, the Contractor shall demolish and remove all concrete and asphalt paving, electrical equipment, miscellaneous piping, valves, utilities, and structures as required and shown on the Contract Drawings during the construction work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01520 – Maintenance of Utility Operations During Construction
- B. Section 01070 – Abbreviations
- C. Section 01090 – Reference Standards
- D. Section 01040 – Coordination

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. References shall be in accordance with reference standards, codes, and specifications as set forth herein.

1.04 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in Section 01300 – Submittals, the Contractor shall submit the following:
 - 1. Copies of all photographs and other records from the joint existing conditions surveys.

PART 2 – EXECUTION

2.01 DEMOLITION

- A. Existing concrete and asphalt paving, electrical equipment, miscellaneous piping, valves, utilities, and structures within the areas designated for new construction work shall be completely demolished and all debris removed from the site.

- B. Excavation caused by demolition shall be backfilled with fill free from rubbish and debris. Select fill or structural fill shall be used where specifically required on Contract Drawings.
- C. Work shall be performed in such manner as not to endanger the safety of the workmen or the public or cause damage to nearby structures.
- D. Provide all barriers and precautionary measures in accordance with Owner's requirements and other authorities having jurisdiction.
- E. Where parts of existing pavements or structures are to remain in service, demolish the portions to be removed, repair damage, and leave the pavement or structure in proper condition for the intended use. Remove asphalt or concrete pavement, concrete, and masonry to the lines designated by saw-cutting, drilling, chipping, or other suitable methods. Leave the resulting surfaces reasonably true and even, with sharp straight corners that will result in neat joints with new construction and be satisfactory for the purpose intended. Where existing reinforcement extends into new construction, remove the concrete so that the reinforcing is clean and undamaged. Cut off other reinforcing 1/2-inch below the surface and fill with epoxy resin binder flush with the surface.
- F. Prior to the execution of the work, the Contractor, Owner, and Engineer shall jointly survey the condition of the adjoining and/or nearby pavements and structures. Photographs and records shall be made of any prior settlement or cracking of structures, pavements, and the like, that may become the subject of possible damage claims. Contractor shall provide Owner a copy of all records of the joint survey of conditions before demolition activities may begin.

2.02 DISPOSAL OF MATERIAL

- A. All debris resulting from the demolition and removal work shall be disposed of by the Contractor at a properly permitted facility as part of the work of this Contract. All regulations covering material handling and disposal shall be followed. Material designated by the Engineer to be salvaged shall be stored on the construction site as directed. All other material shall be disposed of off-site by the Contractor at the Contractor's expense.
- B. Burning of any debris resulting from the demolition will not be permitted at the site.

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

SECTION 03100

CONCRETE FORMWORK

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall design and furnish all materials for concrete formwork, bracing, and supports and shall design and construct all falsework, all in accordance with the provisions of the Contract Documents.

1.02 RESPONSIBILITY

- A. The design and engineering of the formwork as well as safety considerations are the responsibility of the Contractor.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300 - Submittals
- B. Section 03200 – Reinforcing Steel
- C. Section 03250 – Concrete Accessories
- D. Section 03290 – Joints in Concrete
- E. Section 03300 - Cast in Place Concrete
- F. Section 03600 - Grout

1.04 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. Florida Building Code
 - 2. ACI 318 - Building Code Requirements for Structural Concrete
 - 3. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures
 - 4. ACI 301 - Specifications for Structural Concrete
 - 5. ACI 347 - Recommended Practice for Concrete Formwork
 - 6. U.S. Product Standard for Concrete Forms, Class I, PS 1
 - 7. ACI 117 - Specification for Tolerances for Concrete Construction and Materials and Commentary

1.05 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – Submittals.
 - 1. Manufacturer's data on proposed form release agent
 - 2. Manufacturer's data on proposed formwork system including form ties

1.06 QUALITY ASSURANCE

- A. The variation from established grade or lines shall not exceed 1/4 inch in 10 feet and there shall be no offsets or visible bulges or waviness in the finished surface. All tolerances shall be within the "Suggested Tolerances" specified in ACI 347. The Contractor shall grind smooth all fins and projections between formwork panels as directed by the Engineer.
- B. Curved forms shall be used for curved and circular structures that are cast-in-place. Straight panels will not be acceptable for forming curved structures.

PART 2 – PRODUCTS

2.01 FORMS AND FALSEWORK

- A. All forms shall be smooth surface forms unless otherwise specified.
- B. Wood materials for concrete forms and falsework shall conform to the following requirements:
 - 1. Lumber for bracing, shoring, or supporting forms shall be Douglas Fir or Southern Pine, construction grade or better, in conformance with U.S. Product Standard PS20. All lumber used for forms, shoring or bracing shall be new material.
 - 2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine high density overlaid (HDO) plywood manufactured especially for concrete formwork and shall conform to the requirements of PS1 for Concrete Forms, Class I, and shall be edge sealed. Thickness shall be as required to support concrete at the rate it is placed, but not less than 5/8-inch thick.
- C. Other form materials such as metal, fiberglass, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line and grade indicated may be submitted to the Engineer for approval, but only materials that will produce a smooth form finish equal or better than the wood materials specified will be considered.

2.02 FORMWORK ACCESSORIES

- A. Exterior corners in concrete members shall be provided with 3/4 inch chamfers. Re entrant corners in concrete members shall not have fillets unless otherwise shown.
- B. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form tie

fasteners having a circular cross section, shall not exceed 1 1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming.

- C. Form ties for water-retaining structures shall have integral waterstops. Removable taper ties may be used when acceptable to the Engineer. At locations where removable taper ties are acceptable, a preformed mechanical EPDM rubber plug shall be used to seal the hole left after the removal of the taper tie. Plug shall be X-Plug by the Sika Corporation, Inc., or approved equal. Friction fit plugs shall not be used.
- D. Form release agent shall be a blend of natural and synthetic chemicals that employs a chemical reaction to provide quick, easy and clean release of concrete from forms. It shall not stain the concrete and shall leave the concrete with a paintable surface. Formulation of the form release agent shall be such that it would minimize formation of "Bug Holes" in cast-in-place concrete.

PART 3 – EXECUTION

3.01 FORM DESIGN

- A. Forms and falsework shall be designed for total dead load, plus all construction live load as outlined in ACI 347. Design and engineering of formwork and safety considerations during construction shall be the responsibility of the Contractor.
- B. Forms shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between structural members.
- C. All forms shall be designed for predetermined placing rates per hour, considering expected air temperatures and setting rates.

3.02 CONSTRUCTION

- A. The type, size, quality, and strength of all materials from which forms are made shall be subject to the approval of the Engineer. No falsework or forms shall be used which are not clean and suitable. Deformed, broken or defective falsework and forms shall be removed from the work.
- B. Forms shall be smooth and free from surface irregularities. Suitable and effective means shall be provided on all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects in the finished concrete. Joints between the forms shall be sealed to eliminate any irregularities. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to a practical minimum.
- C. Forms shall be true to line and grade and shall be sufficiently rigid to prevent displacement and sagging between supports. Curved forms shall be used for curved and circular structures. Straight panels joined at angles will not be acceptable for forming curved structures. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly placed concrete. Facing material shall be supported with

studs or other backing which shall prevent both visible deflection marks in the concrete and deflections beyond the tolerances specified.

- D. Forms shall be mortar tight to prevent the loss of water, cement and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1 to 1-1/2-inch diameter polyethylene rod held in position to the underside of the wall form.
- E. All vertical surfaces of concrete members shall be formed, and side forms shall be provided for all footings, slab edges and grade beams, except where placement of the concrete against the ground is called for on the Drawings. Not less than 1-inch of concrete shall be added to the thickness of the concrete member as shown where concrete is permitted to be placed against trimmed ground in lieu of forms. Such permission will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.
- F. All forms shall be constructed in such a manner that they can be removed without hammering or prying against the concrete. Wood forms shall be constructed for wall openings to facilitate loosening and to counteract swelling of the forms.
- G. Adequate clean-out holes shall be provided at the bottom of each lift of forms. Temporary openings shall be provided at the base of column forms and wall forms and at other points to facilitate cleaning and observation immediately before the concrete is deposited. The size, number and location of such clean-outs shall be as acceptable to the Engineer.
- H. Construction joints shall not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. For flush surfaces at construction joints exposed to view, the contact surface of the form sheathing over the hardened concrete in the previous placement shall be lapped by not more than 1 inch. Forms shall be held against hardened concrete to prevent offset or loss of mortar at construction joints and to maintain a true surface.
- I. The formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads. Set forms and intermediate screed strips for slabs accurately to produce the designated elevations and contours of the finished surface. Ensure that edge forms and screed strips are sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment. When formwork is cambered, set screeds to a like camber to maintain the proper concrete thickness.
- J. Positive means of adjustment (wedges or jacks) for shores and struts shall be provided and all settlement shall be taken up during concrete placing operation. Shores and struts shall be securely braced against lateral deflections. Wedges shall be fastened firmly in place after final adjustment of forms prior to concrete placement. Formwork shall be anchored to shores or other supporting surfaces or members to prevent upward or lateral movement of any part of the formwork system during concrete placement. If adequate foundation for shores cannot be secured, trussed supports shall be provided.

- K. Runways shall be provided for moving equipment with struts or legs. Runways shall be supported directly on the formwork or structural member without resting on the reinforcing steel.

3.03 TOLERANCES

- A. Unless otherwise indicated in the Contract Documents, formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits listed in ACI 117.
- B. Structural framing of reinforced concrete around elevators and stairways shall be accurately plumbed and located within 1/4 in. tolerance from established dimensions.
- C. The Contractor shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and benchmarks to be used for reference purposes to check tolerances. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement, the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.
- D. Regardless of the tolerances specified, no portion of the structure shall extend beyond the legal boundary of the structure.

3.04 FORM ACCESSORIES

- A. Suitable moldings shall be placed to bevel or round all exposed corners and edges of beams, columns, walls, slabs, and equipment pads. Chamfers shall be 3/4 inch unless otherwise noted.
- B. Form ties shall be so constructed that the ends, or end fasteners, can be removed without causing appreciable spalling at the faces of the concrete. After ends, or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 2 inches from the formed face of the concrete that is exposed to water or enclosed surfaces above the water surface, and not less than 1 inch from the formed face of all other concrete. Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers to leave the surface of the holes clean and rough before being filled with mortar as specified in Section 03 35 00 - Concrete Finishes. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete member. The use of snap-ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. No snap ties shall be broken off until the concrete is at least three days old. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste.

3.05 APPLICATION - FORM RELEASE AGENT

- A. Forms for concrete surfaces that will not be subsequently waterproofed shall be coated with a form release agent. Form release agent shall be applied on formwork in accordance with manufacturer's recommendations.

3.06 INSERTS AND EMBEDDED ITEMS

- A. Sleeves, pipe stubs, inserts, anchors, expansion joint material, waterstops, and other embedded items shall be positioned accurately and supported against displacement prior to concreting. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

3.07 FORM CLEANING AND REUSE

- A. The inner faces of all forms shall be thoroughly cleaned prior to concreting. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture. Unused tie rod holes in forms shall be covered with metal caps or shall be filled by other methods acceptable to the Engineer.

3.08 FORM REMOVAL AND SHORING

- A. Forms shall not be disturbed until the concrete has attained sufficient strength. Sufficient strength shall be demonstrated by structural analysis considering proposed loads, strength of forming and shoring system, and concrete strength data. Shoring shall not be removed until the supported member has acquired sufficient strength to support its weight and the load upon it. Members subject to additional loads during construction shall be adequately shored to sustain all resulting stresses. Forms shall be removed in such manner as not to impair safety and serviceability of the structure. All concrete to be exposed by form removal shall have sufficient strength not to be damaged thereby.
- B. Provided the strength requirements specified above have been met and subject to the Engineer's approval, forms may be removed at the following minimum times. The Contractor shall assume full responsibility for the strength of all such components from which forms are removed prior to the concrete attaining its full design compressive strength. Shoring may be required at the option of the Engineer beyond these periods.

Ambient Temperature (°F.) During Concrete Placement

	Over 95°	70°-95°	60°-70°	50°-60°	Below 50°
Edge Forms for Slabs on Grade	1 day	1 day	1 day	1 day	
Walls	5 days	2 days	2 days	3 days	Do not remove until directed by Engineer (7 days minimum)
Columns	7 days	2 days	3 days	4 days	
Beam Soffits	10 days	7 days	7 days	7 days	
Elevated Slabs	12 days	7 days	7 days	7 days	

- C. When, in the opinion of the Engineer, conditions of the work or weather justify, forms may be required to remain in place for longer periods of time.
- D. An accurate record shall be maintained by the Contractor of the dates of concrete placings and the exact location thereof and the dates of removal of forms. These records shall

always be available for inspection at the site, and two copies shall be furnished the Engineer upon completion of the concrete work.

3.09 RESHORING

- A. When reshoring is permitted or required the operations shall be planned and subjected to approval by the Engineer.
- B. Reshores shall be placed after stripping operations are complete but in no case later than the end of the working day on which stripping occurs.
- C. Reshoring for the purpose of early form removal shall be performed so that at no time will large areas of new construction be required to support their own weight. While reshoring is under way, no construction or live loads shall be permitted on the new construction. Reshores shall be tightened to carry their required loads but they shall not be overtightened so that the new construction is overstressed. Reshores shall remain in place until the concrete has reached its specified 28-day strength, unless otherwise specified.
- D. For floors supporting shores under newly placed concrete, the original supporting shores shall remain in place or reshores shall be placed. The shoring or reshoring system shall have a capacity sufficient to resist the anticipated loads and, in all cases, shall have a capacity equal to at least one-half of the capacity of the shoring system above. Reshores shall be located directly under a reshore position above unless other locations are permitted.
- E. In multi-story buildings, reshoring shall extend over a sufficient number of stories to distribute the weight of newly placed concrete, forms, and construction live loads so the design superimposed loads of the floors supporting shores are not exceeded.

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SECTION 03200

REINFORCING STEEL

PART 1 – GENERAL

1.01 THE REQUIREMENTS

- A. Provide all concrete reinforcing including all cutting, bending, fastening and any special work necessary to hold the reinforcing steel in place and protect it from injury and corrosion in accordance with the requirements of this section.
- B. Provide deformed reinforcing bars to be grouted into reinforced concrete masonry walls.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03100 – Concrete Formwork
- B. Section 03250 – Concrete Accessories
- C. Section 03300 – Cast-in-Place Concrete
- D. Section 03400 – Precast Concrete

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. Florida Building Code
 - 2. CRSI - Concrete Reinforcing Institute Manual of Standard Practice
 - 3. ACI MNL-66 - ACI Detailing Manual
 - 4. ACI 315 - Details and Detailing of Concrete Reinforcing
 - 5. ACI 318 - Building Code Requirements for Structural Concrete
 - 6. WRI - Manual of Standard Practice for Welded Wire Fabric
 - 7. ASTM A 615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
 - 8. ASTM A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
 - 9. ASTM A 1064 - Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 □ Submittals.

1. Detailed placing and shop fabricating drawings, prepared in accordance with ACI 315 and ACI Detailing Manual - (MNL-66), shall be furnished for all concrete reinforcing. These drawings shall be made to such a scale as to clearly show joint locations, openings, and the arrangement, spacing and splicing of the bars.
2. Mill test certificates - 3 copies of each.
3. Description of the reinforcing steel manufacturer's marking pattern.
4. Requests to relocate any bars that cause interferences or that cause placing tolerances to be violated.
5. Proposed supports for each type of reinforcing.
6. Request to use splices not shown on the Drawings.
7. Request to weld reinforcement.
8. Request to use mechanical couplers along with manufacturer's literature on mechanical couplers with instructions for installation, and certified test reports on the couplers' performance, including International Code Council–Evaluation Services Report (ICC-ES ESR)..
9. Request for placement of column dowels without the use of templates.
10. Request and procedure to field bend or straighten partially embedded reinforcing.
11. International Code Council–Evaluation Services Report (ICC-ES ESR) for dowel adhesives.
12. Certification that all installers of dowel adhesive systems in horizontal to vertically overhead applications are certified as Adhesive Anchor Installers in accordance with the ACI-CRSI Anchor Installer Certification Program.
13. Adhesive dowel testing plan.

1.05 QUALITY ASSURANCE

- A. If requested by the Engineer, the Contractor shall provide samples from each load of reinforcing steel delivered in a quantity adequate for testing. Costs of initial tests will be paid by the Owner. Costs of additional tests due to material failing initial tests shall be paid by the Contractor.
- B. Provide a list of names of all installers who are trained by the Manufacturer's Field Representative on this jobsite prior to installation of products. Record must include the installer name, date of training, products included in the training and trainer name and contact information.

- C. Provide a copy of the current ACI/CRSI "Adhesive Anchor Installer" certification cards, or equivalent, for all installers who will be installing adhesive anchors in the horizontal to vertically overhead orientation.
- D. Inspections of the adhesive dowel system may be made by the Engineer or other representatives of the Owner in accordance with the requirements of the ESR published by the manufacturer. Provide adequate time and access for inspections of products and anchor holes prior to injection, installation, and proof testing.

PART 2 – PRODUCTS

2.01 REINFORCING STEEL

- A. Bar reinforcing shall conform to the requirements of ASTM A 615 for Grade 60 deformed billet-steel reinforcing unless noted otherwise. All reinforcing steel shall be from domestic mills and shall have the manufacturer's mill marking rolled into the bar which shall indicate the producer, size, type, and grade. All reinforcing bars shall be deformed bars. Smooth reinforcing bars shall not be used unless specifically called for on Drawings.
 - 1. Reinforcement to be welded shall conform to the requirements of ASTM A706, Grade 60.
- B. Welded wire fabric reinforcing shall conform to the requirements of ASTM A 1064 and the details shown on the Drawings.
- C. A certified copy of the mill test on each load of reinforcing steel delivered showing physical and chemical analysis shall be provided, prior to shipment. The Engineer reserves the right to require the Contractor to obtain separate test results from an independent testing laboratory in the event of any questionable steel. When such tests are necessary because of failure to comply with this Specification, such as improper identification, the cost of such tests shall be borne by the Contractor.
- D. Use of coiled reinforcing steel will not be allowed.

2.02 ACCESSORIES

- A. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcing during concrete placement. Wire bar supports shall be plastic protected (CRSI Class 1).
- B. Concrete blocks (dobies), used to support and position bottom reinforcing steel, shall have the same or higher compressive strength as specified for the concrete in which it is located.

2.03 MECHANICAL COUPLERS

- A. Mechanical couplers shall comply with ACI 318 Type 2 and develop a tensile strength which exceeds 100 percent of the ultimate tensile strength and 125 percent of the yield strength of the reinforcing bars being spliced. The reinforcing steel and coupler used shall be compatible for obtaining the required strength of the connection.

- B. Where the type of coupler used is composed of more than one component, all components required for a complete splice shall be supplied by the same coupler manufacturer.
- C. Hot forged sleeve type couplers shall not be used. Acceptable mechanical couplers are Dayton Superior Dowel Bar Splicer System by Dayton Superior, Dayton, Ohio, or approved equal. Mechanical couplers shall only be used where shown on the Drawings or where specifically approved by the Engineer.
- D. Tension-compression mechanical splices may only be used where shown on the Drawings or where specifically approved by the Engineer. Tension-compression mechanical splices shall be shear screw coupling sleeve type. Acceptable mechanical couplers are Bar Lock L-series or XL-series couplers by Dayton Superior, Dayton, Ohio, or approved equal.
- E. Dowel bar mechanical splices shall only be used at construction joints where shown on the Drawings or where specifically approved by the Engineer. Acceptable dowel bar mechanical couplers are the DBDI Splicing System by Dayton Superior, Dayton, Ohio, or approved equal.
- F. Where the threaded rebar to be inserted into the coupler reduces the diameter of the bar, the threaded rebar piece and all components of the coupler system shall be provided by the same coupler manufacturer.
- G. Mechanical couplers shall have a valid evaluation report from ICC-ES in accordance with the Building Code.
- H. All mechanical couplers shall be installed in accordance with the manufacturer's recommendations.

2.04 DOWEL ADHESIVE SYSTEM

- A. Where shown on the Drawings, reinforcing bars anchored into hardened concrete with a dowel adhesive system shall use a two-component adhesive mix which shall be injected with a static mixing nozzle following manufacturer's instructions.
- B. All holes shall be drilled in accordance with the manufacturer's instructions except that core drilled holes shall not be permitted unless specifically allowed by the Engineer. Cored holes, if allowed by the manufacturer and approved by the Engineer, shall be roughened in accordance with manufacturer's requirements.
- C. Thoroughly clean drill holes of all debris, drill dust, and water in accordance with manufacturer's instructions prior to installation of adhesive and reinforcing bar.
- D. Degree of hole dampness shall be in strict accordance with manufacturer recommendations. Installation conditions shall be dry, or water saturated unless otherwise permitted by the Engineer. If water saturated installation is approved, appropriate reduction factors in accordance with manufacturer's design requirements should be considered. Water filled or submerged holes shall not be permitted unless specifically approved by the Engineer.
- E. Injection of adhesive into the hole shall be performed in a manner to minimize the formation of air pockets in accordance with the manufacturer's instructions.

F. Embedment Depth:

1. The embedment depth of the bar shall be as shown on the Drawings. Although all manufacturers listed below are permitted, the embedment depth shown on the Drawings is based on "Pure 110+" by DeWalt" ESR 3298 issued 7/2023. If the Contractor submits one of the other named dowel adhesives from the list below, the Engineer shall evaluate the required embedment and the Contractor shall provide the required embedment depth stipulated by the Engineer specific to the approved dowel adhesive.
 2. Where the embedment depth is not shown on the Drawings, the embedment depth shall be determined to provide the minimum allowable bond strength equal to the tensile strength of the rebar according to the manufacturer's ICC-ES ESR.
 3. The embedment depth shall be determined using design parameters listed below. In no case shall the embedment depth be less than the minimum, or more than the maximum, embedment depths stated in the manufacturer's ICC-ES ESR.
 4. Design of adhesive anchor system shall be based on the following parameters:
 - a. Actual compressive strength of concrete.
 - b. Cracked concrete state.
 - c. Dry or water saturated condition for installation.
 - d. Base material temperature between 40- and 104-degrees Fahrenheit.
 - e. Installation with either a hammer drill with carbide bit or hollow-drill bit system drilling methods.
 - f. Minimum age of concrete of 21 days at time of installation.
- G. Engineer's approval is required for use of this system in locations other than those shown on the Drawings.
- H. The adhesive system shall be IBC compliant for use in both cracked and uncracked concrete in all Seismic Design Categories and shall be "HIT-HY 200 Adhesive Anchoring System" as manufactured by Hilti, Inc. "SET-3G Epoxy Adhesive Anchors" as manufactured by Simpson Strong-Tie Co. or "Pure 110+ Epoxy Adhesive Anchor System" by DeWalt. Fast-set epoxy formulations shall not be acceptable. No or equal products will be considered, unless pre-qualified and approved.
- I. All individuals installing dowel adhesive systems in horizontal to vertically overhead applications shall be certified as an Adhesive Anchor Installer in accordance with the ACI-CRSI Anchor Installation Certification Program, or equivalent.

PART 3 – EXECUTION

3.01 FABRICATION

- A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.
- B. The Contractor shall fabricate reinforcing bars for structures in accordance with the bending diagrams, placing lists and placing Drawings.
- C. No fabrication shall commence until approval of Shop Drawings has been obtained. All reinforcing bars shall be shop fabricated unless approved to be bent in the field. Reinforcing bars shall not be straightened or bent in a manner that will injure the material. Heating of bars will not be permitted.
- D. Welded wire fabric with longitudinal wire of W9.5 size or smaller shall be either furnished in flat sheets or in rolls with a core diameter of not less than 10 inches. Welded wire fabric with longitudinal wires larger than W9.5 size shall be furnished in flat sheets only.

3.02 DELIVERY, STORAGE, AND HANDLING

- A. All reinforcing shall be neatly bundled and tagged for placement when delivered to the job site. Bundles shall be properly identified for coordination with mill test reports.
- B. Reinforcing steel shall be stored above ground on platforms or other supports and shall always be protected from the weather by suitable covering. Reinforcing steel shall be stored in an orderly manner and plainly marked to facilitate identification.
- C. Reinforcing steel shall always be protected from conditions conducive to corrosion until concrete is placed around it.
- D. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where delay in depositing concrete occurs, reinforcing shall be inspected again and if necessary recleaned.

3.03 PLACING

- A. Reinforcing steel shall be accurately positioned as shown on the Drawings and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or plastic protected (CRSI Class 1) metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the reinforcing bars without settlement. In no case shall concrete block supports be continuous.
- B. The portions of all accessories in contact with the formwork shall be made of plastic or steel coated with a 1/8-inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.

