The Enclosed Document Is Provided For Your Convenience.

Please Email ALL Questions:

MailTo:ContractAdministration@TampaGov.net

Please Let Us Know If You Plan To Bid

City of Tampa
Contract Administration Department
306 E. Jackson St. #280A4N
Tampa, FL 33602
(813)274-8456

CITY OF
TAMPA, FLORIDA

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS
PROPOSAL, BID BOND, FORM OF NOTICE OF AWARD,
AGREEMENT, PERFORMANCE BOND AND
SPECIFICATIONS

FOR

Contract 12-C-00058

CHANNEL DISTRICT: 12TH STREET WASTEWATER PUMP STATION IMPROVEMENTS

City of Tampa
CONTRACT ADMINISTRATION DEPARTMENT
TAMPA MUNICIPAL OFFICE BUILDING
306 E. JACKSON STREET - 4TH FLOOR NORTH
TAMPA, FLORIDA 33602

JULY 2015

CITY OF TAMPA
CONTRACT ADMINISTRATION DEPARTMENT
306 E. Jackson Street 280A4N
Tampa, FL 33602

****

BID NOTICE MEMO

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Bids will be received no later than 1:30 p.m. on the indicated Date(s) for the following Project(s):

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CONTRACT NO.: 12-C-00058; Channel District: 12th Street Wastewater Pump Station Improvements
BID DATE: September 1, 2015 ESTIMATE: $945,000 SCOPE: The project comprises providing a new wastewater pump station on North 12th Street in the City of Tampa's Channel District, including excavation and backfill, precast concrete wet well and triplex system with two (2) 25 HP pumps, precast concrete manholes, concrete footings and slabs, masonry screen wall and chain link fencing, gravity sewer and force main piping, water service connection, roadway and site reconstruction, control panel and electrical, with all associated work required for a complete project in accordance with the Contract Documents.
PRE-BID CONFERENCE: Tuesday, August 18, 2015, 2:00p.m. Attendance is not mandatory, but recommended.

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Bids will be opened in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida 33602. Pre-Bid Conference is held at the same location unless otherwise indicated. Plans and Specifications and Addenda for this work may be examined at, and downloaded from, www.demandstar.com. Backup files are available at http://www.tampagov.net/contract-administration/programs/construction-project-bidding. Subcontracting opportunities may exist for City certified Small Local Business Enterprises (SLBEs). A copy of the current SLBE directory may be obtained at www.Tampagov.net. Phone (813) 274-8456 for assistance. Email Technical Questions to: contractadministration@tampagov.net .

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TECHNICAL SPECIFICATIONS
WORKMANSHIP AND MATERIALS

ADDITIONAL SPECIFICATIONS ARE ON THE DRAWINGS.

NOTICE TO BIDDERS
CITY OF TAMPA, FLORIDA
Contract 12-C-00058; Channel District: 12th Street Wastewater Pump Station Improvements

Sealed Proposals will be received by the City of Tampa no later than 1:30 P.M., September 1, 2015, in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida, there to be publicly opened and read aloud.

The proposed work is to include, but not be limited to, providing a new wastewater pump station on North 12th Street in the City of Tampa's Channel District, including excavation and backfill, precast concrete wet well and triplex system with two (2) 25 HP pumps, precast concrete manholes, concrete footings and slabs, masonry screen wall and chain link fencing, gravity sewer and force main piping, water service connection, roadway and site reconstruction, control panel and electrical, with all associated work required for a complete project in accordance with the Contract Documents.

The Instructions to Bidders, Proposal, Form of Bid Bond, Agreement, Form of Public Construction Bond, Specifications, Plans and other Contract Documents are posted at DemandStar.com. Backup files may be downloaded from http://www.tampagov.net/contract-administration/programs/construction-project-bidding. One set may be available for reference at the office of the Contract Administration Department, Municipal Office Building, Fourth Floor North, City Hall Plaza, Tampa, Florida 33602.

Each Proposal must be submitted on the Proposal form included in the Specifications and must be accompanied by a certified check or cashier's check on a solvent bank or trust company in compliance with Section 255.051, Florida Statutes, made payable to the City of Tampa, in an amount of not less than five per cent of the total bid, or a Bid Bond, of like amount, on the form set forth in the Contract Documents, as a guarantee that, if the Proposal is accepted, the Bidder will execute the Proposed Contract and furnish a Public Construction Bond within twenty (20) days after receipt of Notice of Award of Contract.

The City of Tampa reserves the right to reject any or all Bids and to waive any informalities in the Bid and/or Bid Bond. Acceptance or rejection of Proposals will be made as soon as practicable after the Proposals are received, but the City reserves the right to hold Proposals for ninety (90) days from the date of Opening.

Bid Protest Procedures: Unless subsequently indicated otherwise, in a revised posting on the Department's web page for Construction Project Bidding, the City of Tampa intends to award the referenced project to the lowest bidder listed in the tabulation posted on or about the date of Bid Opening. A bidder aggrieved by this decision may file a protest not later than 4:30 P.M., five (5) business days from the first posting thereof, pursuant to City of Tampa Code Chapter 2, Article V, Division 3, Section 2-282, Procurement Protest Procedures. Protests not conforming therewith shall not be reviewed.

Communication with City Staff

Pursuant to City of Tampa Ordinance 2010-92, during the solicitation period, including any protest and/or appeal, NO CONTACT initiated by bidders or responders with City officers or employees, other than the individuals specified below is permitted:
Contracts Management Supervisor, Jim Greiner
Contract Officer, Jody Gray
The City's Legal Department staff
The City's Contract Administration Department staff.
Technical Questions and Requests For Information should be directed to the Department via
ContractAdministration@tampagov.net

"A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list." Refer to Section 287.133 Florida Statues.

In accordance with the City of Tampa's Equal Business Opportunity Ordinance, a Goal may have been established for subcontracting with Small Local Business Enterprises, SLBEs, certified by the City. A link to the current complete directory of SLBEs is on the Minority Business Development Office Website.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.01 GENERAL:

The proposed work is the Channel District: 12th Street Wastewater Pump Station Improvements in the City of Tampa, as required for a complete project, as shown on the plans and detailed in the specifications. The work is located on land owned or controlled by the City of Tampa.

I-1.02 FORM PREPARATION AND PRESENTATION OF PROPOSALS: Replace the second sentence with the following: Submission of the entire specification book is not required.

I-1.03 ADDENDA – Section I-2.03 is replaced with the following: No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the City of Tampa, Contract Administration Department, 306 E. Jackson St., 4th Floor, Tampa, Florida 33602 and then emailed to ContractAdministration@tampagov.net. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be posted on DemandStar.Com and on the Department's web page, with notice given to all prospective bidders at the respective fax numbers or e-mail addresses furnished, for such purposes. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-1.04 SIGNATURE OF BIDDERS: Section I-2.07 is replaced with the following:

Proposals must be signed in ink by the Bidder with signature in full. When firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more partners. When a corporation is a bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary.

If the bidder referred to in Section I-2.07 is a corporation, it must submit; upon request, a copy of its filed Articles of Incorporation. In addition, if the bidder was incorporated in another state, it must establish that it is authorized to do business in the State of Florida. If the bidder is using a fictitious name, it must submit upon request, proof of registration of such name with the Clerk of the Circuit Court of the Country where its principal place of business is. Failure to submit what is required is grounds to reject the bid of that bidder.

I-1.05 TIME FOR COMPLETION:

The work shall be arranged to be completed in accordance with a progress schedule approved by the Construction Engineer.

The time for completion of this project, referred in Article 4.01 of the Agreement, shall be 300 consecutive calendar days. The period for performance shall start from the date indicated in the Notice To Proceed.

I-1.06 LIQUIDATED DAMAGES:

The amount of liquidated damages, referred to in Article 4.06 of the Agreement, for completion of this project shall be $500.00 per calendar day.

I-1.07 BASIS OF AWARD OF CONTRACT:

The basis of award referred to in Item I-2.11 of Instructions to Bidders shall be the greatest amount of work, which can be accomplished within the funds available as budgeted. The award may be made on the basis of the total bid, base bid, alternates(s) if any, unit bids if any, or any combination thereof deemed to be in the best interest of the City.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

Unless all bids are rejected, the award will be made within 90 days after opening proposals.

I-1.08 GROUND BREAKING CEREMONY:

Arrangement may be made by the City in coordination with the Contractor, for construction to commence with a Ground Breaking Ceremony. Details will be discussed at the pre-construction conference.

I-1.09 INSURANCE:

The insurance required for this project shall be as indicated on Pages beginning with INS-1. Before commencing work, the Contractor shall provide the evidence of the insurance required on a Certificate of Insurance accompanied by evidence of authority to bind the insurance company or companies such as agents license, power of attorney, or letter of authority.

I-1.10 EQUAL BUSINESS OPPORTUNITY PROGRAM / SLBE / REQUIREMENTS

In accordance with the City of Tampa's Equal Business Opportunity Program, a goal of ____% has been established for subcontracting with Small Local Business Enterprises, (SLBEs), certified by the City. The goal is based upon the availability of the firms listed on the Subcontract Goal Contract List included herein.

BIDDERS MUST SOLICIT ALL SLBEs ON THAT LIST and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms as a first step to demonstrate Good Faith Efforts to achieve the goal. The list is formatted to facilitate e-mail solicitations to the listed firms by copying and pasting e-mail addresses.

Bidders may explore other opportunities for subcontracting with SLBEs by consulting the current directory of all certified SLBEs posted on the Minority Business Development Office web page.

GOOD FAITH EFFORT COMPLIANCE PLAN REQUIRED - When a Goal has been established, the Bidder must submit, with its bid, completed to the fullest extent possible, a Good Faith Effort Compliance Plan using the form GFECP contained herein. Additional documentation is required whenever an SLBE subcontractor's low quote is not utilized. Supplemental information or documentation concerning the Bidder's Compliance Plan may be required prior to award as requested by the City.

DIVERSITY MANAGEMENT INITIATIVE, DMI, DATA REPORTING FORMS REQUIRED - Bidders must submit, with its bid, "DMI-Solicited" forms listing all subcontractors solicited and "DMI-Utilized" forms listing all subcontractors to be utilized. Supplemental forms, documentation, or information may be submitted at bid time or as requested by the City.

After an award, "DMI-Payments" forms are to be submitted with payment requests to report payments to subcontractors.

Bidders may visit the Minority Business Development Office's web page at TampaGov.net for other information about the SLBE program, FAQ's, and the latest SLBE directory of certified firms.

I-1.11 BID SECURITY:

Surety companies shall have a rating of not less than B+ Class VI as evaluated in the most recently circulated Best Key rating Guide Property-Liability.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.12 PUBLIC CONSTRUCTION BOND:

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be issued and executed by (a) surety company(ies) acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. After execution of the Agreement and before commencing work, the Contractor must provide the City a certified copy of the officially recorded Bond.

I-1.13 AGREEMENT
Section 2 – Powers of the City's Representatives
Add the following:
Article 2.05 CITY'S TERMINATION FOR CONVENIENCE:

The City may, at any time, terminate the Contract in whole or in part for the City's convenience and without cause. Termination by the City under this Paragraph shall be by a notice of termination delivered to the Contractor, specify the extent of termination and the effective date.

Upon receipt of a notice of termination, the Contractor shall immediately, in accordance with instructions from the City, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

(a) cease operations as specified in the notice;
(b) place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
(c) terminate all subcontracts and orders to the extent they relate to the Work terminated;
(d) proceed to complete the performance of Work not terminated; and
(e) take actions that may be necessary, or that the City may direct, for the protection and preservation of the terminated Work.

The amount to be paid to the Contract by the City because of the termination shall consist of:

(a) for costs related to work performed on the terminated portion of the Work prior to the effective date including termination costs relative to subcontracts that are properly chargeable to the terminated portion of the Work.
(b) the reasonable costs of settlement of the Work terminated, including accounting, legal, clerical and other expenses reasonable necessary for the preparation of termination settlement proposals and supporting data; additional costs of termination and settlement of subcontracts excluding amounts of such settlements; and storage, transportation, and other costs incurred which are reasonably necessary for the preservation, protection or disposition of the terminated Work; and
(c) a fair and reasonable profit on the completed Work unless the Contractor would have sustained a loss on the entire Contract had it been completed.

Allowance shall be made for payments previously made to the Contractor for the terminated portion of the Work, and claims which the City has against the Contractor under the Contract, and for the value of materials supplies, equipment or other items that are part of the costs of the Work to be disposed of by the Contractor.

I-1.14 Section 5 – subcontracts and Assignments, Article 5.01, Page A-7, Last Paragraph:
Change "…twenty-five (25) percent… "to fifty-one (51) percent…"

Section 10-Payments, Article .05 Partial Payments, 1st Paragraph, 1st Sentence:
Change "…fair value of the work done, and may apply for…" to "…fair value of the work done, and shall apply for…"

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.15 Contractors must utilize the U.S. Department of Homeland Security's E-Verify Systems to verify the employment eligibility of all persons employed during the term of the contract to perform employment duties within the State of Florida and all persons, including subcontractors, assigned by the contractor to perform work pursuant to the contract.

I-1.16 GENERAL PROVISIONS; G-2.02 Copies Furnished to Contractor: Replace the first paragraph with the following:

The Contractor shall acquire for its use copies of the plans and specifications as needed. The documents may be downloaded from the City's web site, at
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp

I-1.17 PAYMENT DISPUTE RESOLUTION

Any dispute pertaining to pay requests must be presented to the City pursuant to Executive Order 2003-1.

I-1.18 SCRUTINIZED COMPANIES.

For Contracts $1,000,000 and greater, if the City determines the Contractor submitted a false certification under Section 287.135(5) of the Florida Statutes, or if the Contractor has been placed on the Scrutinized Companies with Activities in the Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, the City shall either terminate the Contract after it has given the Contractor notice and an opportunity to demonstrate the City's determination of false certification was in error pursuant to Section 287.135(5)(a) of the Florida Statutes, or maintain the Contract if the conditions of Section 287.135(4) of the Florida Statutes are met.

I-1.19 FLORIDA'S PUBLIC RECORDS LAW

4.33.3 The City of Tampa is a public agency subject to Chapter 119, Florida Statutes. In accordance with Florida Statutes, 119.0701, if applicable, Contractor shall comply with Florida's Public Records Law. Specifically, the Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service;

2. Provide the public with access to such public records on the same terms and conditions that the City would provide the records and at a cost that does not exceed that provided in Chapter 119, Florida Statutes, or as otherwise provided by law;

3. Ensure that public records that are exempt or that are confidential and exempt from public record requirements are not disclosed except as authorized by law;

4. Meet all requirements for retaining public records and transfer to the City, at no cost, all public records in possession of the contractor upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt. All records stored electronically must be provided to the City in a format that is compatible with the information technology systems of the agency.

4.33.4 The failure of Contractor to comply with the provisions set forth in this Article shall constitute a Default and Breach of this award and the City shall enforce the Default in accordance with the provisions set forth in the DEFAULT/RE-AWARD section of this document.

SECTION 2
GENERAL INSTRUCTIONS

I-2.01 BIDDER'S RESPONSIBILITY
Before submitting Proposals, Bidders shall carefully examine the entire site of the proposed work and adjacent premises and the various means of approach and access to the site, and make all necessary investigations to inform themselves thoroughly as to the facilities necessary for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and inform themselves thoroughly as to all difficulties involved in the completion of all the work in accordance with the Contract Documents.

Bidders must examine the Plans, Specifications, and other Contract Documents and shall exercise their own judgment as to the nature and amount of the whole of the work to be done, and for the bid prices must assume all risk of variance, by whomsoever made, in any computation or statement of amounts or quantities necessary to complete the work in strict compliance with the Contract Documents.

Elevations of the ground are shown on the Plans and are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.

The City may have acquired, for its own use, certain information relating to the character of materials, earth formations, probable profiles of the ground, conditions below ground, and water surfaces to be encountered at the site of the proposed work. This information, if it exists, is on file at the offices of the Department of Public Works and Bidders will be permitted to see and examine this information for whatever value they consider it worth. However, this information is not guaranteed, and Bidders should satisfy themselves by making borings or test pits, or by such other methods as they may prefer, as to the character, location, and amounts of water, peat, clay, sand, quicksand, gravel, boulders, conglomerate, rock, gas or other material to be encountered or work to be performed.

Various underground and overhead structures and utilities are shown on the plans. The location and dimensions of such structures and utilities, where given, are believed to be reasonably correct, but do not purport to be absolutely so. These structures and utilities are plotted on the Plans for the information of the Bidders, but information so given is not to be construed as a representation or assurance that such structures will be found or encountered as plotted, or that such information is complete or accurate.

I-2.02 FORM, PREPARATION AND PRESENTATION OF PROPOSALS
Each Proposal shall be submitted upon the Proposal Form and in accordance with the instructions included herein. The Proposal Form must not be detached herefrom. All blank spaces for bid prices must be filled in, in both words and figures, with the unit or lump sum prices, or both, for which the Proposal is made. The computed total price for each unit price Contract Item shall be determined by multiplying the estimated quantity of the item, as set forth in the Proposal Form, by the corresponding unit price bid for such item. The resulting product shall be entered in the appropriate blank space under the column headed "Computed Total Price for Item". The lump sum price bid for each lump sum price Contract Item shall also be entered in the column headed "Computed Total Price for Item". If a Proposal contains any omissions, erasures, alterations, additions, or items not called for in the itemized Proposal, or contains irregularities of any kind, such may constitute sufficient cause for rejection of the Proposal. In case of any discrepancy in the unit price or amount bid for any item in the Proposal, the price as expressed in written words will govern. In no case is the Agreement Form to be filled out or signed by the Bidder.

In the case of certain jobs bid Lump Sum a "Schedule of Unit Prices" must be filled out as an attachment to the Lump Sum proposal. These prices may be used as a guide for the negotiation of change orders, at the City's option.

The proposal must be signed and certified and be presented on the prescribed form in a sealed envelope on/or before the time and at the place stated in the Notice of Bidders, endorsed with the name of the person, firm or corporation presenting it, the date of presentation, and the title of the work for which the Proposal is made.

Unless the apparent low bidder is now engaged in or has recently completed contract work for the City of Tampa, he, if requested, shall furnish to the City, after the opening of bids and prior to award, a summary statement of record of construction experience over the past three (3) years with proper supporting evidence, and, if required by the City, shall also furnish a list of equipment and other facilities pertinent to and available for the proper execution of the proposed work, and a statement of financial resources to the extent necessary to establish ability to carry on the proposed work. The City may make further investigations as considered necessary with respect to responsibility of the Bidder to whom it appears may be awarded the Contract.

If forwarded by mail, the sealed envelope containing the Proposal, endorsed as directed above, must be enclosed in another envelope addressed as specified in the Notice to Bidders and sent by registered mail.

I-2.03 ADDENDA AND INTERPRETATIONS
No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the Contract Administration Department, Tampa Municipal Office Building, 4th Floor North, City Hall Plaza, Tampa, Florida 33602. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be sent by certified mail, with return receipt requested, to all prospective bidders at the respective addresses furnished, for such purposes, not later than three (3) working days prior to the date fixed for the opening of the Proposals, and if requested, a copy will be delivered to the prospective bidder's representative. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-2.04 BID SECURITY
Each Proposal must be accompanied by a certified or cashier's check issued by a solvent bank or trust company and payable at sight to the City of Tampa, in compliance with Section 255.051 Florida Statutes, or a Bid Bond upon the form provided herein, in an amount of not less than five percent of the sum of the computed total amount of the Bidder's Proposal as a guarantee that if the Proposal is accepted, the Bidder will execute and fill in the proposed Contract and Public Construction Bond within twenty (20) days after notice of award of the Contract. Certified checks shall have all necessary documentary revenue stamps attached if required by law. Surety on Bid Bonds shall be a duly authorized surety company authorized to do business in the State of Florida, and all such Bonds shall be issued or countersigned by a local resident producing agent, and satisfactory evidence of the authority of the person or persons executing such Bond to Execute the same shall be submitted with the Bond. Bid Bonds shall be issued by a surety company acceptable to the City.

Within ten (10) days after the opening of Proposals, the bid security of all but the three lowest Bidders will be returned. The bid security of the remaining two Bidders whose Proposals are not accepted will be

returned within ten (10) days after the execution of the Contract, or, if no such Contract has been executed, within ninety (90) days after the date of opening Proposals. The bid security of the Bidder whose Proposal is accepted will be returned only after he has duly executed the Contract and furnished the required Public Construction Bond and insurance.

Should it be necessary for the City to retain the bid security and said bid security is in the form of checks, the checks of these Bidders will be returned if replaced by Bid Bonds in an amount equal to the amount of the checks of such Bidders in such form and issued by a surety company acceptable to the City.

A Bidder may withdraw his Proposal before the time fixed for the opening of Proposals, without prejudice to himself, by communicating his purpose, in writing, to the Mayor and City Council, and when his communication is received, the Proposal will be handed to him or his authorized agent unopened. No Bidder may withdraw his Proposal within ninety (90) days after the day of opening Proposals.

The Bidder whose Proposal is accepted shall enter into a written contract, upon the Agreement form included herein, for the performance of the work and furnish the required Public Construction Bond within twenty (20) days after written notice by the City of Award of Contract has been served on such Bidder personally or after receipt of the written notice by registered mail to such Bidder at the address given in his Proposal.

If the Bidder to whom a Contract is awarded refuses or neglects to execute it or fails to furnish the required Public Construction Bond within twenty (20) days after receipt by him of the Notice of Award of Contract, the amount of his bid security shall be forfeited and shall be retained by the City as liquidated damages, and not as a penalty, it being now agreed that said sum is a fair estimate of the amount of damages that the City will sustain in case said Bidder fails to enter into a Contract and furnish the required Public Construction Bond. If a Bid Bond was furnished, the full amount of the Bond shall become due and payable as liquidated damages caused by such failure. The full amount of the bid security shall be forfeited as liquidated damages without consideration of the fact that an award may be less than the full amount of the Bidder's Proposal, excepting that the award shall be within the conditions of said Proposal relating to the basis of consideration for an award. No plea of mistake in the bid or misunderstanding of the conditions of forfeiture shall be available to the Bidder for the recovery of his deposit or as a defense to any action based upon the neglect or refusal to execute a contract.

I-2.05 LAWS AND REGULATIONS
The Bidder who is awarded the Contract must comply with all laws of the State of Florida, and all applicable Ordinances of the City of Tampa respecting labor and compensation and with all other statutes, ordinances, rules and regulations applicable and having the force of law.

I-2.06 PUBLIC CONSTRUCTION BOND
The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be executed by a surety company acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. Surety companies shall have a rating of not less than: B+ Class VI as evaluated in the most recently circulated BEST'S KEY RATING GUIDE PROPERTY-LIABILITY.

I-2.07 SIGNATURE AND QUALIFICATIONS OF BIDDERS
Proposals must be signed in ink by the Bidder with signature in full. When a firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more of the partners. When a corporation is a Bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary. Anyone signing the Proposal as agent must file with it legal evidence of his authority to do so.

Bidders who are nonresident corporations shall furnish to the City a duly certified copy of their permit to transact business in the State of Florida, signed by the Secretary of State, within ten days of the notice to do so. Such notice will be given to Bidders who are nonresident corporations, to whom it appears an award will be made, and the copy of the permit must be filed with the City before the award will be made. Failure to promptly submit this evidence of qualification to do business in the State of Florida may be basis for rejection of the Proposal.

I-2.08 REJECTION OF PROPOSALS
The City reserves the right to reject any Proposal if investigation of the Bidder fails to satisfy the City that such Bidder is properly qualified to carry out the obligations and to complete the work contemplated therein. Any or all Proposals will be rejected if there is reason to believe that collusion exists among Bidders. Proposals will be considered irregular and may be rejected if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all Proposals and to waive such technical errors as may be deemed best for the interests of the City.

I-2.09 QUANTITIES ESTIMATED ONLY
The estimate of quantities of the various items of work and materials, if set forth in the Proposal Form, is approximate only and is given solely to be used as a uniform basis for the comparison of Proposals. The quantities actually required to complete the Contract work may be less or more than so estimated, and if awarded a Contract for the work specified, the Contractor agrees that he will not make any claim for damages or for loss of profits because of a difference between the quantities of the various classes of work assumed for comparison of Proposals and quantities of work actually performed. The City further reserves the right to vary the quantities in any amount.

I-2.10 COMPARISON OF PROPOSALS
Except jobs bid on a "One Lump Sum" basis, proposals will be compared on the basis of a total computed price arrived at by taking the sum of the estimated quantity of each time and the corresponding unit price of each item, and including any lump sum prices on individual items.

The computed total prices for individual Contract Items and the total computed price for the entire Contract, as entered by the Bidder in the Proposal Form, are for convenience only and are subject to correction in the tabulation and computation of the Proposals.

I-2.11 BASIS OF AWARD
The Contract will be awarded, if at all, to the lowest responsible Bidder or Bidders, as determined by the City and by the terms and conditions of the Contract Documents. Unless all bids are rejected, the award will be made within ninety (90) days after the opening of Proposals. The successful Bidder will be required to possess, or obtain, a valid City Occupational License.

I-2.12 INSURANCE REQUIRED
The successful Bidder and his subcontractors will be required to procure and pay for insurance covering the work in accordance with the provisions of Article 6.02 of the Agreement as indicated on special instructions pages beginning with INS-1.

I-2.13 NO ASSIGNMENT OF BID
No Bidder shall assign his bid or any rights thereunder.

I-2.14 NONDISCRIMINATION IN EMPLOYMENT
Contracts for work under this Proposal will obligate the contractors and subcontractors not to discriminate in employment practices.

Bidders must, if requested, submit with their initial bid a signed statement as to whether they have previously performed work subject to the President's Executive Order Nos. 11246 and 11375.
Bidders must, if requested, submit a compliance report concerning their employment practices and policies in order to maintain their eligibility to receive the award of the Contract.