- C. Tie wires shall be bent away from the forms to provide the specified concrete coverage.
- D. Reinforcing bars additional to those shown on the Drawings, which may be found necessary or desirable by the Contractor for the purpose of securing reinforcing in position, shall be provided by the Contractor at no additional cost to the Owner.
- E. Reinforcing placing, spacing, and protection tolerances shall be within the limits specified in ACI 318 except where in conflict with the Florida Building Code, unless otherwise specified.
- F. Reinforcing bars may be moved within one bar diameter as necessary to avoid interference with other concrete reinforcing, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed placing tolerances, the resulting arrangement of bars shall be as acceptable to the Engineer.
- G. Welded wire fabric shall be supported on slab bolsters spaced not less than 30 inches on centers, extending continuously across the entire width of the reinforcing mat and supporting the reinforcing mat in the plane shown on the Drawings.
- H. Reinforcing shall not be straightened or bent unless specifically shown on the drawings. Bars with kinks or bends not shown on the Drawings shall not be used. Coiled reinforcement shall not be used.
- I. Dowel Adhesive System shall be installed in strict conformance with the manufacturer's recommendations and as required in Article 2.04 above. A representative of the manufacturer must be on site prior to adhesive dowel installation to provide instruction on proper installation procedures for all adhesive dowel installers. Testing of adhesive dowels shall be as indicated below. If the dowels have a hook at the end to be embedded in subsequent work, an approved mechanical coupler shall be provided at a convenient distance from the face of existing concrete to facilitate adhesive dowel testing while maintaining required hook embedment in subsequent work.
- J. All adhesive dowel installations in the horizontal or overhead orientation shall be conducted by a certified Adhesive Anchor Installer as certified by ACI/CSRI Adhesive Anchor Installer Certification program, or equivalent, per ACI 318-11 D.9.2.2 or ACI 318-14 17.8.2.2. Current AAI Certificates must be submitted to the Engineer for approval prior to commencement of any adhesive anchor installations.
- K. Adhesive Dowel Testing
 - 1. At all locations where adhesive dowels are shown on the Drawings, at least 10 percent of all adhesive dowels installed shall be tested to 80% of the yield load of the reinforcing bar, with a minimum of one tested dowel per group.
 - 2. Contractor shall submit a plan and schedule indicating locations of dowels to be tested, load test values, and proposed dowel testing procedure (including a diagram of the testing equipment proposed for use) prior to conducting any testing. Proof testing procedures shall be in accordance with ASTM E 3121.
 - 3. Where Contract Documents indicate adhesive dowel design is the Contractor's responsibility, the Contractor shall submit a plan and schedule indicating locations of dowels to be tested and load test values, sealed by a Professional Engineer currently

registered in the State of Florida. The Contractor shall also submit documentation indicating the Contractor's testing procedures have been reviewed and the proposed procedures are acceptable.

4. Adhesive Dowel shall have no visible indications of displacement or damage during or after the load test. Dowels exhibiting damage shall be removed and replaced. If more than 5 percent of tested dowels fail, then 100 percent of dowels shall be load tested.
5. Load testing of adhesive dowels shall be performed by an independent testing laboratory hired directly by the Contractor. The Contractor shall be responsible for costs of all testing, including additional testing required due to previously failed tests.

3.04 SPLICING

- A. Reinforcing bar splices shall only be used at locations shown on the Drawings. When necessary to splice reinforcing at points other than where shown, the splice shall be as acceptable to the Engineer.
- B. The length of lap for reinforcing bars, unless otherwise shown on the Drawings shall be in accordance with ACI 318 for a class B splice.
- C. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.
- D. Mechanical splices shall be used only where shown on the drawings or when approved by the Engineer. Splices shall also meet requirements of Section 2.03.
- E. Mechanical couplers for dowel bar mechanical splices at construction joints which are located at a joint shall be a type which can be set either flush or recessed from the concrete surface. The couplers shall be sealed during concrete placement to eliminate concrete, or cement paste from entering. After the concrete is placed, couplers intended for future connections shall be plugged and sealed to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

3.05 WELDING OF REINFORCEMENT

- A. Welding of reinforcement shall only occur where shown on the Drawings or where specifically approved by the Engineer.
- B. Welding shall comply with all requirements of AWS D1.4.
- C. Welding shall be performed by certified welders in conformance with AWS D1.4.
- D. Material of reinforcement to be welded shall be as specified in Section 2.01.A.1.

3.06 INSPECTION

- A. The Contractor shall advise the Engineer of his intentions to place concrete and shall allow him adequate time to inspect all reinforcing steel before concrete is placed.

3.07 CUTTING OF EMBEDDED REBAR

- A. The Contractor shall not cut embedded rebar cast into structural concrete without prior approval.

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SECTION 03250

CONCRETE ACCESSORIES

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish all materials, labor and equipment required to provide all concrete accessories including waterstops, expansion joint material, joint sealants, expansion joint seals, crack inducing joint inserts, epoxy bonding agent, and neoprene bearing pads.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03100 - Concrete Formwork
- B. Section 03290 - Joints in Concrete
- C. Section 03300 - Cast-in-Place Concrete
- D. Section 07900 - Joint Fillers, Sealants, and Caulking

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - 2. ASTM D412 - Standard Tests for Rubber Properties in Tension
 - 3. ASTM D 624 - Standard Test method for Rubber Property - Tear Resistance
 - 4. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics
 - 5. ASTM D1751 - Standard Specifications for Preformed Expansion Joint fillers for Concrete Paving and Structural Construction (non-extruding and resilient bituminous types)
 - 6. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
 - 7. ASTM D 1171 - Standard Test Method for Ozone Resistance at 500 pphm
 - 8. ASTM D 471 - Standard Test Method for Rubber Properties
 - 9. ASTM D 2240 – Standard Test for Rubber Property – Durometer Hardness

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - Submittals.
 - 1. Manufacturer's literature on all products specified herein including material certifications.
 - 2. Proposed system for supporting PVC waterstops in position during concrete placement.
 - 3. Samples of products if requested by the Engineer.

PART 2 – PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) WATERSTOPS

- A. PVC waterstops for construction joints shall be flat ribbed type, 6 inches wide with a minimum thickness at any point of 3/8 inches.
- B. Waterstops for expansion joints shall be ribbed with a center bulb. They shall be 9 inches wide with a minimum thickness at any point of 3/8 inch unless shown or specified otherwise. The center bulb shall have a minimum outside diameter of 1 inch and a minimum inside diameter of 1/2 inch.
- C. The waterstops shall be manufactured from virgin polyvinyl chloride plastic compound and shall not contain any scrap or reclaimed material or pigment whatsoever. The properties of the polyvinyl chloride compound used, as well as the physical properties of the waterstops, shall exceed the requirements of the U.S. Army Corps. of Engineers' Specification CRD C572. The waterstop material shall have an off-white, milky color.
- D. The required minimum physical characteristics for this material are:
 - 1. Tensile strength - 1,750 psi (ASTM D-638).
 - 2. Ultimate elongation - not less than 280% (ASTM D-638).
- E. No reclaimed PVC shall be used for the manufacturing of the waterstops. The Contractor shall furnish certification that the proposed waterstops meet the above requirements.
- F. PVC waterstops shall be as manufactured by BoMetals, Inc., DuraJoint Concrete Accessories, or Sika Greenstreak.
- G. All waterstop intersections, both vertical and horizontal, shall be made from factory fabricated corners and transitions. Only straight butt joint splices shall be made in field.

2.02 RETROFIT WATERSTOPS

- A. Retrofit waterstops shall be used where specifically shown on Drawings for sealing joints between existing concrete construction and new construction.
- B. Retrofit waterstops shall be PVC waterstops fabricated from material as described in Section 2.01 of this Specification.

- C. Retrofit waterstop shall be attached to existing concrete surface as shown on Drawings.
- D. Use of split waterstop in lieu of specially fabricated retrofit waterstop will not be acceptable.
- E. Retrofit Waterstop manufacturer must provide a complete system including all Waterstop, stainless steel anchoring hardware, and epoxy for installation.
- F. For construction joints, retrofit waterstop shall be style number 609 by Sika Greenstreak, RF-638 by BoMetals, Inc., or approved equal. For expansion joints, retrofit waterstop shall be style number 667 by Sika Greenstreak, RF-912 by BoMetals, Inc., Type 36RT Retrofit Kit by DuraJoint Concrete Accessories, or approved equal.

2.03 WATERPROOF MEMBRANE PATCH

- A. Waterproof membrane patch shall be Sikadur Combiflex by Sika Corporation or approved equal. Minimum width of waterstop material shall be twelve (12) inches unless shown otherwise on Contract Drawings.

2.04 HYDROPHILIC WATERSTOPS

- A. Hydrophilic waterstops shall be designed to expand under hydrostatic conditions. For hydrostatic head pressure greater than 25 feet, waterstops shall be Adeka Ultra Seal MC-2010MN by Adeka Ultra Seal/OCM, Inc., or Hydrotite CJ-1020-2K by Sika Greenstreak. For hydrostatic head pressure 25 feet or less, Adeka Ultra Seal KBA-1510FP or Hydrotite CJ-1020-2K shall be used. Concrete cover and confinement requirements shall be in accordance with the manufacturer's recommendations.
- B. Waterstops shall be fabricated from a chemically modified natural rubber product with a hydrophilic agent. Use of bentonite based waterstop material will not be allowed.
- C. Waterstops shall either contain an interior stainless-steel mesh or an interior coextrusion of non-hydrophilic rubber to ensure expansion occurs along the width and thickness of the waterstop thereby restricting the expansion in the longitudinal direction.

2.05 WATERSTOP ADHESIVE

- A. Adhesive between waterstops and existing concrete shall be Neoprene Adhesive 77-198 by JGF Adhesives, Sikadur 31 Hi-Mod Gel by Sika Corporation, DP-605 NS Urethane Adhesive by 3M Adhesive Systems.
- B. Hydrophilic, non-bentonite water swelling elastic sealant shall be used to bond hydrophilic waterstops to rough surfaces. Hydrophilic elastic sealant shall be P-201 by Adeka Ultra Seal/OCM, Inc., Leakmaster LV-Z by Sika Greenstreak, or approved equal.

2.06 JOINT SEALANTS

- A. Joint sealants shall comply with Section 07900 - Joint Fillers, Sealants, and Caulking.

2.07 EXPANSION JOINT MATERIAL

- A. Preformed expansion joint material shall be non-extruding, and shall be of the following types:
 - 1. Type I - Sponge rubber, conforming to ASTM D1752, Type I.
 - 2. Type II -Cork, conforming to ASTM D1752, Type II.
 - 3. Type III - Self-expanding cork, conforming to ASTM D1752, Type III.
 - 4. Type IV - Bituminous fiber, conforming to ASTM Designation D1751.

2.08 EPOXY BONDING AGENT

- A. Epoxy bonding agent shall conform to ASTM C881 and shall be Sikadur 32 Hi-Mod, Sika Corporation, Lyndhurst, N.J.; Euco #452 Epoxy System, Euclid Chemical Company, Cleveland, OH, MasterEmaco ADH Series by Master Builders Solutions.

2.09 EPOXY RESIN BINDER

- A. Epoxy resin binder shall conform to the requirements of ASTM C-881, Type III, Grade 3, Class B and C for epoxy resin binder and shall be Sikadur 23, Low-Mod-Gel, manufactured by the Sika Corporation, Lyndhurst, N.J., Flexocrete Gel manufactured by DuraJoint Concrete Accessories or Euco #352 Gel, Euclid Chemical Company, MasterEmaco ADH 327 or 327 RS by Master Builders Solutions.

2.10 BEARING PADS

- A. Neoprene bearing pads shall conform to requirements of A4-F3-T.063-B2, Grade 2, Method B, in accordance with the RMA Rubber Handbook. Pads shall be nonlaminated pads having a nominal Shore A durometer hardness of 70 in accordance with ASTM D2240. Adhesive for use with neoprene pads shall be an epoxy-resin compound compatible with the neoprene having a sufficient shear strength to prevent slippage between pads and adjacent bearing surfaces. Adhesive shall be 20+F Contact Cement by Miracle Adhesives Corporation, Neoprene Adhesive 77-198 by IGI Adhesives, Sikadur 31, Hi-Mod Gel by Sika Corporation, or DP-605 NS Urethane Adhesive by 3M Adhesive Systems.

PART 3 – EXECUTION

3.01 PVC WATERSTOPS

- A. PVC waterstops shall be provided in all construction and expansion joints in water bearing structures and at other such locations as required by the Drawings.
- B. Waterstops shall be carefully positioned so that they are embedded to an equal depth in concrete on both sides of the joint. They shall be kept free from oil, grease, mortar or other foreign matter. To ensure proper placement, all waterstops shall be secured in correct position at 12" on center along the length of the waterstop on each side, prior to placing concrete. Such method of support shall be submitted to the Engineer for review and

approval. Grommets or small pre-punched holes as close to the edges as possible will be acceptable for securing waterstops.

- C. Splices in PVC waterstops shall be made with a thermostatically controlled heating element. Only straight butt joint splices will be allowed in the field. Factory fabricated corners and transitions shall be used at all intersections. Splices shall be made in strict accordance with the manufacturer's recommended instructions and procedures. At least three satisfactory sample splices shall be made on the site. The Engineer may require tests on these splices by an approved laboratory. The splices shall exhibit not less than 80 percent of the strength of the unspliced material.
- D. All splices in waterstops will be subject to rigid review for misalignment, bubbles, inadequate bond, porosity, cracks, offsets, discoloration, charring, and other defects which would reduce the potential resistance of the material to water pressure at any point. All defective joints shall be replaced with material which will pass said review and all faulty material shall be removed from the site and disposed of by the Contractor at no additional cost to the Owner.
- E. Retrofit waterstops shall be installed as shown on Contract Drawings using approved waterstop adhesive and Type 316 stainless steel batten bars and expansion anchors.
- F. Waterstop installation and splicing defects which are unacceptable include, but are not limited to the following:
 - 1. Tensile strength less than 80 percent of parent material.
 - 2. Overlapped (not spliced) Waterstop.
 - 3. Misalignment of waterstop geometry at any point greater than 1/16 inch.
 - 4. Visible porosity or charred or burnt material in weld area.
 - 5. Visible signs of splice separation when splice (24 hours or greater) is bent by hand at sharp angle.

3.02 WATERPROOF MEMBRANE PATCH AND HYDROPHILIC WATERSTOPS

- A. Patches and waterstops shall be installed only where shown on the Drawings.
- B. Patches and waterstops shall be installed in strict accordance with manufacturer's recommendations.

3.03 WATERSTOP ADHESIVE

- A. Adhesive shall be applied to both contact surfaces in strict accordance with manufacturer's recommendations.
- B. Adhesive shall be used where waterstops are attached to existing concrete surfaces.

3.04 INSTALLATION OF EXPANSION JOINT MATERIAL AND SEALANTS

- A. Type I, II, or III shall be used in all expansion joints in structures and concrete pavements unless specifically shown otherwise on the Drawings. Type IV shall be used in sidewalk and curbing and other locations specifically shown on the Drawings.
- B. All expansion joints exposed in the finish work, exterior and interior, shall be sealed with the specified joint sealant. Expansion joint material and sealants shall be installed in accordance with manufacturer's recommended procedures and as shown on the Drawings.
- C. Expansion joint material that will be exposed after removal of forms shall be cut and trimmed to ensure a neat appearance and shall completely fill the joint except for the space required for the sealant. The material shall be held securely in place and no concrete shall be allowed to enter the joint or the space for the sealant and destroy the proper functions of the joint.
- D. A bond breaker shall be used between expansion joint material and sealant. The joint shall be thoroughly clean and free from dirt and debris before the primer and the sealant are applied. Where the finished joint will be visible, masking of the adjoining surfaces shall be carried out to avoid their discoloration. The sealant shall be neatly tooled into place and its finished surfaces shall present a clean and even appearance.
- E. Type 1 joint sealant shall be used in all expansion and crack inducing joints in concrete, except where other specific types are required as stated below, and wherever else specified or shown on the Drawings. Sealant shall be furnished in pour grade or gun grade depending on installation requirements. Primers shall be used as required by the manufacturer. The sealant shall be furnished in colors as directed by the Engineer.

3.05 EPOXY BONDING AGENT

- A. The Contractor shall use an epoxy bonding agent for bonding fresh concrete to existing concrete as shown on the Drawings.
- B. Bonding surface shall be clean, sound, and free of all dust, laitance, grease, form release agents, curing compounds, and any other foreign particles.
- C. Application of bonding agent shall be in strict accordance with manufacturer's recommendations.
- D. Fresh concrete shall not be placed against existing concrete if epoxy bonding agent has lost its tackiness.

3.06 EPOXY RESIN BINDER

- A. Epoxy resin binder shall be used to seal all existing rebar cut and burned off during demolition operations. Exposed rebar shall be burned back 1/2-inch minimum into existing concrete and the resulting void filled with epoxy resin binder.

3.07 BEARING PADS

- A. Care shall be taken in fabricating pads and related metal parts so effects detrimental to the proper performance of the pads, such as uneven bearing and excessive bulging, will not occur.

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SECTION 03290

JOINTS IN CONCRETE

PART 1 – GENERAL

1.01 THE REQUIREMENTS

- A. Provide all materials, labor and equipment required for the construction of all joints in concrete specified herein and shown on the Drawings.
- B. Types of joints in concrete shall be defined as follows:
 - 1. Construction Joints – Intentionally created formed joints between adjacent concrete placements with 100% of reinforcement continuous through joint.
 - 2. Expansion Joints – Formed joints in concrete which separate adjacent sections to allow movement due to dimensional increases and reduction of adjacent sections (temperature and shrinkage). Reinforcement terminates within concrete on each side of joint. Expansion joints may also be considered isolation joints.
 - 3. Contraction Joints – Formed joints in concrete to create interface between concrete placements to allow movement due to dimensional reduction of adjacent sections (shrinkage).
 - a. Full Contraction Joints – Formed contraction joints with no bonded reinforcement passing through the joint.
 - b. Partial Contraction Joints – Formed contraction joints with no more than 50% of bonded reinforcement passing through the joint.
 - 4. Crack Inducing Joints – Joints formed, tooled, or sawcut in a monolithic placement to create a weakened plane to regulate the location of crack formation due to dimensional reduction of adjacent sections (shrinkage).

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03100 - Concrete Formwork
- B. Section 03250 - Concrete Accessories
- C. Section 03300 - Cast-in-Place Concrete
- D. Section 07900 - Joint Fillers, Sealants and Caulking

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ACI 301 - Specifications for Structural Concrete for Buildings
2. ACI 318 - Building Code Requirements for Structural Concrete
3. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures
4. ACI 224.3 – Joints in Concrete Construction

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - Submittals.
 1. Layout drawings showing location and type of all joints to be placed in each structure.
 2. Details of proposed joints in each structure.
 3. For sawcut crack-inducing joints, submit documentation indicating the following:
 - a. Proposed method of sawcutting indicating early entry or conventional sawing.
 - b. Description of how work is to be performed including equipment to be utilized, size of crew performing the work and curing methods.
 - c. Description of alternate method in case of time constraint issues or failure of equipment.

PART 2 – MATERIALS

2.01 MATERIALS

- A. All materials required for joint construction shall comply with Section 03250 - Concrete Accessories and Section 07900 - Joint Fillers, Sealants and Caulking.

PART 3 – EXECUTION

3.01 CONSTRUCTION JOINTS

- A. Construction joints shall be as shown on the Drawings. Otherwise, Contractor shall submit description of the joint and proposed location to Engineer for approval. All joints shall be construction joints or expansion joints unless otherwise specified on the Drawings or approved by the Engineer on the joint plan submittal.
- B. Unless noted otherwise on the Drawings, construction joints shall be located near the middle of the spans of slabs, beams, and girders unless a beam intersects a girder at this point. In this case, the joints in the girders shall be offset a distance equal to twice the width of the beam. Joints in walls and columns shall be at the underside of floors, slabs, beams, or girders and the top of footings or floor slabs unless noted otherwise on Drawings. Beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

- C. Maximum distance between horizontal joints in slabs and vertical joints in walls shall be 50'-0". For exposed walls with fluid or earth on the opposite side, the spacing between vertical and horizontal joints shall be a maximum of 25'-0".
- D. All corners shall be part of a continuous placement, and should a construction joint be required, the joint shall not be located closer than five feet from a corner.
- E. All reinforcing steel and welded wire fabric shall be continued across construction joints. Keys and inclined dowels shall be provided as shown on the Drawings or as directed by the Engineer. Longitudinal keys shall be provided in all joints in walls and between walls and slabs or footings, except as specifically noted otherwise on the Drawings. Size of keys shall be as shown on the Drawings.
- F. All joints in water bearing structures shall have a waterstop. All joints below grade in walls or slabs which enclose an accessible area shall have a waterstop.
- G. Joint plan of walls and slabs shall consider aspect ratio to create placement of sections as close to square as possible. Aspect ratio is defined as the ratio of plan dimensions for slab sections and length to height placement of wall sections. Aspect ratios shall be between 0.65 and 1.5.

3.02 EXPANSION JOINTS

- A. Size and location of expansion joints shall be as shown on the Drawings. All joints shall be construction joints or expansion joints unless otherwise specified on the Drawings or approved by the Engineer on the joint plan submittal.
- B. All expansion joints in water-bearing structures shall have a center-bulb type waterstop. All expansion joints below grade in walls or slabs which enclose an accessible area shall have a center-bulb type waterstop. Waterstop shall be as shown on Drawings and specified in Section 03250 – Concrete Accessories.

3.03 CONTRACTION JOINTS

- A. Contraction joints shall be located as shown on the Drawings or otherwise approved by the Engineer on the joint plan submittal. Contractor shall submit proposed locations and details of all contraction joints concurrent or prior to submission of reinforcement drawings. Use of contraction joints at locations not specifically detailed on the Drawings requires Engineer approval and will only be considered if meeting the stipulations herein.
- B. Full contraction joints may be considered where the structural behavior of the element allows termination of all reinforcement through joint without compromise of structural integrity of element.
- C. Partial contraction joints may be considered where the structural behavior of the element requires partial continuation of reinforcement through joint to ensure structural integrity.
- D. Where full contraction joints are allowed, maximum distance between horizontal contraction joints in slab and vertical contraction joints in walls shall be 50'-0". For exposed walls with fluid or earth on the opposite side, spacing between vertical and horizontal contraction joints shall be a maximum of 25'-0".

- E. Bond breaker shall be provided between sections for all contraction joints.
- F. Joint plan of walls and slabs shall consider aspect ratio to create placement of sections as close to square as possible. Aspect ratio is defined as the ratio of plan dimensions for slab sections and length to height placement of wall sections. Aspect ratios shall be between 0.65 and 1.5.

3.04 CRACK INDUCING JOINTS

- A. Location of crack inducing joints shall be as shown on the Drawings or submitted by Contractor and approved by Engineer.
- B. Crack inducing joints shall be formed either by saw cutting, tooling, or use of approved inserts as specified in Section 03250 - Concrete Accessories.
- C. If approved by the Engineer, saw cutting of contraction joints in lieu of forming or tooling shall conform to the following requirements:
 - 1. Joints shall be sawed as soon as the concrete can support foot traffic without leaving any impression, normally the same day as concrete is placed and in no case longer than 24 hours after concrete is placed.
 - 2. Curing shall be performed using wet curing methods as indicated in Section 03370 – Concrete Curing. Curing mats, fabrics or sheeting materials shall remain in place to the extent possible while cutting of joint is being performed. Curing materials shall only be removed as required and shall be immediately reinstalled once cutting of the joint has been completed.
 - 3. Depth of joint shall be as shown on the drawings or noted in these specifications. At locations where the joint cannot be installed to full depth due to curbs or other stopping points hand tools shall be used to complete joints.
 - 4. Saw cut joints shall meet the requirements of ACI 224.3, Section 2.8, Jointing Practice.
- D. Unless noted otherwise on Drawings, depth of crack inducing joints shall be 1-1/2 inches in reinforced concrete and 1/3 of concrete thickness in unreinforced concrete.

3.05 JOINT PREPARATION

- A. No concrete shall be allowed to enter the joint or the space for the sealant and destroy the proper functions of the joint.
- B. The surface of the concrete at all joints shall be thoroughly cleaned and all laitance removed by wire brushing, air or light sand blasting.
- C. The joint shall be thoroughly clean and free from dirt and debris before the primer and the sealant are applied. Where the finished joint will be visible, masking of the adjoining surfaces shall be carried out to avoid their discoloration. The sealant shall be neatly tooled into place and its finished surface shall present a clean and even appearance.

- D. All joints shall be sealed as shown on the Drawings and specified in Section 03250 - Concrete Accessories.

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Provide all labor, equipment, materials, and services necessary for the manufacture, transportation, and placement of all plain and reinforced concrete work, as shown on the Drawings or as required by the Engineer.
- B. The requirements in this section shall apply to the types of concrete listed below. See Article 2.09 for concrete mix design and properties of concrete.
 - 1. Class A2 Concrete: Normal weight structural concrete in all structures and for all sidewalks and pavement.
 - 2. Class A4 Concrete: Normal weight structural concrete to be used where specifically called for on Contract Drawings or areas where specifically requested by Contractor and approved by Engineer. Class A4 concrete is identical to Class A2 concrete except that coarse aggregate specified in Article 2.08 below shall be Size #8 in accordance with ASTM C33.
 - 3. Class B Concrete: Normal weight structural concrete used for duct bank encasements, catch basins, fence and guard post embedment, concrete fill, and other areas where specifically noted on Contract Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300 – Submittals
- B. Section 03100 - Concrete Formwork
- C. Section 03200 - Reinforcing Steel
- D. Section 03250 - Concrete Accessories
- E. Section 03290 - Joints in Concrete
- F. Section 03350 - Concrete Finishes
- G. Section 03370 - Concrete Curing
- H. Section 03315 - Grout

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of the Specifications, all work herein shall conform to or exceed the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Florida Building Code
2. ACI 214 - Guide to Evaluation of Strength Test Results of Concrete
3. ACI 301 - Specifications for Structural Concrete
4. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete
5. ACI 305 - Specification for Hot Weather Concreting
6. ACI 306 - Standard Specification for Cold Weather Concreting
7. ACI 309R - Guide for Consolidation of Concrete
8. ACI 318 - Building Code Requirements for Structural Concrete and Commentary
9. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures
10. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
11. ASTM C 33 - Standard Specification for Concrete Aggregates
12. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
13. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
14. ASTM C 88 - Standard Test Method for Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate
15. ASTM C 94 - Standard Specification for Ready-Mixed Concrete
16. ASTM C 114 - Standard Test Method for Chemical Analysis of Hydraulic Cement
17. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
18. ASTM C 138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
19. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete
20. ASTM C 150 - Standard Specification for Portland Cement
21. ASTM C 157 - Standard Test Method for Length Change of Hardened Hydraulic Cement, Mortar and Concrete
22. ASTM C 172 - Standard Practice for Sampling Freshly Mixed Concrete
23. ASTM C 192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory

24. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
25. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete
26. ASTM C 295 - Standard Guide for Petrographic Examination of Aggregates for Concrete
27. ASTM C 457 - Standard Test Method for Microscopical Determination of the Air-Void System in Hardened Concrete
28. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete
29. ASTM C 595 - Standard Specification for Blended Hydraulic Cements
30. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
31. ASTM C 989 - Standard Specification for Slag Cement for Use in Concrete and Mortars
32. ASTM C 1012 – Standard Test Method for Length Change of Hydraulic Cement Mortars Exposed to a Sulfate Solution
33. ASTM C 1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
34. ASTM C 1157 – Standard Performance Specification for Hydraulic Cement
35. ASTM C 1260 - Test Method for Potential Alkali Reactivity of Aggregates (Mortar Bar Method)
36. ASTM C 1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
37. ASTM C 1579 – Standard Test Method for Evaluating Plastic Shrinkage Cracking of Restrained Fiber Reinforced Concrete (Using a Steel Form Insert)
38. ASTM C 1602 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
39. ASTM C 1609 – Standard Test Method for Flexural Performance of Fiber Reinforced Concrete (Using Beam with Third-Point Loading)
40. ASTM C 1778 - Standard Guide for Reducing the Risk of Deleterious Alkali – Aggregate Reaction in Concrete

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - Submittals.

1. Sources of all materials and certifications of compliance with specifications for all materials.
2. Certified current (less than 1 year old) chemical analysis (mill test report) of the Portland Cement or Blended Cement to be used. The chemical analysis must include the equivalent alkali content of the Portland Cement or Blended Cement.
3. Certified current (less than 1 year old) chemical analysis of fly ash or slag cement to be used.
4. Aggregate test results showing compliance with required standards, i.e., sieve analysis, potential reactivity, aggregate soundness tests, petrographic analysis, mortar bar expansion testing, etc.
5. Manufacturer's data on all admixtures stating compliance with required standards and are compatible with one another.
6. Concrete mix design for each class of concrete specified herein.
7. Field experience records and/or trial mix data for the proposed concrete mixes for each class of concrete specified herein.

1.05 QUALITY ASSURANCE

- A. Tests on materials used in the production of concrete shall be required as specified in Part 2 - Products. These tests shall be performed by an independent testing laboratory approved by the Engineer at no additional cost to the Owner.
- B. Trial concrete mixes shall be tested when required in accordance with Article 3.01 at no additional cost to the Owner.
- C. Field quality control tests, as specified in Article 3.11, unless otherwise stated, will be performed by a materials testing consultant supplied by the Contractor at no additional cost to the Owner. The Contractor shall pay for the cost of any additional tests and investigation on work performed which does not meet the Specifications. Any individual who samples and tests concrete to determine if the concrete is being produced in accordance with this Specification shall be certified as a Concrete Field-Testing Technician, Grade I, in accordance with ACI CP-2. Testing laboratory shall conform to requirements of ASTM C-1077.

1.06 CONCRETE COORDINATION CONFERENCE

- A. Unless waived by the Engineer, prior to any concrete submittals and at least 35 days prior to the start of the concrete construction schedule, the Contractor shall conduct a meeting at the site. The purpose of the meeting is to review the proposed concrete mix designs, to discuss the proposed approaches and procedures for mixing, transporting, placing, testing, finishing, and curing of all aspects of concrete work to ensure the concrete construction is performed in accordance with the Specifications, and to clarify roles of the parties involved. The Contractor shall send a concrete coordination conference agenda to all attendees 20 days prior to a mutually agreed upon date for the conference.
- B. As a minimum the agenda shall include:

1. Concrete Materials and Mix Designs
 2. Inspection Responsibilities
 3. Concrete Sampling and Testing Specification Requirements
 4. Cylinder Storage and Transportation
 5. Acceptance/Rejection Responsibility and Authority for Fresh Concrete
 6. Concrete finishing
 7. Concrete Curing
 8. Test Report Distribution
 9. Miscellaneous Items
- C. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
1. Contractor's superintendent
 2. Engineer
 3. Owner's representative (if they chose to attend)
 4. Laboratory retained for trial batching and construction quality control testing for the concrete.
 5. Any subcontractors involved in placing, finishing, and curing of concrete
 6. Concrete supplier
 7. Concrete pumping subcontractor (if pumping is being proposed)
- D. Minutes of the meeting shall be recorded, typed, and printed by the Contractor and distributed to all attendees and any other concerned parties within five days of the meeting.

PART 2 – PRODUCTS

2.01 HYDRAULIC CEMENT

A. Portland Cement

1. Portland Cement shall be Type II conforming to ASTM C 150. Type I cement may be used provided either fly ash or slag cement is also included in the mix in accordance with Articles 2.02 or 2.03, respectively.
2. The proposed Portland Cement shall not contain more than 8% tricalcium aluminate and more than 12% tetracalcium aluminoferrite.

3. Portland Cement shall also meet performance requirements of ASTM C 1157.

B. Blended Cement

1. Blended cements shall be Type IP (Portland Fly Ash Cement), Type IS (Portland Slag Cement), or Type IL (Portland Limestone Cement) conforming to ASTM C 595.
2. Type IP cement shall be an inter-ground blend of Portland Cement and fly ash in which the fly ash constituent is between 15% and 25% of the weight of the total blend.
3. Type IS cement shall be an inter-ground blend of Portland Cement and slag cement in which the slag cement constituent is between 30% and 40% of the weight of the total blend.
4. Type IL cement shall be an inter-ground blend of Portland Cement and limestone in which the limestone constituent is between 5% and 15% of the weight of the total blend.
5. Fly ash, slag cement, and limestone used in the production of blended cements shall meet the requirements of Articles 2.02, 2.03, and 2.04 respectively.
6. Cements meeting ASTM C 1157 shall not be used in manufacture of blended cements.
7. Blended cement shall meet the Physical Requirements of Tables 2 and 3 of ASTM C 595 including the requirements for high sulfate resistance in Table 3 as tested per ASTM C1012.

C. Different types of cement shall not be mixed, nor shall they be used alternately except when authorized in writing by the Engineer. Different brands of cement or the same brand from different mills may be used alternately. A resubmittal will be required if different cements are proposed during the Project.

D. Cement shall be stored in a suitable weather-tight building to prevent deterioration or contamination. Cement which has become caked, partially hydrated, or otherwise damaged will be rejected.

2.02 FLY ASH

- A. Fly ash shall meet the requirements of ASTM C 618 for Class F, except that the loss on ignition shall not exceed 4%. Fly ash shall also meet the optional physical requirements for uniformity as shown in Table 3 of ASTM C 618. Fly ash shall be considered as a supplemental cementitious material.
- B. For fly ash to be used in the production of Type IP cement, the Pozzolan Activity Index shall be greater than 75% as specified in Table 3 of ASTM C 595.
- C. Where fly ash is used, the minimum fly ash content shall be 15%.
- D. Additional fly ash shall not be included in concrete mixed with Type IS or IP cement.

2.03 SLAG CEMENT

- A. Slag cement shall meet the requirements of ASTM C 989 including tests for effectiveness of slag in preventing excessive expansion due to alkali-aggregate reactivity as described in Appendix X-3 of ASTM C 989.
- B. Where Slag Cement is used, the minimum Slag Cement content shall be 30%, and the maximum Slag Cement content shall be 40%.
- C. Additional slag cement shall not be included in concrete mixed with Type IS or IP cement.

2.04 PORTLAND LIMESTONE CEMENT (TYPE IL)

- A. Portland Limestone Cement (Type IL) cement shall meet the requirements of ASTM C 595.
- B. Limestone used for blended cement Type IL shall be naturally occurring and meet the requirements of ASTM C 33.
- C. Fly ash or slag cement shall be used with Type IL cement to meet requirements for durability, ASR resistance, sulfate resistance, and use for environmental structures, as specified herein.

2.05 CONCRETE ALKALI LOADING

- A. The alkali loading of concrete is the Portland Cement equivalent alkali content multiplied by the Portland Cement content of the mix in pounds per cubic yard divided by 100. The Portland Cement equivalent alkali content shall be included in the certified chemical analysis of the Portland Cement.
- B. Means of evaluating alkali loading of concrete and proportioning constituents of concrete to minimize alkali loading of content shall also conform to the guidelines of ASTM C1778.

2.06 WATER

- A. Water used for mixing concrete shall be clear, potable, and free from deleterious substances such as objectionable quantities of silty organic matter, alkali, salts, and other impurities.
- B. Water shall not contain more than 100 PPM chloride.
- C. Water shall not contain more than 500 PPM dissolved solids.
- D. Water shall have a pH in the range of 4.5 to 8.5.
- E. Water shall meet requirements of ASTM C 1602.

2.07 AGGREGATES

- A. All aggregates used in normal weight concrete shall conform to ASTM C 33.

- B. Fine Aggregate (Sand) in the various concrete mixes shall consist of natural or manufactured siliceous sand, clean and free from deleterious substances, and graded within the limits of ASTM C 33.
- C. Coarse aggregates shall consist of hard, clean, durable gravel, crushed gravel, or crushed rock. Coarse aggregate shall be size #57 or #67 as graded within the limits given in ASTM C 33 unless otherwise specified.
- D. For Class A3 concrete, coarse aggregate shall be Size #8 in accordance with ASTM C33.
- E. Aggregates shall be tested for gradation by sieve analysis tests in conformance with ASTM C 136.
- F. Aggregates shall be tested for soundness in accordance with ASTM C 88. The loss resulting after five cycles shall not exceed 10 percent for fine or coarse aggregate when using either magnesium sulfate or sodium sulfate.
- G. Contractor shall submit a new trial mix to the Engineer for approval whenever a different aggregate or gradation is proposed.

2.08 ADMIXTURES

- A. Admixtures containing intentionally added chlorides shall not be used.
- B. Air entraining admixture shall be added to all concrete unless noted otherwise. The air entraining admixture shall conform to ASTM C 260. The admixture proposed shall be selected in advance so that adequate samples may be collected, and the required tests made. Air content of concrete, when placed, shall be within the ranges given in the concrete mix design.
- C. The following admixtures are required or used for water reduction, slump increase, and/or adjustment of initial set, and enhancing durability. Admixtures permitted shall conform to the requirements of ASTM C 494. Admixtures shall be non-toxic after 30 days and shall be compatible with and made by the same manufacturer as the air-entraining admixtures.
 - 1. Water reducing admixture shall conform to ASTM C 494, Type A and shall contain no more than 0.05% chloride ions. Acceptable products are "Eucon Series" by the Euclid Chemical Company, "Master Pozzolith Series or Master Polyheed Series" by Master Builders Solutions, and "Plastocrete Series" by Sika Corporation.
 - 2. High range water reducer shall conform to ASTM C 494, Type F or G. The high range water reducer shall be added to the concrete at the batch plant and may be used in conjunction with a water reducing admixture. The high range water reducer shall be accurately measured, and pressure injected into the mixer as a single dose by an experienced technician. A standby system shall be provided and tested prior to each day's operation of the job site system. Concrete shall be mixed at mixing speed for a minimum of 100 mixer revolutions after the addition of the high range water reducer. Acceptable products are "Eucon 37" or Plastol 5000 by the Euclid Chemical Company, "Master Rheobuild 1000 or Master Glenium Series" by Master Builders Solutions, and "Daracem 100 or Advaflo Series" by W.R. Grace.

3. A non-chloride, non-corrosive accelerating admixture may be used where specifically approved by the Engineer. The admixture shall conform to ASTM C 494, Type C or E. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Acceptable products are "MasterSet AC 534 or MasterSet FP 20" by Master Builders Solutions, "Accelguard 80/90 or NCA" by the Euclid Chemical Company and "Daraset" by W.R. Grace.
 4. A retarding admixture may be used where specifically approved by the Engineer. The admixture shall conform to ASTM C494, Type B or D. Acceptable products are "Eucon NR or Eucon Retarder 100" by the Euclid Chemical Company, "MasterSet R Series or MasterSet DELVO Series" by Master Builders Solutions, and "Plastiment" by Sika Corporation.
 5. Workability Retaining Admixture shall conform to ASTM C 494, Type S. The admixture shall retain concrete workability without affecting time of setting or early-age strength development. Acceptable products are "MasterSure Z 60" by Master Builders Solutions, ViscoFlow-2020 by Sika Corporation, PLASTOL AMP-X3 by Euclid Chemical Company, or equal.
- D. Admixtures containing calcium chloride, thiocyanate or more than 0.05 percent chloride ions are not permitted. The addition of admixtures to prevent freezing is not permitted.
- E. The Contractor shall submit manufacturer's data including the chloride ion content of each admixture and certification from the admixture manufacturer that all admixtures utilized in the design mix are compatible with one another and properly proportioned prior to mix design review.

2.09 CONCRETE MIX DESIGN

- A. The proportions of cement, aggregates, admixtures, and water used in the concrete mixes shall be based on laboratory trial mixes in conformance with ACI 301. Trial mixes shall also conform to Article 3.01 of this Specification. Trial mix data used as the basis for the proposed concrete mix design shall be submitted to the Engineer along with the proposed mix.
- B. Structural concrete shall conform to the following requirements. Cementitious materials refer to the total combined weight of all cement, fly ash, and slag cement contained in the mix.

1. Compressive Strength (28-Day)

Concrete Class A2, A4	4,000 psi (min.), 6000 psi (max.)
Concrete Class B	3,000 psi (min.), 5000 psi (max.)

2. Water/cementitious materials ratio, by weight

	Maximum	Minimum
Concrete Class A2, A4	0.45	0.39
Concrete Class B	0.50	0.39

3. Slump range

- a. 4" nominal unless high range water reducing admixture is used.
- b. 9" max if high range water reducing admixture is used.
- c. 10.5" max if self-compacting concrete additive is used for tremie mix design.

4. Air Content

Concrete Class A2, A4	3% ±1.5%
Concrete Class B	3% Max (non-air-entrained)

PART 3 – EXECUTION

3.01 TRIAL MIXES

- A. Trial mixes shall be used to confirm the quality of a proposed concrete mix in accordance with ACI 301. An independent qualified testing laboratory designated and retained by the Contractor shall test a trial batch of each of the preliminary concrete mixes submitted by the Contractor. The trial batches shall be prepared using the aggregates, cement, supplementary cementitious materials, and admixtures proposed for the project. The trial batch materials shall be of a quantity such that the testing laboratory can obtain enough samples to satisfy requirements stated below. Tests on individual materials stated in PRODUCTS should already be performed before any trial mix is done. The cost of laboratory trial batch tests for each specified concrete mix will be borne by the Contractor and the Contractor shall furnish and deliver the materials to the testing laboratory at no cost to the Owner.
- B. The independent testing laboratory shall prepare a minimum of fifteen (15) standard test cylinders in accordance with ASTM C 31 in addition to conducting slump (ASTM C 143), air content (C 231) and density (C 138) tests. Compressive strength test on the cylinders shall subsequently be performed by the same laboratory in accordance with ASTM C 39 as follows: Test 3 cylinders at age 7 days; test 3 cylinders at age 21 days; test 3 cylinders at age 28 days and test 3 cylinders at 56 days. The cylinders shall be carefully identified as "Trial Mix, Contract No. ". If the average 28-day compressive strength of the trial mix is less than that specified, or if any single cylinder falls below the required strength by more than 500 psi, the mix shall be corrected, another trial batch prepared, test cylinders taken, and new tests performed as before. Any such additional trial batch testing required shall be performed at no additional cost to the Owner. Adjustments to the mix shall be considered refinements to the mix design and shall not be the basis for extra compensation to the Contractor.

3.02 SHRINKAGE TESTS

- A. Concurrent with the trial batch requirements stated in Article 3.01, the testing laboratory shall perform drying shrinkage tests for the trial batches as specified herein. Shrinkage testing is only required for concrete to be used for environmental concrete structures (Class A1).
- B. Fabricate, cure, dry, and measure specimens in accordance with ASTM C157 modified as follows.
 - 1. Remove specimens from molds at an age of 23 hours $\pm$ 1 hour after trial batching.
 - 2. Place specimens immediately in water at 70°F $\pm$ 3°F for at least 30 minutes.
 - 3. Measure within 30 minutes thereafter to determine original length, then submerge in saturated lime water at 73°F $\pm$ 3°F.
 - 4. At age seven days, measure to determine expansion, expressed as a percentage of original length. This length at age seven days shall be the base length for drying shrinkage calculations (zero days' drying age).
 - 5. Store specimens immediately in a humidity-controlled room maintained at 73°F $\pm$ 3°F and 50 percent $\pm$ 4 percent relative humidity for the remainder of the test.
 - 6. Make and report separately measurements to determine shrinkage expressed as base length percentage for 7, 14, 21, and 28 days of drying after 7 days of moist curing.
- C. Compute the drying shrinkage deformation for each specimen as the difference between the base length (at zero days' drying age) and the length after drying at each test age. Compute the average drying shrinkage deformation for the specimens to the nearest 0.0001 inch at each test age. If the drying shrinkage for any specimen departs from the average test age for that test by more than 0.0004 inch, disregard the results obtained from that specimen. Report results from the shrinkage test to the nearest 0.001 percent of shrinkage. Take compression test specimens in each case from the same concrete used for preparing drying shrinkage specimens. These tests shall be considered part of the normal compression tests for the project.
- D. The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21-day drying age or at 28-day drying age, shall be 0.036 or 0.042 percent, respectively. Use a mix design for construction that has first met the trial batch shrinkage requirements.
- E. If the trial batch specimens do not meet both the strength and shrinkage requirements, revise the mix designs and/or materials and retest.

3.03 PRODUCTION OF CONCRETE

- A. All concrete shall be machine mixed. Hand mixing of concrete will not be permitted. The Contractor may supply concrete from a ready-mix concrete plant or from a site mixed plant. In selecting the source for concrete production, the Contractor shall carefully consider its capability for providing quality concrete at a rate commensurate with the

requirements of the placements so that well bonded, homogenous concrete, free of cold joints, is assured.

B. Ready-Mixed Concrete

1. At the Contractor's option, ready-mixed concrete may be used meeting the requirements for materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94.
2. Truck mixers shall be equipped with electrically actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type, and shall be mounted in the driver's cab. The counters shall be actuated at the time of starting mixers at mixing speeds.
3. Each batch of concrete shall be mixed in a truck mixer for not less than 100 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolutions of mixing.
4. Truck mixers and their operation shall be such that the concrete throughout the mixed batch, as discharged, is within acceptable limits of uniformity with respect to consistency, mix and grading. If slump tests taken at approximately the 1/4 and 3/4 points of the load during discharge give slumps differing by more than one inch when the specified slump is 3 inches or less, or if they differ by more than 2 inches when the specified slump is more than 3 inches, the mixer shall not be used on the work unless the causing condition is corrected and satisfactory performance is verified by additional slump tests. All mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.
5. Ready-mixed concrete shall be delivered to the site for the work and discharge shall be completed within the time requirements stated in Article 3.04 of this Section.
6. Every concrete delivery shall be accompanied by a delivery ticket containing at least the following information:
 - a. Date and truck number
 - b. Ticket number
 - c. Mix designation of concrete
 - d. Cubic yards of concrete
 - e. Cement brand, type, and weight in pounds
 - f. Weight in pounds of fine aggregate (sand)
 - g. Weight in pounds of coarse aggregate (stone)

- h. Air entraining agent, brand, and weight in pounds and ounces
 - i. Other admixtures, brand, and weight in pounds and ounces
 - j. Water, in gallons, stored in attached tank
 - k. Water, in gallons, maximum that can be added without exceeding design water/cementitious materials ratio
 - l. Water, in gallons, used (by truck driver)
 - m. Time of loading
 - n. Time of delivery to job (by truck driver)
7. Any truck delivering concrete to the job site, which is not accompanied by a delivery ticket showing the above information will be rejected and such truck shall immediately depart from the job site.
 8. The use of non-agitating equipment for transporting ready-mixed concrete will not be permitted. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted. The quality and quantity of materials used in ready-mixed concrete and in batch aggregates shall be subject to inspection at the batching plant by the Engineer.

C. Site Mixed Concrete

1. Site Mixed Concrete shall only be used where specifically approved by the Engineer.
2. Scales for weighing concrete ingredients shall be accurate when in use within ± 0.4 percent of their total capacities. Standard test weights shall be available to permit checking scale accuracy.
3. Operation of batching equipment shall be such that the concrete ingredients are consistently measured within the following tolerances:
 - a. Cement, fly ash, or slag cement ± 1 percent
 - b. Water ± 1 percent
 - c. Aggregates ± 2 percent
 - d. Admixtures ± 3 percent
4. Each batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates. Water shall continue for a period which may extend to the end of the first 25 percent of the specified mixing time. Controls shall be provided to prevent batched ingredients from entering the mixer before the previous batch has been completely discharged.
5. The concrete shall be mixed in a batch mixer capable of thoroughly combining the aggregates, cement, and water into a uniform mass within the specified mixing time, and of discharging the concrete without harmful segregation. The mixer shall bear a

manufacturer's rating plate indicating the rate capacity and the recommended revolutions per minute and shall be operated in accordance therewith.

6. Mixers with a rated capacity of one cubic yard or larger shall conform to the requirements of the Plant Mixer Manufacturers' Division of the Concrete Plant Manufacturers' Bureau.
7. Except as provided below, batches of one cubic yard or less shall be mixed for not less than one minute. The mixing time shall be increased 15 seconds for each cubic yard or fraction thereof of additional capacity.
8. Shorter mixing time may be permitted provided performance tests made in accordance with of ASTM C 94 indicate that the time is sufficient to produce uniform concrete.
9. Controls shall be provided to ensure that the batch cannot be discharged until the required mixing time has elapsed. At least three-quarters of the required mixing time shall take place after the last of the mixing water has been added.
10. The interior of the mixer shall be free of accumulations that will interfere with mixing action. Mixer blades shall be replaced when they have lost 10 percent of their original height.
11. Air-entraining admixtures and other chemical admixtures shall be charged into the mixer as solutions and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water. Admixtures that cannot be added in solution may be weighed or may be measured by volume if recommended by the manufacturer.
12. If two or more admixtures are used in the concrete, they shall be added separately to avoid possible interaction that might interfere with the efficiency of either admixture or adversely affect the concrete.
13. Addition of retarding admixtures shall be completed within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Retarding admixtures shall not be used unless approved by the Engineer.
14. Concrete shall be mixed only in quantities for immediate use and within the time and mixing requirements of ASTM C 94.

3.04 CONCRETE PLACEMENT

- A. No concrete shall be placed prior to approval of the concrete mix design. Concrete placement shall conform to the recommendations of ACI 304.
- B. Prior to concrete placement, all reinforcement shall be securely and properly fastened in its correct position. Formwork shall be clean, oiled and form ties at construction joints shall be retightened. All bucks, sleeves, castings, hangers, pipe, conduits, bolts, anchors, wire, and any other fixtures required to be embedded therein shall be in place. Forms for openings to be left in the concrete shall be in place and anchored by the Contractor. All loose debris in bottoms of forms or in keyways shall be removed and all debris, water,

snow, ice, and foreign matter shall be removed from the space to be occupied by the concrete. The Contractor shall notify the Engineer in advance of placement, allowing sufficient time for a concurrent inspection and for any corrective measures required.

- C. On horizontal joints where concrete is to be placed on hardened concrete, flowing concrete containing a high range water reducing admixture or cement grout shall be placed with a slump not less than 8 inches for the initial placement at the base of the wall. Concrete or cement grout shall meet all strength and service requirements specified herein for applicable class of concrete. This concrete shall be worked well into the irregularities of the hard surface.
- D. All concrete shall be placed during the daylight hours except with the consent of the Engineer. If special permission is obtained to carry on work during the night, adequate lighting must be provided.
- E. When concrete arrives at the project with slump below that suitable for placing, as indicated by the Specifications, water may be added to bring the concrete within the specified slump range provided the design water-cementitious materials ratio is not exceeded. The water shall be incorporated by additional mixing equal to at least half of the total mixing required. Water may be added only to full trucks. On-site tempering shall not relieve the Contractor from furnishing a concrete mix meeting all specified requirements.
- F. Concrete shall be conveyed as rapidly as practical to the point of deposit by methods which prevent the separation or loss of the ingredients. The concrete shall be deposited so that additional handling will be unnecessary. Discharge of the concrete to its point of deposit shall be completed within 90 minutes after the addition of the cement to the aggregates unless workability-retaining admixtures are included and approved by the Engineer. In hot weather, or under conditions contributing to quick stiffening of the concrete, the time between the introduction of the cement to the aggregates and discharge shall not exceed the requirements stated in Article 3.10 of this Section.
- G. Where concrete is conveyed to position by chutes, a continuous flow in the chute shall be maintained. The angle and discharge arrangement of the chute shall be such to prevent segregation of the concrete ingredients. The delivery end of the chute shall be as close as possible to the point of deposit and in no case shall the free pour from the delivery end of the chute exceed five feet, unless approved otherwise.
- H. Special care must be exercised to prevent splashing of forms or reinforcement with concrete, and any such splashes or accumulations of hardened or partially hardened concrete on the forms or reinforcement above the general level of the concrete already in place must be removed before the work proceeds.
- I. Placing of concrete shall be regulated so the pressure caused by the wet concrete shall not exceed that used in the design of the forms.
- J. All concrete for walls shall be placed through openings in the form spaced at frequent intervals or through tremies (heavy duct canvas, rubber, etc.), equipped with suitable hopper heads. Tremies shall be of variable lengths so the free fall shall not exceed five (5) feet, and enough tremies shall be placed in the form to ensure the concrete remains level.