Successful Bidders must, if requested, submit a list of all subcontractors who will perform work on the project and written,

signed statement from authorized agents of the labor pools with which they will or may deal for employees on the work together with supporting information to the effect that said labor pools practices and policies are in conformity with Executive Order No. 11246 and that said labor pools will affirmatively cooperate in or offer no hindrance to the recruitment, employment and equal treatment of employees seeking employment and performing work under the Contract, or a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish them prior to the award of the Contract.

I-2.15 LABOR STANDARDS
The Bidder's attention is directed to the Contract Provisions of the Labor Standards for federally assisted projects which may be attached to and made a part of the Agreement.

I-2.16 NOTICE TO LABOR UNIONS
If applicable, the successful Bidder will be required to provide Labor Unions and other organizations of workers a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers", and such form may be made a part of the Agreement.

I-2.17 NOTICE TO PROSPECTIVE FEDERALLY-ASSISTED CONSTRUCTION CONTRACTORS
A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted to said Secretary prior to the award of a federally-assisted construction and Contract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The form of certification may be bound herein following the form of Bid Bond.

Contractors receiving federally-assisted construction Contract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractor for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause:

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT
FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

"A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause."

"Contractors receiving subcontract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide from the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause."

The United States requires a pre-award conference if a proposed construction contract exceeds one million dollars to determine if the the prospective contractor is in compliance with the Equal Employment Opportunity requirements of Executive Order 11246 of September 24, 1965. In such instances, a meeting may be scheduled at which the prospective contractor must specify what affirmative action he has taken or proposed to take to assure equal employment opportunity which must be approved by the United States before award of the contract will be authorized.

Bidders must be prepared to submit an Equal Employment Opportunity (EEO) plan at a pre-award conference. The plan must include bidding opportunities offered by the Bidder to minority subcontractors.

On October 13, 1971, President Nixon issued Executive Order 11246 emphasizing the government's commitment to the promotion of minority business enterprise. Accordingly, the United States is firmly committed to the utilization of available resources to support this important program. U.S. agencies are most interested in realizing minority participation on the subject. Achieving equal employment opportunity compliance is required through Executive Order 11246. WE cannot emphasize too strongly that minority subcontractors be extended subcontractors bidding opportunities as but one step in your affirmative action policy.

Due to the importance of this contract, U.S. Agencies may conduct an EEO Conference prior to the award of the Contract. It is suggested that the responsive Bidder confirm the minority subcontractors he contacted for bids or quotations in his EEO plan submitted at the conference.

I-2.18 EEO AFFIRMATIVE ACTION REQUIREMENTS
By the submission of a Proposal, each Bidder acknowledges that he understands and will agree to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under any contract awarded pursuant to solicitation. Each Bidder agrees that if awarded a contract, he will similarly bind contractually each subcontractor. In policies, each Bidder further understands and agrees that if awarded a contract, he must engage in Affirmative Action directed to promoting and ensuring equal employment opportunity in the work force used under the contract (and he must require contractually the same effort of all subcontractors whose subcontracts exceed $100,000). The Bidder understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the project. * * * * * * * END of SECTION * * * * * * *

CITY OF TAMPA INSURANCE REQUIREMENTS

During the life of the award/contract the Awardee/Contractor shall provide, pay for, and maintain insurance with companies authorized to do business in Florida, with an A.M. Best rating of B+ (or better) Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best. All insurance shall be from responsible companies duly authorized to do business in the State of Florida.

All commercial general liability insurance policies (and Excess or Umbrella Liability Insurance policies, if applicable) shall provide that the City is an additional insured as to the operations of the Awardee/Contractor under the award/contract including the additional insured endorsement, the subrogation wavier endorsement, and the Severability of Interest Provision. In lieu of the additional named insured requirement, if the Awardee/Contractor's company has a declared existing policy which precludes it from including additional insureds, the City may permit the Contractor to purchase an Owners and Contractors Protective Liability policy. Such policy shall be written in the name of the City at the same limit as is required for General Liability coverage. The policy shall be evidenced on an insurance binder which must be effective from the date of issue until such time as a policy is in existence and shall be submitted to the City in the manner described below as applicable to certificates of insurance.

The insurance coverages and limits required must be evidenced by a properly executed Acord 25 Certificate of Insurance form or its equivalent. Each Certificate must be personally manually signed by the Authorized Representative of the insurance company shown in the Certificate with proof that he/she is an authorized representative thereof. Thirty days' written notice must be given to the City of any cancellation, intent not to renew, or reduction in the policy coverages, except in the application of the aggregate liability limits provisions. Should any aggregate limit of liability coverage be reduced, it shall be immediately increased back to the limit required by the contract. The insurance coverages required herein are to be primary to any insurance carried by the City or any self-insurance program thereof.

The following coverages are required:

A. Commercial General Liability Insurance shall be provided on the most current Insurance Services Office (ISO) form or its equivalent. This coverage must be provided to cover liability arising from premises and operations, independent contractors, products and completed operations, personal and advertising injury, contractual liability, and XCU exposures (if applicable). Completed operations liability coverage shall be maintained for a minimum of one-year following completion of work. The amount of Commercial General Liability insurance shall not be less than the amount specified.

(a) $1,000,000 per occurrence and a $2,000,000 general aggregate for projects valued at $2,000,000 or less. General aggregate limit for projects over that price shall equal or exceed the price of the project. An Excess or Umbrella Liability insurance policy can be provided to meet the required limit. Risk Management may be contacted for additional information regarding projects of this nature.

B. Automobile Liability Insurance shall be maintained in accordance with the laws of the State of Florida, as to the ownership, maintenance, and use of all owned, non-owned, leased, or hired vehicles. The amount of Automobile Liability Insurance shall not be less than the amount specified.

(a) $500,000 combined single limit each occurrence bodily injury & property damage- for projects valued at $100,000 and under

(b) $1,000,000 combined single limit each occurrence bodily injury & property damage – for projects valued over $100,000

C. Worker's Compensation and Employer's Liability Insurance shall be provided for all employees engaged in the work under the contract, in accordance with the Florida Statutory Requirements. The amount of the Employer's Liability Insurance shall not be less than:

(a) $500,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each employee – for projects valued at $100,00 and under
(b) $1,000,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each –for projects valued over $100,000

D. Excess Liability Insurance or Umbrella Liability Insurance may compensate for a deficiency in general liability, automobile, or worker's compensation insurance coverage limits. If the Excess or Umbrella policy is being provided as proof of coverage, it must name the City of Tampa as an additional insured **(IF APPLICABLE).**

E. Builder's Risk Insurance, specialized policy designed to cover the property loss exposures that are associated with construction of buildings. The amount of coverage should not be less than the amount of the project. **(IF APPLICABLE).**

F. Installation Floater- a builder's risk type policy that covers specific type of property during its installation, is coverage required for highly valued equipment or materials such as compressors, generators, or other machinery that are not covered by the builder's risk policy **(IF APPLICABLE).**

G. Longshoreman's & Harbor Worker's Compensation Act/Jones Act coverage shall be maintained for work being conducted upon navigable water of the United States. The limit required shall be the same limit as the worker's compensation/employer's liability insurance limit **(IF APPLICABLE).**

H. Professional Liability shall be maintained against claims of negligence, errors, mistakes, or omissions in the performance of the services to be performed and furnished by the Awardee/Contractor or any of its subcontractors when it acts as a DESIGN PROFESSIONAL. The amount of coverage shall be no less than amount specified **(IF APPLICABLE).**

(a) $1,000,000 per incident and general aggregate. Note all claims made policies must provide the date of retroactive coverage.

The City may waive any or all of the above referenced insurance requirements based on the specific nature of goods or services to be provided under the award/contract.

ADDITIONAL INSURED - The City must be included as an additional insured by on the general and (Excess or Umbrella liability policies) if applicable. Alternatively, the Contractor may purchase a separate owners protective liability policy in the name of the City in the specified amount as indicated in the insurance requirements.

CLAIMS MADE POLICIES - If any liability insurance is issued on a claims made form, Contractor agrees to maintain uninterrupted coverage for a minimum of one year following completion and acceptance of the work either through purchase of an extended reporting provision, or through purchase of successive renewals with a retroactive date not later than the beginning of performance of work for the City. The retroactive date must be provided for all claims made policies.

CANCELLATION/NON-RENEWAL - Thirty (30) days written notice must be given to the City of any cancellation, intent to non-renew or material reduction in coverages (except aggregate liability limits). However, ten (10) days notice may be given for non-payment of premium. Notice shall be sent to the City of Tampa Department of Public Works, 306 E. Jackson Street, Tampa, FL 33602.

NUMBER OF POLICIES - General and other liability insurance may be arranged under single policies for the full amounts required or by a combination of underlying policies with the balance provided by an excess or umbrella liability insurance policy.

WAIVER OF SUBROGATION - Contractor waives all rights against City, its agents, officers, directors and employees for recovery of damages to the extent such damage is covered under the automobile or excess liability policies.

SUBCONTRACTORS - It is the Contractor's responsibility to require all subcontractors to maintain adequate insurance coverage.

PRIMARY POLICIES - The Contractor's insurance is primary to the City's insurance or any self insurance program thereof.

RATING - All insurers shall be authorized to do business in Florida, and shall have an A.M. Best rating of B+ (or better), Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best.

DEDUCTIBLES - The Contractor is responsible for all deductibles. In the event of loss which would have been covered but for the presence of a deductible, the City may withhold from payment to Contractor an amount equal to the deductible to cover such loss should full recovery not be obtained under the insurance policy.

INSURANCE ADJUSTMENTS - These insurance requirements may be increased, reduced, or waived at the City's sole option with an appropriate adjustment to the Contract price.

Document updated on 12/22/2009 by RLD (Risk Management)

Instructions Regarding Use of the SLBE Goal Contact List

Bidders must solicit a subcontracting bid from ALL of the firms listed on the SLBEs list provided within the Specifications, and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms as a first step in demonstrating Good-Faith Efforts to achieve the goal set for SLBE participation on this contract.

The list is formatted to facilitate e-mailing of a solicitation to the listed firms by copying and pasting the email addresses.

The SLBE participation Goal is based upon the availability of the certified firms indicated on the contact list. The Goal and Requirements of the City's Equal Business Opportunity Program are stated in the Bid/Contract Document, Specifications.

SOLICITATION FOR SUBCONTRACTOR QUOTES

From:
OUR COMPANY NAME:
TELEPHONE NUMBER:
ADDRESS:
FAX NUMBER:
E-MAIL ADDRESS:

To Subcontractor:

Our firm is in the process of preparing a bid for a **City of Tampa Contract**. Please accept this notice as our request for quotes for the scope of work identified below. Please respond to this request by filling in the information below and returning via e-mail or fax to the address or number provided. Please contact us if you need any assistance in obtaining bonding, lines of credit, insurance, assistance in obtaining necessary equipment, supplies, materials, participation in a City-sponsored mentor-protégé program, or if you have any questions.

Plans and Specs for this project are posted at:
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/

CONTRACT NO.:
CONTRACT NAME:
CITY'S BID OPENING DATE:
DEADLINE FOR YOUR SUBCONTRACTOR BID OR RESPONSE:
SPECIFIC SCOPE OF WORK:

Please complete and submit with your subcontract bid or response:
YOUR FIRM'S NAME:
MAILING ADDRESS:
CITY:
STATE:
ZIP:
FAX NUMBER:
E-MAIL ADDRESS:
__Yes, my company is interested in quoting this project for the following items of work:

__No, my company will not quote this project for the following reason(s):

(Sample Suggested Sub Solicitation 3-9-9 Tampa MBDO)

Contract 12-C-00058; Channel District: 12th Street Wastewater Pump Station Improvements

PROPOSAL

To the Mayor and City Council of the City of Tampa, Florida:

Name of Bidder _____

_____
Business Phone Number and Email Address

_____
Business Name and Mailing Address

_____
Phone Number and Name of Contact Regarding Permits

_____
Contractor/Qualifiers Name and Federal Identification Number

Date of Proposal _____

(If Bidder is a firm, fill in the following blanks):

Names and Residential Addresses of Partners

_____

_____

(If Bidder is a corporation, fill in the following blanks):

Organized under the laws of the State of _____

Names and Address of President

_____

_____

Name and Address of Vice President

_____

_____

Name and Address of Secretary

_____

_____

Names and Address of Treasurer

_____

_____

The above-named Bidder affirms and declares:

(1) That the Bidder is of lawful age and that no other person, firm or corporation has any interest in this Proposal or in the Contract proposed to be entered into.

(2) That this Proposal is made without any understanding, agreement or connection with any other person, firm, or corporation making Proposal for the same purposes, and is in all respects fair and without collusion or fraud.

(3) That the Bidder is not in arrears to the City of Tampa, upon debt or contract, and is not a defaulter, as surety or otherwise, upon any obligation to the City of Tampa.

(4) That no officer or employee or person whose salary is payable in whole or in part from the City Treasury is, shall be or become interested, directly or indirectly, as a contracting party, partner, stockholder, surety or otherwise, in this Proposal, or in the performance of the Contract, or in the supplies, materials, or equipment and work or labor to which it relates, or in any portion of the profits thereof.

(5) That the Bidder has carefully examined the site of the work and that, from his own investigations, he has satisfied himself as to the nature and location of the work, the character, quality, and quantity of materials and the kinds and extent of equipment and other facilities needed for the performance of the work, the general and local conditions and all difficulties to be encountered, and all other items which may, in any way, affect the work or its performance.

(6) That the Bidder

_____ Has; Treasury Number _____

_____ Has not
(Check applicable box)

previously performed work under the President's Executive Order Nos. 11246 and 11375.

(7) That the undersigned, as Bidder, also declares that he has carefully examined and fully understands all the component parts of the Contract Documents and agrees that he will execute the Contract and finish the required Performance Bond and will completely perform the work in strict accordance with the terms of the Contract and the Contract Documents therein referred to for the following prices, to wit:

Contract Item No.	Estimated Quantity	Description and Price in Words	Computed Total Price for Item in Figures
BASE BID	LS	The work includes the furnishing of all labor, equipment, and material for providing a new wastewater pump station on North 12th Street in the City of Tampa's Channel District, including excavation and backfill, precast concrete wet well and triplex system with two (2) 25 HP pumps, precast concrete manholes, concrete footings and slabs, masonry screen wall and chain link fencing, gravity sewer and force main piping, water service connection, roadway and site reconstruction, control panel and electrical, any allowances that may be listed in Section 01020, with all associated work required for a complete project in accordance with the Contract Documents. _____ _____ dollars and _____ cents (BASE BID) LS	$_____

Computed Total Price In Words:

_____

_____ dollars and _____ cents.

Computed Total Price in Figures: $_____

The bidder acknowledges that the following addenda have been received and that the changes covered by the addendum(s) have been taken into account in this proposal: #1 ___ #2 ___ #3 ___ #4___ #5___.

The bidder acknowledges the requirements of the City of Tampa's Equal Business Opportunity Program.

Bidder acknowledges that included in the various items of the proposal and the Total Bid Price are costs for complying with the Florida Trench Safety Act (90096), (Laws of Fla.) effective October 1, 1990. The bidder further identifies the costs to be summarized below:

	Trench Safety Measure (Description)	Unit of Measure (LF, SY)	Unit Quantity	Unit Cost	Extended Cost
A.	_____	_____	_____	_____	_____
B.	_____	_____	_____	_____	_____
C.	_____	_____	_____	_____	_____
D.	_____	_____	_____	_____	_____

Total Cost $_____

Signed _____

Failure to complete the above may result in the bid being declared non-responsive.

Accompanying this Proposal is a certified check, cashier's check or Bid Bond (form included herein must be used) on the form at least five (5) percent of the total amount of the Proposal which check shall become the property of the

_____ of _____
(Name of Bank or Surety) (City & State)

City of Tampa, or which bond shall become forthwith due and payable to the City of Tampa, if this Proposal shall be accepted by the City of Tampa and the undersigned shall fail to execute a contract with and to furnish the required Performance Bond and Payment Bond to the City of Tampa within twenty (20) days after the date of receipt of written Notice of Award by the City of Tampa to the undersigned so to do.

Dated _____, 20___

_____
(Name of Bidder)

_____
(Address of Bidder)

_____
(Signature)

_____
(Title)

Where Bidder is a Corporation:

Attest:

_____
Secretary

AFFIX
CORPORATE
SEAL

(ACKNOWLEDGMENT OF PRINCIPAL)

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

_____

Good Faith Effort Compliance Plan for Small Local Business Subcontracting

City of Tampa - Equal Business Opportunity Program

Contract _____ **Bid Date** _____

Bidder _____

Signature _____ **Date** _____

Name _____ **Title** _____

The following Compliance Plan is a true report of Good Faith Efforts made to accomplish subcontracting goals for Small Local Business Enterprises, SLBEs, on the referenced contract:

□ **The goal for SLBE participation has been met or exceeded. See the DMI form reporting subcontractors to be utilized.**
(Check Box, if appropriate; the remainder of the Compliance Plan need not be reported.)

□ **The goal for SLBE participation has not been met. The following is a recap of Good Faith Efforts made:**
(Check applicable boxes below. Enclose additional documents, and/or add remarks below as needed.)

(1) Soliciting through reasonable and available means the interest of SLBEs that have the capability to perform the work of the contract. The Bidder or Contractor must solicit this interest within sufficient time to allow the SLBEs to respond. The Bidder or Contractor must take appropriate steps to follow up initial solicitations with interested SLBEs. □ See DMI report forms for subcontractors solicited. □ See enclosed supplemental data on solicitation efforts. □ Remarks:

(2) Providing interested SLBEs with adequate information about the plans, specifications, and requirements of the contract, including addenda, in a timely manner to assist them in responding to the solicitation. □ See enclosed sample solicitation. □ Remarks:

(3) Negotiating in good faith with interested SLBEs that have submitted bids. Documentation of negotiation must include the names, addresses, and telephone numbers of SLBEs that were solicited; the date of each such solicitation; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why agreements could not be reached with SLBEs to perform the work. That there may be some additional costs involved in soliciting and using SLBEs is not a sufficient reason for a contractor's failure to meet the goals, as long as such costs are reasonable. Bidders are not required to accept higher quotes in order to meet the goal. □ DMI subcontractor-utilized forms reflect successful negotiations □ This project is of a low-bid nature and negotiations are limited to clarifications of scope and specifications. □ See enclosed document. □ Remarks:

(4) Not rejecting SLBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The SLBEs standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations are not legitimate causes for rejecting or not soliciting bids to meet the goals. □ Not applicable. □ See attached explanation for rejection of a low-bidding subcontractor's bid. □ Remarks:

(5) Making a portion of the work available to SLBE subcontractors and suppliers and to select those portions of the work or material consistent with the available SLBE subcontractors and suppliers, so as to facilitate meeting the goal. □ Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion. □ See enclosed comments. □ Remarks:

(6) Making good faith efforts, despite the ability or desire of a Bidder or Contractor to perform the work of a contract with its own organization. A Bidder or Contractor who desires to self-perform the work of a contract must demonstrate good faith efforts unless the goal has been met. □ Sub-Contractors were not prohibited from submitting bids on work not usually sub-contracted. □ Remarks:

(7) Selecting portions of the work to be performed by SLBEs in order to increase the likelihood that the goals will be met. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate SLBE participation, even when the Bidder or Contractor might otherwise prefer to perform these work items with its own forces. □ Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion. □ Sub-Contractors were not prohibited from submitting bids on work not usually sub-contracted. □ See enclosed comments. □ Remarks:

(8) Making efforts to assist interested SLBEs in obtaining bonding, lines of credit, or insurance as required by the city or contractor. □ See enclosed sample solicitation □ see enclosed document. □ Remarks:

(9) Making efforts to assist interested SLBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, including participation in a City-sponsored mentor-protégé program. □ See enclosed sample solicitation. □ See enclosed document. □ Remarks:

(10) Effectively using the services of the City and other organizations that provide assistance in the recruitment and placement of SLBEs. □ See enclosed document. □ The following services were used:

Other Supporting Good Faith Efforts: □ See enclosed document. □ Remarks:

Compliance Plan: Guidance For Meeting Good Faith Efforts

1. All firms on the SLBE Goal Setting List must be solicited and documentation provided for email, fax, letters, phone calls, and other communication with the listed firms. The DMI Solicited and DMI-Utilized forms must be completed for all firms solicited or utilized. Other opportunities for subcontracting may be explored by consulting the City of Tampa and/or Hillsborough County certification listings of SLBE's.

2. Solicitation of SLBEs, via written or electronic notification, should provide specific information on the services needed, where plans can be reviewed and assistance offered in obtaining these, if required. Solicitations should be typically be sent a week or more before the bid date. Sample copies of the bidder's solicitations should be provided.

3. With any quotes received, a follow-up should be made whenever needed to confirm scope of work. For any SLBE low quotes rejected, an explanation should be provided detailing negotiation efforts.

4. If a low bid SLBE is rejected or deemed unqualified the contractor must provide an explanation and supporting documentation for this decision.

5. Prime should break down portions of work into economical feasible opportunities for subcontracting. The SLBE directory can be useful in identifying additional subcontracting opportunities and firms not listed in the "SLBE Goal Setting Firms List."

6. Contractor should not preclude SLBEs from bidding on any part of work, even if the Contractor can self-perform the work.

7. Contractor should avoid relying solely on subcontracting out work where availability is not sufficient to attain pre-determined goal.

8. In its solicitations, the Bidder should offer assistance to SLBEs in obtaining bonding, insurance, etc, if required of subcontractors by the City or Prime Contractor.

9. In its solicitation, the Bidder should offer assistance in obtaining equipment for a specific job to SLBEs, if needed.

10. Contractor should use the services offered by such agencies as the Minority Business Development Office of the City of Tampa, Hillsborough County and the NAACP Empowerment Center for the recruitment and placement of SLBEs.

City of Tampa –DMI -Schedule of All Sub-(Contractors/Consultants/Suppliers) Solicited

(FORM MBD-10)

Contract No.:_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____Phone:_____ Fax:_____ Email:_____

[] No Firms were contacted/solicited for this contract.

[] No Firms were contacted because:_____

[] See attached documents with supplemental information.

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade or Services NIGP Code (listed above)	Contact Method L=Letter F=Fax E=Email P=Phone	Quote or Resp. Rec'd Y/N

It is hereby certified that the information provided is an accurate and true account of contacts and solicitations for sub – contracting opportunitieson this contract. ***This form must be completed and submitted with the bid or proposal***.Modifying or failing to sign DMI forms may result in Non-Compliance and/or deemed non-responsive.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page

Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) Solicited Form (Form MBD-10)

This form must be submitted with all bids or proposals. All subcontractors (regardless of ownership or size) solicited and subcontractors from whom unsolicited quotations were received must be included on this form. The instructions that follow correspond to the headings on the form required to be completed.Note: Ability or desire to self-perform all work shall not exempt the prime from Good Faith Efforts when Goal has been established.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.**FIN. A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Firms were contacted/solicited for this contract.** Checking the box indicates that a pre-determined Subcontract Goal was not set by the City resulting in your business not using subcontractors and will self-perform all work. If during the performance of the contract you employ subcontractors, the City must pre-approve subcontractors. Use of the "Sub-(Contractors/Consultants/Suppliers) Payments" form must be submitted with your invoices. Note: Certified SLBE or WMBE firms bidding as Primes are not exempt from outreach and solicitation of subcontractors.
- **No Firms were contacted because.** Provide brief explanation why no firms were contacted/solicited.
- **See attached documents.**Check box, if after you have completed the DMI Form in its entirety, you are providing any additional documentation relating to the form.All DMI data not submitted on the MBD Form-10 must be in the same format and have all requested data from MBD Form-10 included.

The following instructions are for information of any and all subcontractors solicited.

- **"S" = SLBE, "W" = WMBE.** Enter "**S**" for firms Certified by the City as Small Local Business Enterprises and/or "**W**" for firms Certified by the City as Women/Minority Business Enterprise.
- **Federal ID.**FIN. A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials** Indicate the trade, service, or material provided by the subcontractor. NIGP codes are listed at top section of document.
- **Contact Method L=letter, F=fax, E=Email, P=Phone.** Indicate with letter the method of soliciting for bid.
- **Quote or Resp. (response) Rec'd (received) Y/N**. Indicate "Y" Yes if you received a quotation or if you received a response to your solicitation. Indicate "N" No if you received no response to your solicitation from the subcontractor.

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

City of Tampa –DMI Schedule of Sub-(Contractors/Consultants/Suppliers) to be Utilized

(FORM MBD-20)

Contract No.:_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____Phone:_____ Fax:_____ Email:_____

[ ] See attached documents.

[ ] No Subcontracting (of any kind) will be performed on this contract.

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

Enter "S" for firms Certified as Small Local Business Enterprises, "W" for firms Certified as Women/Minority Business Enterprise

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade, Services, or Materials NIGP Code Listed above	Amount of Quote. Letter of Intent if available.	Percent of Scope/Contract %

Total Subcontract/Supplier Utilization $_____

Total SLBE Utilization $ _____

Total WMBE Utilization $ _____

Percent SLBE Utilization of Total Bid/Proposal Amt. _____% Percent WMBE Utilization of Total Bid/Proposal Amt. _____%

It is hereby certified that the following information is a true and accurate account of utilization for sub-contracting opportunities on this contract. ***This form must be completed and submitted with the bid or proposal.*** Modifying or failing to sign DMI forms may result in Non-Complianceand/or deemed non-responsive.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page.

Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) to be Utilized Form

(Form MBD-20)

This form must be submitted with all bids or proposals. All subcontractors projected to be utilized must be included on this form.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.**FIN. A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Subcontracting (of any kind) will be performed on this contract.** Checking box indicates your business will not use subcontractors when no Subcontract Goal has been set by the City, but will self-perform all work. When subcontractors are utilized during the performance of the contract, the "Sub-(Contractors/Consultants/Suppliers) Payments" form must be submitted with your invoices. Note: Certified SLBE or WMBE firms bidding as Primes are not exempt from outreach and solicitation of subcontractors.
- **See attached documents.** Check if you have provided any additional documentation relating to the utilization of subcontractors.
-

The following instructions are for information of Any and All subcontractors to be utilized.

- **Federal ID.**FIN. A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **"S" = SLBE, "W" = WMBE.** Enter "**S**" for firms Certified by the City as Small Local Business Enterprises and/or "**W**" for firms Certified by the City as Women/Minority Business Enterprise.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials (NIGP code if Known)** Indicate the trade, service, or material provided by the subcontractor. NIGP codes are available at http:/www.tampagov.net/mbd.
- **Amount of Quote, Letters of Intent** (required for both SLBEs and WMBEs)
- **Percent of Work/Contract.** Indicate the percent of the total contract price the subcontract(s) represent.
- **Total Subcontract/Supplier Utilization.** – Provide total dollar amount of all subcontractors/suppliers projected to be used for the contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total SLBE Utilization.** Provide total dollar amount for all projected SLBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total WMBE Utilization.** Provide total dollar amount for all projected WMBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Percent SLBE Utilization.** Total amount allocated to SLBEs divided by the total bid amount. (Dollar amounts may not apply to CCNA proposals.)
- **Percent WMBE Utilization.** Total amount allocated to WMBEs divided by the total bid/proposal amount. (Dollar amounts may not apply to CCNA proposals.)

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

TAMPA BID BOND
Contract 12-C-00058; Channel District: 12th Street Wastewater Pump Station Improvements

KNOW ALL MEN BY THESE PRESENTS, that we, _____

_____

(hereinafter called the Principal) and _____

(hereinafter called the Surety) a Corporation chartered and existing under the laws of the State of _____, with its principal offices in the City of _____, and authorized to do business in the State of Florida, are held and firmly bound unto the City of Tampa, a Municipal Corporation of Hillsborough County, Florida, in the full and just sum of 5% of the amount of the (Bid) (Proposal) good and lawful money of the United States of America, to be paid upon demand of the City of Tampa, Florida, to which payment will and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally and firmly these presents.

WHEREAS, the Principal is about to submit, or has submitted to the City of Tampa, Florida, a Proposal for the construction of certain facilities for the City designated Contract 12-C-00058, Channel District: 12th Street Wastewater Pump Station Improvements.

WHEREAS, the Principal desires to file this Bond in accordance with law, in lieu of a certified Bidder's check otherwise required to accompany this Proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal be accepted, the Principal shall, within twenty (20) days after the date of receipt of written Notice of Award, execute a contract in accordance with the Proposal and upon the terms, conditions and price set forth therein, in the form and manner required by the City of Tampa, Florida and execute a sufficient and satisfactory Public Construction Bond payable to the City of Tampa, Florida in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to said City, then this Bid Bond obligation is to be void; otherwise to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid City, upon demand, the amount thereof, in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this _____ day of _____, 20___.

Principal _____

BY _____

TITLE _____

BY _____

TITLE _____

(SEAL)

_____
Producing Agent

_____
Producing Agent's Address

_____
Name of Agency

_____
The addition of such phrases as "not to exceed" or like import shall render the (Bid) (Proposal)non-responsive.

AGREEMENT

For furnishing all labor, materials and equipment, together with all work incidental thereto, necessary and required for the performance of the work for the construction of Contract 12-C-00058 in accordance with your Proposal dated _____, amounting to a total of $_____ as completed in accordance with subsections I-2.09 and I-2.10 of the Instruction to Bidders.

THIS AGREEMENT, made and entered into in triplicate, this ____ day of _____, 20___, between the City of Tampa, Florida, hereinafter called the City, and hereinafter called the Contractor.

WITNESSETH that, in consideration of the mutual stipulations, agreements, and covenants herein contained, the parties hereto have agreed and hereby agree with each other, the Party of the First Part for itself, its successors and assigns, and the Party of the Second Part for itself, or himself, or themselves, and its successors and assigns, or his or their executors, administrators and assigns, as follows:

Contract 12-C-00058; Channel District: 12th Street Wastewater Pump Station Improvements, shall include, but not be limited to, providing a new wastewater pump station on North 12th Street in the City of Tampa's Channel District, including excavation and backfill, precast concrete wet well and triplex system with two (2) 25 HP pumps, precast concrete manholes, concrete footings and slabs, masonry screen wall and chain link fencing, gravity sewer and force main piping, water service connection, roadway and site reconstruction, control panel and electrical, with all associated work required for a complete project in accordance with the Contract Documents.

Contract Documents referred to in Article 1.01 of this Agreement also includes this volume, applicable standard drawings, the plans and any provisions referred to whether actually attached or not.

TAMPA AGREEMENT

SECTION 1
GENERAL

ARTICLE 1.01 THE CONTRACT

Except for titles, subtitles, headings, running headlines, and tables of contents (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, constitute the Contract:

The Notice to Bidders;
The Instructions to Bidders, including Special Instructions and General Instructions;
The Proposal;
The Bid Bond;
The Certification of Nonsegregated Facilities;
The Notice of Award;
The Agreement;
The Performance Bond;
The Notice To Proceed;
The Specifications, including the General Provisions, the Workmanship and Materials, the Specific Provisions or the Contract Items
The Plans;
All Supplementary Drawings Issued after award of the Contract;
All Addenda issued by the City prior to the receipt of proposals;
All provisions required by law to be inserted in this Contract, whether actually inserted or not.

ARTICLE 1.02 DEFINITIONS

The following words and terms, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless different meaning is clear from the context:

(a)"City" shall mean the City of Tampa, Florida, represented by its Mayor and City Council, Party of the First Part, or such other City official as shall be duly empowered to act for the City on matters relating to this Contract.

(b)"Contractor" shall mean the Party of the Second Part hereto, whether corporation, firm or individual, or any combination thereof, and its, their, or his successors, personal representatives, executors, administrators, and assigns, and any person, firm or corporation who or which shall at any time be substituted in the place of the Party of the Second Part under this Contract.

(c)"Engineer" shall mean the Director of the Department or his duly authorized representative.

(d)"Consultant" shall mean the engineering or architectural firm or individual employed by the City to consult with and advise the City in the construction of the project.

(e)"Surety" shall mean any person, firm or corporation that has executed as Surety the Contractor's Performance Bond securing the performance of this Contact.

(f)"The Work" shall mean everything expressly or implied required to be furnished and done by the Contractor under the Contract, and shall include both Contract Work and Extra Work.

(g)"Contract Work" shall mean everything expressly or implied required to be furnished and done by the Contractor by any one or more of the Contract parts referred to in Article 1.01 hereof, except Extra Work, as hereinafter defined; it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Engineer shall determine which shall prevail.

(h)"Contract" or "Contract Documents" shall mean each of the various part of the Contract referred to in Article 1.01 hereof, both as a whole and severally.

(i)"Extra Work" shall mean work other than that required either expressly or implied by the contract in its present form.

(j)"Plans" shall mean only those drawings specifically referred to as such in these documents, or in any Addendum. Drawings issued after the execution of the Contract to explain further, or to illustrate, or to show changes in the work, will be known as "Supplementary Drawings" and shall be binding upon the Contractor with the same force as the Plans.

(k)"Specifications" shall mean all of the directions, requirements, and standards of performance applying to the work, as hereinafter detailed and designated as such, or which may be issued in an addendum.

(l)"Addendum or Addenda" shall mean the additional contract provisions issued in writing prior to the receipt of bids.

(m)"Notice" shall mean written notice. Notice shall be served upon the Contractor, either personally or by leaving the said notice at his residence or with any employee found on the work, or addressed to the Contractor at the residence or place of business given in his proposal and deposited in a postpaid wrapper in any post office box regularly maintained by the United States Post Office.

(n)"Project" shall mean the entire improvement package or related work. The "project" may consist of several different, but related, contracts.

(o)"Site" shall mean, and be limited to, the area upon or in which the Contractor's operations are carried on and such other appropriate areas as may be designed as such by the Engineer.

(p)"Subcontractor" shall mean any person, firm, or corporation, other than employees of the Contractor, who or which contracts with the Contractor to furnish, or actually furnishes labor, or labor and materials, or labor and equipment or labor, materials, and equipment at the site.

(q)Whenever in the Contract the words "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import are used, they shall imply the direction, requirement, permission, order, designation, or prescription of the Engineer; and "approved", "acceptable", "satisfactory", "in the judgement of", and words of like import shall mean approved by, or acceptable to, or satisfactory to, or in the judgment of the Engineer.

(r)Whenever in the Contract the word "day" is used, it shall mean calendar day.

(s)"Final Acceptance" shall mean acceptance of the

work as evidenced by an official resolution of the City. Such acceptance shall be deemed to have taken place only if and when an approving resolution has been adopted by the City Council. The final acceptance shall be signed only after the City has assured itself by tests, inspection, or otherwise, that all of the provisions of the Contract have been carried out to its satisfaction.

(t)"Eastern Standard Time" shall be construed as the time being observed in the City on the day proposals are received or other documents issued or signed.

SECTION 2
POWERS OF THE CITY'S REPRESENTATIVES

ARTICLE 2.01 THE ENGINEER

It is covenanted and agreed that the Engineer, in addition to those matters elsewhere herein expressly made subject to his determination, direction, or approval, shall have the power, subject to such express provisions and limitations herein contained as are not in conflict herewith, and subject to review by the Mayor and City Council:

(a)To monitor the performance of the work.

(b)To determine the amount, kind, quality, sequence, and location of the work to be paid for hereunder and, when completed, to measure such work for payment.

(c)To determine all questions of an engineering character in relation to the work, to interpret the Plans, Specifications and Addenda.

(d)To determine how the work of this Contract shall be coordinated with the work of other contractors engaged simultaneously on this project.

(e)To make minor changes in the work as he deems necessary, provided such changes do not result in a net increase in the cost to the City or to the Contractor of the work to be done under the Contract.

(f)To amplify the Plans, add explanatory information and furnish additional Specifications and Drawings consistent with the intent of the Contract Documents.

The power of the Engineer shall not be limited to the foregoing enumeration, for it is the intent of this Contract that all of the work shall be subject to his determinations and approval, except where the determination or approval of someone other than the Engineer is expressly called for herein and except as subject to review by the Mayor and City Council. All orders of the Engineer requiring the Contractor to perform work as Contract work shall be promptly obeyed by the Contractor.

The Engineer shall not, however, have the power to issue an extra work order, and the performance of such work on the order of the Engineer without previously obtaining written confirmation thereof from the Mayor in accordance with Article 7.02 hereof may constitute a waiver of any right to extra compensation therefor. The Contractor is warned that the Engineer has no power to change the terms and provisions of this Contract, except minor changes where such change results in no net increase in the Contract Price.

ARTICLE 2.02 DIRECTOR

The Director of the Department in addition to those matters expressly made subject to his determination, direction or approval in his capacity as "Engineer", shall also have the power:

(a)To review any and all questions in relation to this Contract and its performance, except as herein otherwise specifically provided, and his determination upon such review shall be final and conclusive upon the Contractor.

(b)With the approval of the Mayor and City Council to authorize modifications or changes in the Contract so as to require: (1) the performance of extra work, or (2) the omission of Contract work whenever he deems it in the interest of the City to do so, or both.

(c)To suspend the whole or any part of the work whenever, in his judgment, such suspension is required: (1) in the interest of the City generally, or (2) to coordinate the work of the various Contractors engaged on this project, or (3) to expedite the completion of the entire project, even though the completion of this particular Contract may be thereby delayed, without compensation to the Contractor for such suspension other than extending the time for the completion of the work, as much as it may have been, in the opinion of the City, delayed by such a suspension.

(d)If, before the final acceptance of all the work contemplated herein, it shall be deemed necessary to take over, use, occupy, or operate any part of the completed or partly completed work, the Engineer shall have the right to do so and the Contractor will not, in any way, interfere with or object to the use, occupation, or operation of such work by the City after receipt of notice in writing from the Engineer that such work or part thereof will be used by the City on and after the date specified in such notice. Such taking over, use, occupancy or operation of any part of the completed or partially completed work shall not constitute final acceptance or approval of any such part of the work.

ARTICLE 2.03 NO ESTOPPEL

The City shall not, nor shall any department, officer, agent, or employee thereof, be bound, precluded, or estopped by any determination, decision, acceptance, return, certificate, or payment made or given under or in connection with this Contract by any officer, agent or employee of the City at any time either before or after final completion and acceptance of the work and payment therefor: (a) from showing the true and correct classification, amount, quality, or character of the work done, or that any determination, decision, acceptance, return certificate or payment is untrue, incorrect or improperly made in any particular, or that the work or any part thereof does not in fact conform to the requirements of the Contract Documents, and (b) from demanding and recovering from the Contractor any overpayments made to him or such damages as it may sustain by reason his failure to comply with the requirements of the Contract of Documents, or both.

ARTICLE 2.04 NO WAIVER OF RIGHTS

Neither the inspection, nor any order, measurements or certificate of the City or its employees, officers, or agents, nor by any order of the City for payment of money, nor any money, nor payments for or acceptance of the whole or any part of the work by the City, nor any extension of time, nor any changes in the Contract, Specifications or Plans, nor any possession by the City or its employees shall operate as a

waiver of any provisions of this Contract, nor any power herein provided nor shall any waiver of any breach of this Contract be held as a waiver of any other subsequent breach.

Any remedy provided in this Contract shall be taken and construed as cumulative, namely, in addition to each and every other suit, action, or legal proceeding. The City shall be entitled as of right to an injunction against any breach of the provisions of this Contract.

SECTION 3
PERFORMANCE OF WORK

ARTICLE 3.01 CONTRACTOR'S RESPONSIBILITY
The Contractor shall do all the work and furnish, at his own cost and expense, all labor, materials, equipment, and other facilities, except as herein otherwise provided, as may be necessary and proper for performing and completing the work under this Contract. The Contractor shall be responsible for the entire work until completed and finally accepted by the City.

The work shall be performed in accordance with the true intent and meaning of the Contract Documents. Unless otherwise expressly provided, the work must be performed in accordance with the best modern practice, with materials as specified and workmanship of the highest quality, all as determined by and entirely to the satisfaction of the Engineer.

Unless otherwise expressly provided, the means and methods of construction shall be such as the Contractor may choose, subject, however, to the approval of the Engineer. Only adequate and safe procedure, methods, structures and equipment shall be used. The Engineer's approval or the Engineer's failure to exercise his right thereon shall not relieve the Contractor of obligations to accomplish the result intended by the Contract, nor shall such create a cause of action for damages.

ARTICLE 3.02 COMPLIANCE WITH LAWS
The Contractor must comply with all local, State and Federal laws, rules, ordinances and regulations applicable to this Contract and to the work done hereunder, and must obtain, at his own expense, all permits, licenses or other authorization necessary for the prosecution of the work.

No work shall be performed under this Contract on Sundays, legal holidays or after regular working hours without the express permission of the Engineer. Where such permission is granted, the Engineer may require that such work be performed without additional expense to the City.

ARTICLE 3.03 INSPECTION
During the progress of the work and up to the date of final acceptance, the Contractor shall, at all times, afford the representatives of the City, the Florida Department of Environmental Regulation, and if applicable, the Federal Environmental Protection Agency and the Federal Department of Labor every reasonable, safe and proper facility for inspecting the work done or being done at the site. The inspection of any work shall not relieve the Contractor of any of his obligations to perform proper and satisfactory work as herein specified. Finished or unfinished work found not to be in strict accordance with the Contract shall be replaced as directed by the Engineer, even though such work may have been previously approved and payment made therefor.

The City shall have the right to reject materials and workmanship which are defective or require their correction. Rejected work and materials must be promptly removed from the site, which must at all times be kept in a reasonably clean and neat condition.

Failure or neglect on the part of the City to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials, if it becomes evident at any time prior to the final acceptance of the work by the City. Neither shall it be construed as barring the City at any subsequent time from the recovery of damages of such a sum of money as may be needed to build anew all portions of the work in which inferior work or improper materials were used, wherever found.

Should it be considered necessary or advisable by the City at any time before final acceptance of the entire work to make examinations of work already completed, by removing or tearing out all or portions of such work, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material for that purpose. If such work is found to be defective in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the work shall be considered an item of extra work to be paid for in accordance with the provisions of Article 7.02 hereof.

ARTICLE 3.04 PROTECTION
During performance and until final acceptance, the Contractor shall be under an absolute obligation to protect the finished and unfinished work against any damage, loss, or injury. The Contractor shall take proper precaution to protect the finished work from loss or damage, pending completion and the final acceptance of all the work included in the entire Contract, provided that such precaution shall not relieve the Contractor from any and all liability and responsibility for loss or damage to the work occurring before final acceptance by the City. Such loss or damage shall be at the risk of and borne by the Contractor, whether arising from acts or omissions of the Contractor or others. In the event of any such loss or damage, the Contractor shall forthwith repair, replace, and make good the work without extension of time therefor, except as may be otherwise provided herein.

The provisions of this Article shall not be deemed to create any new right of action in favor of third parties against the Contractor or the City.

ARTICLE 3.05 PRESERVATION OF PROPERTY

The Contractor shall preserve from damage all property along the line of the work, or which is in the vicinity of or is in anywise affected by the work, the removal or destruction of which is not called for by the Plans. This applies, but is not limited, to the public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, public streets (except natural wear and tear of streets resulting from legitimate use thereof by the Contractor), and wherever such property is damaged due to the activities of the Contractor, it shall be immediately restored to its original condition by the Contractor and at his own expense.

In case of failure on the part of the Contractor to restore such property, or make good such damage or injury, the City may, upon forty-eight (48) hour written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under this Contract. Nothing in this clause shall prevent the Contractor from receiving proper compensation for the removal, damage, or replacement of any public or private property not shown on the Plans, when this is made necessary by alteration of grade or alignment authorized by the Engineer, provided that such property has not been damaged through fault of the Contractor, his employees or agents.

ARTICLE 3.06 BOUNDARIES
The Contractor shall confine his equipment, apparatus, the storage of materials, supplies and apparatus of his workmen to the limits indicated on the plans, by law, ordinances, permits or direction of the Engineer.

ARTICLE 3.07 SAFETY AND HEALTH REGULATIONS
The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL91-54).

ARTICLE 3.08 TAXES
All taxes of any kind and character payable on account of the work done and materials furnished under this Contract shall be paid by the Contractor and shall be deemed to have been included in his bid. The laws of the State of Florida provide that sales and use taxes are payable by the Contractor upon the tangible personal property incorporated in the work and such taxes shall be paid by the Contractor and shall be deemed to have been included in his bid.

ARTICLE 3.09 ENVIRONMENTAL CONSIDERATIONS
The Contractor, in the performance of the work under this Contract, shall comply with all Local, State and Federal laws, statutes, ordinances, rules and regulations applicable to protection of the environment; and, in the event he violates any of the provisions of same, he shall be answerable to the Local, State and Federal agencies designated by law to protect the environment. In the event the City receives, from any of the environmental agencies, a citation which is occasioned by an act or omission of the Contractor or his subcontractor or any officers, employees or agents of either, it is understood and agreed that the Contractor shall automatically become a party-respondent under said citation; and the City immediately shall notify the Contractor and provide him with a copy of said citation.

The Contractor shall comply with the requirements of the citation and correct the offending conditions(s) within the time stated in said citation and further shall be held fully responsible for all fines and/or penalties.

SECTION 4
TIME PROVISIONS

ARTICLE 4.01 TIME OF START AND COMPLETION
The Contractor must commence work within thirty (30) days subsequent to the date of the receipt of the "Notice to Proceed" by the City unless otherwise provided in the Specific Provisions and Special Instructions. Time being of the essence of this Contract, the Contractor shall thereafter prosecute the work diligently, using such means and methods of construction as well as secure its full completion in accordance with the requirements of the Contract Documents no later than the date specified therefor, or on the date to which the time for completion may be extended.

The Contractor must complete the work covered by this Contract in the number of consecutive calendar days set forth in the Instructions to Bidders, unless the date of completion is extended pursuant to the provisions of Article 4.05 hereof. The period for performance shall start from the date of signing of this Agreement by the City.

The actual date of completion will be established after a final inspection as provided in Article 4.07 hereof.

ARTICLE 4.02 PROGRESS SCHEDULE
To enable the work to be laid out and prosecuted in an orderly and expeditious manner, the Contractor shall submit to the Engineer a proposed progress schedule within fifteen (15) days after the award of this Contract.

The schedule shall state the Contract starting date, time for completion and date of completion and shall show the anticipated time of starting and completion of each of the various operations to be performed under this Contract, together with all necessary and appropriate information regarding sequence and correlation of work and an estimated time required for the delivery of all materials and equipment required for the work. The proposed schedule shall be revised as directed by the Engineer until finally approved by him, and, after such approval, shall be strictly adhered to by the Contractor. The approved progress schedule may be changed only with the written permission of the Engineer.

If the Contractor shall fail to adhere to the approved progress schedule or the schedule as revised, he shall promptly adopt such other or additional means and methods of construction as will make up for the time lost, and will assure completion in accordance with the contract time.

ARTICLE 4.03 APPROVAL REQUESTS
From time to time, as the work progresses and in the sequence indicated by the approved schedule, the Contractor must submit to the Engineer a specific request, in writing, for each item of information or approval required of him by the Contract. These requests must be submitted sufficiently in advance of the date upon which the information or approval is actually required by the Contractor to allow for the time the Engineer may take to act upon such submissions or resubmissions. The Contractor shall not have any right to an extension of time on account of delays due to his failure to submit his requests for the required information or the required approval in accordance with these requirements.

ARTICLE 4.04 COORDINATION WITH OTHER CONTRACTORS
During progress of the work, other Contractors may be engaged in performing other work on this project or on other projects on the site. In that event, the Contractor shall coordinate the work to be done hereunder with the work of such other Contractors in such manner as the Engineer may direct.

ARTICLE 4.05 EXTENSION OF TIME
If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the work should the Contractor be obstructed or delayed in the commencement, prosecution or completion of any part of said work by any act or delay of the City, or by acts or omissions of other Contractors on this project, or by a riot, insurrection, war, pestilence, acts of public authorities, fire, lightning, hurricanes, earthquakes, tornadoes, floods, extremely abnormal and excessive inclement weather as indicated by the records of the local weather bureau for a five-year period preceding the date of the Contract, or by strikes, or other causes, which causes of delay mentioned in this Article, in the opinion of the City, are entirely beyond the expectation and control of the Contractor.

The Contractor shall, however, be entitled to an extension of time for such causes only for the number of days of delay which the City may determine to be due solely to such causes and only to the extent that such occurrences actually delay the completion of the project and then only if the Contractor shall have strictly complied with all of the requirements of Articles 4.01, 4.02, 4.03 and 4.04 hereof. It is hereby understood that the determination by the Engineer as to the order and sequence of the work shall not in itself constitute a basis for extension of time.

The determination made by the City on an application for an extension of time shall be binding and conclusive on the Contractor.

Delays caused by failure of the Contractor's materialmen, manufacturers, and dealers to furnish approved working drawings, materials, fixtures, equipment, appliances, or other fittings on time or failure of subcontractors to perform their work shall not constitute a basis of extension of time.

The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any act or omission to act of the City or any of its representatives or because of any injunction which may be brought against the City or its representatives and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work as provided herein.

ARTICLE 4.06 LIQUIDATED DAMAGES
It is mutually agreed between the parties that time is the essence of this Contract and that there will be on the part of the City considerable monetary damage in the event the Contractor should fail to complete the work within the time fixed for completion in the Contract or within the time to which such completion may have been extended.

The amount per day set forth in the Instructions to Bidders is hereby agreed upon as the liquidated damages for each and every calendar day that the time consumed in completing the work under this Contract exceeds the time allowed.

This amount shall, in no event, be considered as a penalty or otherwise than as the liquidated and adjusted damages to the City because of the delay and the Contractor and his Surety agree that the stated sum per day for each such day of delay shall be deducted and retained out of the monies which may become due hereunder and if not so deductible, the Contractor and his Surety shall be liable therefor.

ARTICLE 4.07 FINAL INSPECTION
When the work has been completed in accordance with the requirements of the Contract and final cleaning up performed, a date for final inspection of the work by the Engineer shall be set by the Contractor in a written request therefor, which date shall be not less than ten (10) days after the date of such request. The work will be deemed complete as of the date so set by the Contractor if, upon such inspection, the Engineer determines that no further work remains to be done at the site.

If such inspection reveals interms of work still to be performed, however, the Contractor shall promptly perform them and then request a reinspection. If, upon such inspection, the Engineer determines that the work is complete, the date of final completion shall be deemed to be the last day of such reinspection.

SECTION 5
SUBCONTRACTS AND ASSIGNMENTS

ARTICLE 5.01 LIMITATIONS AND CONSENT
The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of his right, title, or interest therein, or his power to execute such Contract, or to assign any monies due or to become due thereunder to any other person, firm or corporation unless the previous written consent of the City shall first be obtained thereto and the giving of any such consent to a particular subcontract or assignment shall not dispense with the necessity of such consent to any further or other assignment.

Before making any subcontract, the Contractor must submit a

written statement to the Engineer, giving the name and address of the proposed contractor, the portion of the work and materials which he is to perform and furnish and any other information tending to prove that the proposed subcontractor has the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and conditions of this Contract.

If the City finds that the proposed subcontractor is qualified, the Contractor will be notified in writing. The City may revoke approval of any subcontractor when such subcontractor evidences an unwillingness or inability to perform his work in strict accordance with these Contract Documents. Notice of such revocation of approval will be given in writing to the Contractor.