- K. When placing concrete which will be exposed, sufficient illumination shall be provided in the interior of the forms so the concrete, at places of deposit, is visible from deck and runways.
- L. Concrete shall be placed to thoroughly embed all reinforcement, inserts, and fixtures.
- M. When forms are removed, surfaces shall be even and dense, free from aggregate pockets or honeycomb. Concrete shall be consolidated using mechanical vibration, supplemented by forking and spading by hand in the corners and angle of forms and along form surfaces while the concrete is plastic under the vibratory action. Consolidation shall conform to ACI 309.
- N. Mechanical vibration shall be applied directly to the concrete, unless otherwise approved by the Engineer. The bottom of vibrators used on floor slabs must not be permitted to ride the form supporting the slab. Vibration shall be applied at the point of deposit and in freshly placed concrete by a vertical penetration of the vibrator. Vibrators shall not be used to move concrete laterally within the forms.
- O. The intensity of vibration shall be sufficient to cause settlement of the concrete into place and to produce monolithic joining with the preceding layer. Vibration shall be of sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures with a vibrator transmitting not less than 7,500 impulses per minute. Since the duration of vibration per square foot of surface is dependent on the frequency (impulses per minute), size of vibrator, and slump of concrete, the length of time must therefore be determined in the field. Vibration shall not be continued in any one location to the extent that pools of grout are formed.
- P. Care shall be taken to prevent cold joints when placing concrete in any portion of the work. The concrete placing rate shall ensure that each layer is placed while the previous layer is soft or plastic, so the two layers can be made monolithic by penetration of the vibrators. Maximum thickness of concrete layers shall be 18 inches. The surface of the concrete shall be level whenever a run of concrete is stopped.
- Q. To prevent feathered edges, construction joints located at the tops of horizontal lifts near sloping exposed concrete surfaces shall be inclined near the exposed surface, so the angle between such inclined surface and the exposed concrete surface will be not less than 50°.
- R. In placing unformed concrete on slopes, the concrete shall be placed ahead of a non-vibrated slip-form screed extending approximately 2-1/2 feet back from its leading edge. The method of placement shall provide a uniform finished surface with the deviation from the straight line less than 1/8 inch in any concrete placement. Concrete ahead of the slip-form screed shall be consolidated by internal vibrators to ensure complete filling under the slip-form. Prior to placement of concrete on sloped walls or slabs, the Contractor shall submit a plan specifically detailing methods and sequence of placements, proposed concrete screed equipment, location of construction joints and water stops, and/or any proposed deviations from the stated requirements to the Engineer for review and approval.
- S. Concrete shall not be placed during rains sufficiently heavy or prolonged to prevent washing of mortar from coarse aggregate on the forward slopes of the placement. Once placement of concrete has commenced in a block, placement shall not be interrupted by diverting the placing equipment to other uses.

3.05 PLACING FLOOR SLABS ON GROUND

- A. The subgrade for slabs on ground shall be well drained and of adequate and uniform loadbearing nature. The in-place density of the subgrade soils shall be at least the minimum required by the specifications. No foundation, slab, or pavement concrete shall be placed until the depth and character of the foundation soils have been inspected and approved by the materials testing consultant.
- B. The subgrade shall be free of frost before concrete placing begins. If the temperature inside a building where concrete is to be placed is below freezing, the temperature shall be raised and maintained above 50° long enough to remove all frost from the subgrade.
- C. The subgrade shall be moist at the time of concreting. If necessary, the subgrade shall be dampened with water in advance of concreting, but no free water shall remain standing on the subgrade nor any muddy or soft spots when the concrete is placed.
- D. Thirty-pound felt-paper shall be provided between edges of slabs-on-ground and vertical and horizontal concrete surfaces, unless otherwise indicated on the Drawings.
- E. Contraction joints shall be provided in slabs-on-ground at locations indicated on the Drawings. Contraction joints shall be installed as per Section 03290 - Joints in Concrete.
- F. Floor slabs shall be screeded level or pitched to drain as indicated on the Drawings. Finishes shall conform with requirements of Section 03350 - Concrete Finishes.

3.06 PLACING CONCRETE UNDERWATER (CLASS A4 CONCRETE)

- A. Placing concrete underwater (tremie concrete) will be permitted only when shown on the Drawings. Concrete deposited under water shall be carefully placed in a compacted mass in final position by means of a tremie, a closed bottom dump bucket or other approved method. Care must be exercised to maintain still water at the point of deposit. Concrete shall not be placed in running water. Underwater formwork shall be watertight. The consistency of the concrete shall be regulated to prevent segregation of materials. The method of depositing concrete shall be regulated such that the concrete enters the mass of the previously placed concrete from within, displacing water with a minimum disturbance to the surface of the concrete.
- B. Tremie shall consist of a tube having a diameter of not less than 10 inches and constructed in sections having flanged couplings fitted with gaskets. The tremie shall be supported to permit free movement of the discharge and over the entire top surface of the work and shall permit rapid lowering when necessary to choke off or retard the flow. The discharge end shall be sealed, and the tremie tube kept full to the bottom of the hopper. When a batch is dumped into the hopper, the tremie shall be slightly raised, but not out of the concrete at the bottom, until the batch discharges to the bottom of the hopper. The flow shall then be stopped by lowering the tremie. The flow shall be continuous until the placement has been completed.

3.07 PLACING CONCRETE UNDER PRESSURE

- A. Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall have the capacity for the operation. The operation of the pump shall produce a continuous stream of concrete without air pockets. To obtain the least line resistance, the

layout of the pipeline system shall contain minimum bends with no change in pipe size. If two sizes of pipe must be used, the smaller diameter should be used at the pump end and the larger at the discharge end. When pumping is completed, the concrete remaining in the pipelines shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients.

- B. Priming of the concrete pumping equipment shall be with cement grout only. Use of specialty mix pump primers or pumping aids will not be allowed.
- C. No aluminum parts shall be in contact with the concrete during the placing of concrete under pressure.
- D. Prior to placing concrete under pressure, the Contractor shall submit the concrete mix design together with test results from a material's testing consultant proving the proposed mix meets all requirements. In addition, an actual pumping test under field conditions is required prior to acceptance of the mix. This test requires a duplication of anticipated site conditions from beginning to end. The batching and truck mixing shall be the same as will be used during construction, and the pipe and pipe layouts will reflect the maximum height and distance contemplated. All submissions shall be subject to approval by the Engineer.
- E. If the pumped concrete does not produce satisfactory end results, the Contractor shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.
- F. The pumping equipment must have two cylinders and be designed to operate with one cylinder only in case the other one is not functioning. In lieu of this requirement, the Contractor may have a standby pump on the site during pumping.
- G. The minimum diameter of the hose (conduits) shall be four inches.
- H. Pumping equipment and hoses (conduits) that are not functioning properly shall be replaced.
- I. Concrete samples for quality control in accordance with Article 3.11 will be taken at the placement (discharge) end of the line.

3.08 ORDER OF PLACING CONCRETE

- A. To minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints shown on the Drawings and maximum lengths as indicated on Drawings. Where required on the Drawings and wherever else practical, the placing of such units shall be done in a strip pattern in accordance with ACI 302.1. A minimum of 72 hours shall pass prior to placing concrete directly adjacent to previously placed concrete.

3.09 CONCRETE WORK IN COLD WEATHER

- A. Cold weather concreting procedures shall conform to the requirements of ACI 306.1.
- B. The Engineer may prohibit the placing of concrete at any time when air temperature is 40°F. or lower. If concrete work is permitted, the concrete shall have a minimum temperature, as placed, of 55°F. for placements less than 12" thick, 50°F. for placements 12" to 36" thick, and 45°F. for placements greater than 36" thick. The temperature of the

concrete as placed shall not exceed these minimum values by more than 20°F, unless otherwise approved by the Engineer.

- C. All aggregate and water shall be preheated. Precautions shall be taken to avoid the possibility of flash set when aggregate or water are heated to a temperature greater than 100°F. to meet concrete temperature requirements. The addition of admixtures to the concrete to prevent freezing is not permitted. All reinforcement, forms, and concrete accessories shall be defrosted by an approved method. No concrete shall be placed on frozen ground.

3.10 CONCRETE WORK IN HOT WEATHER

- A. Hot weather concreting procedures shall conform to the requirements of ACI 305.1.
- B. When air temperatures exceed 85°F., or when extremely dry or high wind conditions exist even at lower temperatures, the Contractor and the Contractor's concrete supplier shall exercise special and precautionary measures in preparing, delivering, placing, finishing, curing, and protecting the concrete mix. The Contractor shall consult with the Engineer regarding such measures prior to each day's placing operation, and the Engineer reserves the right to modify the proposed measures consistent with the requirements herein. All necessary materials and equipment shall be in place prior to each placing operation.
- C. Preparatory work at the job site shall include thorough wetting of all forms, reinforcing steel and, in the case of slab pours on ground or subgrade, spraying the ground surface on the preceding evening and again just prior to placing. No standing puddles of water shall be permitted in those areas which are to receive the concrete.
- D. The temperature of the concrete mix when placed shall not exceed 95°F.
- E. Temperature of mixing water and aggregates shall be carefully controlled and monitored at the supplier's plant, with haul distance to the job site being considered. Stockpiled aggregates shall be shaded from the sun and sprinkled intermittently with water. If ice is used in the mixing water for cooling purposes, the ice must be entirely melted prior to addition of the water to the dry mix.
- F. Delivery schedules shall be carefully considered in advance to ensure concrete is placed as soon as practical after mixing. For hot weather concrete work (air temperature greater than 85°F), discharge of the concrete to its point of deposit shall be completed within 60 minutes from the time the concrete is batched, unless workability-retaining admixtures are included and approved by the Engineer.
- G. The Contractor shall arrange for an ample work force to be on hand to accomplish transporting, vibrating, finishing, and covering of the fresh concrete as rapidly as possible.

3.11 QUALITY CONTROL

- A. Field Testing of Concrete
 - 1. The Contractor shall coordinate with the Engineer's project representative the on-site scheduling of the materials testing consultant personnel as required for concrete testing.

2. Concrete for testing shall be supplied by the Contractor at no additional cost to the Owner, and the Contractor shall assist the materials testing consultant in obtaining samples. The Contractor shall dispose of and clean up all excess material.

B. Consistency

1. The consistency of the concrete will be checked by the materials testing consultant by standard slump cone tests. The Contractor shall make any necessary adjustments in the mix as the Engineer and/or the materials testing consultant may direct and shall upon written order suspend all placing operations in the event the consistency does not meet the intent of the specifications. No payment shall be made for any delays, material, or labor costs due to such occurrences.
2. Slump tests shall be made in accordance with ASTM C 143. Slump tests will be performed as deemed necessary by the materials testing consultant and each time compressive strength samples are taken.
3. Concrete with a specified nominal slump shall be placed having a slump within 1" (higher or lower) of the specified slump. Concrete with a specified maximum slump shall be placed having a slump less than the specified slump.

C. Density

1. Samples of freshly mixed concrete shall be tested for density by the materials testing consultant in accordance with ASTM C 138.
2. Density tests will be performed as deemed necessary by the Engineer and each time compressive strength samples are taken.

D. Air Content

1. Samples of freshly mixed concrete will be tested for entrained air content by the materials testing consultant in accordance with ASTM C 231.
2. Air content tests will be performed as deemed necessary by the materials testing consultant and each time compressive strength samples are taken.
3. In the event test results are outside the limits specified, additional testing shall occur. Admixture quantity adjustments shall be made immediately upon discovery of incorrect air entrainment.

E. Compressive Strength

1. Samples of freshly mixed concrete will be taken by the materials testing consultant and tested for compressive strength in accordance with ASTM C 172, C 31, and C 39, except as modified herein.
2. In general, one sampling shall be taken for each placement more than five (5) cubic yards, with a minimum of one (1) sampling for each day of concrete placement operations, or for each fifty (50) cubic yards of concrete, or for each 5,000 square feet of surface area for slabs or walls, whichever is greater.

3. Each sampling shall consist of at least five (5) 6x12 cylinders or (8) 4x8 cylinders. Each cylinder shall be identified by a tag, which shall be hooked or wired to the side of the container. The materials testing consultant will fill out the required information on the tag, and the Contractor shall satisfy themselves that such information shown is correct.
4. The Contractor shall be required to furnish labor to the Owner for assisting in preparing test cylinders. The Contractor shall provide approved curing boxes for storage of cylinders on site. The insulated curing box shall be of sufficient size and strength to contain all the cylinders made in any four consecutive working days and to protect the specimens from falling over, being jarred, or otherwise disturbed during the period of initial curing. The box shall be erected, furnished, and maintained by the Contractor. The box shall be equipped to provide the moisture conditions and to regulate the temperature necessary to maintain the proper curing conditions required by ASTM C 31. The curing box shall be placed in an area free from vibration such as pile driving and traffic of all kinds and such that all cylinders are shielded from direct sunlight and/or radiant heating sources. No concrete requiring testing shall be delivered to the site until the storage curing box has been provided. Cylinders shall remain undisturbed in the curing box until ready for delivery to the testing laboratory, but not less than sixteen hours.
5. The Contractor shall be responsible for maintaining the temperatures of the curing box during the initial curing of cylinders with the temperature preserved between 60°F and 80°F as measured by a maximum-minimum thermometer. The Contractor shall maintain a written record of curing box temperatures for each day the curing box contains cylinders. Temperature shall be recorded a minimum of three times a day with one recording at the start of the day and one recording at the end of the day.
6. When transported, the cylinders shall not be thrown, dropped, allowed to roll, or be damaged in any way.
7. Compression tests shall be performed in accordance with ASTM C 39. For 6x12 cylinders, two test cylinders will be tested at seven days and two at 28 days. For 4x8 cylinders, three test cylinders will be tested at seven days, three at 28 days. The remaining cylinders will be held to verify test results, if needed. Additional test cylinders shall be made when the Contractor anticipates performing additional compression tests earlier than seven days, or at any other interval thereof.

F. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 214, ACI 318, and ACI 350.
2. The strength level of concrete will be considered satisfactory if the following conditions are satisfied.
 - a. Every arithmetic average of any three consecutive strength tests equals or exceeds the minimum specified 28-day compressive strength for the mix (see Article 2.11).
 - b. No individual compressive strength test result falls below the minimum specified strength by more than 500 psi.

3. If any of the conditions listed above are not met, the mix proportions shall be corrected for the next concrete placing operation.
 4. If condition 3.11.F.2.b is not met, additional tests in accordance with Article 3.11, Paragraph H shall be performed.
 5. When a ratio between 7-day and 28-day strengths has been established by these tests, the 7-day strengths shall subsequently be taken as a preliminary indication of the 28-day strengths. Should the 7-day test strength from any sampling be more than 10% below the established minimum strength, the Contractor shall:
 - a. Immediately provide additional periods of curing in the affected area from which the deficient test cylinders were taken.
 - b. Maintain or add temporary structural support as required.
 - c. Correct the mix for the next concrete placement operation, if required to remedy the situation.
 6. All concrete which fails to meet the ACI requirements, and these specifications is subject to removal and replacement at no additional cost to the Owner.
- G. When non-compliant concrete is identified, test reports shall be sent immediately to the Engineer for review.
- H. Additional Tests
1. When ordered by the Engineer, additional tests on in-place concrete shall be provided and paid for by the Contractor.
 2. If the 28-day test cylinders fail to meet the minimum strength requirements as outlined in Article 3.11, Paragraph F, the Contractor shall have concrete core specimens obtained and tested from the affected area immediately.
 - a. Three cores shall be taken for each sample in which the strength requirements were not met.
 - b. The drilled cores shall be obtained and tested in conformance with ASTM C 42. The tests shall be conducted by a materials testing consultant approved by the Engineer.
 - c. The location from which each core is taken shall be approved by the Engineer. Each core specimen shall be located, when possible, so its axis is perpendicular to the concrete surface and not near formed joints or obvious edges of a unit of deposit.
 - d. The core specimens shall be taken, if possible, so no reinforcing steel is within the confines of the core.
 - e. The diameter of core specimens should be at least 3 times the maximum nominal size of the coarse aggregate used in the concrete but must be at least 2-inches in diameter.

- f. The length of specimen, when capped, shall be at least twice the diameter of the specimen.
 - g. The core specimens shall be taken to the laboratory and when transported, shall not be thrown, dropped, allowed to roll, or damaged in any way.
 - h. Two (2) copies of test results shall be mailed directly to the Engineer. The concrete in question will be considered acceptable if the average compressive strength of a minimum of three test core specimens taken from a given area equal or exceed 85% of the specified 28-day strength and if the lowest core strength is greater than 75% of the specified 28-day strength.
3. If the concrete placed by the Contractor is suspected of not having proper air content, the Contractor shall engage a materials testing consultant approved by the Engineer, to obtain and test samples for air content in accordance with ASTM C 457.

3.12 CARE AND REPAIR OF CONCRETE

- A. The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the Owner. Care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Care shall be exercised to avoid jarring forms or placing any strain on the ends of projecting reinforcing bars. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete at no additional cost to the Owner.
- B. Areas of honeycomb shall be chipped back to sound concrete and repaired as directed.
- C. Concrete formwork blowouts or unacceptable deviations in tolerances for formed surfaces due to improperly constructed or misaligned formwork shall be repaired as directed. Bulging or protruding areas, which result from slipping or deflecting forms shall be ground flush or chipped out and redressed as directed.
- D. Areas of concrete in which cracking, spalling, or other signs of deterioration develop prior to final acceptance shall be removed and replaced or repaired as directed. This stipulation includes concrete that has experienced cracking due to drying or thermal shrinkage of the concrete. Structural cracks shall be repaired using an approved epoxy injection system. Non-structural cracks shall be repaired using an approved hydrophilic resin pressure injected grout system unless other means of repair are deemed necessary and approved. All repair work shall be performed at no additional cost to the Owner.
- E. Concrete which fails to meet the strength requirements as outlined in Article 3.11, Paragraph F, will be analyzed as to its adequacy based upon loading conditions, resultant stresses, and exposure conditions for the area of concrete in question. If the concrete in question is found unacceptable based upon this analysis, that portion of the structure shall be strengthened or replaced by the Contractor at no additional cost to the Owner. The method of strengthening or extent of replacement shall be as directed by the Engineer.

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SECTION 03315

GROUT

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish all materials, labor, and equipment required to provide all grout used in concrete work and as bearing surfaces for base plates, in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Requirements of related work are included in Division 01 and Division 02 of these Specifications.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. CRD-C 621 – Corps of Engineers Specification for Non-shrink Grout
2. ASTM C 33 – Standard Specification for Concrete Aggregates
3. ASTM C 109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm cube Specimens)
4. ASTM C 531 – Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing
5. ASTM C 579 – Test Method for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacing
6. ASTM C 827 – Standard Test Method for Early Volume Change of Cementitious Mixtures
7. ASTM C 1107 – Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - Submittals.
 1. Certified test results verifying the compressive strength and shrinkage and expansion requirements specified herein.

2. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, and appropriate uses for each type of grout used in the work.

1.05 QUALITY ASSURANCE

A. Field Tests

1. Compression test specimens will be taken during construction from the first placement of each type of grout and at intervals thereafter as selected by the Engineer to ensure continued compliance with these Specifications. The specimens will be made by the Engineer or its representative.
 - a. Compression tests and fabrication of specimens for cement grout and non-shrink grout will be performed as specified in ASTM C 109 at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at seven days, 28 days, and any additional times as appropriate.
 - b. Compression tests and fabrication of specimens for epoxy grout will be performed as specified in ASTM C 579, Method B, at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at seven days and any other time as appropriate.
2. The cost of all laboratory tests on grout will be borne by the Owner, but the Contractor shall assist the Engineer in obtaining specimens for testing. The Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the specifications. The Contractor shall supply all materials necessary for fabricating the test specimens, at no additional cost to the Owner.
3. All grout, already placed, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Cement Grout

1. Cement grout shall be composed of Portland Cement and sand in the proportion specified in the Contract Documents and the minimum amount of water necessary to obtain the desired consistency. If no proportion is indicated, cement grout shall consist of one-part Portland Cement to three parts sand. Water amount shall be as required to achieve desired consistency without compromising strength requirements. White Portland Cement shall be mixed with the Portland Cement as required to match color of adjacent concrete.
2. The minimum compressive strength at 28 days shall be 4000 psi.
3. For beds thicker than 1-1/2 inch and/or where free passage of grout will not be obstructed by coarse aggregate, 1-1/2 parts of coarse aggregate having a top size of 3/8 inch should be added. This stipulation does not apply for grout being swept in by a mechanism. These applications shall use a plain cement grout without coarse aggregate regardless of bed thickness.

4. Sand shall conform to the requirements of ASTM C33.

B. Non-Shrink Grout

1. Non-shrink grout shall conform to CRD-C 621 and ASTM C 1107, Grade B or C when tested at a max. fluid consistency of 30 seconds per CDC 611/ASTM C939 at temperature extremes of 45°F and 90°F and an extended working time of 15 minutes. Grout shall have a min. 28-day strength of 7,000 psi. Non-shrink grout shall be, "NS Grout" by the Euclid Chemical Company, "Sikagrout 212" by Sika Corporation, "Conspec 100 Non-Shrink Non-Metallic Grout" by Conspec, "MasterFlow 928" by Master Builders Solutions.

C. Epoxy Grout

1. Epoxy grout shall be "Sikadur 32 Hi-Mod" by Sika Corporation, "Duralcrete LV" by Tamms Industries, or "E3 Series" by Euclid Chemical, "MasterEmaco ADH 1090 RS" by Master Builders Solutions.
2. Epoxy grout shall be modified as required for each application with aggregate per manufacturer's instructions.

D. Epoxy Base Plate Grout

1. Epoxy base plate grout shall be "Sikadur 42, Grout-Pak" by Sika Corporation, or "MasterFlow 648" by Master Builders Solutions.

2.02 CURING MATERIALS

- A. Curing materials shall be as specified in Section 03370 – Concrete Curing for cement grout and as recommended by the manufacturer for prepackaged grouts.

PART 3 – EXECUTION

3.01 GENERAL

- A. The different types of grout shall be used for the applications stated below unless noted otherwise in the Contract Documents. Where grout is called for in the Contract Documents which does not fall under any of the applications stated below, non-shrink grout shall be used unless another type is specifically referenced.
1. Cement grout shall be used for grout toppings and for patching of fresh concrete, when approved by the Engineer.
 2. Non-shrink grout shall be used for grouting beneath base plates of structural metal framing.
 3. Epoxy grout shall be used for bonding new concrete to hardened concrete.
 4. Epoxy base plate grout shall be used for precision seating of base plates including base plates for all equipment such as engines, mixers, pumps, vibratory and heavy impact machinery, etc.

- B. New concrete surfaces to receive cement grout shall be as specified in Section 03350 – Concrete Finishes, and shall be cleaned of all dirt, grease, and oil-like films. Existing concrete surfaces shall likewise be cleaned of all similar contamination and debris, including chipping, or roughening the surface if a laitance or poor concrete is evident. The finish of the grout surface shall match that of the adjacent concrete. Curing and protection of cement grout shall be as specified in Section 03370 – Concrete Curing.
- C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.
- D. The Contractor, through the manufacturer of a non-shrink grout and epoxy grout, shall provide on-site technical assistance upon request, at no additional cost to the Owner.

3.02 CONSISTENCY

- A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the application. Dry pack consistency is such that the grout is plastic and moldable but will not flow.

3.03 MEASUREMENT OF INGREDIENTS

- A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurement shall not be allowed.
- B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

3.04 GROUT INSTALLATION

- A. Grout shall be placed quickly and continuously, shall completely fill the space to be grouted and be thoroughly compacted and free of air pockets. The grout may be poured in place, pressure grouted by gravity, or pumped. The use of pneumatic pressure or dry-packed grouting requires approval of the Engineer. For grouting beneath base plates, grout shall be placed from one side only and allowed to flow across to the open side to avoid air-entrapment.

- END OF SECTION -

SECTION 03350

CONCRETE FINISHES

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish all materials, labor, and equipment required to provide finishes of all concrete surfaces specified herein and shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03100 - Concrete Formwork
- B. Section 03300 - Cast-in-Place Concrete
- C. Section 03315 - Grout

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. ACI 301 - Specifications for Structural Concrete for Buildings
 - 2. ACI 318 - Building Code Requirements for Structural Concrete

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - Submittals.
 - 1. Manufacturer's literature on all products specified herein.

PART 2 – PRODUCTS

2.01 CONCRETE FLOOR SEALER

- A. Floor sealer shall be Diamond Clear VOX or Super Diamond Clear VOX by the Euclid Chemical Company, MasterKure CC 300 SB by Master Builders Solutions.

2.02 CONCRETE LIQUID DENSIFIER AND SEALANT

- A. Concrete liquid densifier and sealant shall be a high performance, deeply penetrating concrete densifier and sealant. Product shall be odorless, colorless, VOC-compliant, non-yellowing silicate based solution designed to harden, dustproof, and protect concrete floors subjected to heavy vehicular traffic and to resist black rubber tire marks on concrete surfaces. The product must contain a minimum solids content of 20% of which 50% is silicate. Acceptable products are Diamond Hard by the Euclid Chemical Company, and

Seal Hard by L&M Construction Chemicals, and Masterkure HD 200 WB by Master Builders Solutions.

2.03 NON-OXIDIZING HEAVY DUTY METALLIC FLOOR HARDENER

- A. Non-oxidizing heavy-duty metallic floor hardener shall be formulated, processed, and packaged under stringent quality control at the manufacturer's owned and controlled factory. The hardener shall be a mixture of specifically processed non-rusting aggregate, selected Portland cement, and necessary plasticizing agents. Product shall be "Diamond-Plate" by the Euclid Chemical Company, or MasterTop 200 by Master Builders Solutions.

2.04 NON-SLIP FLOORING ADDITIVE

- A. Non-slip flooring additives for slip resistant floors shall be non-metallic. Non-slip flooring additives shall be MasterTop 120SR by Master Builders Solutions, A-H Aloxx by Anti-Hydro, or Euco Grip by the Euclid Chemical Company.