The Contractor will promptly, upon request, file with the City a conformed copy of the subcontract. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of these Contract Documents, insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontracts that the City may exercise over the Contractor under provisions of these Contract Documents.

The Contractor shall be required to perform with his own forces at least twenty-five (25) percent of the work, unless written consent to subcontract a greater percentage of the work is first obtained from the City.

ARTICLE 5.02 RESPONSIBILITY
The approval by the City of a subcontractor shall not relieve the Contractor of any of his responsibilities, duties, and liabilities hereunder. The Contractor shall be solely responsible to the City for the acts or defaults or omissions of his subcontractor and of such subcontractor's officers, agents, and employees, each of whom shall for all purposes be deemed to be the agent or employee of the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the City.

SECTION 6
SECURITY AND GUARANTY

ARTICLE 6.01 CONTRACT SECURITY
The Contractor shall execute and deliver to the City a Performance Bond on the form as provided herein, in an amount at least equal to one hundred (100) percent of the full Contract price, such Bond to be executed by a surety company acceptable to the City. The surety on such Performance Bond shall be a surety company duly authorized to do business in the State of Florida, and the Bond shall be issued or countersigned by a local resident producing agent of such surety company who is a resident of the State of Florida, regularly commissioned and licensed in said State, and satisfactory evidence of the authority of the person or persons executing such Bond shall be submitted with the Bond. The Performance Bond shall serve as security for the faithful performance of this Contract, including maintenance and guaranty provisions, and for the payment of all persons performing labor and furnishing materials in connection with the Contract. The premiums on the Performance Bond shall be paid by the Contractor.

If, at any time, the City shall become dissatisfied with any surety or sureties then upon the Performance Bond, or if for any other reason such bond shall cease to be adequate security for the City, the Contractor shall, within five days after notice so to do, substitute an acceptable Bond in such form and sum and signed by such other sureties as may be satisfactory to the City. The premiums on such Bond shall be paid by the Contractor. No further partial payments shall be deemed due or shall be made until the new sureties have qualified.

ARTICLE 6.02 CONTRACTORS INSURANCE
Insurance required shall be as indicated on Special Instructions pages beginning with "INS-1"

ARTICLE 6.03 AGAINST CLAIMS AND LIENS
The City may withhold from the Contractor as much as any approved payments to him as may, in the opinion of the City, be necessary to secure (a) just claims of any persons supplying labor or materials to the Contractor or any of his subcontractors for the work then due and unpaid; (b) loss due to defective work not remedied, or (c) liability, damage, or loss due to injury to persons or damages to the work or property of other contractors, subcontractors, or others, caused by the act or neglect of the Contractor or of any of his subcontractors. The City shall have the right, as agent for the Contractor, to apply any such amounts so withheld in such manner as the City may deem proper to satisfy such claims or to secure such protection. Such application of such money shall be deemed payments for the account of the Contractor.

ARTICLE 6.04 MAINTENANCE AND GUARANTY
The Contractor hereby guarantees all the work furnished under this Contract against any defects in workmanship and materials for a period of one year following the date of final acceptance of the work by the City. Under this guarantee, the Contractor hereby agrees to make good, without delay, at his own expense, any failure of any part of the work due to faulty materials or manufacture, construction, or installation, or the failure of any equipment to perform satisfactorily all the work put upon it within the limits of the Contract Documents, and further, shall make good any damage to any part of the work caused by such failure. It is hereby agreed that the Performance Bond shall fully cover all guarantees contained in this Article.
It is also agreed that all warranties, expressed or implied, inure to the benefit of the City and are enforceable by the City.

SECTION 7
CHANGES

ARTICLE 7.01 MINOR CHANGES
The City reserves the right to make such additions, deductions, or changes to this Contract from time to time as

it deems necessary and in a manner not materially affecting the substance thereof or materially changing the price to be paid in order to carry out and complete more fully and perfectly the work herein agreed to be done and performed. This Contract shall in no way be invalidated by any such additions, deductions, or changes, and no claim by the Contractor shall be made for any loss of anticipated profits thereby.

Construction conditions may require that minor changes be made in the location and installation of the work and equipment to be furnished and other work to be performed hereunder, and the Contractor when ordered by the Engineer, shall make such adjustments and changes in said locations and work as may be necessary, without additional cost to the City, provided such adjustments and changes do not alter the character, quantity of cost of the work as a whole, and provided further that Plans and Specifications showing such adjustments and changes are furnished to the Contractor by the City within a reasonable time before any work involving such adjustment and changes is begun. The Engineer shall be the sole judge of what constitutes a minor change for which no additional compensation shall be allowed.

ARTICLE 7.02 EXTRA WORK

The City may at any time by a written order and without notice to the sureties require the performance of such extra work as it may find necessary or desirable. An order for extra work shall be valid only if issued in writing and signed by the Mayor and the work so ordered must be performed by the Contractor.

The amount of compensation to be paid to the Contractor for any extra work as so ordered shall be determined as follows:

(a)By such applicable unit prices, if any, as are set forth in the Proposal; or

(b)If no such unit prices are set forth then by a lump sum or other unit prices mutually agreed upon by the City and the Contractor; or

(c)If no such unit prices are set forth in the Proposal and if the parties cannot agree upon a lump sum or other unit prices then by the actual net cost in money to the Contractor of the extra work performed, which cost shall be determined as follows:

(1) For all labor and foreman in direct charge of the authorized operations, the Contractor shall receive the current local rate of wages to be agreed upon, in writing, before starting such work for each hour that said labor and foremen are actually engaged thereon, to which shall be added an amount equal to 25 percent of the sum thereof which shall be considered and accepted as full compensation for general supervision, FICA taxes, contributions under the Florida Unemployment Compensation Act, insurance, bond, subcontractor's profit and overhead, the furnishing of small tools and miscellaneous equipment used, such as picks, shovels, hand pumps, and similar items.

(2) For all materials used, the Contractor shall receive the actual cost of such materials delivered at the site or previously approved delivery point as established by original receipted bills. No percentage shall be added to this cost.

(3) For special equipment and machinery such as power-driven pumps, concrete mixers, trucks, and tractors, or other equipment, required for the economical performance of the authorized work, the Contractor shall receive payment based on the average local area rental price for each item of equipment and the actual time of its use on the work. No percentage shall be added to this sum.

(4) Records of extra work done under this procedure shall be reviewed at the end of each day by the Contractor or his representative and the Engineer. Duplicate copies of accepted records shall be made and signed by both Contractor or his representative and the Engineer, and one copy retained by each.

Request for payment for approved and duly authorized extra work shall be submitted in the same form as Contract work or in the case of work performed under paragraph (c) (1) above upon a certified statement supported by receipted bills. Such statement shall be submitted for the current Contract payment for the month in which the work was done.

ARTICLE 7.03 DISPUTED WORK

If the Contractor is of the opinion that any work required, necessitated, or ordered violates the terms and provisions of this Contract, he must promptly notify the Engineer, in writing, of his contentions with respect thereto and request a final determination thereof. If the Engineer determines that the work in question is Contract work and not extra work or that the order complained of is proper, he will direct the Contractor to proceed and the Contractor shall promptly comply. In order, however, to reserve his right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within five (5) days after receiving notice of the Engineer's determination and direction, notify the City in writing that the work is being performed or that the determination and direction is being complied with under protest. Failure of the Contractor to notify shall be deemed as a waiver of claim for extra compensation or damages therefor.

Before final acceptance by the City, all matters of dispute must be adjusted to the mutual satisfaction of the parties thereto. Final determinations and decisions, in case any questions shall arise, shall constitute a condition precedent to the right of the Contractor to receive the money therefor until the matter in question has been adjusted.

ARTICLE 7.04 OMITTED WORK

The City may at any time by a written order and without notice to the sureties require the omission of such Contract work as it may find necessary or desirable.

An order for omission of work shall be valid only if signed by the Mayor and the work so ordered must be omitted by the Contractor. The amount by which the Contract price shall be reduced shall be determined as follows:

(a) By such applicable unit prices, if any, as are set forth in the Contract; or

(b) By the appropriate lump sum price set forth in the Contract; or

(c) By the fair and reasonable estimated cost to the City

of such omitted work as determined by the Engineer and approved by the City.

SECTION 8
CONTRACTOR'S EMPLOYEES

ARTICLE 8.01 CHARACTER AND COMPETENCY
The Contractor and his subcontractors shall employ upon all parts of the work herein contracted for only competent, skillful, and trustworthy workers. Should the Engineer at any time give notice, in writing, to the Contractor or his duly authorized representative on the work that any employee in his opinion is incompetent, unfaithful, disorderly, careless, unobservant of instructions, or in any way a detriment to the satisfactory progress of the work, such employee shall immediately be dismissed and not again allowed upon the site.

ARTICLE 8.02 SUPERINTENDENCE
The Contractor shall give his personal supervision to the faithful prosecution of the work and in case of his absence shall have a competent, experienced, and reliable supervisor or superintendent, acceptable to the Engineer on the site who shall follow without delay all instructions of the Engineer in the prosecution and completion of the work and every part thereof, in full authority to supply workers, material, and equipment immediately. He shall keep on hand at all times copies of the Contract Documents.

ARTICLE 8.03 EMPLOYMENT OPPORTUNITIES
The Contractor shall, in the performance of the work required to be done under this Contract, employ all workers without discrimination regarding race, creed, color, sex or national origin and must not maintain or provide facilities that are segregated on the basis of race, color, creed or national origin.

ARTICLE 8.04 RATES OF WAGES
On federally assisted projects, the rates of wages to be paid under this Contract shall not be less than the rates of wages set forth in Section 12 of this Agreement.

On other projects, no wage rate determination is included. Florida's Prevailing Wage Law (Section 215.19, Florida Statutes) was repealed effective April 25, 1979.

ARTICLE 8.05 PAYROLL REPORTS
The Contractor and each subcontractor shall, if requested to do so, furnish to the Engineer a duly certified copy of his payroll and also any other information required by the Engineer to satisfy him that the provisions of the law as to the hours of employment and rate of wages are being observed.

Payrolls shall be prepared in accordance with instructions furnished by the City and on approved forms. The Contractor shall not carry on his payroll any persons not employed by him. Subcontractor's employees shall be carried only on the payrolls of the employing subcontractor.

SECTION 9
CONTRACTOR'S DEFAULT

ARTICLE 9.01 CITY'S RIGHT AND NOTICE
It is mutually agreed that: (a) if the Contractor fails to begin work when required to do so, or (b) if at any time during the progress of the work it shall appear to the Engineer that the Contractor is not prosecuting the work with reasonable speed, or is delaying the work unreasonably and unnecessarily, or (c) if the force of workmen or quality or quantity of material furnished are not sufficient to insure completion of the work within the specified time and in accordance with the Specifications hereto attached, or (d) if the Contractor shall fail to make prompt payments for materials or labor or to subcontractors for work performed under the Contract, or (e) if legal proceedings have been instituted by others than the City in such manner as to interfere with the progress of the work and may subject the City to peril of litigation or outside claims of (f) if the Contractor shall be adjudged a bankrupt or make an assignment for the benefit of creditors, or (g) if in any proceeding instituted by or against the Contractor an order shall be made or entered granting an extension of time of payment, composition, adjustment, modification, settlement or satisfaction of his debts or liabilities, or (h) if a receiver or trustee shall be appointed for the Contractor or the Contractor's property, or (i) if the Contract or any part thereof shall be sublet without the consent of the City being first obtained in writing, or (j) if this Contract or any right, monies, or claim thereunder shall be assigned by the Contractor, otherwise than as herein specified, or (k) if the Contractor shall fail in any manner of substance to observe the provisions of this Contract, or (l) if any of the work, machinery, or equipment shall be defective, and shall not be replaced as herein provided, or (m) if the work to be done under this Contract shall be abandoned, then such fact or conditions shall be certified by the Engineer and thereupon the City without prejudice to any other rights or remedies of the City, shall have the right to declare the Contractor in default and so notify the Contractor by a written notice, setting forth the ground or grounds upon which such default is declared and the Contractor must discontinue the work, either as a portion of the work or the whole thereof, as directed.

ARTICLE 9.02 CONTRACTOR'S DUTY UPON DEFAULT
Upon receipt of notice that his Contract is in default, the Contractor shall immediately discontinue all further operations on the work or such part thereof, and shall immediately quit the site or such part thereof, leaving untouched all plant, materials, equipment, tools, and supplies.

ARTICLE 9.03 COMPLETION OF DEFAULTED WORK
The City, after declaring the Contractor in default, may then have the work completed or the defective equipment or machinery replaced or anything else done to complete the work in strict accordance with the Contract Documents by such means and in such manner, by Contract with or without public letting, or otherwise, as it may deem advisable,

utilizing for such purpose without additional cost to the City such of the Contractor's plant, materials, equipment, tools, and supplies remaining on the site, and also such subcontractors as it may deem advisable.

The City shall reimburse all parties, including itself, for the expense of such completion, including liquidated damages, if any, and the cost of reletting. The City shall deduct this expense from monies due or to become due to the Contractor under this Contract, or any part thereof, and in case such expense is more than the sum remaining unpaid of the original contract price, the Contractor and his sureties shall pay the amount of such deficiency to the City.

ARTICLE 9.04 PARTIAL DEFAULT
In case the City shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractor or person whom the City may engage to complete the work as to which the Contractor was declared in default.

SECTION 10
PAYMENTS

ARTICLE 10.01 PRICES
For the Contractor's complete performance of the work, the City will pay and the Contractor agrees to accept, subject to the terms and conditions hereof, the lump sum prices or unit prices in the Contractor's Proposal and the award made therein, plus the amount required to be paid for any extra work ordered under Article 7.02 hereof, less credit for any work omitted pursuant to Article 7.04 hereof. Under unit price items, the number of units actually required to complete the work under the Contract may be more than stated in the Proposal. The Contractor agrees that no claim will be made for any damages or for loss of profits because of a difference between the quantities of the various classes of work assumed and stated in the Proposal Form as a basis for comparing Proposals and the quantities of work actually performed.

The sum as awarded for any lump sum Contract or lump sum Contract Item shall represent payment in full for all of the various classes of work, including materials, equipment, and labor necessary or required to complete, in conformity with the Contract Document, the entire work shown, indicated or specified under the lump sum Contract or lump sum Contract Item.

The amount as awarded as a unit price for any unit price Contact Item shall represent payment in full for all the materials, equipment, and labor necessary to complete, in conformity with the Contract Documents, each unit of work shown, specified, or required under the said unit price Contract Item.

No payment other than the amount as awarded will be made for any class of work included in a lump sum Contract Item or a unit price Contract Item, unless specific provision is made therefor in the Contract Documents.

ARTICLE 10.02 SUBMISSION OF BID BREAKDOWN
Within fifteen (15) days after the execution of this Contract, the Contractor must submit to the Engineer in duplicate an acceptable breakdown of the lump sums and unit prices bid for items of the Contract, showing the various operations to be performed under the Contract, as described in the progress schedule required under Article 4.02 hereof, and the value of each of such operations, the total of such items to equal the total price bid. The Contractor shall also submit such other information relating to the bid prices as may be required and shall revise the bid breakdown as directed. Thereafter, the breakdown may be used for checking the Contractor's applications for partial payments hereunder but shall not be binding upon the City or the Engineer for any purpose whatsoever.

ARTICLE 10.03 REPORTS, RECORDS AND DATA
The Contractor shall furnish to the Engineer such schedules of quantities and costs, progress schedules, reports, invoices, delivery tickets, estimates, records, and other data as the Engineer may request concerning work performed or to be performed and the materials furnished under the Contract.

ARTICLE 10.04 PAYMENTS BY CONTRACTOR
The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which such services are rendered, (b) for all materials, tools, and equipment delivered at the site of the project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors, to the extent of each subcontractor's interest therein; and proof of such payments or releases therefor shall be submitted to the Engineer upon request.

ARTICLE 10.05 PARTIAL PAYMENTS
On or about the first of each month, the Contractor shall make and certify an estimate, on forms prescribed by the City, of the amount and fair value of the work done, and may apply for partial payment therefor. The Contractor shall revise the estimate as the Engineer may direct. When satisfactory progress has been made, and shows that the value of the work completed since the last payment exceeds one percent (1%) of the total Contract price in amount, the Engineer will issue a certificate that such work has been completed and the value thereof. The City will then issue a voucher to the Contractor in accordance with the following schedule:

FOR CONTRACT AMOUNTS UNDER $250,000
(A)In the amount of ninety percent (90%) of the value of the work completed as certified until construction is one hundred percent (100%) complete (operational or beneficial occupancy), the withheld amount may be reduced below ten percent (10%), at the Engineer's option, to only that amount necessary to assure completion.

FOR CONTRACT AMOUNTS OVER $250,000

(A)In the amount of ninety percent (90%) of the value of the work completed as certified until construction is fifty percent (50%) complete.

(B)When the dollar value, as determined by the Engineer, of satisfactorily completed work in place is greater than fifty percent (50%) of the original contract price, vouchers for partial payment will be issued by the City to the Contractor in the amount of one hundred percent (100%) of the value of the work, above 50%, completed as certified for that payment period.

(C)If the Contractor has performed satisfactorily and the work is substantially complete (operational or beneficial occupancy) the withheld amount may be reduced, at the Engineer's option, to only that amount necessary to assure completion.

In addition to the Conditions set forth in (A), (B), and (C) above, payments will always be less any sums that may be retained or deducted by the City under the terms of any of the contract documents and less any sums that may be retained to cover monetary guarantees for equipment, materials or progress performance.

Payment on estimates made on or about the first of the month may be expected on or about the 20th of the month.

Unless specified otherwise in the Contract Items, the delivered cost of equipment and nonperishable materials suitably stored at the site of the work and tested for adequacy may be included in the Contractor's application for partial payment provided, however, that the Contractor shall furnish evidence satisfactory to the City that the Contractor is the unconditional owner and in possession of such materials or equipment. The amount to be paid will be 90 percent of the invoice cost to the Contractor which cost shall be supported by receipted bills within 30 days of the date of payment by the City to the Contractor. Such payment shall not relieve the Contractor from full responsibility for completion of the work and for protection of such materials and equipment until incorporated in the work in a permanent manner as required by the Contract Documents.

Before any payment will be made under this Contract, the Contractor and every subcontractor, if required, shall deliver to the Engineer a written, verified statement, in satisfactory form, showing in detail all amounts then due and unpaid by such Contractor or subcontractor to all laborers, workmen, and mechanics, employed by him under the Contract for the performance of the work at the site thereof, for daily or weekly wages, or to other persons for materials, equipment, or supplies delivered at the site of the work during the period covered by the payment under consideration.

ARTICLE 10.06 FINAL PAYMENT

Under determination of satisfactory completion of the work under this Contract as provided in Article 4.07 hereof, the Engineer will prepare the final estimate showing the value of the completed work. This estimate will be prepared within 30 days after the date of completion or as soon thereafter as the necessary measurements and computations can be made. All prior certificates and estimates, being approximate only, are subject to correction in the final estimate and payment.

When the final estimate has been prepared and certified by Engineer, he will submit to the Mayor and City Council the final certificate stating that the work has been completed and the amount based on the final estimate remaining due to the Contractor. The City will then accept the work as fully completed and will, not later than 30 days after the final acceptance, as defined in Article 1.02, of the work done under this Contract, pay the Contractor the entire amount so found due thereunder after deduction of all previous payments and all percentages and amounts to be kept and retained under provisions of this Contract; provided, however, and it is understood and agreed that, as a precedent to receiving final payment, the Contractor shall submit to the City a sworn affidavit that all bills for labor, service, materials, and subcontractors have been paid and that there are no suits pending in connection with this work. The City, at its option, may permit the Contractor to execute a separate surety bond in a form satisfactory to the City. The surety bond shall be in the full amount of the suit or suits.

Neither the final payment nor any part of the retained percentage shall be paid until the Contractor, if required, shall furnish the City with a complete release from any should remain unsatisfied after all payments are made, the Contractor shall refund to the City all monies which the City may be compelled to pay in discharging such claim, including incidental costs and attorney's fees.

ARTICLE 10.07 ACCEPTANCE OF FINAL PAYMENT

The acceptance by the Contractor, or by anyone claiming by or through him, of the final payment shall operate as and shall be a release to the City and every officer and agent thereof from any and all claims and liability to the Contractor for anything done or furnished in connection with the work or project and for any act or neglect of the Contractor or of any others relating to or affecting the work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations under this Contract or the Performance Bond.

SECTION 11
MISCELLANEOUS PROVISIONS

ARTICLE 11.01 CONTRACTOR'S WARRANTIES

In consideration of, and to induce the award of this contract to him, the Contractor represents and warrants:

(a)That he is not in arrears to the City upon debt or contract, and he is not a defaulter, as surety, contractor, or otherwise.

(b)That he is financially solvent and sufficiently experienced and competent to perform the work.

(c)That the work can be performed as called for by the Contract Documents.

(d)That the facts stated in his proposal and the information given by him are true and correct in all respects.

(e)That he is fully informed regarding all the conditions affecting the work to be done and labor and materials to be

furnished for the completion of this Contract, and that his information was secured by personal investigation and research.

ARTICLE 11.02 PATENTED DEVICES, MATERIAL AND PROCESSES

It is mutually understood and agreed that Contract prices include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the work. Whenever the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall indemnify and save harmless the City, its officers, agents and employees from any and all claims for infringement by reason of the use of any such patented design, device, tool, material, equipment, or process, to be performed under the Contract, and shall indemnify the said City, its officers, agents, and employees for any costs, expenses, and damages which may be incurred by reason of such infringement at any time during the prosecution or after completion of the work.

ARTICLE 11.03 SUITS AT LAW

In case any action at law or suit in equity may or shall be brought against the City or any of its officers, agents, or employees for or on account of the failure, omission, or neglect of the Contractor or his subcontractors, employees, or agents, to do or perform any of the covenants, acts, matters, or things by this Contract undertaken to be done or performed by the Contractor of his subcontractors, employees, or agents, or from any injuries done to property or persons and caused by the negligence or alleged negligence of the Contractor of his subcontractors, employees, or agents, or in any other manner arising out of the performance of this Contract, then the Contractor shall immediately assume and take charge of the defense of such actions or suits in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor, and the Contractor shall also indemnity and save harmless the City, its officers, agents, and employees from any and all loss, cost or damage whatever arising out of such actions or suits, in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor.

The Contractor shall and does hereby assume all liability for and agrees to indemnify the City or its Engineer against any or all loss, costs, damages, and liability for any or by reason of any lien, claims or demands, either for materials purchased or for work performed by laborers, mechanics, and others and from any damages, costs, actions, or causes of action and judgement arising from injuries sustained by mechanics, laborers, or other persons by reason of accidents or otherwise, whether caused by the carelessness or inefficiency or neglect of said Contractor, his subcontractors, agents, employees, workmen or otherwise.

ARTICLE 11.04 CLAIMS FOR DAMAGES

If the Contractor shall claim compensation for any damage sustained, other than for extra or disputed work covered by Article 7.02 and 7.03 hereof, by reason of any act or omission of the City, its agents, or any persons, he shall, within five days after sustaining such damage, make and deliver to the Engineer a written statement of the nature of the damage sustained and of the basis of the claim against the City. On or before the 15th of the month succeeding that in which any damage shall have been sustained, the Contractor shall make and deliver to the Engineer an itemized statement of the details and amounts of such damage, duly verified by the Contractor. Unless such statements shall be made delivered within the times aforesaid, it is stipulated that and all claims for such compensation shall be forfeited and invalidated, and the Contractor shall not be entitled to payment on account of such claims.

ARTICLE 11.05 NO CLAIMS AGAINST INDIVIDUALS

No claim whatsoever shall be made by the Contractor against any officer, agent, employee of the City for, or on account of, anything done or omitted to be done in connection with this Contract.

ARTICLE 11.06 LIABILITY UNAFFECTED

Nothing herein contained shall in any manner create any liability against the City on behalf of any claim for labor, services, or materials, or of subcontractors, and nothing herein contained shall affect the liability of the Contractor or his sureties to the City or to any workmen or materialsmen upon bond given in connection with this Contract.

ARTICLE 11.07 INDEMNIFICATION PROVISIONS

Whenever there appears in this Agreement, or in the other Contact Documents made a part hereof, an indemnification provision within the purview of Chapter 725.06, Laws of Florida, the monetary limitation on the extent of the indemnification under each such provision shall be One Million Dollars or a sum equal to the total Contract price, whichever shall be the greater.

ARTICLE 11.08 UNLAWFUL PROVISIONS DEEMED STRICKEN

If this contract contains any unlawful provisions not an essential part of the Contract and which shall not appear to have a controlling or material inducement to the making thereof, such provisions shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the Contract without affecting the binding force of the remainder.

ARTICLE 11.09 LEGAL PROVISIONS DEEMED INCLUDED

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

ARTICLE 11.10 DEATH OR INCOMPETENCY OF CONTRACTOR

In the event of death or legal incompetency of a Contractor who shall be an individual or surviving member of a contracting firm, such death or adjudication of incompetency

shall not terminate the Contract, but shall act as default hereunder to the effect provided in Article 9.01 hereof and the estate of the Contractor and his surety shall remain liable hereunder to the same extent as though the Contractor had lived. Notice of default, as provided in Article 9.01 hereof, shall not be required to be given in the event of such death or adjudication of incompetency.

ARTICLE 11.11 NUMBER AND GENDER OF WORDS

Whenever the context so admits or requires, all references herein in one number shall be deemed extended to and including the other number, whether singular or plural, and the use of any gender shall be applicable to all genders.