PART 3 – EXECUTION

3.01 FINISHES ON FORMED CONCRETE SURFACES

- A. After removal of forms, the finishes described below shall be applied in accordance with Article 3.06 - Concrete Finish Schedule. Unless the finish schedule specifies otherwise, all surfaces shall receive at least a Type I finish. See Article 3.05 for surfaces to receive paint or protective coatings. The Engineer shall be the sole judge of acceptability of all concrete finish work.
 - 1. Type I - Rough: All fins, burrs, offsets, marks, and all other projections left by the forms shall be removed. Projections, depressions, etc. below finished grade required to be removed will only be those greater than 1/4-inch. All holes left by removal of ends of ties, and all other holes, depressions, bug holes, air/blow holes or voids shall be filled solid with cement grout after first being thoroughly wetted and then struck off flush. The only holes below grade to be filled will be tie holes and any other holes larger than 1/4-inch in any dimension. Honeycombs shall be chipped back to solid concrete and repaired as directed by the Engineer. All holes shall be filled with tools, such as sponge floats and trowels, that will permit packing the hole solidly with cement grout. Cement grout shall consist of one-part cement to three parts sand, epoxy bonding agent (for tie holes only) and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of cement grout shall match the adjacent wall surface.
 - 2. Type II - Grout Cleaned: Where this finish is required, it shall be applied after completion of Type I finish. After the concrete has been pre-dampened over an extended amount of time to reach the condition of saturated surface dry (SSD), a slurry consisting of one part cement (including an appropriate quantity of white cement to produce a color matching the surrounding concrete) and 1-1/2 parts sand passing the No. 16 sieve, by damp loose volume, shall be spread over the surface with clean burlap pads or sponge rubber floats. Mix proportions shall be submitted to the Engineer after a sample of the work is established and accepted. Any surplus shall be removed by scraping and then rubbing with clean burlap.

3. Type III - Smooth Rubbed: Where this finish is required, it shall be applied after the completion of the Type II finish. No rubbing shall be done before the concrete is thoroughly hardened and the mortar used for patching is firmly set. A smooth, uniform surface shall be obtained by wetting the surface and rubbing with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities requires it, the general surface of the concrete shall not be cut into. Corners and edges shall be slightly rounded using a carborundum stone. Brush finishing or painting with grout or neat cement will not be permitted. A 100 square foot example shall be established at the beginning of the project to establish acceptability.

3.02 SLAB AND FLOOR FINISHES

- A. The finishes described below shall be applied to floors, slabs, flow channels and top of walls in accordance with Article 3.05 - Concrete Finish Schedule. The Engineer shall be the sole judge of acceptability of all such finish work.
 1. Type "A" - Screeded: This finish shall be obtained by placing screeds at frequent intervals and striking off to the surface elevation required. When a Type "F" finish is subsequently to be applied, the surface of the screeded concrete shall be roughened with a concrete rake to 1/2" minimum deep grooves prior to final set.
 2. Type "B" - Wood or Magnesium Floated: This finish shall be obtained after completion of a Type "A" finish by working a previously screeded surface with a wood or magnesium float or until the desired texture is reached. Floating shall begin when the water sheen has disappeared and when the concrete has sufficiently hardened so that a person's foot leaves only a slight imprint. If wet spots occur, water shall be removed with a squeegee. Care shall be taken to prevent the formation of laitance and excess water on the finished surface. All edges shall be edged with an 1/8-inch tool as directed by the Engineer. The finished surface shall be true, even, and free from blemishes and any other irregularities.
 3. Type "C" - Cork Floated: This finish shall be similar to Type "B" but slightly smoother than the finish obtained with a wood float. The finish shall be obtained by power or band floating with cork floats.
 4. Type "D" - Steel Troweled: This finish shall be obtained after completion of a Type "B" finish. When the concrete has hardened sufficiently to prevent excess fine material from working to the surface, the surface shall be compacted and smoothed with not less than two thorough and complete steel troweling operations. In areas which are to receive a floor covering such as tile, resilient flooring, or carpeting, the applicable Specification Sections and Contract Drawings shall be reviewed for the required finishes and degree of flatness. In areas that are intermittently wet such as pump rooms, only one troweling operation is required to provide some trowel marks for slip resistance. All edges shall be edged with an 1/8-inch tool as directed by the Engineer. The finish shall be brought to a smooth, dense surface, free from defects and blemishes.
 5. Type "E" - Broom or Belt: This finish shall provide the surface with a transverse scored texture by drawing a broom or burlap belt across the surface immediately after completion of a Type "B" finish. All edges shall be edged with an 1/8-inch tool as directed by the Engineer.

6. Type "F" - Swept in Grout Topping: This finish shall be applied after a completion of a Type "A" finish. The concrete surface shall be properly cleaned, washed, and coated with a mixture of water and Portland Cement. Cement grout with inclusion of micro-synthetic fibers in accordance with Section 03315 Grout shall be plowed and swept into neat conformance with the blades or arms of the apparatus by turning or rotating the previously positioned mechanical equipment. Special attention shall be paid to true grades, shapes and tolerances as specified by the manufacturer of the equipment. Before beginning this finish, the Contractor shall notify the Engineer and the equipment manufacturer of the details of the operation and obtain approval and recommendations.
7. Type "G" Hardened Finish: This finish shall be applied after completion of a Type "B" or Type "C" finish and prior to application of a Type "D" finish. Hardeners shall be applied in strict accordance with the manufacturer's requirements. Hardeners shall be applied using a mechanical spreader. The hardener shall be applied in two shakes with the first shake comprising 2/3 of the total amount. Type "D" finish shall be applied following completion of application of the hardener. Non-oxidizing, heavy-duty metallic floor hardener shall be applied at the loading docks and where specifically required on the Contract Drawings or specified herein at the rate of 1.5 pounds/ft.2.
8. Type "H" - Non-Slip Finish: This finish shall be provided by applying a non-slip flooring additive concurrently with the application of a Type "D" finish and/or installation of floor sealants. Application procedure shall be in accordance with manufacturer's instructions. Finish shall be applied where specifically required on the Contract Drawings or specified herein.
9. Type "J" - Raked Finish: This finish shall be provided by raking the surface as soon as the condition of the concrete permits by making depressions of $\pm 1/4$ inch.

3.03 CONCRETE SEALERS

- A. Concrete sealers shall be applied where specifically required on the Contract Drawings or specified herein. Concrete sealers and densifiers shall not be used as concrete curing compounds. Curing compounds, when allowed, shall be in accordance with Section 03370 - Concrete Curing.
- B. Sealers shall be applied after installation of all equipment, piping, etc. and after completion of any other related construction activities. Application of sealers shall be in strict accordance with manufacturer's requirements.
- C. Sealers shall be applied to all floor slabs not painted and not intended to be immersed.
- D. Floor slabs subjected to vehicular traffic shall be sealed with the concrete liquid densifier and sealer.
- E. All other floor slabs to receive sealer shall be sealed with concrete floor sealer.

3.04 FINISHES ON EQUIPMENT PADS

- A. Formed surfaces of equipment pads shall receive a Type III finish.

- B. Top surfaces of equipment pads, except those surfaces subsequently required to receive grout and support equipment bases, shall receive a Type "D" finish, unless otherwise noted. Surfaces which will later receive grout shall, before the concrete takes its final set, be made rough by removing the sand and cement that accumulates on the top to the extent that the aggregate will be exposed with irregular indentations in the surface up to 1/2 inch deep.

3.05 FINISHES FOR SURFACES TO RECEIVE PAINT OR COATINGS

- A. Surfaces indicated or specified to receive paint or special coatings shall be prepared per specifications in Division 09. All products applied to the concrete surfaces during the placement, finishing, and curing process shall be compatible with the painting or coating system as required by the manufacturer.

3.06 CONCRETE FINISH SCHEDULE

Item	Type of Finish
Inner face of walls of tanks, flow channels, wet wells, perimeter walls, and miscellaneous concrete structures:	
From one foot below water surface to bottom of wall	I
From top of wall to one foot below water surface	II
Exterior concrete walls below grade	I
Exterior exposed concrete walls, ceilings, beams, manholes, hand holes, miscellaneous structures, and columns (including top of wall) to one foot below grade. All other exposed concrete surfaces not specified elsewhere	II
Interior exposed ceiling, including beams	II
Floors of process equipment tanks or basins, wetwells, flow channels and slabs to receive roofing material or waterproof membranes	B
Exterior concrete sidewalks, steps, ramps, decks, slabs on grade and landings exposed to weather, including precast slabs	E

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SECTION 03370

CONCRETE CURING

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Protect all freshly deposited concrete from premature drying and from the weather elements. The concrete shall be maintained with minimal moisture loss at a relatively constant temperature for a period necessary for the hydration of the cement and proper hardening of the concrete in accordance with the requirements specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03100 - Concrete Formwork
- B. Section 03300 - Cast-In-Place Concrete
- C. Section 03350 - Concrete Finishes

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. ACI 301 - Specifications for Structural Concrete
 - 2. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete
 - 3. ACI 305.1 - Specification for Hot Weather Concreting
 - 4. ACI 306.1 - Standard Specification for Cold Weather Concreting
 - 5. ACI 308.1 - Specification for Curing Concrete
 - 6. ASTM C171 - Standard Specifications for Sheet Materials for Curing Concrete
 - 7. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
 - 8. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - Submittals.

1. Proposed procedures for protection of concrete under wet weather placement conditions.
2. Proposed normal procedures for protection and curing of concrete.
3. Proposed special procedures for protection and curing of concrete under hot and cold weather conditions.
4. Proposed method of measuring concrete surface temperature changes.
5. Manufacturer's literature and material certification for proposed curing compounds.

PART 2 – PRODUCTS

2.01 LIQUID MEMBRANE-FORMING CURING COMPOUND

- A. Clear curing and sealing compound shall be a clear styrene acrylate type complying with ASTM C 1315, Type 1, Class A with a minimum solids content of 30%. Moisture loss shall not be greater than 0.40 kg/m² when applied at manufacturer's recommended volume for square feet of area. Manufacturer's certification is required. Acceptable products are Super Diamond Clear VOX by the Euclid Chemical Company.
- B. Where specifically approved by Engineer, on slabs to receive subsequent applied finishes, compound shall conform to ASTM C 309. Acceptable products are "Kurez DR VOX" or "Kurez W VOX" by the Euclid Chemical Company. Install in strict accordance with manufacturer's requirements.

2.02 EVAPORATION REDUCER

- A. Evaporation reducer shall be "MasterKure ER 50" by Master Builders Solutions, or "Euco-Bar" by Euclid Chemical Company.

PART 3 – EXECUTION

3.01 PROTECTION AND CURING

- A. All freshly placed concrete shall be protected from the elements, flowing water and from defacement of any nature during construction operations.
- B. As soon as the concrete has been placed and horizontal top surfaces have received their required finish, provisions shall be made for maintaining the concrete in a moist condition for at least a 7-day period thereafter, except for high early strength concrete, for which the period shall be at least the first three days after placement. Horizontal surfaces shall be kept covered, and intermittent, and localized drying will not be permitted.
- C. Walls that will be exposed on one side with either fluid or earth backfill on the opposite side shall be continuously wet cured for a minimum of seven days. Use of a curing compound will not be acceptable for applications of this type.
- D. The Contractor shall use one of the following methods to ensure that the concrete remains in a moist condition for the minimum period stated above.

1. Ponding or continuous fogging or sprinkling.
 2. Application of mats or fabric kept continuously wet.
 3. Continuous application of steam (under 150°F).
 4. Application of sheet materials conforming to ASTM C171.
 5. If approved by the Engineer, application of a curing compound in accordance with Article 3.04.
- E. The Contractor shall keep absorbent wood forms wet until they are removed. After form removal, the concrete shall be cured by one of the methods in paragraph D.
- F. Any of the curing procedures used in Paragraph 3.01-D may be replaced by one of the other curing procedures listed in Paragraph 3.01-D after the concrete is one-day old. However, the concrete surface shall not be permitted to become dry at any time.

3.02 CURING CONCRETE UNDER COLD WEATHER CONDITIONS

- A. Suitable means shall be provided for a minimum of 72 hours after placing concrete to maintain it at or above the minimum as placed temperatures specified in Section 03300 - Cast-In-Place Concrete, for concrete work in cold weather. During the 72-hour period, the concrete surface shall not be exposed to air more than 20°F above the minimum as placed temperatures.
- B. Stripping time for forms and supports shall be increased as necessary to allow for retardation in concrete strength caused by colder temperatures. This retardation is magnified when using concrete made with blended cements or containing fly ash or slag cement. Therefore, curing times and stripping times shall be further increased as necessary when using these types of concrete.
- C. The methods of protecting the concrete shall be approved by the Engineer and shall be such as will prevent local drying. Equipment and materials approved for this purpose shall be on the site in sufficient quantity before the work begins. The Contractor shall assist the Engineer by providing holes in the forms and the concrete in which thermometers can be placed to determine the adequacy of heating and protection. All such thermometers shall be furnished by the Contractor in quantity and type which the Engineer directs.
- D. Curing procedures during cold weather conditions shall conform to the requirements of ACI 306.

3.03 CURING CONCRETE UNDER HOT WEATHER CONDITIONS

- A. When air temperatures exceed 85°F, the Contractor shall take extra care in placing and finishing techniques to avoid formation of cold joints and plastic shrinkage cracking. If ordered by the Engineer, temporary sunshades and/or windbreakers shall be erected to guard against such developments, including generous use of wet burlap coverings and fog sprays to prevent drying out of the exposed concrete surfaces.

- B. Immediately after screeding, horizontal surfaces shall receive an application of evaporation reducer. Apply in accordance with manufacturer's instructions. Final finish work shall begin as soon as the mix has stiffened sufficiently to support the workmen.
- C. Curing and protection of the concrete shall begin immediately after completion of the finishing operation. Continuous moist-curing consisting of method 1 or 2 listed in paragraph 3.01D is mandatory for at least the first 24 hours. Method 2 may be used only if the finished surface is not marred or blemished during contact with the coverings.
- D. At the end of the initial 24-hour period, curing and protection of the concrete shall continue for at least six (6) additional days using one of the methods listed in paragraph 3.01D.
- E. Curing procedures during hot weather conditions shall conform to the requirements of ACI 305.

3.04 USE OF CURING COMPOUND

- A. Curing compound shall be used only where specifically approved by the Engineer. Curing compound shall never be used for curing exposed walls with fluid or earth backfill on the opposite side. A continuous wet cure for a minimum of seven days is required for these applications. Curing compound shall not be used on surfaces exposed to water in potable water storage tanks and treatment plants unless curing compound is certified in accordance with ANSI/NSF Standard 61.
- B. When permitted, the curing compound shall maintain the concrete in a moist condition for the required time, and the subsequent appearance of the concrete surface shall not be affected.
- C. The compound shall be applied in strict accordance with the manufacturer's recommendations after water sheen has disappeared from the concrete surface and after finishing operations. Coverage rates for the curing and sealing compound shall be in strict accordance with manufacturer's requirements for the specific type of finish required. For rough surfaces, apply in two directions at right angles to each other.

- END OF SECTION -

SECTION 03 40 00
PRECAST CONCRETE

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. The Contractor shall construct all precast concrete items as required in the Contract Documents, including all appurtenances necessary to make a complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03200 – Reinforcing Steel
- B. Section 03300 – Cast-in-Place Concrete
- C. Section 03350 – Concrete Finishes
- D. Section 03370 – Concrete Curing
- E. Section 03315 – Grout
- F. Section 05010 – Metal Materials
- G. Section 05050 – Metal Fastening

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of the Bid.
 - 1. Florida Building Code
 - 2. ACI 301 – Structural Concrete for Buildings
 - 3. ACI 318 – Building Code Requirements for Structural Concrete
 - 4. ASTM D2240 – Standard Test for Rubber Property – Durometer Hardness
 - 5. PCI Standard MNL-116 – Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products
 - 6. PCI Standard MNL-120 - Design Handbook Precast and Prestressed Concrete
 - 7. PCI Standard MNL-123 – Manual on Design of Connections for Precast Prestressed Concrete

8. PCI Standard MNL-124 – PCI Design for Fire Resistance of Precast Prestressed Concrete

1.04 SUBMITTALS

- A. The Contractor shall submit the following for review in accordance with Section 01300 – Submittals.
 1. Shop Drawings for all precast members including layout and dimensions, unit locations, unit identification marks, reinforcement connection details, support items, dimensions, openings, temporary supports, and relationship to adjacent materials. Indicate design loads, deflections, cambers, bearing requirements, and special conditions. The submittal shall be sealed by a Professional Engineer currently registered in the State of Florida.
 2. A list of the design criteria used by the manufacturer for all manufactured, precast items.
 3. Design calculations, showing at least the design loads and stresses on the item and assumptions, shall be submitted. Calculations shall be sealed by a Professional Engineer currently registered in the in the State of Florida.
 4. Certified reports for all lifting inserts, indicating allowable design loads.
 5. Information on lifting and erection procedures.

1.05 QUALITY ASSURANCE

- A. All manufactured precast concrete units shall be produced by an experienced manufacturer regularly engaged in the production of such items. All manufactured precast concrete and site-cast units shall be free of defects, spalls, and cracks. Care shall be taken in the mixing of materials, casting, curing, and shipping to avoid any of the above. The Engineer may elect to examine the units at the casting yard or upon arrival of the same at the site. The Engineer shall have the option of rejecting any or all the precast work if it does not meet with the requirements specified herein or on the Drawings. All rejected work shall be replaced at no additional cost to the Owner.
- B. Manufacturer Qualifications: The precast concrete manufacturing plant shall be certified by the Prestressed Concrete Institute, Plant Certification Program, prior to the start of production. Certification is required for plants providing prestressed structural members such as hollow core planks, double-T members, etc.
- C. Plant production and engineering must be under direct supervision and control of an Engineer who possesses a minimum of five years' experience in precast concrete work.
- D. Erector of precast and prestressed items shall be a company specializing in erecting members specified with a minimum of three years documented experience and specifically approved by the fabricator of precast and prestressed members specified.

PART 2 – PRODUCTS

2.01 DESIGN REQUIREMENTS

- A. Precast and prestressed members shall be designed to support superimposed loads indicated on the Drawings and as required by current Building Code of the State or Commonwealth in which the project is located. Design shall also consider loads and stresses due to handling, transporting, and erecting of units.
- B. Maximum live load deflections for members shall be L/240 for roof members and L/360 for floor members.
- C. Members shall be designed to accommodate construction tolerances, and clearances of intended openings.
- D. Design shall be performed by a qualified professional engineer registered in the State or Commonwealth in which the project is located.
- E. Fire Rating shall be established in accordance with PCI MNL 124 to achieve the fire ratings required on the Drawings for floor, wall, and roof assemblies.

2.02 CONCRETE

- A. Concrete materials including Portland cement, aggregates, water, and admixtures shall conform to Section 03300 – Cast-in-Place Concrete. Precast concrete manufacturer has option of using Type III cement for prestressed concrete members to expedite release of prestressing and erection.
- B. For prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 5,000 psi unless otherwise specified. Minimum compressive strength of concrete at transfer of prestressing force shall be 3,500 psi unless otherwise specified.
- C. For non-prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 4,500 psi for fluid containing and other environmental concrete structures and 4,000 for other structural concrete structures, unless otherwise specified.

2.03 GROUT

- A. Grout for joints between members shall be a cement grout in conformance with Section 03315 – Grout.
- B. Minimum compressive strength of grout at 7 days shall be 3,000 psi.

2.04 REINFORCING STEEL

- A. Reinforcing steel used for precast concrete construction shall conform to Section 03200 – Reinforcing Steel.

2.05 PRESTRESSING STRANDS

- A. Prestressing strands shall be 7-wire, stress-relieved, high-strength strands Grade 250K or 270K.

2.06 STEEL INSERTS

- A. Steel inserts shall be in accordance with Section 05010 – Metal Materials.
- B. All steel inserts protruding from or occurring at the surface of precast units shall be galvanized.

2.07 WELDING

- A. Welding shall conform to Section 05050 – Metal Fastening.

2.08 BEARING PADS

- A. Neoprene bearing pads shall conform to the requirements of A4-F3-T.063-B2, Grade 2, Method B, in accordance with the RMA Rubber Handbook. Pads shall be nonlaminated pads having a nominal Shore A durometer hardness of 70 in accordance with ASTM D2240. Adhesive for use with neoprene pads shall be an epoxy-resin compound compatible with the neoprene having a sufficient shear strength to prevent slippage between pads and adjacent bearing surfaces. Adhesive shall be 20+F Contact Cement by Miracle Adhesives Corporation, Neoprene Adhesive 77-198 by IGI Adhesives, Sikadur 31, Hi-Mod Gel by Sika Corporation, or DP-605 NS Urethane Adhesive by 3M Adhesive Systems.
- B. Plastic bearing pads shall be multi-monomer plastic strips which are non-leaching and support construction loads with no visible overall expansion, manufactured specifically for the purpose of bearing precast concrete.

PART 3 – EXECUTION

3.01 FABRICATION AND CASTING

- A. All precast members shall be fabricated and cast to the shapes, dimensions and lengths shown on the Drawings and in compliance with PCI MNL-116. Precast members shall be straight, true, and free from dimensional distortions, except for camber and tolerances permitted later in this clause. All integral appurtenances, reinforcing, openings, etc., shall be accurately located and secured in position. Form materials shall be steel and the systems free from leakage during the casting operation.
- B. Manufacturer shall maintain plant records and quality control program during production of precast members.
- C. Ensure reinforcing steel anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.

- D. Openings with a 10-inch minimum dimension in either direction shall be cast in place. Smaller openings shall be considered in the design and arrangement of reinforcement and strands. These openings may be field cut, but only in the size and location approved by the precast manufacturer.
- E. All cover of reinforcing shall be the same as detailed on the Drawings.
- F. Because of the critical nature of the bond development length in prestressed concrete panel construction, if the transfer of stress is by burning of the fully tensioned strands at the ends of the member, each strand shall first be burned at the ends of the bed and then at each end of each member before proceeding to the next strand in the burning pattern.
- G. The Contractor shall coordinate the communication of all necessary information concerning openings, sleeves, or inserts to the manufacturer of the precast members.
- H. Concrete shall be finished in accordance with Section 03350 – Concrete Finishes. Grout all recesses due to cut tendons which will not otherwise be grouted during erection.
- I. Curing of precast members shall be in accordance with Section 03370 – Concrete Curing. Use of a membrane curing compound will not be allowed.
- J. The manufacturer shall provide lifting inserts or other approved means of lifting members.

3.02 HANDLING, TRANSPORTING AND STORING

- A. Precast members shall not be transported away from the casting yard until the concrete has reached the minimum required 28-day compressive strength and a period of at least 5 days has elapsed since casting.
- B. No precast member shall be transported from the plant to the job site prior to approval of that member by the plant inspector. This approval will be stamped on the member by the plant inspector.
- C. During handling, transporting, and storing, precast concrete members shall be lifted and supported only at the lifting or supporting points as indicated on the shop drawings.
- D. All precast members shall be stored on solid, unyielding, storage blocks in a manner to prevent torsion, objectionable bending, and contact with the ground.
- E. Precast concrete members shall not be used as storage areas for other materials or equipment.
- F. Precast members damaged while being handled or transported will be rejected or shall be repaired in a manner approved by the Engineer.

3.03 ERECTION

- A. Erection shall be carried out by the manufacturer or under the manufacturer's supervision using labor, equipment, tools, and materials required for proper execution of the work.
- B. Contractor shall prepare all bearing surfaces to a true and level line prior to erection. All supports of the precast members shall be accurately located and of required size and bearing materials.
- C. Installation of the precast members shall be made by leveling the top surface of the assembled units keeping the units tight and at right angles to the bearing surface.
- D. Connections which require welding shall be properly made in accordance with Section 05050 – Metal Fastening.
- E. Grouting between adjacent precast members and along the edges of the assembled precast members shall be accomplished as indicated on the drawings, care being taken to solidly pack such spaces and to prevent leakage or droppings of grout through the assembled precast members. Any grout which seeps through the precast members shall be removed before it hardens.
- F. In no case shall concentrated construction loads, or construction loads exceeding the design loads, be placed on the precast members. In no case shall loads be placed on the precast members prior to the welding operations associated with erection, and prior to placing of topping (if required).
- G. No Contractor, Subcontractor or any of their employees shall arbitrarily cut, drill, punch or otherwise tamper with the precast members.
- H. Precast members damaged while being erected will be rejected or shall be repaired in a manner approved by the Engineer.

END OF SECTION

SECTION 03 41 13
PRECAST PRESTRESSED CONCRETE
HOLLOW CORE PLANKS

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. The Contractor shall furnish all materials, labor, equipment, tools, etc., required for the design, fabrication, delivery and erection of precast, prestressed concrete hollow core planks in accordance with the Drawings and as specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03400 – Precast Concrete

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of other requirements of these Specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. ACI 423 – Recommendations for Concrete Members Prestressed with Unbonded Tendons
 - 2. PCI Design Handbook

1.04 SUBMITTALS

- A. Submittals shall comply with Section 03400 – Precast Concrete.

1.05 QUALITY ASSURANCE

- A. Quality assurance shall comply with Section 03400 – Precast Concrete.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Materials shall comply with Section 03400 – Precast Concrete, except as stated below.
- B. Minimum compressive strength of concrete at transfer of prestressing force shall be 3,500 psi.

PART 3 – EXECUTION

3.01 DESIGN CRITERIA

- A. All units shall be designed in accordance with the applicable provisions of ACI 318 and PCI Design Handbook, prestressed to sustain the superimposed dead and live loads indicated herein and on the Drawings. Design and subsequent fabrication shall provide for a camber in each unit to eliminate total dead load deflection.
- B. Superimposed Roof Loads
1. Dead Loads - Uniform load shall be that resulting from weight of member and weights of insulation material, built-up roofing, ballast, and lightweight concrete, as shown on the Drawings. Concentrated load at crane rail hanger-support shall be that resulting from contributing weight of crane rail and its support-assembly.
 2. Live Loads - Uniform live load shall be 30 psf unless noted otherwise on the Drawings. Concentrated hoist loads shall consist of the rated capacity plus 33% impact loading and shall occur where crane rails are shown on the Drawings.
 3. Other applicable loads per the Florida Building Code as indicated on the Drawings.

3.02 FABRICATION AND CASTING

- A. All hollow core planks shall comply with Section 03400 – Precast Concrete.
- B. Hollow core plank dimensions shall comply with PCI Design Handbook and as indicated on the Drawings.
- C. Curing of hollow core planks shall be equivalent to three days moist curing at 70°F.
- D. Unless otherwise noted on the Drawings, permitted dimensional tolerances are as follows:

Length	±1/2"
Width	±1/4" Max.
Depth	±1/4" Max.
Differential Camber Between Adjacent Units	1/4" Max.
Horizontal Alignment	±1/8" per 10' ±1/2" Max.
Location of openings, blockouts, anchors, plates and inserts	±1/2" Max.
Square Ends	±1/8" per 12" of Height

3.03 HANDLING, TRANSPORTING, AND STORING

- A. Handling, transporting, and storing shall comply with Section 03400 – Precast Concrete.

3.04 ERECTION

- A. Erection shall comply with Section 03400 – Precast Concrete.
- B. All hollow core planks shall bear on bearing pads at each end.
 - 1. All hollow core planks shall bear on plastic or neoprene bearing pads at each end in accordance with Section 03400 – Precast Concrete. Pads shall be the size shown on the Contract Drawings.
 - 2. Where neoprene pads are shown on the Drawings, hollow core planks shall bear on neoprene bearing pads at each end in accordance with Section 03400 – Precast Concrete. Pads shall be the size shown on the Contract Drawings and shall be adhered to the supporting concrete surface below with an approved adhesive.
- C. The top of all hollow core planks which receive concrete topping shall be cleaned of all contaminants and thoroughly wetted just prior to placing the topping.

3.05 ANCHORS FOR ITEMS SUSPENDED FROM PLANKS

- A. Anchors for hangers attached to the bottom of hollow core planks shall be designed by the Contractor and coordinated with the hollow core plank manufacturer to support the loads imposed on the anchors.
- B. The anchors shall be designed for the forces indicated on the Contract Drawings. Where forces are not indicated, the Contractor shall determine the applied forces.
- C. The anchor design for all anchors with applied forces over 400 pounds shall be sealed and signed by a Professional Engineer currently registered in the State or Commonwealth where the Project is located. All anchor forces and anchor designs shall be submitted to the Engineer for record purposes.
- D. Prior to installing anchors, the Contractor shall consult with the manufacturer of the hollow core planks to determine locations of prestressing strands and interior voids in planks. Prestressing strands shall not be cut or damaged under any circumstances.
- E. Anchors shall be embedded and installed as directed by the anchor manufacturer.

END OF SECTION

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SECTION 04100

MORTAR AND MASONRY GROUT

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish labor, materials, equipment, and appliances required for complete execution of Work shown on Drawings and specified herein.
- B. Principal items of work include:
 - 1. Mortar for unit masonry work.
 - 2. Grout for grouting masonry.
 - 3. Mortar for pointing and touchup.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 04200 – Unit Masonry

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the Specifications, the Work shall conform to the applicable requirements of the following documents:
 - 1. ASTM C91 – Standard Specification for Masonry Cement
 - 2. ASTM C144 – Standard Specification for Aggregate for Masonry Mortar
 - 3. ASTM C150 – Standard Specification for Portland Cement
 - 4. ASTM C207 – Standard Specification for Hydrated Lime for Masonry Purposes
 - 5. ASTM C270 – Standard Specification for Mortar for Unit Masonry
 - 6. ASTM C476 – Standard Specification for Grout for Masonry
 - 7. ASTM C979 – Pigments for Integrally Colored Concrete
 - 8. ASTM C1019 – Standard Methods of Sampling and Testing Grout
 - 9. TMS 602 – Specification for Masonry Structures

1.04 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in Section 01300 – Submittals, submit the following:
 - 1. Manufacturer's data and mixing instructions for each product.
 - 2. Certificate of compliance with these specifications for each material specified below.
 - 3. Mix Design for Masonry Grout.
 - 4. Test reports.
 - 5. Samples of colored masonry mortar.

1.05 DELIVERY AND STORAGE

- A. Deliver materials in manufacturer's original containers, bearing labels indicating product and manufacturer's name.
- B. Store cementitious materials in waterproof locations to prevent damage by elements. Reject containers showing evidence of damage.
- C. Store aggregates in separate bins to prevent intrusion of foreign particles. Do not use bottom 6 inches of sand or other aggregate stored in contact with the ground.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Specifications provide products manufactured by one of the following:
 - 1. LaFarge, Reston, VA
 - 2. Lehigh Cement Company, Allentown, PA
 - 3. Holcim, Inc., Dundee, MI

2.02 MATERIALS

- A. Mortar and Grout Materials
 - 1. Materials used in the production of masonry grout shall meet the requirements of specification 03300, Cast – in – Place Concrete, PART 2 – Products, except coarse and fine aggregate shall meet the requirements of ASTM C 404.
 - 2. Hydrated lime: ASTM C-207, Type "S".

3. Sand: Clean, coarse, free of loam, salt, organic and foreign matter and conforming to ASTM C-144.
4. Masonry Cement: ASTM C 91, Type S and meet the following criteria:
 - a. Prepackaged masonry cement shall contain Portland Cement, hydrated lime and plasticizing admixtures or hydraulic hydrated lime. Masonry cements which contain other materials, including ground limestone, ground slag, or other cementitious and non-cementitious materials, are not acceptable.
5. Water - clean, fresh, potable, and free from injurious amounts of oil, acids, alkalis, salts, organic matter or other deleterious substances.

B. Admixtures

1. Do not use calcium chloride.
2. Provide water repellant admixture in mortar used for architectural concrete masonry units. Admixture shall be compatible with ACMU water repellant admixture.
3. Do not use admixtures, without written approval of Engineer.

C. Mortar pigment

1. Natural or synthetic iron oxide and chromium oxides meeting the requirements of ASTM C979.
2. Pigment shall not exceed 10% of the weight of Portland cement. Carbon black shall not exceed 2% of Portland cement.
3. Color shall be selected by the Owner from the manufacturer's full range of colors.

2.03 GROUT AND MORTAR MIXES

- A. Masonry mortar shall be Type "S" according to ASTM C-270. Proportions for masonry mortar shall be one of the following:
1. Proportions by volume: 1 part Portland cement to 1/4 - 1/2 parts hydrated lime, and aggregate volume of not less than 2-1/4 or more than 3 times the sum of the volumes of cement and lime.
 2. Proportions by volume: 1/2 part Portland cement to 1 part masonry cement, and aggregate volume of not less than 1-1/4 or more than 3 times the sum of the volumes of cement and lime.

B. Proportions for pointing mortar.

1. Proportions by volume: 1 part Portland cement to 1/4 part hydrated lime and 2 parts extra fine sand.

C. Masonry Grout shall conform to the requirements of ASTM C 476 and ACI 530.1/ASCE 6, strength of grout, tested in accordance with ASTM C 1019 shall be equal to f'_m as specified in Section 04 20 00 – Unit Masonry, but not less than 2,000 psi.

1. Test grout for every 5,000 square feet of masonry, with a minimum of one test per structure.

PART 3 – EXECUTION

3.01 FIELD MORTAR MIXING

- A. Mixing shall be by mechanically operated batch mixer. Entirely discharge before recharging. Mix sand, lime, cement and admixtures dry for two (2) minutes minimum, add water and mix for three (3) minutes minimum. Control batching procedures by measuring materials by volume. Measurement by shovel count shall not be permitted. Mix mortar with less water than the maximum amount, consistent with workability, to provide near maximum tensile bond strength. Mix only quantity that can be used before initial set, or within the first one-half hour.
- B. Mixers, wheel barrows, mortar boards, etc., shall be kept clean.
- C. Retempering of mortar will not be permitted and mortar allowed to stand more than one (1) hour shall not be used.

3.02 INSTALLATION

- A. Install mortar and grout in accordance with TMS 602.

3.03 REPOINTING MORTAR

- A. Prehydrate the mortar by mixing ingredients together dry, and then add only enough water to make a damp, stiff mix that will retain its form when pressed into a ball. After one to two hours, add water to bring it to the proper consistency.

- END OF SECTION -

SECTION 04150

MASONRY ACCESSORIES

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish labor, materials, equipment and appliances required for complete execution of Work shown on Drawings and specified herein.
- B. Principal items of work include:
 - 1. Metal joint reinforcement for masonry.
 - 2. Accessories for masonry construction.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 04100 – Mortar and Masonry Grout
- B. Section 04200 – Unit Masonry

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of these specifications, Work shall conform to the applicable requirements of the following documents:
 - 1. ASTM A1064/1064M – Standard Specification for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
 - 2. ASTM A153 – Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
 - 3. ASTM A 951 – Standard Specification for Steel Wire Masonry Joint Reinforcement
 - 4. ASTM D1056 – Standard Specification for Flexible Cellular Materials - Sponge or Extruded Rubber
 - 5. TMS 602 – Specifications for Masonry Structures

1.04 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in Section 01300 – Submittals, submit the following:
 - 1. Provide manufacturer's complete product data.

2. Provide manufacturer's certification attesting compliance of material and source of each material specified below.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS FOR MASONRY REINFORCEMENT

- A. Subject to compliance with the Specifications, provide products manufactured by the following:
 1. AA Wire Products, Company, Chicago, IL
 2. Dur-O-Wal, Inc., Arlington Heights, IL
 3. Heckmann Building Products, Inc., Chicago, IL.
 4. Holman and Barnard, Inc., Hauppauge, NY.

2.02 MATERIALS

- A. Multi Wythe Joint Reinforcement
 1. Steel ladder type reinforcement conforming to ASTM A 951 with adjustable pintel and eye assembly; 3/16 inch side rods and 9 gauge continuous cross rods; manufactured with wire conforming to ASTM A1064/1064M, with widths 2-inches less than nominal wall thickness. Provide seismic clip with 9 gauge continuous wire.
- B. Single Wythe Joint Reinforcement
 1. Steel ladder type reinforcement conforming to ASTM A 951 with 3/16 inch side rods and 9 gauge continuous cross rods; manufactured with wire conforming to ASTM A1064/1064M, with widths 2-inches less than nominal wall thickness.
- C. Anchors: Cast into concrete or weld to steel.
 1. Dovetail Slot shall be 1 inch back by 1 inch deep by 5/8 inch throat, 22 gauge, foam filled.
 2. Dovetail Anchor - accessory for anchoring triangular flexible tie to dovetail slot, shall be 12 gauge by 1 inch wide 1/2 inch long dovetail section.
 3. Wire/Strap Anchor - 1/4 inch wire or 12 gauge x 3/4 inch x length required, welded or mechanically attached to back up structure.
- D. Ties
 1. Triangular Flexible Tie: 3/16 inch wire, sized to suit application.

2. Adjustable Tie: Pintel and eye full tie; properly sized for application, 3/16 inch cold drawn steel.

E. Top of Wall Anchor

1. Top of wall anchor shall be a 3/8" diameter rod welded to a 3/16" plate with two anchor holes. Provide a plastic tube to allow vertical deflection.

F. Finish

1. Reinforcements, anchorages and ties shall be hot dipped galvanized, Class B-2, after fabrication in accordance with ASTM A153.

2.03 ACCESSORIES

A. Expansion and Joint Filler Material

1. Closed cell neoprene material conforming to ASTM D 1056, with a minimum compressibility of 50%. Horizontal joint filler shall be 1/4 inch thick. Expansion joints shall be a minimum 3/8" thick.

B. Weep and Vent Holes

1. Cellular vent 3/8" wide by 2 1/2" high x 3 5/8" length. CellVent by Mortar Net or equal. Color to closely match mortar.

C. Control Joint

1. Wide flange rapid preformed neoprene or PVC gasket.

D. Hardware Cloth

1. 1/2-inch hardware cloth.

E. Through Wall Flashing

1. Self-sealing, fully adhering composite flashing consisting of 32 mil rubberized asphalt bonded to an 8 mil cross laminated polyethylene film to produce an overall 40 mil thickness.
2. Provide Perm-A-Barrier Wall Flashing by W.R. Grace, Flash-Bond by Wire-Bond or Poly-Barrier Wall Flashing by Polytite Manufacturing Corporation.

F. Cavity Drainage Mat

1. CavClear Masonry Mat by CavClear, Hudson WI. Or approved equal. Description: Fluid conducting, non-absorbent, mold and mildew resistant polymer mesh

consisting of 100% recycled polymer with PVC binder. Thickness of actual air space minus tolerances recommended by manufacturer.

PART 3 – EXECUTION

3.01 REINFORCEMENT AND ANCHORAGE

- A. In masonry wall panels, place horizontal joint reinforcement at a vertical spacing of 16 inches on center, unless otherwise noted.
- B. Lap side rods at each end joint a minimum of 6 inches.
- C. Install prefabricated corner and tee assemblies at each wall corner and intersection.
- D. Mitre and butt end joints are prohibited.
- E. Place horizontal joint reinforcement in approximate center of out-to-out wall assembly and assuring a 5/8 inch, minimum, mortar coverage on exterior face and 1/2 inch on interior face.
- F. Veneer ties and wire anchors shall be length required to provide a minimum of 1 1/2" engagement into the veneer and assuring a 5/8 inch, minimum, mortar coverage on exterior face and 1/2 inch on interior face.
- G. Adjustable anchor assemblies may be offset no more than that which is stated in manufacturer's published instructions. Pintles may be installed either up or down.
- H. Install horizontal joint reinforcement continuous, terminating only at vertical control joints.
- I. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend 24 inches minimum each side of opening.
- J. Place joint reinforcement continuous and at 8 inches on center vertically above roof.
- K. Place reinforcing bars supported and secured against displacement. Maintain position with 1/2 inch to true dimension.
- L. Coordinate and verify that dowels and anchorages embedded in concrete and attached to structural steel members are properly placed.
- M. Provide wall ties for masonry veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place at maximum 8 inches on center each way around perimeter of openings, within 12 inches of openings.
- N. Masonry adjacent to steel and concrete columns to be attached to the column with masonry anchors at 16 inches on center. Anchors to be attached to each face of the column which is adjacent to a masonry wall, unless otherwise noted.

3.02 DOVETAIL SLOTS AND ANCHORS

- A. Provide dovetail slots to concrete contractor for placement into the concrete construction. Dovetail slots shall be placed vertically and spaced 16 inches on center horizontally.
- B. Remove slot filler after forms are removed.
- C. Hook dovetail anchor into slots and set in masonry joints at 16 inches on center.

3.03 BENDING, CUTTING AND SPLICING REINFORCEMENT

- A. Make bends and splices in reinforcement only where indicated, or prior-approval by Engineer. Bend reinforcement only when cold, and prior to any placement in construction, forming around a steel pin of diameter at least 6 times the reinforcement size. Cut bars only by approved sawing, shearing or welding methods. Make ends of reinforcement straight, square, clean and free of defects before splicing. Do not heat or weld bends and splices at points of maximum stress. Clip and bend any tie wires as required to direct the ends away from external surfaces of masonry walls.
- B. Where welding is necessary, provide materials and perform welding in accordance with AWS requirements.
- C. All lap splices to be 48 bar diameters, unless otherwise noted.

3.04 THROUGH WALL FLASHING

- A. Clean areas to receive flashing. Surface shall be free of voids, spalled areas, or sharp protrusions. Concrete surfaces shall be cured a minimum of 7 days.
- B. Apply Primer as recommended by manufacturer.
- C. Apply flashing in strict accordance with manufacturer's instructions and recommendations. Sidelaps shall be a minimum of 2½ inches. End laps shall have a 6" minimum lap. Provide end dams at ends of lintels and other interruptions.
- D. Seal flashing where vertical reinforcing penetrates flashing with a mastic approved for use by manufacturer.

3.05 CAVITY DRAINAGE MAT

- A. Install cavity drainage mat in air-space between insulation and masonry veneer construction full height of cavity.
- B. Cavity drainage mat shall be temporarily fastened in accordance with manufacturer's instructions.

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SECTION 04200

UNIT MASONRY

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish labor, materials, equipment, and appliances required for complete execution of Work shown on Drawings and specified work.

- 1. Principal items of work include:

- a. Electrical Building masonry wall construction.
- b. Installation of masonry reinforcement and accessories.
- c. Masonry unit lintels.
- d. Installing dampproofing, insulation, flashing and work required to be built into masonry work.
- e. Building into masonry work all anchors, inserts, hangers and the like provided under other Sections.
- f. Pointing and cleaning of exposed masonry surfaces.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03200 – Reinforcing Steel
- B. Section 04100 – Mortar and Masonry Grout

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of the Specifications, the Work shall conform to the applicable requirements of the following documents:

- 1. TMS 402 – Building Code Requirements for Masonry Structures
- 2. TMS 602 – Specifications for Masonry Structures
 - a. TMS 602 shall be considered minimum specifications for all materials, workmanship, methods, and techniques for all masonry work.
 - b. Obtain a copy of the above Specifications prior to beginning any work in this Section.

3. ASTM C62 – Standard Specification for Building Brick
4. ASTM C90 – Standard Specification for Load-Bearing Concrete Masonry Units
5. ASTM C140 – Standard Methods for Sampling and Testing Concrete Masonry Units
6. ASTM C216 – Standard Specification for Facing Brick
7. ASTM C744 – Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units
8. ANSI A41.1 R70 – Code Requirements for Masonry

1.04 TESTING

A. Tests

1. The Owner reserves the right to test materials for compliance with these specifications. Sampling and testing will be done in accordance with the ASTM standard, by an independent testing agency employed by the Owner. Materials that fail to meet requirements are considered defective. Subsequent tests to establish compliance (of the same or new materials) shall be paid for by the Contractor.
 - a. Mortar testing shall be performed in accordance with ASTM C 109.
 - b. Masonry grout testing shall be performed in accordance with ASTM C 1019.

1.05 SUBMITTALS

- A. In accordance with the procedures and requirements set forth in Section 01300 – Submittals, submit the following:
 1. Samples of each material to be used showing full range of colors.
 2. Manufacturer's specifications and certifications of compliance to the Specifications, including results of tests on masonry units showing such compliance, for each type of masonry. Provide handling, storage, and installation instructions along with protection instructions. Indicate by transmittal that installer has received copies of each instruction.
 3. Shop drawings for precast concrete lintels.
 4. Detailed placing and shop fabricating drawings, prepared in accordance with ACI 315 and ACI Detailing Manual - (SP66), shall be furnished for all deformed bar reinforcing. These drawings shall be made to such a scale as to clearly show joint locations, openings, and the arrangement, locations, spacing and splicing of the bars.

5. Cold and/or hot weather construction procedures in accordance with ACI 530.1/ASCE 6 sections 2.3.2.2. and 2.3.2.3.

6. Cleaning procedures and cleaner for each masonry type.

1.06 MOCK-UPS

- A. Build mock-ups at the site, where directed, full thickness and approximately 4 feet x 4 feet, indicating the proposed color range, texture, and workmanship for each type of masonry. Obtain Engineer's acceptance of visual qualities of the mock-up before start of masonry work. Do not alter, move, or destroy mock-ups until Work is completed and removal is directed by the Engineer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in the manufacturer's original unbroken, undamaged, and unopened packaging with labels bearing the name of the manufacturer and the product. Masonry units and brick shall be factory packaged and strapped, delivered to the site and stored on skids.
- B. Store and handle materials to prevent inclusion of water or foreign matter and to prevent damage of any nature.
- C. Distribute materials on floor slabs to prevent overloading. Designated live loads shown for floor shall not be exceeded.
- D. All concrete masonry units shall be stored under cover, in a dry place and in a manner to prevent damage, breakage, or staining. Blocks shall be delivered to the site dry, in conformance with the specification limitation for moisture content, and kept dry by storing off the ground and under cover. Blocks which have become wet shall be removed from the site by the Contractor.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Provide special shape, type or size indicated or for application requiring a form, size or finish which cannot be produced from standard masonry units by sawing. Provide solid units where masonry unit is exposed.
- B. Masonry units for fire-rated walls shall comply with Underwriter's Laboratory requirements for fire rating shown on the Drawings.
- C. Deformed bar reinforcing steel shall meet the requirements of specification 03 21 00 – Reinforcing Steel.

2.02 MATERIALS

A. Mortar

1. In accordance with Section 04100 – Mortar and Masonry Grout

B. Concrete Masonry Units

1. Provide units conforming to ACI 530.1 unless otherwise specified.
2. Provide light weight units meeting the requirements of ASTM C90 for hollow and solid load bearing CMU.
3. Manufacture units of Portland Cement, conforming to ASTM C-150 and light weight aggregate conforming to ASTM C331 and ASTM C33. Weight of unit shall not exceed 105 lb. per cu. ft. when measured in accordance with provisions of ASTM C140. Units shall be nominally 8 inches x 16 inches x thicknesses shown or as required. Masonry units shall be manufactured not less than 30 days prior to being used and stored under cover until shipment. All units shall have true, sharp edges and corners, free from cracks or other defects. Provide half special sizes and shapes as required by the Drawings or to meet job conditions.
4. Net area compressive strength of concrete masonry units shall be a minimum of 2,000 psi when tested in accordance with ASTM C140. Compressive strength of masonry (f_m) shall be a minimum of 2,000 psi in accordance with ACI 530.1 when these units are used with the mortar specified in Section 04 05 13 – Mortar and Masonry Grout.
5. All bond beam, corner, lintel, sill, and other specially shaped blocks shall be provided and used where required or necessary. Specially shaped nonstructural blocks may be constructed by sawcutting. Color and texture shall match that of the adjacent units.

C. Concrete Masonry Lintels

1. Specially formed units with reinforcing bars and grout fill provided where shown and wherever openings in masonry are indicated without structural steel or other supporting lintels.

D. Architectural Concrete Masonry Units

1. Scored smooth and split-face CMU shall be manufactured by firm producing architectural concrete masonry units for a minimum of five years.
2. Units shall conform to ASTM C-90, Type I, normal weight.
3. Provide units with integral water repellant admixture. Absorption shall not exceed 10 lbs per cubic foot.

4. Minimum compressive strength shall be 2700 psi on wet area of a single unit.
5. Color shall be selected from manufacturer full line of colors. Up to two colors shall be selected.

PART 3 – EXECUTION

3.01 GENERAL

- A. Examine areas and conditions under which masonry is to be installed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Do not wet concrete masonry units.
- C. Brick having absorption rates in excess of 0.025 oz. per square inch per minute (as determined per ASTM C 67) shall be wetted sufficiently so that the rate of absorption, when brick is laid, does not exceed this amount.
- D. Clean reinforcing, removing loose rust, ice, or other coatings from bars, before placement.
- E. Thickness of cavity and composite walls, and other masonry construction shall be the full thickness shown. Build single wythe walls to the actual size of masonry units.
- F. Build other work into masonry work as shown, fitting masonry units around other work and grouting to assure anchorage.
- G. Cut masonry units with motor driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown or specified, and to fit adjoining work neatly.
- H. Cold and hot weather construction.
 1. No masonry shall be erected when ambient temperature has dropped below 45°F unless it is rising and at no time when it has dropped below 40°F. Provisions shall be made for heating and drying of materials, and the complete work shall be protected in accordance with the ACI 530.1/ASCE 6 Section 2.3.2.2. Masonry shall not be laid with ice or frost on its surfaces, and no masonry shall be laid on frozen work. Any work which freezes before the mortar has set shall be removed and replaced at the Contractor's own expense. Do not use any admixtures or antifreeze in the mortar.
 2. When the temperature is above 100°F or 90°F with a wind velocity greater than 8 mph, mortar beds shall be spread no more than 4 feet ahead of masonry and masonry units shall be set within one minute of spreading mortar.

3.02 CONSTRUCTION TOLERANCES

- A. Variation from plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10', or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, nor 1/2" in 40' or more. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10', 1/2" maximum.
- B. Variation from level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines do not exceed 1/4" in any bay or 20' maximum, nor 1/2" in 40' or more. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10' or 1/16" within width of a single unit.
- C. Variation of Linear Building Line: For position shown on plan and related portion of columns, walls, and partitions, do not exceed 1/2" in any bay or 20' maximum, nor 3/4" in 40' or more.
- D. Variation in Cross Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".
- E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8".

3.03 LAYING MASONRY WALLS

- A. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs, and wherever possible at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Pattern Bond: Lay exposed masonry in the bond pattern shown or, if not shown, lay in running bond with vertical joint in each course centered on units in courses above and below.
- D. Stopping and Resuming Work: Rack back 1/2 unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly, and remove loose masonry units and mortar prior to laying fresh mortar.
- E. Cover top of walls at the end of each day. Protect wall from water infiltration from the top until wall is capped.
- F. Built-In Work: As work progresses, build-in items specified under this and other sections of these Specifications. Fill in solidly with masonry around built-in items.

1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of hardware cloth in the joint below and rod grout into core.
3. Fill cores in hollow masonry units with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar items, unless otherwise noted.
4. Seal masonry tight around wall penetrations such as beams, joists, pipes, ducts, and conduit by cutting masonry units to fit as tightly as possible, then closing final gap all around with mortar, or joint filler and caulking as necessary.

3.04 MORTAR BEDDING AND JOINTING

- A. Lay solid masonry units with filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells; also bed webs with mortar in starting courses on footing or floors, and where adjacent cells are to be reinforced or filled with grout. For starting courses where cells are not grouted, spread full mortar bed including areas under cells.
- C. Maintain joint widths of 3/8", except for minor variations required to maintain bond alignment.
- D. Tooling: Joints shall be tooled to a uniform concave joint. Head joints first and then the bed joints.
- E. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners and jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean, and reset in fresh mortar.

3.05 JOINT REINFORCING

- A. Use continuous horizontal joint reinforcement installed in horizontal mortar joints not more than 16" o.c. vertically.
- B. Reinforced masonry openings greater than 12" wide, with horizontal joint reinforcing placed in 2 horizontal joints immediately above the lintel and immediately below the sill. Extend reinforcements 2'-0" beyond jambs of the opening except at control joints.
- C. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- D. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, pipe enclosures and other special conditions.