ARTICLE 11.12 ACCESS TO RECORDS

Representatives of Federal Agencies, if applicable, and the State of Florida shall have access to the work whenever it is in preparation of progress. On federally assisted projects the Federal Agency, the Comptroller General of the United States, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcription thereof.

SECTION 12
LABOR STANDARDS

ARTICLE 12.01 LABOR STANDARDS

The Contractor shall comply with all of the regulations set forth in "Labor Standards Provisions for Federally Assisted Construction Contracts", which may be attached, and any applicable Florida Statutes.

ARTICLE 12.02 NOTICE TO LABOR UNIONS

If required, the Contractor shall provide Labor Unions and other organizations of workers, and shall post, in a conspicuous place available to employees or applicants for employment, a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers" attached to and made a part of this Agreement.

ARTICLE 12.03 SAFETY AND HEALTH REGULATIONS

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). Nothing in these Acts shall be construed to supersede or in any manner affect any worker's compensation law or statutory rights, duties, or liabilities of employers and employees under any law with respect to injuries, diseases, or death of employees arising out of, or in the course of, employment.

ARTICLE 12.04 EEO AFFIRMATIVE ACTION REQUIREMENTS

The Contractor understands and agrees to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under this Contract. The Contractor also agrees to similarly bind contractually each subcontractor. In policies, the Contractor agrees to engage in Affirmative Action directed at promoting and ensuring equal employment opportunity in the work force used under the Contract (and the Contractor agrees to require contractually the same effort of all subcontractors whose subcontractors exceed $100,000). The Contractor understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the Contract.

ARTICLE 12.05 PREVAILING RATES OF WAGES

Florida's prevailing wage law was repealed effective April 25, 1979.

For Federally assisted projects, appropriate prevailing wage rate determinations are indicated on pages beginning with WR-1.

* * * * * * *

IN WITNESS THEREOF, the parties have hereunto set their hands and seals, and such of them as are corporation have caused these present to be signed by their duly authorized officers.

CITY OF TAMPA, FLORIDA

_____
Bob Buckhorn, Mayor
(SEAL)

ATTEST:

_____
City Clerk

Approved as to Form:
The execution of this document was authorized by Resolution No. _____

_____
Rachel S. Peterkin, Assistant City Attorney

Contractor

By:_____
(SEAL)

Title:

ATTEST:

_____
Secretary

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

_____

PUBLIC CONSTRUCTION BOND

Bond No. (enter bond number)_____

Name of Contractor:_____

Principal Business Address of Contractor:_____

_____

Telephone Number of Contractor:_____

Name of Surety (if more than one list each):_____

_____

Principal Business Address of Surety:_____

_____

Telephone Number of Surety:_____

Owner is The City of Tampa, Florida

Principal Business Address of Owner: 306 E Jackson St, Tampa, FL 33602

Contract Administration Department (280A4N)

Telephone Number of Owner: 813/274-8456

Contract Number Assigned by City to contract which is the subject of this bond:_____

Legal Description or Address of Property Improved or Contract Number is:_____

_____

_____

_____

General Description of Work and Services:_____

_____

_____

_____

KNOW ALL MEN BY THESE PRESENTS That we, _____

_____
(Name of Contractor)

as Principal, hereinafter called CONTRACTOR, of the State of _____, and

_____(Name of Surety)
a corporation organized and existing under and by virtue of the laws of the State of _____, and regularly authorized to do business in the State of Florida, as SURETY, are held and firmly bound unto the City of Tampa, a municipal corporation organized and existing under the laws of the State of Florida, hereinafter called Owner, in the penal sum of _____Dollars and _____Cents ($_____), lawful money of the United States of America, for the payment whereof well and truly to be made, we bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the contract dated _____, _____, 20___, between Principal and Owner for construction of _____, the contract being made a part of this bond by reference, in the time and in the manner prescribed in the contract; and

2. Promptly makes payments to all claimants, as defined in Section 255.05(1) (Section 713.01), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and

3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Principal under the contract; and

4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.

5. Contractor and Surety acknowledge that the Work for which this bond has been issued may be one of several such contract documents for a group of projects. This bond does not secure covenants to pay for or to perform design services survey or program management services. The Owner/Obligee is expected to reasonably account for damages that are caused to Owner with respect to Principal's (Contractor's) default in performance of the scope of the Work incorporated by reference into the bond, and notwithstanding any contractual or common law remedy permitted to Owner as against Contractor, the obligation of Surety for any damages under this bond shall be determined by the cost of completion of the Work less the contract balance unpaid upon default of Contractor for the Work plus liquidated damages at the rate of $500.00 per day for delays by the Contractor and/or Surety in reaching substantial completion.

6. The notice requirements for claimants and conditions for entitlement to payment set forth in Section 255.05, Fla. Stat. and the limitations period to actions upon Section 255.05, Fla. Stat. bonds apply to claimants seeking payment from surety under this bond. Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05, Florida Statutes.

7. The Surety, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the contract documents or other Work to be performed hereunder, or the specifications referred to therein shall in any way affect its obligations under this bond, and it does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to Work or to the specifications.

8. The above SURETY states that it has read all of the Contract Documents made by the CONTRACTOR with the CITY, hereto attached, and the terms and conditions of the contract and work, and is familiar therewith and in particular those portions of the Agreement concerning the guaranty of such CONTRACTOR for a period of one year following the date of the final acceptance of the completed work under the Contract by the CITY, all of which this BOND includes.

DATED ON _____, 20___

_____
(Name of Principal)

_____
(Principal Business Address)

By _____

Title _____

_____
Telephone Number of Principal

Countersignature:

_____
(Name of Local Agency)

_____
(Address of Resident Agent)

By _____

Title _____

_____
Telephone Number of Local Agency

_____
(Name of Surety)

_____
(Surety Address)

By _____
(As Attorney in Fact)*

_____
Telephone Number of Surety

Accepted by City of Tampa:

By _____
Bob Buckhorn, Mayor

Date: _____ 20____

Approved as to legal sufficiency:

By _____
Assistant City Attorney

Date: _____, 20____

*(As Attorney in Fact) attach Power of Attorney and Current Certificate with Original Signature

SPECIFICATIONS
GENERAL PROVISIONS

SECTION 1
SCOPE AND INTENT

G-1.01 DESCRIPTION
The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.

G-1.02 WORK INCLUDED
The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work. He shall obtain and pay for all required permits. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

The cost of incidental work described in these General Provisions, for which there are no specific Contract Items, shall be considered as part of the overhead cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.

The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his plant and equipment, prior approval of the Engineer notwithstanding.

G-1.03 PUBLIC UTILITY INSTALLATIONS AND STRUCTURES
Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, and all other appurtenances and facilities pertaining thereto whether owned or controlled by the City, other governmental bodies or privately owned by individuals, firms, or corporations, and used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work.

The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.

The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the City or other governmental body which are shown on the Plans to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various Contract Items. No separate payment shall be made therefor.

Where public utility installations or structures owned or controlled by the City or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided for in Article 7.02 of the Agreement.

The Contractor shall, at all times in performance of the work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of public utility installations and structures; and shall, at all times in the performance of the work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

All City and other governmental utility departments and other owners of public utilities, which may be affected by the work, will be informed in writing by the Engineer within two weeks after the execution of the Contract or Contracts covering the work. Such notice will set out, in general, and direct attention to, the responsibilities of the City and other governmental

utility departments and other owners of public utilities for such installations and structures as may be affected by the work and will be accompanied by one set of Plans and Specifications covering the work under such Contract or Contracts.

In addition to the general notice given by the Engineer, the Contractor shall give written notice to all City and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Underground Utility Notification Center for Excavators (Call Candy)".

The maintenance, repair, removal, relocation, or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Engineer.

SECTION 2
PLANS AND SPECIFICATIONS

G-2.01 PLANS
The Plans referred to in the Contract Documents bear the general project name and number as shown in the Notice To Bidders.

When obtaining data and information from the Plans, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

G-2.02 COPIES FURNISHED TO CONTRACTOR
After the Contract has been executed, the Contractor will be furnished with five sets of paper prints, the same size as the original drawings, of each sheet of the Plans and five copies of the Specifications. Additional copies of the Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

The Contractor shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for his work.

G-2.03 SUPPLEMENTARY DRAWINGS
When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and five paper prints thereof will be given to the Contractor.

The Supplementary Drawings shall be binding upon the Contractor with the same force as the Plans. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the City or compensation therefor to the Contractor shall be subject to the terms of the Agreement.

G-2.04 CONTRACTOR TO CHECK PLANS AND DATA
The Contractor shall verify all dimensions, quantities, and details shown on the Plans, Supplementary Drawings, Schedules, Specifications, or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions as full instructions will be furnished by the Engineer, should such errors or omissions be discovered. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

G-2.05 SPECIFICATIONS
The specifications consist of four parts, the General Provisions, the Technical Specifications, the Special Provisions and the Contract Items. The General Provisions and Technical Specifications contain general requirements which govern the work. The Special Provisions and the Contract Items modify and supplement these by detailed requirements for the work and shall always govern, whenever there appears to be conflict.

G-2.06 INTENT
All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

SECTION 3
WORKING DRAWINGS

G-3.01 SCOPE
The Contractor shall promptly prepare and submit layout, detail and shop drawings to insure proper construction, assembly, and installation of the work using those materials and methods as hereafter specified under the Technical Specifications, Special Provisions and Contract Items.

These drawings shall accurately and distinctly present the following:

a. All working and erection dimensions.
b. Arrangements and sectional views.
c. Necessary details, including complete information for making connections between work under this Contract and work under other Contracts.
d. Kinds of materials and finishes.
e. Parts listed and description thereof.

Drawings for mechanical equipment shall present, where applicable, such data as dimensions, weight and performance characteristics. These data shall show conformance with the performance characteristics and other criteria incorporated in the Plans and Specifications.

Each drawing shall be dated and shall contain the name of the project, Division number and description, the technical specifications section number, names of equipment or materials and the location at which the equipment or materials are to be installed. Location shall mean both physical location and location relative to other connected or attached material. The Engineer will return unchecked any submittal which does not contain complete data on the work and full information on related matters.

Stock or standard drawings will not be accepted for review unless full identification and supplementary information is shown thereon in ink or typewritten form.

The Contractor shall review all working drawing submittals before transmitting them to the Engineer to determine that they comply with requirements of the Specifications. Drawings which are incomplete or are not in compliance with the Contract Documents shall not be submitted for processing by the Engineer. The Contractor shall place his stamp of approval on all working drawings submitted to the Engineer to indicate compliance with the above.

G-3.02 APPROVAL
If the working drawings show departures from the Contract requirements, the Contractor shall make specific mention thereof in his letter of submittal; otherwise approval of such submittals shall not constitute approval of the departure. Approval of the drawings shall constitute approval of the subject matter thereof only and not of any structure, material, equipment, or apparatus shown or indicated.

The approval of drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such drawings, nor for the proper fitting and construction of the work, nor for the furnishing of materials or work required by the Contract and not indicated on the drawings. No work called for by working drawings shall be done until such drawings have been approved by the Engineer.

The procedure in seeking approval of the working drawings shall be as follows:

1.The Contractor shall submit four complete sets of drawings and other descriptive data together with one copy of a letter of transmittal to the Engineer for approval. The letter of transmittal shall contain the name of the project, contract number, technical specifications section number, the name of the Contractor, a list of drawings with numbers and titles, and any other pertinent information.

2.Drawings or descriptive data will be stamped "Approved", "Approved Subject to Corrections Marked", or "Examined and Returned for Correction" and one copy with a letter of transmittal will be returned to the Contractor.

3.If a drawing or other data is stamped "Approved", the Contractor shall insert the date of approval on five additional copies of the document and transmit the five copies to the Engineer together with one copy of a letter of transmittal containing substantially the same information as described in Instruction 1. above.

4.If a drawing or other data is stamped "Approved Subject to Corrections Marked", the Contractor shall make the corrections indicated and proceed as in Instruction 3., above.

5.If a drawing or data is stamped "Examined and Returned for Correction", the Contractor shall make the necessary corrections and resubmit the documents as set forth in Instruction 1., above. The letter of transmittal shall indicate that this is a resubmittal.

The Contractor shall revise and resubmit the working drawings as required by the Engineer, until approval thereof is obtained.

SECTION 4
MATERIALS AND EQUIPMENT

G-4.01 GENERAL REQUIREMENTS
All materials, appliances, and types or methods of construction shall be in accordance with the Specifications and shall, in no event, be less than that necessary to conform to the requirements of any applicable laws, ordinances, and codes.

All materials and equipment shall be new, unused, and correctly designed. They shall be of standard first grade quality, produced by expert personnel, and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

The quality of Workmanship and Materials entering into the work under this Contract shall conform to the requirements of the pertinent sections, clauses, paragraphs, and sentences, both directly and indirectly applicable thereto, of that part of the Technical Specifications, whether or not direct reference to such occurs in the Contract Items.

Equipment and appurtenances shall be designed in conformity with ANSI, ASME, IEEE, NEMA and other

generally accepted standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operation. All bearings and moving parts shall be adequately protected against wear by bushings or other approved means and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers, and the like, shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.

Equipment shall be of the approximate dimensions as indicated on the Plans or as specified, shall fit the spaces shown on the Plans with adequate clearances, and shall be capable of being handled through openings provided in the structure for this purpose. The equipment shall be of such design that piping and electrical connections, ductwork, and auxiliary equipment can be assembled and installed without causing major revisions to the location or arrangement of any of the facilities.

Machinery parts shall conform exactly to the dimensions shown on the working drawings. There shall be no more fitting or adjusting in setting up a machine than is necessary in assembling high grade apparatus of standard design. The equivalent parts of identical machines shall be made interchangeable. All grease lubricating fittings on equipment shall be of a uniform type. All machinery and equipment shall be safeguarded in accordance with the safety codes of the ANSI and applicable state and local codes.

G-4.02 MANUFACTURER

The names of proposed manufacturers, suppliers, material, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval, as early as possible, to afford proper investigation and checking. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

G-4.03 REFERENCE TO STANDARDS

Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for proposals, even though reference has been made to an earlier standard, and such standards are made a part hereof to the extent which is indicated or intended.

Reference to a technical society, organization or body may be made in the Specifications by abbreviations, in accordance with the following list:

AASHTO for American Association of State Highway and Transportation Officials (formerly AASHO)
ACI for American Concrete Institute
AGMA for American Gear Manufacturer's Association
AFBMA for Anti-Friction Bearing Manufacturer's Association
AISC for American Institute of Steel Construction
AISI for American Iron and Steel Institute
ANSI for American National Standards Institute
ASCE for American Society of Civil Engineers
ASTM for American Society for Testing and Materials
ASME for American Society of Mechanical Engineers
AWS for American Welding Society
AWWA for American Water Works Association
AWPA for American Wood Preservers Association
CEMA for Conveyor Equipment Manufacturers Association
CIPRA for Cast Iron Pipe Research Association
IEEE for Institute of Electrical and Electronic Engineers
IPCEA for Insulated Power Cable Engineers Association
NEC for National Electrical Code
NEMA for National Electrical Manufacturers Association
SAE for Society of Automotive Engineers
SHBI for Steel Heating Boiler Institute
Fed.Spec. for Federal Specifications
Navy Spec. for Navy Department Specifications
U.L.,Inc. for Underwriters' Laboratories, Inc.

When no reference is made to a code, standard or specification, the Standard Specifications of the ANSI, the ASME, the ASTM, the IEEE, or the NEMA shall govern.

G-4.04 SAMPLES

The Contractor shall, when required, submit to the Engineer for approval typical samples of materials and equipment. The samples shall be properly identified by tags and shall be submitted sufficiently in advance of the time when they are to be incorporated into the work, so that rejections thereof will not cause delay. A letter of transmittal, in duplicate, from the Contractor requesting approval must accompany all such samples.

G-4.05 EQUIVALENT QUALITY

Whenever, in the Contract Documents, an article, material, apparatus, equipment, or process is called for by trade name or by the name of a patentee, manufacturer, or dealer or by reference to catalogs of a manufacturer or dealer, it shall be understood as intending to mean and specify the article, material, apparatus, equipment or process designated, or any

equal thereto in quality, finish, design, efficiency, and durability and equally serviceable for the purposes for which it is intended.

Whenever material or equipment is submitted for approval as being equal to that specified, the decision as to whether or not such material or equipment is equal to that specified shall be made by the Engineer.

Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract, the Contractor shall immediately proceed to furnish the designated material or equipment.

Neither the approval by the Engineer of alternate material or equipment as being equivalent to that specified nor the furnishing of the material or equipment specified, shall in any way relieve the Contractor of responsibility for failure of the material or equipment, due to faulty design, material, or workmanship, to perform the functions required of them by the Specifications.

G-4.06 DELIVERY
The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete thw work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid a delay in, or impediment of, the progress of the work of any related Contractor.

G-4.07 CARE AND PROTECTION
The Contractor shall be solely responsible for properly storing and protecting all materials, equipment, and work furnished under the Contract from the time such materials and equipment are delivered at the site of the work until final acceptance thereof. He shall, at all times, take necessary precautions to prevent injury or damage by water, freezing, or by inclemencies of the weather to such materials, equipment and work. All injury or damage to materials, equipment, or work resulting from any cause whatsoever shall be made good by the Contractor.

The Engineer shall, in all cases, determine the portion of the site to be used by the Contractor for storage, plant or for other purposes. If, however, it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the work or interference with the work to be done by any other Contractor, the Contractor shall remove and restack such materials at his own expense.

G-4.08 TOOLS AND ACCESSORIES
The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

Spare parts shall be furnished as specified.

Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.

G-4.09 INSTALLATION OF EQUIPMENT
The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the Engineer during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the Engineer and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

The Contractor shall, at his own expense, furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations. Grout shall completely fill the space between the equipment base and the foundation.

G-4.10 OPERATING INSTRUCTIONS
The Contractor, through qualified individuals, shall adequately instruct designated employees of the City in the operation and care of all equipment installed hereunder, except for equipment that may be furnished by the City.

The Contractor shall also furnish and deliver to the Engineer three complete sets for permanent files, identified in accordance with Subsection G-3.01 hereof, of instructions, technical bulletins and any other printed matter, such as diagrams, prints or drawings, containing full information required for the proper operation, maintenance, and repair, of the equipment installed and the ordering of spare parts, except for equipment that may be furnished by the City.

In addition to the above three copies, the Contractor shall furnish any additional copies that may be required for use during construction and start-up operations.

G-4.11 SERVICE OF MANUFACTURER'S ENGINEER
The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in

permanent operation by the City, such engineer or superintendent shall make all adjustments and tests required by the Engineer to provide that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the City in the proper operation and maintenance of such equipment.

SECTION 5
INSPECTION AND TESTING

G-5.01 GENERAL
The Contractor's attention is hereby directed to Article 3.03 of the Agreement.

Inspection and testing of materials will be performed by the City unless otherwise specified.

For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material and equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the City.

Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the City formally takes over the operation thereof.

G-5.02 COSTS
All inspection and testing of materials furnished under this Contract will be performed by the City or duly authorized inspection engineers or inspection bureaus without cost to the Contractor, unless otherwise expressly specified.

The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the contract price.

Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the City for compliance. The Contractor shall reimburse the City for the expenditures incurred in making such tests on materials and equipment which are rejected for noncompliance.

G-5.03 INSPECTIONS OF MATERIALS
The Contractor shall give notice, in writing to the Engineer, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice the Engineer will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that inspection will be made at a point other than the point of manufacture, or he will notify the Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

G-5.04 CERTIFICATE OF MANUFACTURE
When inspection is waived or when the Engineer so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

G-5.05 SHOP TESTS OF OPERATING EQUIPMENT
Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.

Five copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer for approval.

The cost of the shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

G-5.06 PRELIMINARY FIELD TESTS
As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments, and replacements required.

G-5.07 FINAL FIELD TESTS
Upon completion of the work and prior to final payment, all equipment and appliances installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment, and instruments necessary for all acceptance tests, at no additional cost to the City.

G-5.08 FAILURE OF TESTS
Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make those corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees or specified requirements, the City, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.

In case the City rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the City may, after the expiration of a period of thirty calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under this Contract.

The City agrees to obtain other equipment within a reasonable time and the Contractor agrees that the City may use the equipment furnished by him without rental or other charges until the new equipment is obtained.

Materials or work in place that fails to pass acceptability tests shall be retested at the direction of the construction engineer all such retests shall be at the Contractor's expense. The rates charged shall be in accordance with the Department of Public Works current annual inspection contract which is available for inspection at the offices of the Department of Public Works.

G-5.09 FINAL INSPECTION
The procedures for final inspection shall be in accordance with the provisions of Article 4.07 of the Agreement. During such final inspections, the work shall be clean and free from water. In no case will the final estimate be prepared until the Contractor has complied with all the requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily cosntructed in accordance with the requirements of the Contract Documents.

SECTION 6

TEMPORARY STRUCTURES

G-6.01 GENERAL
All false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the work and which are not herein described or specified in detail, must be furnished, maintained and removed by the Contractor, and he shall be responsible for the safety and efficiency of such works and for any damages that may result from their failure or from their improper construction, maintenance, or operation.

G-6.02 PUBLIC ACCESS
At all points in the work where public access to any building, house, place of business, public road, or sidewalk would be obstructed by any action of the Contractor in executing the work required by this Contract, the Contractor shall provide such temporary structure, bridges or roadway as may be necessary to maintain public access at all times. At least one lane for vehicular traffic shall be maintained in streets in which the Contractor is working. Street closure permits are required from the Department of Public Works.

The Contractor shall provide suitable temporary bridges, as directed by the Engineer, at street intersections when necessary for the maintenance of vehicular and pedestrian traffic.

Prior to temporarily cutting of access to driveways and garages, the Contractor shall give twelve (12) hours notice to affected property owners. Interruptions to use of private driveways shall be kept to a minimum.

G-6.03 CONTRACTOR'S FIELD OFFICE
The Contractor shall erect, furnish and maintain a field office with a telephone at the site during the entire period of construction. He or an authorized agent shall be present at this office at all times while his work is in progress. Readily accessible copies of both the Contract Documents and the latest approved working drawings shall be kept at this field office.

G-6.04 TEMPORARY FENCE
If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the Engineer, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The Engineer shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

G-6.05 RESPONSIBILITY FOR TEMPORARY STRUCTURES
In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance, or operation and will indemnify and save harmless the City from

all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

SECTION 7
TEMPORARY SERVICES

G-7.01 WATER
The Contractor shall provide the necessary water supply at his own expense. He shall, if necessary, provide and lay necessary waterlines from existing mains to the place of using, shall secure all necessary permits and pay for all taps to water mains or hydrants and for all water used at the established rates.

G-7.02 LIGHT AND POWER
The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution and inspection of the work. If, in the opinion of the Engineer, these facilities are inadequate, the Contractor will not be permitted to proceed with any portion of the work affected thereby.

G-7.03 SANITARY REGULATIONS
The Contractor shall prohibit and prevent the committing of nuisances on the site of the work or on adjoining property and shall discharge any employee who violates this rule.

Ample washrooms and toilet facilities and a drinking water supply shall be furnished and maintained in strict conformity with the law by the Contractor for use by his employees.

G-7.04 ACCIDENT PREVENTION
Precautions shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws, building and construction codes shall be observed. The Contractor shall comply with the U. S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Section 107 of the Contract Work. Hours and Safety Standards Act (PL 91-54), except where state and local safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act.

G-7.05 FIRST AID
The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when men are employed on the work.

G-7.06 HEATING
The Contractor shall provide temporary heat, at his own expense, whenever required on account of work being carried on during cold weather and to prevent freezing of water pipes and other damage to the work.

SECTION 8
LINES AND GRADES

G-8.01 GENERAL
All work done under this Contract shall be constructed in accordance with the lines and grades shown on the Plans, or as given by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

The Engineer will establish bench marks and base line controlling points. Reference remarks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

G-8.02 SURVEYS
The Contractor shall furnish and maintain, at his own expense, stakes and other such materials, and give such assistance, including qualified helpers, as may be required by the Engineer for setting reference marks. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the Engineer, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review of the Engineer.

The Contractor shall keep the Engineer informed a reasonable time in advance as to his need for line and grade reference marks, in order that they may be furnished and all necessary measurements made for record and payment with the minimum of inconvenience to the Engineer or of delay to the Contractor.

It is the intention not to delay the work for the establishment of reference marks but, when necessary, working operations shall be suspended for such reasonable time as the Engineer may require for this purpose.

G-8.03 SAFEGUARDING MARKS
The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.

The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

G-8.04 DATUM PLANE
All elevations indicated or specified refer to the Mean Sea Level Datum of the U.S.C. & G.S. (N.O.S.) which is 0.80 feet above the Mean Low Water Datum of the U. S. Army

Corps of Engineers.

SECTION 9
ADJACENT STRUCTURES AND LANDSCAPING

G-9.01 RESPONSIBILITY
The responsibility for removal, replacement, relocation, repair, rebuilding or protection of all public utility installations, including poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, sewers, traffic control and fire alarm signal circuit installations and other appurtenances and facilities shall be in accordance with G-1.02 and G-1.03.

The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Plans, and the removal, relocation, and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payment will be made therefor. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the Engineer, removal or relocation and reconstruction is necessary to avoid interference with the work, payment therefor will be made as provided for extra work in Article 7.02 of the Agreement.

G-9.02 PROTECTION OF TREES
All trees and shrubs shall be adequately protected by the Contractor with boxes or otherwise and, within the City of Tampa, in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season, and at the sole expense of the Contractor.

Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.

The City may order the Contractor, for the convenience of the City, to remove trees along the line of trench excavation. If so ordered, the City will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

G-9.03 LAWN AREAS
Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed and later replaced, or the area where sod has been removed shall be restored with new sod in the manner described in the Technical Specifications section.