- E. Intersecting Load-bearing Walls: Provide rigid steel anchors at not more than 2'-0" o.c vertically. Embed ends in mortar-filled cores.
- F. Non-loadbearing Interior Partitions: Build full height of story to underside of solid floor or structure above, unless shown otherwise. Fill joint with mortar after dead load deflection of structure above approaches final position.

3.06 CONTROL AND EXPANSION JOINTS

- A. General: Provide vertical and horizontal expansion, control and isolation joints in masonry where shown. Build-in related items as the masonry work progresses.

3.07 LINTELS

- A. Install galvanized steel lintels where indicated.
- B. Provide masonry lintels where shown and wherever openings of more than 8" for brick size units and 1'-4" for block size units are shown without structural steel or other supporting lintels. Provide precast or poured-in-place masonry lintels. Cure precast lintels before handling and installation. Temporarily support formed-in-place lintels.
- C. For hollow concrete masonry unit walls, use specially formed "U"-shaped lintel units with reinforcement bars placed as shown and filled with grout.
- D. Provide minimum bearing of 8" at each jamb.

3.08 REINFORCED UNIT MASONRY

- A. Vertical reinforcement shall be held in place by means of frames or other suitable means. Place horizontal joint reinforcement as masonry work progresses. Provide minimum clear distance between longitudinal bars equal to nominal diameter of bar. Minimum thickness of mortar or grout between masonry and reinforcement shall be 1/4", except 6 gage or smaller wires may be laid in 3/8" mortar joints. Collar joints which contain both horizontal and vertical reinforcement shall have a minimum width of 1/2" larger than the diameter of the horizontal and vertical reinforcement.
- B. Bar splices shall be contact lap splices. Length of splice shall be as shown on Structural Drawings.
- C. Low lift grouting shall be used when grout space is less than 2" in width. Place grout at maximum intervals of 24" in lifts of 6 to 8 inches as the work progresses. Cores to be grouted shall be clean of mortar, mortar dropping and debris. Agitate grout to assure complete filling and coverage of reinforcement. Hold grout 1-1/2 inches below to top of masonry if work is discontinued for more than an hour.
- D. High lift grouting may be used when the grout space is greater than 2". Grout shall not be placed in lifts greater than 4 feet. Grout core shall be kept clean of mortar, mortar dripping and debris. Provide cleanout holes as required for inspection and cleaning. Replace

cleanout plugs after inspection and acceptance. Place grout in accordance with TMS 402 and TMS 602. Hold grout 1-1/2 inches below top of masonry if work is discontinued for more than an hour.

- E. Forms and shoring shall be substantial and tight to prevent leakage of mortar or grout. Brace and shore forms to maintain position and shape. Do not remove forms or shoring until masonry gains enough strength to sufficiently carry its own weight and any other loads, temporary or permanent, placed on it during construction.

3.09 PROTECTION OF WORK

- A. Exposed masonry surfaces shall be protected from staining. Tops of wall shall be covered with nonstaining waterproof coverings when work is not in progress. Installed material shall be secure in high winds.
- B. Protection shall be provided for all openings in the walls to prevent damage to sills, jambs, etc., from all causes. Aluminum or steel frames and other finish materials shall be protected from damage during masonry work.

3.10 REPAIR, POINTING, AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing of Masonry: At the completion of the masonry work, all holes in exposed masonry shall be pointed. Defective joints shall be cut out and tuckpointed solidly with mortar. Pointing and tuckpointing shall be done with a pre-hydrated mortar. The mortar cement shall be controlled so that, after curing of the mortar, no difference in texture or color exists with that of adjacent masonry.
- C. Masonry Cleaning: While laying masonry units, good workmanship and job housekeeping practices shall be used to minimize the need for cleaning the masonry work. Protect the base of the wall from mud splashes and mortar droppings. The technique for laying masonry shall be such that mortar does not run down the face of the wall or smear onto the face.
 - 1. After the joints are tooled, cut off mortar failings with the trowel and brush excess mortar burrs and dust from the face of the masonry, use a bricklayer's brush made with medium soft hair.
 - 2. Remove all large mortar particles with a hardwood scraper.
 - 3. If, after using the above outlined techniques, additional cleaning of the walls is found necessary, allow the walls to cure one month prior to initiating further cleaning processes.

D. Clean masonry to comply with the masonry manufacturer's directions and applicable NCMA "Tek" bulletins or BIA technical notes and the following requirements.

1. Saturate the wall with clean water. The wall shall be thoroughly saturated prior to and at the time the cleaning solution is applied.
2. Clean masonry with an approved cleaning solution for each type of masonry applied with a brush, starting at the top of the wall. Approved cleaners shall be composed primarily of detergents, wetting agents, buffering agents, and a maximum of 10% muriatic acid. Do not use acids on masonry surfaces that will be damaged by use of an acid cleaner. The use of any of the above cleaning agents shall first be approved in writing by the manufacturer of the masonry being cleaned and the Engineer. The concentration, method of application of the cleaning solution, and method of scraping shall be as outlined on the container by the manufacturer.
3. High pressure water and sandblasting shall not be used for cleaning except with the recommendation of the masonry manufacturer and the written approval of the Engineer.
4. Immediately after cleaning a small area, the wall shall be rinsed thoroughly with quantities of water.
5. Protect adjacent surfaces and materials during masonry cleaning operations.
6. After the walls are cleaned, take the necessary precautions to ensure that other contractors and subcontractors do not damage or soil the walls. Mud protection around the base of walls shall be left in place until the grading work is done.

- END OF SECTION -

SECTION 05010

METAL MATERIALS

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Metal materials not otherwise specified shall conform to the requirements of this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Materials for fasteners are included in Section 05050 – Metal Fastening.
- B. Requirements for specific products made from the materials specified herein are included in other sections of the Specifications. See the section for the specific item in question.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. ASTM A36 – Standard Specification for Structural Steel
- B. ASTM A47 – Standard Specification for Malleable Iron Castings
- C. ASTM A48 – Standard Specification for Gray Iron Castings
- D. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
- E. ASTM A167 – Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
- F. ASTM A276 – Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
- G. ASTM A307 – Standard Specification for Carbon Steel Externally Threaded Standard Fasteners
- H. ASTM A446 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) quality
- I. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- J. ASTM A501 – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

- K. ASTM A529 – Standard Specification for Structural Steel with 42 000 psi (290 Mpa) Minimum Yield Point (1/2 in. (12.7 mm) Maximum Thickness)
 - L. ASTM A536 – Standard Specification for Ductile Iron Castings
 - M. ASTM A570 – Standard Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality
 - N. ASTM A572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
 - O. ASTM A992 – Standard Specification for Structural Steel Shapes
 - P. ASTM A666 – Standard Specification for Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar for Structural Applications
 - Q. ASTM A1085 – Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)
 - R. ASTM B26 – Standard Specification for Aluminum-Alloy Sand Castings
 - S. ASTM B85 – Standard Specification for Aluminum-Alloy Die Castings
 - T. ASTM B108 – Standard Specification for Aluminum-Alloy Permanent Mold Castings
 - U. ASTM B138 – Standard Specification for Manganese Bronze Rod, Bar, and Shapes
 - V. ASTM B209 – Standard Specification for Aluminum-Alloy Sheet and Plate
 - W. ASTM B221 – Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
 - X. ASTM B308 – Standard Specification for Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded
 - Y. ASTM B574 – Standard Specification for Nickel-Molybdenum-Chromium Alloy Rod
 - Z. ASTM F468 - Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
 - AA. ASTM F593 – Standard Specification for Stainless Steel Fasteners
- 1.04 SUBMITTALS
- A. Material certifications shall be submitted along with any shop drawings for metal products and fabrications required by other sections of the Specifications.

1.05 QUALITY ASSURANCE

- A. Owner may engage the services of a testing agency to test any metal materials for conformance with the material requirements herein. If the material is found to be in conformance with Specifications the cost of testing will be borne by the Owner. If the material does not conform to the Specifications, the cost of testing shall be paid by the Contractor and all materials not in conformance as determined by the Engineer shall be replaced by the Contractor at no additional cost to the Owner. In lieu of replacing materials, the Contractor may request further testing to determine conformance, but any such testing shall be paid for by the Contractor regardless of outcome of such testing.

PART 2 – PRODUCTS

2.01 CARBON AND LOW ALLOY STEEL

- A. Material types and ASTM designations shall be as listed below:

Steel W, C, and MC Shapes	A992
Steel HP Shapes	A572 Grade 50
Steel M and S shapes and Angles, Bars, and Plates	A36
Rods	F 1554 Grade 55
Pipe - Structural Use	A53 Grade B
Hollow Structural Sections	A500 Grade C or A1085 Grade A
Cold-Formed Steel Framing	A 653

2.02 STAINLESS STEEL

- A. All stainless steel fabrications exposed to underwater service shall be Type 316. All other stainless steel fabrications shall be Type 304, unless noted otherwise.
- B. Material types and ASTM designations are listed below:

Plates and Sheets	ASTM A167 or A666 Grade A
Structural Shapes	ASTM A276
Fasteners (Bolts, etc.)	ASTM F593

2.03 ALUMINUM

- A. All aluminum shall be alloy 6061-T6, unless otherwise noted or specified herein.

B. Material types and ASTM designations are listed below:

Structural Shapes	ASTM B308
Castings	ASTM B26, B85, or B108
Extruded Bars	ASTM B221 - Alloy 6061
Extruded Rods, Shapes and Tubes	ASTM B221 - Alloy 6063
Plates	ASTM B209 - Alloy 6061
Sheets	ASTM B221 - Alloy 3003

C. All aluminum structural members shall conform to the requirements of Section 05140 – Structural Aluminum.

D. All aluminum shall be provided with mill finish unless otherwise noted.

E. Where bolted connections are indicated, aluminum shall be fastened with stainless steel bolts.

2.04 CAST IRON

A. Material types and ASTM designations are listed below:

Gray	ASTM A48 Class 30B
Malleable	ASTM A47
Ductile	ASTM A536 Grade 60-40-18

2.05 DISSIMILAR METALS

Dielectric isolation shall be installed wherever dissimilar metals are connected according to the following table.

	Zinc	Galvanized Steel	Aluminum	Cast Iron	Ductile Iron	Mild Steel/ Carbon Steel	Copper	Brass	Stainless Steel
Zinc			•	•	•	•	•	•	•
Galvanized Steel			•	•	•	•	•	•	•
Aluminum	•	•		•	•	•	•	•	•

	Zinc	Galvanized Steel	Aluminum	Cast Iron	Ductile Iron	Mild Steel/ Carbon Steel	Copper	Brass	Stainless Steel
Cast Iron	•	•	•				•	•	•
Ductile Iron	•	•	•				•	•	•
Mild Steel/ Carbon Steel	•	•	•				•	•	•
Copper	•	•	•	•	•	•			•
Brass	•	•	•	•	•	•			•
Stainless Steel	•	•	•	•	•	•	•	•	

"•" signifies dielectric isolation is required between the two materials noted.

Consult Engineer for items not listed in table.

PART 3 – EXECUTION (NOT USED)

- END OF SECTION -

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SECTION 05050

METAL FASTENING

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish all materials, labor, and equipment required to provide all metal welds and fasteners not otherwise specified, in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05010 – Metal Materials
- B. Section 05061 – Stainless Steel
- C. Section 05140 – Structural Aluminum

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. Florida Building Code
 - 2. AC 193 – Acceptance Criteria for Mechanical Anchors in Concrete Elements
 - 3. AC 308 – Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements
 - 4. ACI 318 – Building Code Requirements for Structural Concrete
 - 5. ACI 355.2 – Qualifications of Post-Installed Mechanical Anchors in Concrete
 - 6. ACI 355.4 – Qualifications of Post-Installed Adhesive Anchors in Concrete
 - 7. AISC – RCSC Specification for Structural Joints Using High Strength Bolts
 - 8. AISC – Code of Standard Practice
 - 9. AWS D1.1 – Structural Welding Code – Steel
 - 10. AWS D1.2 – Structural Welding Code – Aluminum

11. AWS D1.6 – Structural Welding Code – Stainless Steel
12. Aluminum Association – Specifications for Aluminum Structures
13. ASTM A572/A572M-94C – Standard Specification for High Strength Low-Alloy Columbium-Vanadium Structural Steel Grade 50
14. ASTM A36 – Standard Specification for Carbon Structural Steel
15. ASTM A489 – Standard Specification for Eyebolts
16. ASTM A563 – Standard Specifications for Carbon and Alloy Steel Nuts
17. ASTM D1785 – Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe
18. ASTM E3121 – Standard Test Methods for Field Testing of Anchors in Concrete or Masonry
19. ASTM F436 – Standard Specification for Hardened Steel Washers
20. ASTM F467 – Standard Specification for Nonferrous Nuts for General Use
21. ASTM F593 – Standard Specification for Stainless Steel Bolts; Hex Cap Screws, and Studs
22. ASTM F594 – Standard Specification for Stainless Steel Nuts
23. ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
24. ASTM F3125 – Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength, Inch and Metric Dimension

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 – Submittals.

1. Shop Drawings providing the fastener's manufacturer and type and certification of the fastener's material and capacity.
2. Anchor design calculations sealed by a Professional Engineer currently registered in the State of Florida. Only required if design not shown on Contract Drawings.
3. A current Evaluation Report shall be submitted for all anchors that will be considered for use on this project.
4. Manufacturer's installation instructions.

5. Copy of valid certification for each person who is to perform field welding.
6. Certified weld inspection reports, when required.
7. Welding procedures.
8. Installer qualifications.
9. Certification of Installer Training.
10. Inspection Reports.
11. Results of Anchor Proof Testing.
12. Manufacturer's Literature for Resistance of Adhesive to Appropriate Chemical Exposure, where deemed necessary.

1.05 QUALITY ASSURANCE

- A. Fasteners not manufactured in the United States shall be tested and certification provided with respect to specified quality and strength standards. Certifications of origin shall be submitted for all U.S. fasteners supplied on the project.
- B. Evaluation Report: A current Evaluation Report from an independent testing and evaluation agency (ITEA) shall be submitted for all anchors that will be used on this project. The ITEA producing the evaluation report shall be accredited in accordance with the requirements for ITEA's in ACI 355.2 (mechanical anchors) or 355.4 (adhesive anchors). Acceptable ITEA's include but are not necessarily limited to the International Code Council Evaluation Service (ICC-ES) and the International Association of Plumbing and Mechanical Officials Uniform Evaluation Service (IAPMO-UES).
- C. Installer Qualifications: All concrete anchors shall be installed by an Installer with at least three years of experience performing similar installations. Concrete adhesive anchor installers for anchor installations shall be certified as an Adhesive Anchor Installer in accordance with ACI-CRSI Adhesive Anchor Installation Certification Program.
- D. Installer Training: For concrete anchors, conduct a thorough training with the manufacturer or the manufacturer's representative for the Installer on the project. Training shall consist of a review of the complete installation process to include but not be limited to the following:
 1. Hole drilling procedure.
 2. Hole preparation and cleaning technique.
 3. Adhesive injection technique and dispenser training/maintenance.
 4. Concrete adhesive anchor preparation and installation.

5. Proof loading/torquing.
6. Provide a copy of the current ACI/CRSI "Adhesive Anchor Installer" certification cards for all installers.
- E. All steel welding shall be performed by welders certified in accordance with AWS D1.1. All aluminum welding shall be performed by welders certified in accordance with AWS D1.2. All stainless-steel welding shall be performed by welders certified in accordance with AWS D1.6. Certifications of field welders shall be submitted prior to performing any field welds.
- F. Welds and high strength bolts used in connections of structural steel will be visually inspected in accordance with Article 3.04.
- G. The Owner may engage an independent testing agency to perform testing of welded connections and to prepare test reports in accordance with AWS. Inadequate welds shall be corrected or redone and retested to the satisfaction of the Engineer and/or an acceptable independent testing laboratory, at no additional cost to the Owner.
- H. Provide a welding procedure for each type and thickness of weld. For welds that are not prequalified, include a Performance Qualification Report. The welding procedure shall be given to each welder performing the weld. The welding procedure shall follow the format in Annex E of AWS D1.1 with relevant information presented.
- I. Inspections of the adhesive dowel system shall be made by the Engineer or other representatives of the Owner in accordance with the requirements of the ESR published by the manufacturer. Provide adequate time and access for inspections of products and anchor holes prior to injections, installation, and proof testing.

PART 2 – PRODUCTS

2.01 ANCHOR RODS

- A. Anchor rods shall conform to ASTM F1554 Grade 55 except where stainless steel or other approved anchor rods are shown on the Drawings or stated herein. Anchor rods shall have hexagonal heads and shall be supplied with hexagonal nuts meeting the requirements of ASTM A563 Grade A. Washers shall meet the requirements of ASTM A436.
- B. All anchors into concrete shall be cast-in-place anchors unless specifically referenced otherwise on Drawings.
- C. Where anchor rods are used to anchor galvanized steel or are otherwise specified to be galvanized, anchor rods and nuts shall be hot dipped galvanized in accordance with ASTM F1554.
- D. Where pipe sleeves around anchor rods are shown on the Drawings, pipe sleeves shall be cut from Schedule 40 PVC plastic piping meeting the requirements of ASTM D1785.

2.02 HIGH STRENGTH BOLTS

- A. High strength bolts and associated nuts and washers shall be in accordance with ASTM F3125, Grade A325 Type 1 or Grade F1852 Type 1. Bolts, nuts, and washers shall meet the requirements of RCSC "Specification for Structural Joints Using High Strength Bolts".
- B. Where high strength bolts are used to connect galvanized steel or are otherwise specified to be galvanized, bolts, nuts, and washers shall be hot dipped galvanized in accordance with ASTM A325.

2.03 STAINLESS STEEL BOLTS

- A. Stainless steel bolts shall conform to ASTM F-593 for alloy groups 1 and 2, Condition CW1, or ASTM F-3125. All fasteners for aluminum and stainless steel members that are underwater, in confined areas containing fluid, and in corrosive environments shall be Type 316 stainless steel unless noted otherwise. Fasteners for aluminum and stainless-steel members not subject to the above conditions shall be Type 304 stainless steel unless otherwise noted.
- B. Stainless steel bolts shall have hexagonal heads with a raised letter or symbol on the bolts indicating the manufacturer and shall be supplied with hexagonal nuts meeting the requirements of ASTM F594. Nuts, washers, and lock washers shall be of the same alloy as the bolts.

2.04 CONCRETE ANCHORS

A. General

- 1. Where concrete anchors are called for on the Drawings, one of the types listed below shall be used. Where one of the types listed below is specifically called for on the Drawings, only that type shall be used. If no specific type is indicated on the Drawings, the concrete anchor shall be a cast-in-place anchor. The determination of anchors equivalent to those listed below shall be based on test data performed by an approved independent testing laboratory. Two types of anchors shall be used:
 - a. Mechanical anchors include any of the following anchors:
 - 1) Expansion anchors shall be mechanical anchors of the wedge, sleeve, or drop-in type that are set by expanding against the sides of the drilled hole.
 - 2) Screw anchors are mechanical anchors that derive tensile holding strength by the mechanical interlock provided by threads cutting into the concrete during installation. Screw anchors shall be one-piece, heavy duty screw anchors with a finished head.
 - b. Adhesive anchors shall consist of threaded rods anchored with an adhesive system into hardened concrete. Adhesive anchors shall be two-part injection

type using the manufacturer's static mixing nozzle and shall be supplied as an entire system.

2. Adhesive anchors shall conform to the requirements of ACI 355.4 or alternately to AC 308. Mechanical anchors shall conform to the requirements of ACI 355.2 or alternately to AC 193.
3. Engineer's approval is required for use of concrete anchors in locations other than those shown on the Drawings.

B. Wedge Anchors:

- a. Do not use when subjected to vibration.
- b. Do not use in exterior locations or locations subjected to freezing.
- c. Do not use in submerged, intermittently submerged, or buried locations.
- d. Suitable for use in overhead applications.

C. Screw Anchors:

- a. Do not use when subjected to vibration.
- b. Do not use in exterior locations or locations subjected to freezing.
- c. Do not use in submerged, intermittently submerged, or buried locations.
- d. Suitable for use in overhead applications.

D. Sleeve Anchors:

- a. Do not use when subjected to vibration.
- b. Do not use in exterior locations or locations subjected to freezing.
- c. Do not use in submerged, intermittently submerged, or buried locations.
- d. Suitable for use in overhead applications.

E. Undercut Anchors:

- a. Suitable for use where subjected to vibration.
- b. Do not use in exterior locations or locations subjected to freezing.
- c. Do not use in submerged, intermittently submerged, or buried locations.
- d. Suitable for use in overhead applications.

F. Adhesive Anchors in Concrete:

- a. Suitable for use where subjected to vibration.
- b. Suitable for use in exterior locations or locations subjected to freezing.
- c. Suitable for use in submerged, intermittently submerged, or buried locations.
- d. Do not use in overhead applications, unless otherwise shown or approved by Engineer.
- e. Suitable for use in chemical areas provided manufacturer's literature confirms appropriate chemical resistance.
- f. Do not use for pipe hangers, unless otherwise shown or approved by Engineer.

G. Concrete Anchor Design:

- 1. Basis of design shall include the following design parameters:
 - a. Actual compressive strength of concrete.
 - b. Cracked concrete conditions.
 - c. Dry or water saturated installation conditions.
 - d. Base material temperature between 40- and 104-degrees Fahrenheit.
 - e. Installation with hammer drill or hollow-drill bit system drilling methods.
 - f. Installation not prior to 21-day minimum age of concrete.
- 2. An anchor design consists of specifying anchor size, quantity, spacing, edge distance and embedment to resist all applicable loads. Where an anchor design is indicated on the Drawings, the anchors shall be installed to the prescribed size, spacing, embedment depth, and edge distance. If all parts of an anchor design are provided on the Drawings except embedment depth, the Contractor shall provide the embedment depth as indicated in Paragraph B.3 unless otherwise directed by the Engineer. Where an anchor design is not indicated on the Drawings, the Contractor shall provide the anchor design per the requirements listed below.
 - a. The Contractor shall submit design with sealed calculations and drawings performed by an Engineer currently registered in the State of Florida. Anchors shall be of a type recommended by the anchor manufacturer for use in cracked concrete and shall be designed by the Contractor in accordance with ACI 318 Chapter 17.

b. Embedment Depth

- 1) Minimum anchor embedment shall be as indicated on the Drawings unless anchor design is stipulated to be by Contractor or equipment provider. The provider of equipment including pumps, blowers, etc. shall provide anchor design including size of anchors, pattern, and embedment depth. If the equipment provider is unable to provide design of embedment depth, the design shall be provided by the Contractor using the loads furnished by the equipment provider. Although all manufacturers listed are permitted, the embedment depth indicated on the Drawings is based on “Pure 110+ by DeWalt” ESR 3298 issued 7/2023. If the Contractor submits one of the other concrete adhesive anchors listed, the Engineer shall evaluate the required embedment and the Contractor shall provide the required embedment depth stipulated by the Engineer specific to the approved dowel adhesive.
- 2) Where the embedment depth is not shown on the Drawings, concrete anchors shall be embedded no less than the manufacturer's standard embedment (mechanical anchors) or to provide a minimum allowable bond strength equal to the allowable yield capacity of the rod according to the manufacturer (adhesive anchors).
- 3) The embedment depth shall be determined using the actual concrete compressive strength, a cracked concrete state, maximum long-term temperature of 110 degrees F, and maximum short-term temperature of 140 degrees F. In no case shall the embedment depth be less than the minimum or more than the maximum stated in the manufacturer's literature.

H. Anchors:

1. Mechanical Anchors:

- a. Wedge Anchors: Wedge anchors shall be “Kwik Bolt TZ” by Hilti, Inc., “Strong-Bolt 2” by Simpson Strong-Tie Co. or “Power-Stud+SD1” or “Power-Stud+ SD-2” by DeWalt.
- b. Screw Anchors: Screw anchors shall be “KWIK HUS-EZ”, “KWIK HUS-EZ-I”, or “KWIK HUS-EZ CRC” by Hilti, Inc., “Titen HD” or “Stainless Steel Titen HD” by Simpson Strong-Tie Co., or “Screw-Bolt+” by DeWalt.
- c. Sleeve Anchors: Sleeve anchors shall be “HSL-3 Heavy Duty Sleeve Anchor” by Hilti, Inc. or “Power-Bolt +” by DeWalt.
- d. Shallow Embedment Internally Threaded Insert (3/4” max embedment): “Mini-Undercut +Anchor” by DeWalt, “HDI-P-TZ” by Hilti, Inc. or approved equal.

- e. Concrete Undercut Anchors: Concrete undercut anchors shall be “HDA Undercut Anchors” by Hilti, Inc, “DUC Ductile Undercut Anchor”, by USP Structural Connectors, or approved equal.
- f. Mechanical anchor systems shall comply with ACI 355.2 or alternatively the latest revision of AC 193 and shall have a valid evaluation report in accordance with the applicable building code.

2. Adhesive Anchors:

- a. Adhesive anchors shall be “HIT HY-200 Adhesive Anchoring System” by Hilti, Inc., “SET-3G Epoxy Adhesive Anchors” by Simpson Strong-Tie Co., or “Pure 110+ Epoxy Adhesive Anchor System” by DeWalt.
- b. Adhesive anchor systems shall be IBC compliant and capable of resisting short term wind and seismic loads (Seismic Design Categories A through F) as well as long term and short term sustained static loads in both cracked and uncracked concrete in all Seismic Design Categories. Adhesive anchor systems shall comply with ACI 355.4 or alternatively the latest revision of AC308 and shall have a valid evaluation report in accordance with the applicable building code.

I. Concrete Anchor Materials:

- 1. Concrete anchors used to anchor structural steel shall be a threaded steel rod per anchor manufacturer’s recommendations but shall not have a yield strength (fy) less than 58 ksi nor an ultimate strength (fu) less than 72.5 ksi, unless noted otherwise. Where steel to be anchored is galvanized, concrete anchors shall also be galvanized unless otherwise indicated on the Drawings.
- 2. Concrete anchors used to anchor aluminum, FRP, or stainless steel shall be manufactured from stainless steel unless noted otherwise. All underwater fasteners, fasteners in confined areas containing fluid, and fasteners in corrosive environments shall be Type 316 stainless steel unless noted otherwise. Fasteners for aluminum and stainless-steel members not subject to the above conditions shall be Type 304 stainless steel unless otherwise noted.
- 3. Nuts, washers, lock washers and other hardware shall be of a material to match the anchors.