G-9.04 RESTORATION OF FENCES
Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the Engineer. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or Items, or if no specific Item is provided therefor, as part of the overhead cost of the work, and no additional payment will be made therefor.

SECTION 10
PROTECTION OF WORK AND PUBLIC

G-10.01 TRAFFIC REGULATIONS
The Contractor shall arrange his work to comply with Article G-6.02. The work shall be done with the least possible inconvenience to the public and to that end the work may be confined by the Engineer to one block at a time.

G-10.02 BARRIERS AND LIGHTS
During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers, and lights, as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public. Such barriers and signs shall be constructed to State of Florida Department of Transportation standards and placed as recommended by the Traffic Division of the City's Department of Public Works.

No open fires will be permitted.

G-10.03 SMOKE PREVENTIONS
The Contractor shall use hard coal, coke, oil or gas as fuel for equipment generating steam. A strict compliance with ordinances regulating the production and emission of smoke will be required.

G-10.04 NOISE
The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

Except in the event of an emergency, no work shall be done between the hours of 7:00 p.m. and 7:00 a.m., or on Sundays. If the proper and efficient prosecution of the work requires operations during the night, the written permission of the Engineer shall be obtained before starting such items of the work.

G-10.05 ACCESS TO PUBLIC SERVICES
Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

G-10.06 DUST PREVENTION
The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the streets sprinkled with water at all times.

G-10.07 PRIVATE PROPERTY
The Contractor shall so conduct the work that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the work unless he shall have obtained the owner's written consent thereto and shall have shown this consent to the Engineer.

SECTION 11
SLEEVES AND INSERTS

G-11.01 COORDINATION
When the Contract requires the placing of conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors, and other like work in floors, roofs, or walls of buildings and structures, they shall be promptly installed in conformity with the construction program. The Contractor who erects the floors, roofs, and walls shall facilitate such work by fully cooperating with the Contractors responsible for installing such appurtenances. The Contractor responsible for installing such appurtenances shall arrange the work in strict conformity with the construction schedule and avoid interference with the work of other contractors.

G-11.02 OPENINGS TO BE PROVIDED
In the event timely delivery of sleeves and other materials cannot be made and to avoid delay, the affected Contractor may arrange to have boxes or other forms set at the locations where the appurtenances are to pass through or into the floors, roofs, walls, or other work. Upon the subsequent installation of these appurtenances, the Contractor erecting the structure shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors required to furnish the sleeves and inserts. Formed openings and later installation of sleeves will not be permitted at locations subject to hydrostatic pressure.

SECTION 12
CUTTING AND PATCHING

G-12.01 GENERAL
The Contractor shall do all cutting, fitting, or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Plans and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.

SECTION 13
CLEANING

G-13.01 DURING CONSTRUCTION
During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris, and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefor develops.

G-13.02 FINAL CLEANING
At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished, and new appearing condition.

SECTION 14
MISCELLANEOUS

G-14.01 PROTECTION AGAINST SILTATION AND BANK EROSION
The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed watercourses and drainage ditches.

G-14.02 EXISTING FACILITIES
The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Work shall be scheduled to minimize bypassing during construction. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

G-14.03 USE OF CHEMICALS
All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

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SUPPLEMENTARY GENERAL PROVISIONS

1.0 GENERAL:

1.1 This Section sets forth modifications to the "General Provisions" of the Contract Documents which are referred to as Specifications, General Provisions.

1.2 Paragraph numbers and titles used herein refer to similarly numbered and titled articles in the General Provisions.

1.3 Only those paragraphs contained herein shall be assumed to be modified. Paragraphs not appearing herein shall apply as written in the General Provisions.

1.4 Any portion of the General Provisions, whether or not modified herein, may be further modified in Special Conditions and in the Instructions to Bidders of these Specifications.

1.5 Where the Supplementary General Provisions, Special Conditions and Instructions to Bidders conflict with the General Provisions, the Supplementary General Provisions, Special Conditions and the Instructions to Bidders shall take precedence.

2.0 MODIFICATIONS TO THE GENERAL PROVISIONS AS FOLLOWS:

2.1 SECTION 1 SCOPE AND INTENT

G-1.02 WORK INCLUDED

The first paragraph shall be deleted in its entirety and replaced by the following paragraph:

"The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work. He shall obtain all required permits. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until incidental thereto. He shall repair or restore all during performance of the work."

2.2 SECTION 3 WORKING DRAWINGS

a. Change to read as follows:

SECTION 3 SHOP DRAWINGS

b. Replace the existing paragraphs in their entirety with the following paragraphs:

G-3.01 SCOPE

Shop drawings, schedules, etc., shall be submitted to the Engineer and/or Architect in quadruplet, accompanied by a letter of transmittal. Subcontractors and suppliers shall submit shop drawings and make requests for approvals through their respective prime Contractors.

The drawings shall be numbered consecutively and shall accurately and distinctly present the following:

(1) Names of equipment or materials, and the locations at which the equipment or materials are to be installed in the work.

(2) All working and erection dimensions.

(3) Arrangement and sectional views.

(4) Necessary details, including complete information for making connections between work under this contract and work under other contracts.

(5) Kinds of materials and finishes.

(6) Parts list and description thereof.

The Engineer and/or Architect may decline to consider any shop drawing that does not contain complete data on the work and full information of related matters.

Fax submittals will not be reviewed.

G-3.02 APPROVAL:

Shop drawings shall be examined by the Contractor prior to his transmitting them to the Engineer and/or Architect. Shop drawings submitted to the Engineer and/or Architect shall bear the Contractor's stamp of approval evidencing that he has examined and checked each drawing and that he has found said drawings to be in accordance with the Contract requirements. Any drawings submitted without this stamp will not be considered by the Engineer and/or Architect and will be returned to the Contractor for re- submission.

If the shop drawings show departures from the Contract requirements, the Contractor shall make specific mention thereof in his letter of submittal and the following shall be submitted:

(1) Each request shall include a complete description of the proposed substitute and the name of the material or equipment for which it is to be substituted.

(2) Furnish drawings, cut, manufacturer's printed specifications, performance and test data and any other data or information necessary for a complete evaluation of both the item specified and the proposed substitute item.

Approval of the drawings shall constitute approval of the subject matter thereof only and not of any structure, material, equipment or apparatus shown or indicated.

Approval of the drawings shall be general and shall not relieve the Contractor of responsibility for the accuracy of such drawings, nor for the quantities of materials and equipment, nor for the proper fitting and construction of the work, nor for the furnishing of materials, tools, equipment, etc., required by this contract and not indicated on the drawings.

No work called for by Shop Drawings shall be done until the said drawings have been approved by the Engineer and/or Architect.

The Contractor shall revise and resubmit the shop drawings as required by the Engineer and/or Architect until approval thereof is obtained.

The City shall retain four (4) copies of all submittals unless the Engineers and/or Architect makes a specific request for additional copies.

Items	Submittals	*Approval
All trade	Fourteen (14) Days	Fourteen (14) Days

*From date of receipt of submittal.

Delays on account of tardy or untimely submittals will not be considered as causes of extension of time of the Contract or increases to the Contract Sum.

G-3.03 JOB SITE:

One (1) copy of all approved submittals SHALL BE available at the Contractor's Office at the job site.

2.3 SECTION 4 MATERIALS AND EQUIPMENT

G-4.01 GENERAL REQUIREMENTS

In the first paragraph, second line, delete the word "specifications" and substitute the words "Contract Documents".

G4.03 REFERENCE TO STANDARDS

The following paragraph shall be added in its entirety:

"Compliance with the Standard Building Code, latest edition, and all local electrical and plumbing codes shall be required. In the event of a conflict in code requirements, the most stringent code or standard shall apply."

G-4.05 EQUIVALENT QUALITY

Add the following sentence to paragraph two: "Any professional fees associated with shop drawing review of materials or equipment submitted for approval as equivalent to that specified shall be borne by the Contractor.

2.4 SECTION 5 INSPECTION AND TESTING

G-5.01 GENERAL

a. The City shall provide soil density and concrete strength testing only.

G-5.02 COSTS

a. The City shall provide soil density and concrete strength testing only.

G-5.07 FINAL FIELD TEST

a. Add the following sentence to BOTH of the above paragraphs:

The Contractor shall provide, at NO EXTRA COST to the City, ALL labor, tools, equipment, materials, etc., for the Engineer and/or Architect to make any field test that may be required in the judgment of the Engineer and/or Architect.

2.5 SECTION 6 TEMPORARY STRUCTURES

G-6.03 CONTRACTOR'S FIELD OFFICE

a. In the last sentence of this paragraph, add the following words: "...and Shop Drawings".

2.6 SECTION 7 TEMPORARY SERVICES

G-7.07 TELEPHONE

The Contractor shall furnish the Engineer with a telephone number(s) by which the Engineer may contact the site.

2.7 SECTION 14 MISCELLANEOUS

G-14.04 USE OF EXPLOSIVES:

Explosives will not be used on the work except when authorized by the Engineer and/or Architect. The use of same, if authorized, shall conform to laws or ordinances which may pertain to the use of same and the utmost care will be exercised by the Contractor so as not to endanger life or property. The Contractor will assume full responsibility in connection with use of any explosives even though authorized. Explosives will not be stored within the City limits.

G-14.05 OWNERSHIP OF MATERIALS:

The removal of any underground and surface structures as required shall be performed in a careful manner to permit salvaging of as much material, such as pipe and brick, also broken section of sidewalk, as practical for use in repair and maintenance of City-owned facilities.

Such acceptable salvaged material remains the property of the City and shall be placed in stock piles so as not to interfere with new construction work but accessible for loading and hauling by the City or by the Contractor within the free haul limit of six (6) miles. The Engineer and/or Architect shall direct the Contractor as to the location of stockpile.

The paving material, such as vitrified brick, asphalt block and other paving materials removed from the excavated areas and suitable for reuse but not reused in the work, shall also be considered the property of the City. The handling of such materials shall be as set forth elsewhere in the Specifications or Special Provisions.

G-14.06 NOTICE OR SERVICE THEREOF:

All notices, which shall include demands, instructions, requests, approvals and claims, shall be in writing.

Any notice to or demand upon the Contractor shall be sufficiently given if delivered to the office of the Contractor specified in the bid (or to such other office as the Contractor may, from time to time, designate to the City in writing), or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered, with charges case addressed to such office.

All notices required to be delivered to the City shall, unless otherwise specified in writing to the Contractor, be delivered to Contract Administration Department – Construction Management Division, 3808 East 26th Avenue, Tampa, Florida 33605, and any notice to or demand upon the City shall be sufficiently given if delivered to the office of the said Engineer and/or Architect, or if deposited in the United States mail in a sealed, postage- prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to said Engineer and/or Architect or to such other representative of the City or to such other address as the City may subsequently specify in writing to the Contractor or to its representative at the construction site for such purposes.

Any such notice or demand shall be deemed to have been given or made as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post or (in the case of telegram) at the time of actual receipt, as the case may be.

G-14.07 REQUIREMENTS FOR CONTROL OF THE WORK:

Prior to the start of the work included in this contract, a Preconstruction Conference will be held by the Engineer and/or Architect to be attended by the Contractor and representatives of the various utilities and others for the purpose of establishing a schedule of operations which will coordinate the work to be done under this contract with all related work to be done by others within the limits of the project. The Contractor shall be prepared for this meeting and shall present a comprehensive construction schedule for all items of work to be accomplished by him, which will be used as the basis for the development of an overall operational schedule and a list of subcontractors to be used on this work.

All items of work on this contract shall be coordinated so that progress on each related work item will be continuous from week to week. The progress of the work will be reviewed by the Engineer and/or Architect at the end of each week, and if the progress on any item of work during that week is found to be unsatisfactory, the Contractor shall be required to adjust the rate of progress on that item or other items as directed by the Engineer and/or Architect.

The Contractor shall conduct his operations in such a manner as will result in a minimum of inconvenience to occupants of adjacent homes and business establishments and shall provide temporary access as directed or as conditions in any particular location may require.

G-14.08 WORK DIRECTIVE CHANGE:

"A Work Directive Change is a written directive to the Contractor, issued on or after the date of the execution of the Agreement, and signed by the Engineer on behalf of the City, ordering an addition, deletion or revision in the work, or responding to an emergency. A Work Directive Change will not change the contract price or the time for completion, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the contract price or the time for completion. "Without invalidating the Agreement, additions, deletions or revisions in the Work may, at any time or from time to time, be authorized by a Change Order or a Work Directive Change. Upon receipt of any such document, the Contractor shall promptly proceed with the work involved."

G-14.09 RESERVED PARKING SIGNS IN PARKING METER AREAS

Not Applicable.

G-14.10 EROSION AND SEDIMENT CONTROL:

During construction, the Contractor shall provide adequate erosion and sediment controls to prevent adverse effects to the environment and public and private property. He shall construct and maintain control structures necessary to prevent erosion and sediment. He shall conduct and schedule construction operations to avoid, prevent, and minimize erosion and sediment. He shall comply with City, County, State, and Federal codes, laws, and regulations and the plans and specifications for this project pertaining to erosion and sediment prevention and control.

At the Preconstruction Conference, the Contractor shall present a plan for erosion and sediment prevention and control. This plan shall include the operations methods, also temporary and permanent control measures and structures to be used on this project.

G-14.11 ENGINEER'S FIELD OFFICE:

The Contractor shall provide and maintain an adequate field office, which may be combined with but completely separated from the Contractor's field office, for the exclusive use of the Construction Engineer and/or

Architect and engineering technicians within the project limits. No additional payment shall be made for this item. Location of said field office shall be as directed by the Engineer and/or Architect.

Contractor shall provide one (1) desk with chair, one (1) four-drawer metal file cabinet with lock, plan rack to hold a minimum of eight (8) separate sets of plans and one (1) plan table, top shall be minimum of 3'-0" wide x 6'-8" long; also adequate heating, air conditioning, lighting and one (1) window, 36"x36" minimum size, in each of two (2) walls.

G-14.12 PROJECT SIGNS:

The Contractor shall furnish and install, as directed by the Engineer and/or Architect, a project sign of design, size, color, etc., as per drawing page SIGN-1 and SIGN-2.

END OF SECTION SGP

SPECIAL CONDITIONS

1.0 PRECONSTRUCTION BRIEFING:

The Contractor, upon receiving notice that he has been awarded the contract for the construction of the project, shall make an appointment with the Engineer and/or Architect for said briefing. The Contractor shall bring to this meeting the following:

1. Contract Documents not yet submitted.
2. A detailed Job Progress Schedule.
3. Samples, questions, etc., he feels necessary.
4. List of subcontractors.

Failure to bring the above items to the meeting will result in cancellation of meeting. Once items have been submitted, meeting will be rescheduled by the City. Site access and commencement of work will not be allowed during period between meetings.

Contractor shall have representatives present at meeting that are familiar with, and conversant on, the scope of the work and Contract Document requirements. Failure to have such persons present will also result in cancellation and rescheduling of meeting until such a time when condition is corrected.

Elapsed time as a result of the Contractor's failure to comply with above will not result in an extension of contract time.

2.0 SITE REVIEW:

Before submitting Proposals, Bidders shall carefully examine the entire site of the proposed work and adjacent premises and the various means of approach and access to the site, and make all necessary investigations to inform themselves thoroughly as to the facilities for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and inform themselves thoroughly as to all difficulties involved in the completion of all the work in accordance with the Contract Documents.

The Contractor shall immediately, upon entering project site for the purpose of beginning work, review project site with the Engineer and/or Architect for the purpose of selecting area(s) to place materials for storage.

The Contractor must exercise proper precaution to verify all figures shown or indicated on the drawings, all existing trees, paved areas; utilities, etc., shall be located before beginning any work, and he shall be held responsible for any error resulting from his failure to exercise such precaution.

2.1 LAYING OUT WORK:

The Contractor shall locate all general reference points and take necessary action to prevent their destruction; lay out his own work and be responsible for all lines, elevations, measurements, grading, trenching, backfilling, utilities and other work to be executed by him for a complete project under this contract.

The Contractor shall lay out all work and have final approval by the Engineer and/or Architect before installation begins. Contractor shall be held responsible for any error resulting from his failure to exercise such approval. Said errors shall be corrected by the Contractor at NO EXTRA COST to the City.

The Contractor shall coordinate with the Parks Department and shall identify each and every tree to remain prior to the start of work. The specific trees to remain shall be approved by the Parks Department.

The final location of all work to be performed shall be made jointly by the Engineer and/or Architect and the Contractor at the project site.

3.0 SAFETY AND HEALTH STANDARDS:

The performance of all construction under this contract shall conform to ALL Local, State, Federal Occupation Safety and Health Act Standards.

At the end of each work day, all work areas shall be left in a safe condition. Barricades and/or warning devices shall be provided for at any open excavations or barriers on the project site.

The Contractor's attention is directed to paragraphs Article 3.07 (page A-10) and Article 12.03 (page A-31) of the Agreement, and paragraph G-7.04 (page G-18) of the General Provisions.

4.0 INFORMATION FOR COLOR SCHEDULES:

Not later than thirty (30) calendar days after authorization to proceed with contract work, the Contractor shall submit to the Engineer and/or Architect the names of all manufacturers and trade names for all materials involving selection based upon color or texture or other design appearance features which are to be used in this project. Where samples are necessary for such selection, furnish same.

If such information is not furnished by Contractor within thirty (30) day period, the Engineer and/or Architect will select colors and textures from products named in the Contract Documents.

5.0 RESPONSIBILITY OF CONTRACTOR:

The Contractor shall take all necessary precautions to protect all project surfaces and adjoining areas from mechanical damage from tools, equipment, materials, supports, etc., and shall provide adequate protection from leaking lubricants or fluids from his equipment.

Damage to said project surfaces and adjoining areas caused by a lack of protection or negligence by the Contractor shall be repaired and/or replaced at NO EXTRA COST to the City and to the full satisfaction of the Engineer and/or Architect.

The Contractor and all subcontractors are charged with the protection of the work and property, but the final responsibility for these provisions rests with the Contractor who shall take complete charge of the project site from start to finish of work.

The Contractor shall take particular precautions to protect existing trees and plant material. All trees and other plant material to remain shall be marked by the City prior to start of work.

Excavation, earthwork or sitework within the drip line of existing trees shall be done either manually or by methods approved by the City of Tampa Parks Department.

If the Contractor damages any tree or plant material in any way he shall be required to replace the damaged tree or plant material as follows:

1. Trees

    a. Replace a 6" caliper or less with a 6" caliper of the same species.

    b. Replace a 7"-10" caliper with two (2) 6" caliper of the same species.

    c. Replace a 10"-15" caliper with three 6" caliper of the same species.

    d. Replace a 16"-20" caliper with five (5) 6" caliper of the same species.

e. Replace a 21"-36" caliper with ten (10) 6" caliper of the same species.

2. Plant Material

Replace any damaged plant material with an equal size and quantity of the same material.

The replaced trees and plant material shall be guaranteed by the Contractor for a period of six (6) months.

6.0 COORDINATION WITH N.I.C. ITEMS:

The Contractor shall give to the Engineer and/or Architect, in writing, a time schedule for the installation or removal of all N.I.C. items at the beginning of the project. Failure of the Contractor to supply the Engineer and/or Architect with said schedule shall not be used for reason of time extension by the Contractor.

7.0 ELECTRICAL SERVICE LOCATION:

The Contractor shall verify and coordinate the service location with the local power company and the Engineer and/or Architect.

The Contractor shall coordinate with the local power company and shall include in his bid all costs for electrical service to work area(s) under this Contract, including but not limited to new service, connections from existing and/or new service and all required labor, equipment, materials etc. and all other associated electrical work.

8.0 SCHEDULING:

The Contractor shall provide the City with a detailed schedule prior to start of work.

The schedule shall be a fully developed, horizontal bar-chart type Contractor's construction schedule. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".

Unless otherwise directed or approved, prepare schedule on a single 8-1/2" X 14" sheet of plain bond white paper.

Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.

Contractor shall also prepare schedule in accordance with applicable portions of Section 4.02 of the Agreement.

9.0 ASSIGNMENT OF CONTRACT: Not applicable.

10.0 WORKMANSHIP AND MATERIALS:

Workmanship and materials shall be installed in accordance with accepted standards of the specific trade, as defined by the applicable recognized trade association(s). In the event of a conflict between these trade standards and the Contract Documents, the conflict shall be brought to the Engineer's and/or Architect's attention writing and the final decision shall be made by the Engineer and/or Architect.

11.0 RECORD DRAWINGS:

During the course of the work, Contractor shall maintain, at the site, a clean undamaged set of the Contract Documents. Contractor shall mark set, on a daily basis, with location and progress of all contract work, including but not limited to:

1. Sewer, water, stormwater and irrigation fabrication drawings showing to scale all manholes, all distances and angles between manholes, line dimension, grid co-ordinates, trunk lines, inverts and cleanouts,

2. Fencing, roadway, parking and sleeving,

3. Electrical service, and

4. General building location, and/or foundations, structures, etc.

Drawings shall be on site at all times and available for review by the City. Failure of Contractor to have drawings on site and/or up to date may result in suspension of work until situation is corrected. Extension of contract will not be granted for such condition.

At conclusion of work, the Contractor shall provide the City with one complete set of Electronic Record Drawings incorporating changes described above, and four marked hard copy sets of as-built record drawings clean and damaged free shall also be submitted to the City at the same time. Electronic files will be issued to the Contractor by the City of Tampa. These files will be AutoCAD DWG, AutoCAD DWF or Adobe PDF latest versions.

All Record Drawing surveys shall be completed and certified by a Florida Registered Professional Surveyor and Mapper hired and/or employed by the Contractor, and shall consist of survey data collected on all constructed improvements, so they may be compared to and contrasted with the design plans and/or construction drawings. The annotated disk shall delineate all changes and deviations to the planned improvements within the project limits. All changes and deviations shall be clearly shown on the drawing files.

12.0 ON SITE RECYCLABLE CRITERIA:

Contractor shall make reasonable attempts to recycle and/or salvage at least 50% of non-hazardous construction and demolition debris. Contractor shall develop and implement a Construction Waste Management Plan that identifies the materials that are to be diverted from disposal by weight or volume and be directed to a recycling facility. Specific area(s) on the construction site shall be designated for collection and tracking of the designated materials as needed. Location of the recycling area on site shall be coordinated with the project owner's representative on site prior to construction start. The intent of this section is to encourage recycling where practical in the context of the scope of work.

Contractor shall submit the following but not limited to items related to this section:

1. Provide a submittal of the contractor's plan of action to recycle

2. Contractor is required to document all activities with above requirements and provide to the city upon request items that are recyclable, documentation of the quantity of material disposed at a recycling facility.

END OF SECTION SC

SPECIFIC PROVISIONS

INDEX OF SUBJECTS

SP- 1.01 DPW TECHNICAL SPECIFICATIONS:

The work on this project shall comply with the FDOT Standard Specifications for Road and Bridge Construction (2010), and the FDOT Roadway and Traffic Design Standards (2010), except as noted herein.

SP-2.01 LINES AND GRADES:

The General Provisions Section G-8.01 and G-8.02 are revised to read as follows:

G-8.01 GENERAL

All work done under this contract shall be constructed in accordance with the lines and grades as shown on the plans or as directed by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

The Engineer will establish Bench Marks and baseline controlling points only. All elevations indicated or specified refer to the North American Vertical Datum of 1988.

G-8.02 SURVEYS

The Contractor shall furnish and maintain stakes and other such material as may be required for setting reference marks, and shall establish all working or construction lines and grades as required from the reference marks set by the Engineer's Surveyor, and shall be solely responsible for the accuracy thereof. The Contractor shall, however, be subject to check and review by the Engineer's Surveyor.

Pay items requiring survey information, such as embankment or excavation, shall be documented by a Florida Registered Professional Surveyor and Mapper hired and/or employed by the Contractor. In addition, plotted cross sections and quantity computations must be supplied and certified. All surveys shall be in accordance with the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 61G17-6, Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

The cost for providing the surveys shall be included in the lump sum bid.

SP-2.02 REQUIREMENTS FOR CONTROL OF THE WORK:

Prior to the start of the work included in this contract, a pre-construction conference will be held by the Engineer to be attended by the Contractor and representatives of the various utilities and others for the purpose of establishing a schedule of operations which will coordinate the work to be done under this contract with all related work to be done by others within the limits of the project. The Contractor shall be prepared for this meeting and shall present a comprehensive construction schedule for all items of work to be accomplished, which will be used as the basis for the development of an overall operational schedule and a list of subcontractors and material suppliers to be used on this work.

All items of work in this contract shall be coordinated so that progress on each related work item will be continuous from week to week. The progress of the work will be reviewed by the Engineer at the end of each week, and if the progress on any item of work during that week is found to be unsatisfactory, the Contractor shall be required to adjust the rate of progress on that item or other items as directed by the Engineer.

The Contractor shall conduct operations in such a manner as will result in the minimum of inconvenience to occupants of adjacent homes and business establishments and shall provide temporary access as directed or as conditions in any particular location may require.

Access to adjacent residential, public and commercial properties shall be provided at all times during the contract period.

The Contractor shall restore to its previous condition as directed by the Engineer any private property, City property, or utilities damaged by its construction. No payment shall be made to the Contractor for any required restoration of private property, City property or utilities, unless otherwise noted.

SP-2.03 MONTHLY CONSTRUCTION ESTIMATES AND RELEASE OF LIEN:

The Contractor shall prepare on or about the first day of each month an estimate of the work completed in the preceding month. Said estimate shall be prepared on standard forms provided by the Engineer, and three (3) signed originals shall be provided by the Contractor. Any disputed quantities shall be adjusted as directed by the Engineer prior to each partial payment, as provided for in Article 10.05 of the Agreement.

Certification that all subcontractors have been paid for the previous month's work shall be submitted with each partial payment request on forms provided by the Engineer.