2.05 WELDS

- A. Electrodes for welding structural steel and all ferrous steel shall comply with AWS Code, using E70 series electrodes for shielded metal arc welding (SMAW), or F7 series electrodes for submerged arc welding (SAW).

B. Electrodes for welding aluminum shall comply with the Aluminum Association Specifications and AWS D1.2.

C. Electrodes for welding stainless steel and other metals shall comply with AWS D1.6.

2.06 WELDED STUD CONNECTORS

A. Welded stud connectors shall conform to the requirements of AWS D1.1 Type C.

2.07 EYEBOLTS

A. Eyebolts shall conform to ASTM A489 unless noted otherwise.

2.08 ANTISEIZE LUBRICANT

A. Antiseize lubricant shall be C5-A Anti-Seize by Loctite Corporation, Molykote P-37 Anti-Seize Paste by Dow Corning, 3M Anti-Seize by 3M, or equal.

PART 3 – EXECUTION

3.01 MEASUREMENTS

A. The Contractor shall verify all dimensions and review the Drawings and shall report any discrepancies to the Engineer for clarification prior to starting fabrication.

3.02 FASTENER INSTALLATION

A. Anchor Rods, Concrete Anchors, and Masonry Anchors

1. Anchor rods shall be installed in accordance with AISC "Code of Standard Practice" by securing rods where concrete will be placed and positioned by means of a rigidly secured template. Overhead anchors, and base plates or elements being anchored, shall be shored as required and securely held in place during anchor setting to prevent movement during anchor installation. Movement of anchors during curing is prohibited.
2. The Contractor shall verify that all concrete and masonry anchors have been installed in accordance with the manufacturer's recommendations and that the capacity of the installed anchor meets or exceeds the specified safe holding capacity.
3. Post-installed concrete anchors shall not be used in place of cast-in-place anchor rods without Engineer's approval.
4. All stainless-steel threads shall be coated with anti-seize lubricant.

B. High Strength Bolts

1. All bolted connections for structural steel shall use high strength bolts. High strength bolts shall be installed in accordance with RCSC "Specification for Structural Joints Using High Strength Bolts". All bolted joints shall be Type N, snug-tight, bearing connections in accordance with AISC Specifications unless noted otherwise on the Drawings.

C. Stainless Steel Bolts

1. Where connections indicate the use of stainless-steel bolts, the bolts shall be installed to the snug tight condition. Connections shall include stainless steel washers under both the bolt head and the nut head. Lock washers shall be utilized for all connections and shall be placed under the nut head.

D. Concrete Anchors

1. Concrete at time of anchor installation shall be a minimum age of 21 days, have a minimum compressive strength of 2500 psi, and ambient temperature at time of installation shall be at least 50 degrees F.
2. Concrete Anchor Testing:
 - a. At all locations, at least 10 percent of all concrete anchors installed shall be proof tested to 80% of the yield strength of the anchor rod, with a minimum of one tested anchor per anchor group.
 - b. Contractor shall submit a plan and schedule indicating locations of anchors to be proof tested, load test values and proposed anchor testing procedure (including a diagram of the testing equipment proposed for use) to the Engineer for review prior to conducting any testing. Proof testing of anchors shall be in accordance with ASTM E3121 for the static tension test. If additional tests are required, inclusion of these tests shall be as stipulated on Contract Drawings.
 - c. Where Contract Documents indicate anchor design to be the Contractor's responsibility, the Contractor shall submit a plan and schedule indicating locations of anchors to be proof tested and load test values, sealed by a Professional Engineer currently registered in the State of Florida. Documentation shall also be submitted indicating the Contractor's proof testing procedures have been reviewed and the proposed procedures are acceptable. Proof testing procedures shall be in accordance with ASTM E3121.
 - d. Concrete Anchors shall have no visible indications of displacement or damage during or after the proof test. Concrete cracking in the vicinity of the anchor after loading shall be considered a failure. Anchors exhibiting damage shall be removed and replaced. If more than 5 percent of tested anchors fail, then 100 percent of anchors shall be proof tested.

- e. Proof testing of concrete anchors shall be performed by an independent testing laboratory hired directly by the Contractor and approved by the Engineer. The Contractor shall be responsible for costs of all proof testing, including additional testing required due to previously failed tests.
- 3. All concrete anchors shall be installed in strict conformance with the manufacturer's printed installation instructions. A representative of the manufacturer shall be on site when required by the Engineer.
- 4. All holes shall be drilled in accordance with the manufacturer's instructions except that cored holes shall not be allowed unless specifically approved by the Engineer. If cored holes are allowed, cored holes shall be roughened in accordance with manufacturer requirements. If hammer drills are used to drill holes in slabs, the drills shall be equipped with a depth stop device. The depth of hole shall be the minimum depth required for anchor embedment and development of required capacity. Prior to drilling, the Contractor shall use GPR or other means to confirm anchor installation will not interfere with reinforcement or embedded items, especially electrical conduit. Thoroughly clean drill holes of all debris, drill dust, and water in accordance with the manufacturer's instructions prior to installation of adhesive and threaded rod unless otherwise recommended by the manufacturer. Degree of hole dampness shall be in strict accordance with manufacturer recommendations. Installation conditions shall be either dry or water saturated. Water filled or submerged holes shall not be permitted unless specifically approved by the Engineer. Injection of adhesive into the hole shall be performed to minimize the formation of air pockets in accordance with the manufacturer's instructions. Wipe rod free from oil that may be present from shipping or handling.
- 5. All adhesive anchor installations shall be conducted by a certified Adhesive Anchor Installer as certified by ACI/CSRI per ACI 318-14 17.8.2.2. Current AAI Certificate must be submitted to the Engineer of Record prior to commencement of any adhesive anchor installations.

E. Other Bolts

- 1. All dissimilar metal shall be connected with appropriate fasteners and shall be isolated via an approved dielectric.
- 2. All stainless-steel bolts shall be coated with anti-seize lubricant.

3.03 WELDING

- A. All welding shall comply with AWS Code for procedures, appearance, quality of welds, qualifications of welders and methods used in correcting welded work.
- B. Welded stud connectors shall be installed in accordance with AWS D1.1.

- C. Welds shown on the Drawings with a field weld symbol shall be field welded. All other welds shall be shop welded unless specifically approved by the Engineer.

3.04 INSPECTION

- A. High strength bolting will be visually inspected in accordance with RCSC "Specification for Structural Joints Using High Strength Bolts". Rejected bolts shall be either replaced or retightened as required.
- B. Field welds will be visually inspected in accordance with AWS Codes. Inadequate welds shall be corrected or redone as required in accordance with AWS Codes.
- C. Post-installed concrete anchors shall be inspected as required by ACI 318.

3.05 CUTTING OF EMBEDDED REBAR

The Contractor shall not cut embedded rebar cast into concrete during installation of post-installed anchors without prior approval of the Engineer.

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SECTION 05140

STRUCTURAL ALUMINUM

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish all equipment, labor, materials, and services required to provide all structural aluminum work in accordance with the Contract Documents. The term "structural aluminum" shall include items as defined in the Aluminum Association "Specifications for Aluminum Structures".

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05010 – Metal Materials
- B. Section 05050 – Metal Fastening
- C. Section 09900 – Painting

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of the Bid.
 - 1. Florida Building Code
 - 2. Aluminum Association "Specifications for Aluminum Structures"
 - 3. AWS D1.2 – "Structural Welding Code"

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – Submittals.
 - 1. Certified Mill Test Reports
 - 2. Affidavit of Compliance with grade specified
 - 3. Shop Drawings which include the following:
 - a. Layout drawings indicating all structural shapes, sizes, and dimensions.
 - b. Beam and column schedules.

- c. Detailed drawings indicating jointing, anchoring and connection details.

1.05 QUALITY ASSURANCE

- A. Shop inspection may be required by the Owner at the Owner's own expense. The Contractor shall give ample notice to the Engineer prior to the beginning of any fabrication work so that inspection may be provided. The Contractor shall furnish all facilities for the inspection of materials and workmanship in the shop, and the inspectors shall be allowed free access to the necessary parts of the work. Inspectors shall have the authority to reject any materials or work which do not meet the requirements of these Specifications. Inspection at the shop is intended as a means of facilitating the work and avoiding errors, but is expressly understood that it will in no way relieve the Contractor from the responsibility for furnishing proper materials or workmanship under this Specification.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Structural aluminum shall comply with Section 05010 – Metal Materials.
- B. Fasteners for structural aluminum shall be in accordance with Section 05050 – Metal Fastening.
- C. Electrodes for welding shall be in accordance with Section 05050 – Metal Fastening.

PART 3 – EXECUTION

3.01 MEASUREMENT

- A. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of work. The Contractor shall review the Drawings and any discrepancies shall be reported to the Engineer for clarification prior to starting fabrication.

3.02 FABRICATION

- A. Fabrication shall be in accordance with the Aluminum Association "Specifications for Aluminum Structures". Fabrication shall begin only after Shop Drawing approval.
- B. Except where otherwise noted on the Drawings or in this Specification, all shop connections shall be welded.
- C. All holes in structural aluminum members required for anchors, anchor rods, bolts, or other members or for attachment of other work shall be provided by the fabricator and detailed on the Shop Drawings.

- D. All materials shall be properly worked and match-marked for field assembly.

3.03 DELIVERY, STORAGE, AND HANDLING

- A. Structural members shall be loaded in such a manner that they may be transported and unloaded without being over-stressed, deformed or otherwise damaged.
- B. Structural aluminum members and packaged materials shall be protected from corrosion and deterioration. Material shall be stored in a dry area and shall not be placed in direct contact with the ground. Materials shall not be placed on the structure in a manner that might cause distortion or damage to the members or the supporting structures. The Contractor shall repair or replace damaged materials or structures as directed.

3.04 ERECTION

- A. All temporary bracing, guys and bolts as may be necessary to ensure the safety of the structure until the permanent connections have been made shall be provided by the Contractor.
- B. Structural members shall be set accurately to the lines and elevations indicated. The various members shall be aligned and adjusted to form a part of a complete frame or structure before being permanently fastened.
- C. No cutting of structural aluminum members in the field will be allowed except by the written approval of the Engineer.
- D. Bearing surfaces and other surfaces which will be in permanent contact shall be cleaned before assembly.
- E. Field welding shall not be permitted unless specifically indicated in the Drawings or approved in writing by the Engineer. All field welding shall comply with Section 05050 – Metal Fastening.
- F. All bolted connections shall comply with Section 05050 – Metal Fastening.
- G. All field connections shall be accurately fitted up before being bolted. Drifting shall be only such as will bring the parts into position and shall not be sufficient to enlarge the holes or to distort the metal. All unfair holes shall be drilled or reamed.
- H. Misfits at Bolted Connections
 - 1. Where misfits in erection bolting are encountered, the Engineer shall be immediately notified. The Contractor shall submit a method to remedy the misfit for review by the Engineer. The Engineer will determine whether the remedy is acceptable or if the member must be refabricated.

2. Incorrectly sized or misaligned holes in members shall not be enlarged by burning or by the use of drift pins. The Contractor shall notify the Engineer immediately and shall submit a proposed method of remedy for review by the Engineer.
3. Where misalignment between anchor bolts and bolt holes in aluminum members are encountered, the Engineer shall be immediately notified. The Contractor shall submit a method to remedy the misalignment for review by the Engineer.

I. Grouting of Base Plates and Bearing Plates

1. The bottom surface of the plates shall be cleaned of all foreign materials, and concrete or masonry bearing surface shall be cleaned of all foreign materials and roughened to improve bonding.
2. Accurately set all base and bearing plates to designated levels with steel wedges or leveling plates.
3. Baseplates shall be grouted with non-shrink grout to assure full uniform bearing. Grouting shall be done prior to placing loads on the structure. Non-shrink grout shall conform to Section 03315 – Grout.
4. Anchor bolts shall be tightened after the supported members have been positioned and plumbed and the non-shrink grout has attained its specified strength.

- J. Where finishing is required, assembly shall be completed including bolting and welding of units before start of finishing operations.

3.05 PAINTING

- A. Painting shall be performed according to Section 09900 – Painting.
- B. Aluminum surfaces in contact with concrete or dissimilar metals shall be thoroughly protected with two coats of epoxy paint with a minimum total thickness of 16 mils or other approved isolating material in accordance with the requirements of Section 09900 – Painting.

- END OF SECTION -

SECTION 05500

METAL FABRICATIONS

PART 1 – GENERAL

1.01 REQUIREMENT

- A. Furnish all materials, labor, and equipment required to provide all metal fabrications not specifically included in other Sections, complete and in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05010 – Metal Materials
- B. Section 05050 – Metal Fastening
- C. Certain specific items are included in other Sections of the Specifications. See the section for the specific item in question.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. Florida Building Code
 - 2. AISC – Specification for Structural Steel Buildings
 - 3. AISI – Specifications for the Design of Cold-Formed Steel Structural Members
 - 4. Aluminum Association Specifications for Aluminum Structures

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – Submittals.
 - 1. Complete fabrication and erection drawings of all metalwork specified herein.
 - 2. Other submittals as required in accordance with Section 05010 – Metal Materials and Section 05050 – Metal Fastening.

PART 2 – PRODUCTS

2.01 METAL MATERIALS

- A. Metal materials used in metal fabrications shall conform to Section 05010 – Metal Materials, unless noted otherwise.

2.02 METAL FASTENING

- A. All welds and fasteners used in metal fabrication shall conform to Section 05050 – Metal Fastening, unless noted otherwise.

2.03 GUARD POSTS (BOLLARDS)

- A. Guard posts shall be 6-inch diameter Schedule 40 galvanized steel pipe in accordance with ASTM A53.
- B. Guard posts shall be concrete filled and crowned, as detailed in the Drawings.

PART 3 – EXECUTION

3.01 FABRICATION

- A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with adjoining work.
- B. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection. All miscellaneous items such as stiffeners, fillets, connections, brackets, and other details necessary for a complete installation shall be provided.
- C. All work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent shearing of bolts, screws, and other fastenings, ensure rigidity, and provide a close fit of sections.
- D. Finished members shall conform to the lines, angles, and curves shown on the Drawings and shall be free from distortions of any kind.
- E. All shearings shall be neat and accurate, with parts exposed to view neatly finished. Flame cutting is allowed only when performed utilizing a machine.
- F. All shop connections shall be welded unless otherwise indicated on the Drawings or specified herein. Bolts and welds shall conform to Section 05050 – Metal Fastening. All fastenings shall be concealed where practicable.
- G. Fabricated items shall be shop painted when specified in Section 09900 – Painting.

3.02 INSTALLATION

- A. Assembly and installation of fabricated system components shall be performed in strict accordance with manufacturer's recommendations.
- B. All miscellaneous metalwork shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.
- C. Metal work shall be field painted when as specified in accordance with Section 09900 – Painting. Aluminum in contact with concrete shall be painted in accordance with Section 09900.

- END OF SECTION -

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SECTION 05510

METAL STAIRS

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish all materials, labor, and equipment required to provide all metal stairs in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05010 – Metal Materials
- B. Section 05050 – Metal Fastening
- C. Section 05140 – Structural Aluminum
- D. Section 05520 – Guards and Railings
- E. Section 05531 – Gratings, Checkered Floor Plates, and Access Doors
- F. Section 05550 – Stair Treads and Nosings

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. 2023 Florida Building Code, 8th Edition
 - 2. AISC – Specification for Structural Steel Buildings
 - 3. AISI – Specification for the Design of Cold-Formed Steel Structural Members
 - 4. Aluminum Association Specifications for Aluminum Structures

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – Submittals.
 - 1. Complete fabrication and erection drawings of all metal work specified herein.

2. Other submittals as required in accordance with Section 05010 – Metal Materials and Section 05050 – Metal Fastening.

PART 2 – PRODUCTS

2.01 METAL MATERIALS

- A. Metal materials used for metal stairs shall conform to Section 05010 – Metal Materials, unless noted otherwise.

2.02 METAL FASTENING

- A. All welds and fasteners used in metal stairs shall conform to Section 05050 – Metal Fastening, unless noted otherwise.

2.03 METAL STAIRS AND LANDINGS

- A. Stair stringers and structural framing of landings shall be fabricated from aluminum as indicated on the Drawings.
 1. Aluminum stairs shall be fabricated from aluminum alloy 6061-T6 in accordance with Section 05140 – Structural Aluminum.
- B. All stair treads shall be aluminum in accordance with Section 05550 – Stair Treads and Nosings.
- C. Where metal landings are required as indicated on the Drawings, gratings at landings shall conform to Section 05531 – Gratings, Checkered Floor Plates, and Access Doors.
- D. Handrails for metal stairs shall conform to Section 05520 – Guards and Railings. Contractor shall coordinate attachment of handrails to metal stairs.
- E. All clips, anchors, and necessary appurtenances shall be provided for a complete and rigid installation.
- F. Closure plates shall be provided for all exposed ends of stringers.
- G. All exposed connections shall be welded and ground smooth, unless otherwise indicated on the Drawings.
- H. Stairs and landings shall be designed to support a 100 psf live load, minimum, unless otherwise indicated on the Drawings.

PART 3 – EXECUTION

3.01 FABRICATION

- A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with all adjoining work.
- B. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection. All miscellaneous items such as stiffeners, fillets, connections, brackets, and other details necessary for a complete installation shall be provided.
- C. All work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent shearing of bolts, screws, and other fastenings, ensure rigidity, and provide a close fit of sections.
- D. Finished members shall conform to the lines, angles, and curves shown on the drawings and shall be free from distortions of any kind.
- E. All shearings shall be neat and accurate, with parts exposed to view neatly finished. Flame cutting is allowed only when performed utilizing a machine.
- F. All shop connections shall be welded unless otherwise indicated on the Drawings or specified herein. Bolts and welds shall conform to Section 05050 – Metal Fastening. All fastenings shall be concealed where practicable.
- G. Fabricated items shall be shop painted when specified in accordance with Section 09900 – Painting.

3.02 INSTALLATION

- A. Assembly and installation of metal stairs shall be performed in strict accordance with manufacturer's recommendations.
- B. All miscellaneous metalwork shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.
- C. Metal stairs shall field painted when specified in accordance with Section 09900 – Painting.

- END OF SECTION -

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SECTION 05515

LADDERS

PART 1 – GENERAL

1.01 REQUIREMENT

- A. Furnish all materials, labor, and equipment required to provide all ladders in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05010 – Metal Materials
- B. Section 05050 – Metal Fastening

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Without limiting the generality of the Specifications, all work specified herein shall conform to the applicable requirements of the following documents.
 - 1. Florida Building Code
 - 2. Aluminum Association Specifications for Aluminum Structures
 - 3. Occupational Safety and Health Administration (OSHA) Regulations

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – Submittals.
 - 1. Complete fabrication and erection drawings of all metalwork specified herein.
 - 2. Other submittals as required in accordance with Section 05010 – Metal Materials and Section 05050 – Metal Fastening.

PART 2 – PRODUCTS

2.01 METAL MATERIALS

- A. Metal materials used for ladders shall conform to Section 05010 – Metal Materials, unless noted otherwise.

2.02 METAL FASTENING

- A. All welds and fasteners used for ladders shall conform to Section 05050 – Metal Fastening, unless noted otherwise.

2.03 LADDERS

- A. Ladders shall be furnished with all mounting brackets, baseplates, fasteners, and necessary appurtenances for a complete and rigid installation.
- B. Unless noted otherwise on the Drawings, all ladders shall be aluminum alloy 6061-T6 or 6063-T5, with a clear, anodized finish, Aluminum Association M12C22A41.
- C. All ladders shall conform to dimensions indicated on the Drawings and shall comply with OSHA requirements.
- D. Side rails shall be 1-1/2 inch diameter Schedule 80 pipe, minimum.
- E. Rungs shall be serrated 3/4 inch diameter, minimum.
- F. All exposed connections shall be welded and ground smooth.
- G. Ladders shall be as manufactured by Thompson Fabricating Company, or equal.

2.04 LADDER RETRACTABLE SAFETY EXTENSION

- 1. Where the Contract Documents indicate fixed ladders are required under access doors and checkered floor plates, they shall be provided with "LadderUp, Model LU-4" by Bilco Company, "L1E Ladder Extension" by Halliday Products Inc., or "Ladder Climb-out Device" by Thompson Fabricating.
- 2. For access doors, the safety extension shall be manufactured from the same material as the access door with telescoping tubular sections that lock automatically when fully extended.
- 3. Upward and downward movement shall be controlled by a stainless-steel balancing mechanism.
- 4. Safety extension shall be assembled in strict accordance with manufacturer's recommendations.

PART 3 – EXECUTION

3.01 FABRICATION

- A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with adjoining work.
- B. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection.
- C. All work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent shearing of bolts, screws, and other fastenings, ensure rigidity, and provide a close fit of sections.
- D. Finished members shall conform to the lines, angles, and curves shown on the Drawings and shall be free from distortions of any kind.
- E. All shearings shall be neat and accurate, with parts exposed to view neatly finished. Flame cutting is allowed only when performed utilizing a machine.
- F. All shop connections shall be welded unless otherwise indicated on the Drawings or specified herein. Bolts and welds shall conform to Section 05050 – Metal Fastening. All fastenings shall be concealed where practicable.
- G. Fabricated items shall be shop painted when specified in accordance with Section 09900 – Painting.

3.02 INSTALLATION

- A. Assembly and installation of fabricated system components shall be performed in strict accordance with manufacturer's recommendations.
- B. All miscellaneous metalwork shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.
- C. Metalwork shall be field painted when specified in accordance with Section 09900 – Painting.

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SECTION 05520

GUARDS AND RAILINGS

PART 1 – GENERAL

1.01 THE REQUIREMENT

- A. Furnish all materials, labor, and equipment required to provide all metal guards and railings in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 05010 – Metal Materials
- B. Section 05050 – Metal Fastening

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.
 - 1. Florida Building Code
 - 2. Aluminum Association Specifications for Aluminum Structures
 - 3. Occupational Safety and Health Administration (OSHA) Regulations

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300 – Submittals.
 - 1. Complete fabrication and erection drawings of all metal work specified herein, sealed by a Professional Engineer currently licensed in the State of Florida.
 - 2. Other submittals as required in accordance with Section 05100 – Metal Materials and Section 05050 – Metal Fastening.
 - 3. Structural calculations on guard and handrail system sealed by a Professional Engineer currently licensed in the State of Florida.

PART 2 – PRODUCTS

2.01 METAL MATERIALS

- A. Metal materials used for guards and railings shall conform to Section 05100 – Metal Materials, unless noted otherwise.

2.02 METAL FASTENING

- A. All welds and fasteners used in guards and railings shall conform to Section 05050 – Metal Fastening, unless noted otherwise.

2.03 GUARDS AND RAILINGS

- A. General – Design of guard and handrail systems is the exclusive responsibility of the Contractor. Guard systems shall consist of all railings, posts, toeboards, baseplates, anchors, and accessories required for a complete and rigid installation.
 - 1. All guard systems shall be fabricated from extruded aluminum alloy 6061-T6 or 6105-T5, with Aluminum Association M12C22A41 finish, unless otherwise noted.
 - 2. Metal railings shall be fabricated from 1-1/2 inch Schedule 40 minimum pipe. Metal railing support posts shall be fabricated from 1-1/2 inch Schedule 80 minimum pipe.
 - 3. The top of the upper guard rail shall be 42 inches above the walking surface for level guards. For stair guards, the top of the upper guard rail shall be 42 inches above the leading edge of the tread nosing. The top of stair handrail shall be 34 inches above the leading edge of the tread nosing.
 - 4. Posts
 - a. Maximum horizontal spacing between posts for level rail shall be six feet.
 - b. Maximum horizontal spacing between posts for stair rail shall be five feet.
 - 5. All rail joints shall be finished flush and shall occur only at supports. Posts shall not interrupt the continuation of the top rail at any point along the railing, including corners and end terminations. The top surface of the top railing shall be smooth and shall not be interrupted by projecting fittings.
 - 6. Toeboards
 - a. Toeboards shall project 4-inches above the walking surface and shall not infringe on the minimum required walkway width.
 - b. Aluminum toeboards shall be extruded from aluminum alloy 6063-T6 unless otherwise noted.

- c. Toeboards shall have a minimum thickness of 1/8" at any point. Geometry of toeboard shall closely resemble geometry shown on Drawings.
- 7. Expansion joint splices shall be provided at 30 foot maximum spacing and at all expansion joints in the structure supporting the guards.
- 8. The guard system shall be designed to resist the design loads specified by both OSHA and the Florida Building Code.
- 9. Provide handrail extensions at top and bottom of stairs and ramps in accordance with the Florida Building Code.
- B. The Contractor shall have the option of providing a guard system of either an all welded type construction or a component type construction.
 - 1. With both the all welded or component type construction, the baseplates and toeboards shall be furnished as shown on the Drawings.
 - 2. Component Type System
 - a. All fittings and brackets shall be designed for stainless steel concealed set screws with internal type connectors.
 - b. Exposed fittings shall be cast or extruded aluminum, or stainless steel to match guard material, except where corrosion-resistant steel is employed as a standard fabricator's item for use.
 - c. Component type guards shall be as manufactured by Thompson Fabricating Company, Inc., or Hollaender Manufacturing Company, Inc.
 - 3. Welded guards may be field assembled using component type fittings as described herein.
- C. Guards shall be a two-rail system. The intermediate rail shall be located as required to prevent passage of a 21-inch diameter sphere at any point.

PART 3 – EXECUTION

3.01 FABRICATION

- A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with all adjoining work.
- B. All fabricated work shall be shop fitted together as much as practical, and delivered to the field, complete and ready for erection.