An update of the overall project schedule shall be submitted with each partial payment request.

SP-2.04 CONTRACTOR'S REPRESENTATIVE:

Add the following paragraph to Article 8.02 of the Agreement:

> "The Contractor shall submit in writing to the Engineer the name of its duly authorized representative who will be present on the job during all work activities and is authorized to make decisions for the Contractor. Any change in the contractor's representative shall require written notification to the Engineer prior to such change".

SP-2.05 DAMAGE TO ADJACENT STREETS:

Any streets (including detour routes) consisting of travel lanes, curbs, gutters and shoulders, outside the project area (not designated for construction), which are determined by the Engineer to have been damaged due to negligent construction related operations and/or equipment, shall be restored by the Contractor to its original or better condition without any cost to the City and to the satisfaction of the Engineer.

SP-2.06 PROJECT VIDEOTAPES:

The Contractor shall submit to the Engineer for approval prior to commencing work a DVD containing a continuous color video recording including complete coverage of pre-construction conditions of all surface features within the construction's zone of influence, (including detour routes) simultaneously produced audio commentary and electronic display of time and date. The video recording shall be sufficient to fulfill the technical and forensic requirements of the project and provide continuous unedited coverage, establishing locations and viewer orientation with clear, bright, steady and sharp video images with accurate colors free of distortion or other imperfections. The video must be accompanied by a detailed Log of the recorded contents including date, locations, track numbers and features. No work shall be allowed to commence until the completed video and Log are approved by the Engineer.

The cost of providing this work should be included under lump sum bid.

SP-2.07 PROJECT CLEAN-UP:

Clean-up on this project is extremely important and the Contractor will be responsible for keeping the construction site neat and clean with debris being removed regularly as the work progresses.

If project cleanliness and/or dust control reaches an unacceptable level in the opinion of the Engineer, the Engineer will notify the Contractor in writing. If the Contractor does not act to correct the situation within 4 hours in the case of dust control or within 24 hours in the case of general cleanliness, the Engineer may call upon outside forces to provide the appropriate services. Cost of all such activities shall be charged to the Contractor via contract change order.

SP-2.08 CITY PERMITS:

The Contractor shall be responsible for obtaining all applicable City permits for this project. These can include but may not be limited to: Rights-of-Way permit(s), Site Clearing/Tree Removal permit(s), and Drainage /Earthwork permit(s). The Contractor shall supply any required plans or other information to the issuing department.

The time required to prepare, submit, review, and issue the permits shall be included in the contract time and no payment shall be made for any delay incurred by this process.

Cost for obtaining City permits shall be included in the lump sum bid, and no separate payment shall be made. The fee for a Rights-of-Way Construction Permit and other City permits shall be waived by the City.

All subcontractors working on the project shall obtain their own, separate permits as above.

The Contractor shall have in his possession the proper license to perform the work before submittal of his bid and shall obtain and pay for all other licenses and authorizations required for the prosecution of the work, including the cost of all work performed in compliance with the terms and conditions of such permits, licenses and authorizations, whether by himself or others.

The Contractor shall require all subcontractors to be currently licensed by the City to perform the proposed work in their respective fields and to obtain permits for the execution of said work. All work shall be performed in accordance with the licenses, permits and the requirements of the current Building and Construction Regulations Chapter of the City of Tampa Code.

The Contractor is responsible to schedule and coordinate with the City all required inspections and tests for all phases of work to obtain final approval thereof.

SP-2.09 FDEP PERMITS

Copies of the Florida Department of Environmental Protection Permits for the Construction of a Water Main and the Construction of a Wastewater Collection System have been included with these specifications. The work shall comply with the conditions noted on the permits.

SP-2.10 OPERATION AND MAINTENANCE MANUAL

The Contractor shall prepare and submit to the Engineer nine copies of an Operation and Maintenance Manual for all equipment and associated control systems furnished and installed under this Contract. When the work reaches 75 to 80 percent completion, the Contractor shall submit to the Engineer for approval two copies of the manual with all specified material that is available at that time. The submittal shall accompany the Contractor's partial payment request for the specified completion. Within 30 days after approval of the Engineer of the two-copy submittal, the Contractor shall fumish to the Engineer the remaining seven copies of the manual. Appropriate space shall be left in the manual for material not available at the time of submittal. All missing material for the manual shall be submitted with the request for final payment.

Also along with the missing material submitted with the request for final payment, one electronic copy (in pdf format) complete with all the missing material to be included in the earlier submitted hard copies shall be submitted.

The manual shall be prepared and arranged as follows:

1. Space shall be provided in the manual for a reduced set of record Contract Drawings, size approximately 11 by 17 inches and folded to 8-1/2 by 11 inches. Drawings will be furnished by the Engineer.

2. One copy of all approved shop drawings and diagrams for all equipment furnished. The shop drawings and diagrams shall be reduced to either 8-1/2 by 11 inches or to 11 inches in the vertical dimension and as near as practicable to 17 inches in the horizontal dimension. Such sheets shall be folded to 8-1/2 by 11 inches.

3. One copy of manufacturer's operating, lubrication and maintenance instructions for all equipment and controls furnished. All equipment operating, lubrication and maintenance instruction and procedures shall be furnished on 8-1/2 by 11 inch commercially printed or typed forms. Such forms shall include equipment name, serial number and other identifying references.

4. One copy of manufacturer's spare parts list for all equipment furnished and prepared as specified in No. 3 above.

5. One valve schedule, giving the valve number, location, fluid and fluid destination for each valve installed and prepared as specified in No. 3 above. All valves in the same piping system shall be grouped together in the schedule. A sample of the valve numbering system to be used will be furnished by the Engineer. Valve numbers may include three or four numerals and a letter.

6. List of electrical relay settings and control and alarm contact settings.

Each copy of the manual shall be assembled in one or more binders, each with title page, typed table of contents, and heavy section dividers with copper reinforced holes and numbered plastic index tabs. Each manual shall be divided into sections headed by the equipment specification section included in "Workmanship and Materials." Binders shall be 3- ring, hard-back Type No. S-43772 as manufactured by Marshall-Jackson Co., Chicago, IL, or equal. All data shall be punched for binding and composition and printing shall be arranged so that punching does not obliterate any data. The cover and binding edge of each manual shall have the project title, Division designation and manual title printed thereon, all as furnished and approved by the Engineer.

Where more than one binder is required, they shall be labeled Vol. 1, Vol. 2, and so on. The table of contents for the entire set, identified by volume number, shall appear in each binder.

The nine copies of the manuals and data included therein shall be provided in conformance with the subsection headed "Working Drawings" and, in addition, to the requirements of the General Provisions. The costs of the Operation and Maintenance Manual shall be included in the various Contract Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made.

SP-2.11 AS-BUILT PLANS

During manufacture and construction, installation and testing, records shall be kept of any changes or adjustments made in the work. All such changes shall be incorporated in the "As-Built" plans, shown in red.

The Contractor shall provide the City of Tampa with two (2) sets of "As-Built" plans. Plan sheets shall have all deviations from original design annotated in red pencil to clearly show as-built conditions. Relocation of existing facilities and utilities must be clearly noted.

All as-built plans shall be submitted within seven (7) calendar days of the final inspection. The final payment will not be issued until the as-built plans have been submitted to, and accepted by the City.

SP-3.01 STREET CLOSURE AND MAINTENANCE OF TRAFFIC:

A temporary street closure permit will be required for closure of a street, lane, or sidewalk within Rights-of-Way under the jurisdiction of the City of Tampa.

These permits will establish the requirements for the closure related to number of lanes and/or time of day lanes or street may be closed. The Contractor shall adhere to the requirements as described in the permit(s). The cost for obtaining temporary street closure permits shall be included in the pay item for Maintenance of Traffic and no separate payment will be made.

Notification to neighbors will be required prior to partial or full lane street closures. The Contractor is to coordinate with affected neighbors a minimum of ten working days prior to closure of road.

The cost for the various items associated with maintenance of traffic shall reflect the cost for placing and maintaining the item for the duration of construction and shall be included in the lump sum bid.

SP-3.02 TRAFFIC INFORMATION SIGNS:

The Contractor's attention is directed to Section 10 of the General Provisions, PROTECTION OF WORK AND PUBLIC, and to the consideration therein for providing Advanced Notice information signs advising the public of scheduled closures, thereby creating better understanding and relations during the construction.

Variable Message signs shall be set in-place at least two weeks prior to the closing.

SP-3.03 PROJECT SIGN:

The Contractor shall furnish two (2) project signs in conformance with the general configuration and dimensions as shown on the attachments SIGN-1 and SIGN-2, which is made a part of these specifications. The signs shall be maintained in good condition until the completion of the project, and shall be located as instructed by the Engineer. Reference Supplementary General Provisions G-14.12.

The cost of furnishing and maintaining the signs shall be included in the lump contract price and no separate payment shall be made.

SP-3.04 NIGHT WORK:

No work shall be performed at night

SP-4.01 DENSITY REQUIREMENTS:

Refer to applicable sections of FDOT Standard Specifications (2010).

SP-4.02 STABILIZATION:

Refer to applicable sections of FDOT Standard Specifications (2010).

SP-4.03 SOIL BORING INFORMATION:

A subsurface soil investigation has been performed and a report has been included with these specific provisions. Additional borings required during construction will be at no cost to the City of Tampa. Excavation and disposal of unsuitable soils as defined in the geotech report shall be included with the lump sum contract price.

SP-4.04 DEWATERING:

Dewatering operations shall be performed with consideration to possible effects to adjacent structures. The condition of adjacent structures and surrounding areas that may be affected by the lowering of the groundwater level shall be surveyed and documented prior to beginning dewatering operations. Upon

completion of dewatering activities the contractor shall inspect adjacent structure and surrounding areas to determine if any damage may have occurred. Contractor shall document the results of this inspection.

The dewatering shall be done by an experienced contractor. The Contractor shall submit a dewatering plan signed and sealed by a professional engineer registered in the state of Florida detailing the proposed methodology by which dewatering is to be accomplish and shall include a list of the structures and areas to be surveyed for potential damage. A geotechnical evaluation with dewatering recommendations has been provided for reference.

Discharges from dewatering activities shall meet State and Federal regulatory criteria. Dewatering permitting, as regulated by the Southwest Florida Water Management District and the Florida Department of Environmental Protection, shall be the responsibility of the Contractor. A copy of the FDEP Permit for Discharge of Produced Groundwater from Any Non-Contaminated Site Activity has been included with these specifications.

Dewatering effluent shall be discharged to the City of Tampa sanitary sewer system. Prior to the commencement of dewatering activities, the Contractor shall obtain the services of a qualified lab to sample the dewatering effluent to ensure compliance with the City of Tampa Wastewater Department allowable thresholds. The discharge shall be metered. The Contractor shall submit the meter details and specifications to the Engineer for approval prior to installation. The discharge shall not exceed 250 gallons per minute as directed by the City of Tampa Wastewater Department. The dewatering discharge connection to a sewer manhole or pipe shall meet the City of Tampa criteria.

Dewatering will only be allowed for one (1) calendar year from the issuance of a Service Commitment by the City of Tampa Wastewater Department. Should the dewatering activities need to extend past this date, the Contractor is to notify the Engineer 30-days in advance of the expiration of the Commitment to allow sufficient time for the Service Commitment to be extended. A copy of the Service Commitment will be provided to the Contractor prior to commencement of dewatering activities. The Contractor will be required to create a temporary customer service account with the City of Tampa to allow for meter reading and inspection of the meter. The Contractor shall provide the City with the meter serial number and the meter shall be maintained and used on-site throughout the duration of the project dewatering activities. The City may, at its discretion, sample the discharge into the sewer system.

The Contractor shall be reimbursed for the fee paid to the Wastewater Department for disposal of the dewatering discharge into the sanitary sewer system. Payment for this activity will be from the project allowance. Reference Section 01020 ALLOWANCES.

SP-5.01 UTILITY PROTECTION CONSIDERATIONS:

The Contractor shall protect all utilities and other facilities within and adjacent to the construction as covered in Section G- 1.03, unless a utility firm has conclusively indicated, or such is shown on the plans, that the certain adjustment, removal, reconstruction, or protection of the utility's facility will be performed by that respective utility.

The Contractor shall make every effort to protect all water mains. If the main is damaged or lost, the Contractor shall replace the affected line in strict accordance with the City of Tampa Water Department Specifications and Construction Standards, latest, edition, at no extra cost to the City, and he shall assure that service is maintained at all times.

The Contractor shall make every effort to protect all sanitary sewer lines. If the main is damaged or lost, the Contractor shall replace the affected line in strict accordance with the City of Tampa Wastewater Department Specifications and Construction Standards, latest edition, at no extra cost to the City.

It will be the Contractor's responsibility to preserve all existing sanitary sewer services without interruption during the construction of storm sewers or the repairs or reconstruction of sanitary sewers. When the construction of storm sewers, repair or reconstruction of sanitary sewers has been completed, all temporary connections shall be removed. Sewers shall be cleaned of all settled solids.

The cost of handling sanitary sewers during construction, including cost of all labor, materials, and equipment or other items incidental to completing the job, shall be included in the contract price and no separate payment shall be made.

It will be the Contractors responsibility to preserve all existing ditches, swales, force main, gravity main, laterals, etc., and other stormwater appurtenances and facilities pertaining thereto whether owned or controlled by City, other governmental bodies or privately owned by individuals, firms or corporations.

Any temporary measures constructed shall first be approved by the Engineer. The cost of such temporary measures shall be included in the contract price and no separate payment shall be made.

The Contractor shall furnish, install, and remove sheeting and shoring and other protective measures as may be necessary to satisfactorily accomplish the construction of this project. The cost of such sheeting and shoring and other protective measures shall be included in the contract price and no separate payment shall be made.

In the event that a utility line is located within the limits shown in Diagram P, the following exceptions may be made:

(a) If the utility is incorrectly shown on the plans and the actual location is found to be completely within the limits of Zone B, the Contractor will be eligible to receive compensation for steel sheeting and shoring to be furnished, installed, and removed to protect the portions of such utility line lying within Zone B as directed and approved by the Engineer.

(b) If the utility is incorrectly shown on the plans and the actual location is found to be within the limits of Zone A so that relocation will be necessary, as determined by the Engineer, the Contractor will be compensated for performing the relocation construction when directed and approved by the Engineer.

The above provisions shall only apply to water, sanitary sewer and drainage lines, which are, in general parallel to the line under construction.

The limits and the definitions of Zones A and B are not intended to define any excavation requirements and shall in no way cause any conflict with any authorized safety requirements or applicable governmental laws and regulations.

Utility lines which are correctly located on the plans and fall within the limits of Zone B or A of Diagram P shall not be considered as being either exception (a) or (b) and are not eligible for compensation.

Compensation for steel sheeting and shoring furnished, installed and removed shall be paid for as extra work in accordance with Article 7.02, EXTRA WORK, on Page A-8 of the Tampa Agreement when

approved for use by the Engineer. Such approval shall be for its use only, and the Contractor shall have full responsibility for the design, installation, and removal of the sheeting and shoring. The Contractor shall obtain the services of a registered Professional Engineer to design and certify the sheeting and shoring plans.

SP-5.02 ADJUSTMENT OF UTILITIES AND PUBLIC SERVICE INSTALLATIONS:

Storm and sanitary sewer manhole covers, valve covers or boxes, water meter boxes, and vaults located within the limits of construction of the pavement or sidewalk area to be constructed, reconstructed or overlaid shall be relocated or adjusted by the Contractor to conform with the new pavement or sidewalk elevation as a part of the work of constructing or reconstructing the pavement or sidewalk and no separate payment will be made.

Appurtenances of other utilities will be relocated or adjusted by the utility company owning or having jurisdiction over the respective utility.

SP-5.03 REMOVAL OR ADJUSTMENT OF PUBLIC UTILITIES:

The City will make necessary arrangements with public utility owners, other than City of Tampa Water and Wastewater Departments, for removal or adjustments of existing utilities, whether shown or not shown on the plans, where such removal or adjustment is determined by the Engineer to be essential to the performance of the required construction, provided normal construction procedures are used by the Contractor.

Relocations or adjustments requested by the Contractor on the basis of the use of a particular method of construction or a particular type of equipment shall not be considered as being essential to the construction of the project if other commonly used methods or equipment could be employed without the necessity of relocating or adjusting the utility. The Engineer will determine the responsibility for any such adjustment of utilities.

Relocations or adjustments requested for the Contractor's convenience or because of delivery of materials to the job site shall be the responsibility of and at the expense of the Contractor.

The Contractor shall be required to coordinate its activities with relocation work by the utilities. A schedule for relocation work will be presented to the Contractor at the pre-construction conference. This schedule may be adjusted to "fit" the Contractor's proposed schedule, but it will include periods during which the Contractor's ability to perform work in the relocation area will be limited, with no additional compensation.

SP-5.04 USE OF CITY WATER SYSTEM:

A Tampa Water Department portable meter shall be utilized when obtaining water from the City system. The Contractor will be responsible for obtaining the meter from the City and no separate payment will be made for the meter or water usage.

SP-5.05 WATER MAIN AND WATER SERVICE CONSTRUCTION:

The work specified consists of the construction of new meter service line and extension of a hydrant, to include tees, fittings, valves, valve box, thrust blocks, joint restraints, hydrant, and other related

appurtenances in conformity with the location, lines, and grades shown on the plans. All materials and workmanship shall be in accordance with the Technical Special Provisions for Water Main Relocation (WR) made a part of these specifications and any applicable sections of the City of Tampa Water Department Technical Specifications and Construction Standards and Materials Specifications, latest edition available from the Tampa Water Department, with the exception that pipe joint gaskets shall be made of EPDM Rubber.

SP-5.06 BY-PASS PUMPING:

Contractor shall determine location of by-pass pumps (if needed) and shall submit complete details of the by-pass pumping system for Engineer's and City review and approval prior to commencement of by-pass pumping operations.

The City shall provide information on the required flow rates at bid time. By-pass pumping system shall include a back-up system that has the same pumping capacity of the primary system.

SP-6.01 EXISTING SIDEWALKS, DRIVEWAYS AND PARKING AREAS:

The Contractor shall meet the grade of existing sidewalks, driveways and parking areas (concrete or asphalt) with the proposed work. At locations where existing sidewalks and driveways are not at the same elevations as the new grades, the Contractor may be required to reconstruct a portion of the sidewalk or driveway as directed by the Engineer.

Reconstruction of sidewalk shall be included as part of the lump sum contract price. There will be no payment if existing sidewalks, roads or driveways must be reconstructed due to negligence of the Contractor.

SP-6.02 PRIME/TACK COAT:

Refer to applicable sections of the FDOT Standard Specifications (2010).

SP-6.03 BASE MATERIAL:

Refer to applicable sections of the FDOT Standard Specifications (2010).

SP-6.04 MILLING EXISTING PAVEMENT:

Refer to applicable sections of the FDOT Standard Specifications (2010).

SP-6.05 DRIVEWAYS:

Construct a concrete driveway per Index 515 of the FDOT Design Standards, 2010 edition.

SP-7.01 GRASSING AND/OR SODDING:

Disturbed areas shall be stabilized with sod. Refer to Section 981 of the FDOT Standard Specifications (2010).

SP-7.02 TREE REMOVAL:

If trees need to be removed within the areas of construction, the contractor shall comply with the City of Tampa Tree Ordinance, and submit a Site Clearing Permit. A copy of the Existing Conditions plans should be included with the permit with the trees marked to be removed. Tree removal shall be approved by the City of Tampa Parks and Recreation Department. Disposal of timber, stumps, roots, or other material resulting from the tree removal operations shall be the sole responsibility of the Contractor with approval of the Engineer. The cost of removing the trees shall be included in the lump sum contract price and no separate payment shall be made.

SP-7.03 ROOT PRUNING:

The Contractor shall provide all labor, materials, equipment and services necessary to prune tree roots that are in conflict with the proposed construction. The Contractor shall provide root pruning services only as directed by the Engineer.

All root pruning shall be performed by a qualified, licensed tree professional as approved by the Engineer. Root pruning shall be performed with a chain saw, stump grinder, trencher, Dasco root pruner or equal, as approved by the Engineer.

Root pruning on protected trees to facilitate installation of pipelines, manholes, inlets, and other underground appurtenances and structures will be included for payment under this contract item. The quantity of root pruning, in linear feet, to be measured for payment will be the actual length of root pruning performed within the limits of construction, as directed by the Engineer. Depth of root pruning shall be as directed by the Engineer.

All roots of protected trees to be removed shall be severed cleanly, leaving a smooth, uniform section at the remaining root end to prevent root damage. The root shall be severed only as needed to clear the conflict, and no closer to the tree than the perimeter of each barricade. No excavation shall occur within the protected area. Root pruning shall be approved by the City of Tampa Parks and Recreation Department.

The work includes all cutting, excavation, removal, hauling, disposal of roots and other associated tasks to complete the root pruning. Payment for root pruning shall be included in the lump sum contract price.

SP-7.04 TREE PROTECTION:

The Contractor shall make provisions for tree protection to the satisfaction of the Engineer prior to any excavation or clearing and grubbing. All applicable site inspections by the City of Tampa Parks Department and all permits required for tree work shall be obtained by the Contractor prior to commencing work.

Tree barricades shall be constructed and maintained at the locations indicated on the Tree Survey for "trees to remain-construct barricade" and/or as directed by the Engineer. Generally, barricades are to be placed ten (10) feet from the trunk of each protected tree, but a minimum of three (3) feet is acceptable when in conflict with the proposed construction.

Barricades shall be constructed of commercially available pine lumber, as follows: Vertical members shall be 2" x 2" or larger, generally spaced twelve (12) feet apart. Horizontal members shall consist of one (1) 1" x 2" board.

Payment for tree protection shall be included in the lump sum contract price.

SP-8.01 EXISTING PUBLIC FACILITIES:

Existing public facilities as defined in G-1.03 that are removed by the Contractor to facilitate construction operations shall be properly stored to protect from damage and returned in good condition to a location designated by the Engineer. These items shall also include, but not be limited to, all public benches, light poles, shelters, roadway signs, etc., and removal/reinstallation of all public facilities shall be considered incidental to the cost of construction and no separate payment will be made.

SP-8.02 WATER FOR DUST CONTROL:

The work specified in this section consists of the application of water within the limits of construction of the project or on streets used as detour routes in connection with the project, in accordance with these specifications. All dust control operations shall be performed by the Contractor at the time, location, and in the amount ordered by the Engineer. The application of water shall be under the control of the Engineer at all times. No water will be used to control dust without authorization of the Engineer. Water ordered by the Engineer to be applied on Saturdays, Sundays, or legal holidays will be considered part of the required work and no additional compensation will be allowed therefor.

Water used for dust control shall be free from pollution to the extent that its use will not constitute a nuisance or health hazard to anyone living in close proximity to the areas where it is used.

Cost of providing water shall be considered incidental to the project and included in the lump sum contract price and no separate payment shall be made.

SP-8.03 MASONRY ENCLOSURE:

Construct a 6 foot high concrete masonry unit enclosure and chain-link gate as shown on the construction plans and per Wastewater Specification Sections W43-Masonry and W-560 Galvanized Steel Fence.

SP-8.04 RELOCATION OF EXISTING FENCE:

The Contractor may have to remove and relocate existing fence as necessary to facilitate the work, or as directed by the Engineer. The cost of this work is considered to be incidental to the project and no separate payment shall be made.

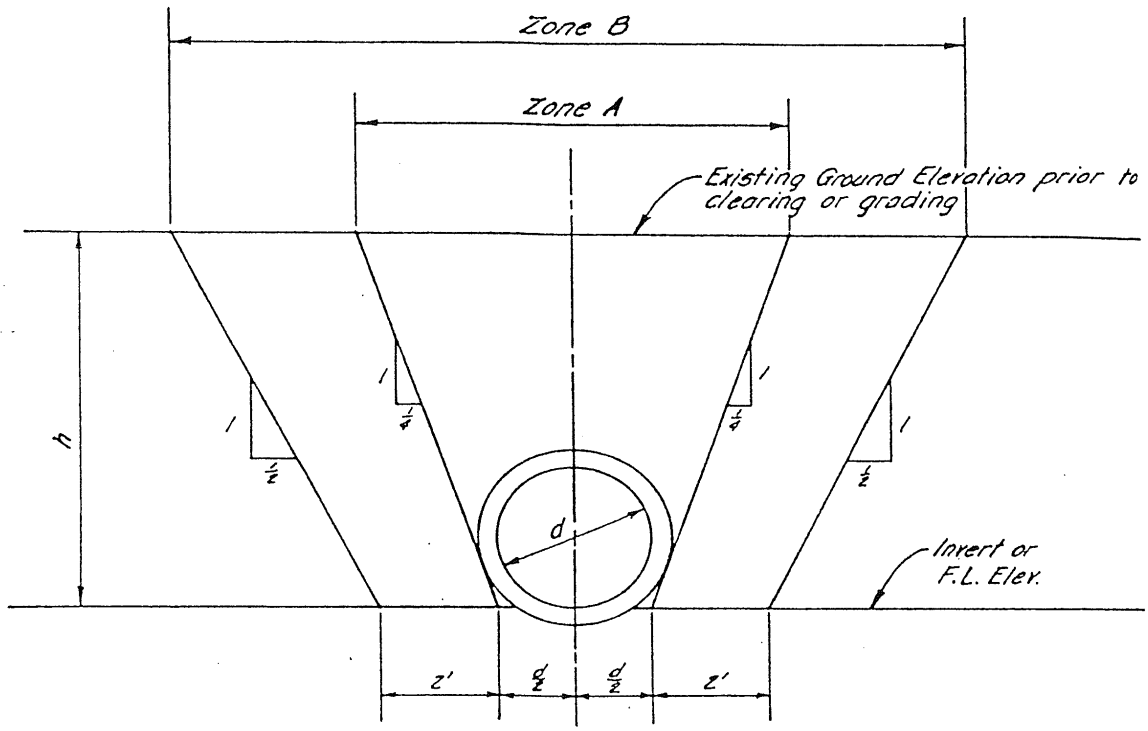
SP-8.05 RESTORATION OF EXISTING FENCE:

Existing fence, if removed without prior approval from the Engineer, or damaged by the Contractor during the construction work in this project, shall be restored to its original condition or better.

No payment shall be made to the Contractor for the fence removal and/or restoration.

SP-8.06 RESTORATION OF MONUMENTATION:

The Contractor shall re-establish any permanent survey or mapping monumentation which is disturbed or destroyed in the course of the construction project and no separate payment will be made.



$A = d + 0.5h$

$B = 4' + d + h$

d = Inside diameter of storm sewer pipe or inside width of box culvert.

h = Depth per existing gravel to invert or flow line elevation.

DIAGRAM P

END OF SECTION SPECIFIC PROVISIONS

City of Tampa – DMI Sub-(Contractors/Consultants/Suppliers) Payments

(FORM MBD-30)

[ ] Partial [ ] Final

Contract No.: _____ WO#,(if any): _____ Contract Name: _____

Contractor Name: _____ Address: _____

Federal ID: _____ Phone: _____ Fax: _____ Email: _____

GC Pay Period: _____ Payment Request/Invoice Number: _____ City Department: _____

Total Amount Requested for pay period: $_____ Total Contract Amount(including change orders):$_____

-Type of Ownership - (F=Female M=Male), BF BM = African Am., HF HM = Hispanic Am., AF AM = Asian Am., NF NM = Native Am., CF CM = Caucasian S = SLBE

Type Trade/Work Activity []Sub []Supplier Federal ID		Total Sub Contract Or PO Amount	Amount Paid To Date Amount Pending Previously Reported	Amount To Be Paid For This Period Sub Pay Period Ending Date
			$	$
			$	$
			$	$
			$	$
			$	$
			$	$

(Modifying This Form or Failure to Complete and Sign May Result in Non-Compliance)

Certification: I hereby certify that the above information is a true and accurate account of payments to sub – contractors/consultants on this contract.

Signed: _____ Name/Title: _____ Date: _____

Note: Detailed Instructions for completing this form are on the next page

Page 2 of 2 – DMI Payment

Instructions for completing The DMI Sub-(Contractors/Consultants/ Suppliers) Payment Form (Form MBD-30)

This form must be submitted with all invoicing or payment requests where there has been subcontracting rendered for the pay period. If applicable, after payment has been made to the subcontractor, "Waiver and Release of Lien upon Progress Payment", "Affidavit of Contractor in Connection with Final Payment", or an affidavit of payment must be submitted with the amount paid for the pay period. The following will detail what data is required for this form. The instructions that follow correspond to the headings on the form required to be completed. **(Modifying or omitted information from this form my result in non-compliance).**

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **W.O.#** If the report covers a work order number (W.O.#) for the contract, please indicate it in that space.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.** A number assigned to a business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **Pay Period.** Provide start and finish dates for pay period. (e.g. 05/01/13 – 05/31/13)
- **Payment Request/Invoice Number.** Provide sequence number for payment requests. (ex. Payment one, write 1 in space, payment three, write 3 in space provided.)
- **City Department**. The City of Tampa department to which the contract pertains.
- **Total Amount Requested for pay period.** Provide all dollars you are expecting to receive for the pay period.
- **Total Contract Amount (including change orders).** Provide expected total contract amount. This includes any change orders that may increase or decrease the original contract amount.
- **Signed/Name/Title/Date**. This is your certification that the information provided on the form is accurate.
- **See attached documents.** Check if you have provided any additional documentation relating to the payment data. Located at the bottom middle of the form.
- **Partial Payment.** Check if the payment period is a partial payment, not a final payment. Located at the top right of the form.
- **Final Payment.** Check of this period is the final payment period. Located at the top right of the form.

The following instructions are for information of any and all subcontractors used for the pay period.

- **(Type) of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business or SLBE.
- **Trade/Work Activity.** Indicate the trade, service, or material provided by the subcontractor.
- **SubContractor/SubConsultant/Supplier.** Please indicate status of firm on this contract.
- **Federal ID.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Total Subcontract Amount.** Provide total amount of subcontract for subcontractor including change orders.
- **Amount Paid To Date.** Indicate all dollars paid to date for the subcontractor.
- **Amount Pending, Previously Reported.** Indicate any amount previously reported that payments are pending.
- **Amount To Be Paid for this Period.** Provide dollar amount of dollars requested for the pay period.
- **Sub Pay Period Ending Date.** Provide date for which subcontractor invoiced performed work.

Forms must be signed and dated or will be considered incomplete. The company authorized representative must sign and certify the information is true and accurate. Failure to sign this document or return the document unsigned can be cause for determining a company is in non-compliance of Ordinance 2008-89.

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

SIGN EXAMPLE ONLY GRAPHIC TO BE DEVELOPED BY CONTRACTOR

3"

scale: 3"

Sign Information

Building a Better Tampa

Downtown Riverwalk

Creates a waterfront pedestrian walkway connecting the south edge of the CapTrust building with MacDill Park.

$1.5 Million investment
Scheduled for completion in October 2012

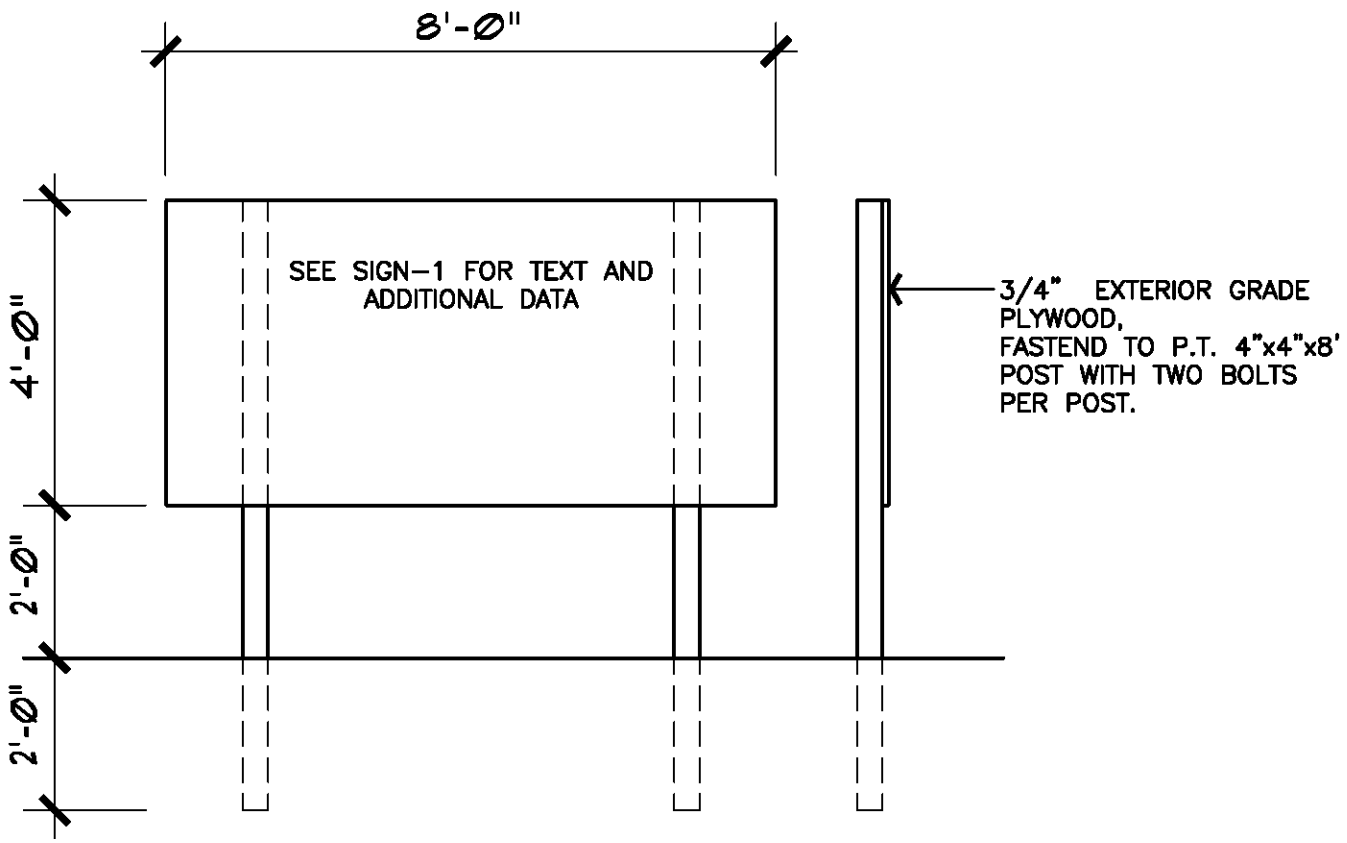
Orion Marine
Construction, Inc.

Colors

Blue: Sherwin Williams Naval SW6244
Green: Sherwin Williams Center Stage SW6920
White: Sherwin Williams Pure White SW7005

Font

Franklin Gothic



CITY OF TAMPA–PROJECT SIGN
REVISED 4/28/04

ENVIRONMENTAL PROTECTION COMMISSION
HILLSBOROUGH COUNTY

PERMITTEE:

David L. Vaughn, Director
City of Tampa Contract Admin. Dept.
306 E. Jackson St., 4N
Tampa, FL 33602

DATE: 12/4/2012

PROJECT: 12th St. Pump Station Improvements
PERMIT NUMBER: 0314946-001-DWC
COUNTY: Hillsborough
CONNECTED TO: Howard F. Curren AWWTP
EFFECTIVE DATE: December 05, 2012

Dear Mr. Vaughn:

SUBJECT: **12TH ST. PUMP STATION IMPROVEMENTS**
N. 12TH ST. AND TWIGGS ST., TAMPA
0 GALLONS PER DAY
INFRASTRUCTURE

This letter acknowledges receipt of your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System for the subject project. Our office received the Notice on November 05, 2012.

As a delegated local program of the Florida Department of Environmental Protection (Department), this is to advise you that the Environmental Protection Commission (EPC) does not object to your use of such General Permit.

In accordance with Rules 62-4.530(1) and 62-604.600(6)(a)1., FAC, construction of this project shall not begin until at least 30 days after receipt of Application Form 62-604.300(8)(a). This is the Effective Date of the General Permit. All General Permits are subject to the general conditions of Rule 62-4.540, FAC (attached), and Rules 62-604.600 and 62-604.700, FAC.

You are further advised that the construction activity must conform to the description contained in your Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System and that any deviation will subject the permittee to enforcement action and possible penalties.

Sincerely,

Kim Barlow

Kim Barlow, P.E.
Domestic Wastewater Permitting

cc: Charles D. Lynch, P.E., C.O.T., DPW
Jose De Jesus, P.E., WilsonMiller, Inc.

SPECIFIC REQUIREMENTS FOR USE OF THE GENERAL PERMIT FOR DOMESTIC WASTEWATER COLLECTION/TRANSMISSION SYSTEMS:

1. This general permit is subject to the general permit conditions of Rule 62-4.540, F.A.C., as applicable. This rule is attached to this document or can be retrieved from the Department's Internet site at: http://www.dep.state.fl.us/water/wastewater/rules.htm#domestic [62-4.050, 5-1-03].

2. This general permit does not relieve the permittee of the responsibility for obtaining a dredge and fill permit where it is required. [62-604.600(6)(b)1, 11-06-03]

3. This general permit can not be revised, except to transfer the permit. [62-604.600(6)(b)2, 11-06-03]

4. Upon completion of construction of the collection/transmission system project, and before placing the facilities into operation for any purpose other than testing for leaks or testing equipment operation, the permittee shall submit to the EPC Form 62-604.300(8)(b), Request for Approval to Place a Domestic Wastewater Collection/Transmission System into Operation. This form is available at the Department's Internet site at: http://www.dep.state.fl.us/water/wastewater/forms.htm [62-604.700(2), 11-06-03]

5. The new or modified collection/transmission facilities shall not be placed into service until the EPC clears the project for use. [62-604.700(3), 11-06-03]

6. Abnormal events shall be reported to the EPC in accordance with Rule 62-604.550, F.A.C. For unauthorized spills of wastewater in excess of 1000 gallons per incident, or where information indicates that public health or the environment may be endangered, oral reports shall be provided to (813) 627-2600 and the STATE WARNING POINT TOLL FREE NUMBER (800) 320-0519 as soon as practical, but no later than 24 hours from the time the permittee or other designee becomes aware of the circumstances. Unauthorized releases or spills less than 1000 gallons per incident are to be reported orally to the EPC within 24 hours from the time the permittee, or other designee becomes aware of the circumstances. [62-604.550, 11-06-03]

62-4.540 GENERAL CONDITIONS FOR ALL GENERAL PERMITS.

(1) The terms, conditions, requirements, limitations, and restrictions set forth in this Part are "general permit conditions" and are binding upon the permittee. The conditions are enforceable under Chapter 403, F.S.
(2) The general permit is valid only for the specific activity indicated. Any deviation from the specified activity and the conditions for undertaking that activity shall constitute a violation of the permit. The permittee is placed on notice that violation of the permit may result in suspension or revocation of the permittee's use of the general permit and may cause the Department to begin legal proceedings.
(3) The general permit does not convey any vested rights or any exclusive privileges. It does not authorize any injury to public or private property nor any invasion of personal rights. It does not authorize any infringement of federal, state or local laws or regulations. It does not eliminate the necessity for obtaining any other federal, state or local permits that may be required, or allow the permittee to violate any more stringent standards established by federal or local law.
(4) The general permit does not relieve the permittee from liability and penalties when the construction or operation of the permitted activity causes harm or injury to human health or welfare; causes harm or injury to animal, plant or aquatic life; or causes harm or injury to property. It does not allow the permittee to cause pollution in contravention of Florida Statutes and Department rules.
(5) The general permit conveys no title to land or water, nor does it constitute State recognition or acknowledgment of title. It does not constitute authority for reclamation of submerged lands. Only the Board of Trustees of the Internal Improvement Trust Fund may express State opinion as to title.
(6) No general permit shall authorize the use of state owned land without the prior consent of the Board of Trustees of the Internal Improvement Trust Fund pursuant to Section 253.77, F.S.
(7) The general permit may be modified, suspended or revoked in accordance with Chapter 120, F.S., if the Secretary determines that there has been a violation of any of the terms or conditions of the permit, there has been a violation of state water quality standards or state air quality standards, or the permittee has submitted false, incomplete or inaccurate data or information.
(8) The general permit shall not be transferred to a third party except pursuant to Rule 62-4.120, F.A.C.
(9) The general permit authorizes construction and, where applicable, operation of the permitted facility.
(10) The permittee agrees in using the general permit to make every reasonable effort to conduct the specific activity or construction authorized by the general permit in a manner that will minimize any adverse effects on the adjacent property or on public use of the adjacent property, where applicable, and on the environment, including fish, wildlife, natural resources of the area, water quality or air quality.
(11) The permittee agrees in using the general permit to allow a duly authorized representative of the Department access to the permitted facility or activity at reasonable times to inspect and test upon presentation of credentials or other documents as may be
required by law to determine compliance with the permit and the department rules.
(12) The permittee agrees to maintain any permitted facility, or activity in good condition and in accordance with the plans submitted to the department under subsection 62-4.530(1), F.A.C.
(13) A permittee's use of a general permit is limited to five years. However, the permittee may request continued use of the general permit by notifying the department pursuant to subsection 62-4.530(1), F.A.C. However, the permittee shall give notice of continued use of a general permit thirty days before it expires.

Specific Authority 403.814(1) FS. Law Implemented 253.123, 253.124, 403.061, 403.087, 403.088, 403.702-.73, 403.814, 403.851-.864 FS.
History–New 7-8-82, Formerly 17-4.54, Amended 8-31-88, Formerly 17-4.540.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

GENERIC PERMIT

FOR THE

DISCHARGE OF PRODUCED GROUND WATER

FROM ANY NON-CONTAMINATED SITE ACTIVITY

Document number 62-621.300(2)
Effective Date: February 14, 2000

Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity

(1) The facility is authorized to discharge produced ground water from any non-contaminated site activity which discharges by a point source to surface waters of the State, as defined in Chapter 62-620, F.A.C., only if the reported values for the parameters listed in Table 1 do not exceed any of the listed screening values. Before discharge of produced ground water can occur from such sites, analytical tests on samples of the proposed untreated discharge water shall be performed to determine if contamination exists.

(2) Minimum reporting requirements for all produced ground water dischargers. The effluent shall be sampled before the commencement of discharge, again within thirty (30) days after commencement of discharge, and then once every six (6) months for the life of the project to maintain continued coverage under this generic permit. Samples taken in compliance with the provisions of this permit shall be taken prior to actual discharge or mixing with the receiving waters. The effluent shall be sampled for the parameters listed in Table 1.

Table 1

	Screening Values for Discharges into:	
Parameter	Fresh Waters	Coastal Waters
Total Organic Carbon (TOC)	10.0 mg/l	10.0 mg/l
pH, standard units	6.0-8.5	6.5-8.5
Total Recoverable Mercury	0.012 μg/l	0.025 μg/l
Total Recoverable Cadmium	9.3 μg/l	9.3 μg/l
Total Recoverable Copper	2.9 μg/l	2.9 μg/l
Total Recoverable Lead	0.03 mg/l	5.6 μg/l
Total Recoverable Zinc	86.0 μg/l	86.0 μg/l
Total Recoverable Chromium (Hex.)	11.0 μg/l	50.0 μg/l
Benzene	1.0 μg/l	1.0 μg/l
Naphthalene	100.0 μg/l	100.0 μg/l

(3) If any of the analytical test results exceed the screening values listed in Table 1, except TOC, the discharge is not authorized by this permit.

(a) For initial TOC values that exceed the screening values listed in Table 1, which may be caused by naturally-occurring, high molecular weight organic compounds, the permittee may request to be exempted from the TOC requirement. To request this exemption, the permittee shall submit additional information with a Notice of Intent (NOI),

described below, which describes the method used to determine that these compounds are naturally occurring. The Department shall grant the exemption if the permittee affirmatively demonstrates that the TOC values are caused by naturally-occurring, high molecular weight organic compounds.

(b) The NOI shall be submitted to the appropriate Department district office thirty (30) days prior to discharge, and contain the following information:

1. the name and address of the person that the permit coverage will be issued to;

2. the name and address of the facility, including county location;

3. any applicable individual wastewater permit number(s);

4. a map showing the facility and discharge location (including latitude and longitude);

5. the name of the receiving water; and

6. the additional information required by paragraph (3)(a) of this permit.

(c) Discharge shall not commence until notification of coverage is received from the Department.

(4) For fresh waters and coastal waters, the pH of the effluent shall not be lowered to less than 6.0 units for fresh waters, or less than 6.5 units for coastal waters, or raised above 8.5 units, unless the permittee submits natural background data confirming a natural background pH outside of this range. If natural background of the receiving water is determined to be less than 6.0 units for fresh waters, or less than 6.5 units in coastal waters, the pH shall not vary below natural background or vary more than one (1) unit above natural background for fresh and coastal waters. If natural background of the receiving water is determined to be higher than 8.5 units, the pH shall not vary above natural background or vary more than one (1) unit below natural background of fresh and coastal waters. The permittee shall include the natural background pH of the receiving waters with the results of the analyses required under paragraph (2) of this permit. For purposes of this section only, fresh waters are those having a chloride concentration of less than 1500 mg/l, and coastal waters are those having a chloride concentration equal to or greater than 1500 mg/l.

(5) In accordance with Rule 62-302.500(1)(a-c), F.A.C., the discharge shall at all times be free from floating solids, visible foam, turbidity, or visible oil in such amounts as to form nuisances on surface waters.

(6) If contamination exists, as indicated by the results of the analytical tests required by paragraph (2), the discharge cannot be covered by this generic permit. The facility shall apply for an individual wastewater permit at least ninety (90) days prior to the date discharge to surface waters of the State is expected, or, if applicable, the facility may seek coverage under any other applicable Department generic permit. No discharge is permissible without an effective permit.

(7) If the analytical tests required by paragraph (2) reveal that no contamination exists from any source, the facility can begin discharge immediately and is covered by this permit without having to submit an NOI request for coverage to the Department. A short summary of the proposed activity and copy of the analytical tests shall be sent to the applicable Department district office within one (1) week after discharge begins. These analytical tests shall be kept on site during discharge and made available to the Department if requested. Additionally, no Discharge Monitoring Report forms are required to be submitted to the Department.

(8) All of the general conditions listed in Rule 62-621.250, F.A.C., are applicable to this generic permit.

(9) There are no annual fees associated with the use of this generic permit.

SECTION 01010 - SUMMARY OF WORK

1.0 GENERAL:

The work shall consist of furnishing all materials, labor, equipment, tools, and all items and services required for the complete construction in conformity with Contract Documents of:

Channel District
12th Street Wastewater Pump Station Improvements
for the
City of Tampa

All construction work and materials, in addition to complying with requirements of Contract Documents, shall fully comply with all requirements of local building codes, all ordinances, and regulations of other Federal, State and public authorities having jurisdiction over this type of work in the given area.

2.0 SCOPE:

The work shall include but not be limited to, providing a new wastewater pump station on North 12th Street in the City of Tampa's Channel District, including excavation and backfill, precast concrete wet well and triplex system with two (2) 25 HP pumps, precast concrete manholes, concrete footings and slabs, masonry screen wall and chain link fencing, gravity sewer and force main piping, water service connection, roadway and site reconstruction, control panel and electrical, with all associated work required for a complete project, as shown and indicated on the Drawings and in the Specifications.

3.0 LEGAL DESCRIPTION OF PROJECT SITE:

Legal description as shown on the drawings, Sheet No. 01 (Cover Sheet).

4.0 VERIFICATION OF OWNER'S SURVEY DATA:

Prior to commencing any work, the Contractor shall satisfy himself as to accuracy of all survey data which shall affect his work as indicated in these plans and specifications and/or provided by the City.

Should the Contractor discover any inaccuracies or errors which will affect his work, he shall notify the Engineer and/or Architect in order that proper adjustments can be ordered.

The exact location of the building and related items shall be determined on site jointly by the Contractor and the Engineer and/or Architect. NO work shall commence until said final approval of the locations is made by the Engineer and/or Architect.

5.0 CONTRACT DOCUMENTS:

a. BIDDING REQUIREMENTS

b. CONTRACT FORMS

c. GENERAL PROVISIONS, SUPPLEMENTARY GENERAL PROVISIONS, AND SPECIAL, CONDITIONS

6.0 SPECIFICATIONS: (DATED: July 2015)

Divisions: 1, and Section SS, 330, 331, 334, 16010, 16050, 16095, 16110, 16120, 16195, 16400, 16450, 16470, 16475, 16620, and 16940.

7.0 DRAWINGS: (DATED: July 2015)

Sheet No's: Cover Sheet 01 through 26.

8.0 ADDENDA AND LETTERS OF CLARIFICATION:

All addenda and letters of clarification issued prior to bid opening time date.

END OF SECTION 01010

SECTION 01020 - ALLOWANCES

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes administrative and procedural requirements governing allowances.

Types of allowances include the following:

Contingency allowances.

SELECTION AND PURCHASE

SUBMITTALS

Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

CONTINGENCY ALLOWANCES

Use the contingency allowance only as directed by the Owner.

The Contractor's related costs for services, products and equipment ordered by the Owner under the contingency allowance are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

Work Directive Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

EXAMINATION

Examine products covered by an allowance promptly upon delivery for damage or defects.

PREPARATION

Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

SCHEDULE OF ALLOWANCES

Allowance No. 1: Include a contingency allowance of $100,000 for use according to the Owner's instructions. THIS ALLOWANCE SHALL BE INCLUDED IN THE BID.

END OF SECTION 01020

SECTION 01040 - PROJECT COORDINATION

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

- Coordination.
- Administrative and supervisory personnel.
- General installation provisions.
- Cleaning and protection.

COORDINATION

Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

Make adequate provisions to accommodate items scheduled for later installation.

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

Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

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

- Preparation of schedules.
- Installation and removal of temporary facilities.
- Delivery and processing of submittals.
- Progress meetings.
- Project Close-out activities.

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

Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

SUBMITTALS

Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

Show the interrelationship of components shown on separate Shop Drawings.

Indicate required installation sequences.

Refer to Division-15 Section "Basic Mechanical Requirements," and Division-16 Section "Basic Electrical Requirements" for specific coordination Drawing requirements for mechanical and electrical installations.

Staff Names: At the Preconstruction Conference, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

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

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

GENERAL INSTALLATION PROVISIONS

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

Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

Recheck measurements and dimensions, before starting each installation.

Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

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

Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

CLEANING AND PROTECTION

During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Limiting Exposures: Supervise construction activities to ensure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

Excessive static or dynamic loading.
Excessive internal or external pressures.
Excessively high or low temperatures.
Thermal shock.
Excessively high or low humidity.
Air contamination or pollution.
Water or ice.
Solvents.
Chemicals.
Light.
Radiation.
Puncture.
Abrasion.
Heavy traffic.
Soiling, staining and corrosion.
Bacteria.
Rodent and insect infestation.
Combustion.
Electrical current.
High speed operation,
Improper lubrication,
Unusual wear or other misuse.
Contact between incompatible materials.
Destructive testing.
Misalignment.
Excessive weathering.
Unprotected storage.
Improper shipping or handling.
Theft.
Vandalism.

CHANNEL DISTRICT OPERATIONS DURING CONSTRUCTION

Contractor shall perform all work in recognition of, and coordination with, ongoing District activities. Adhere to approved sequence/layout plan and project schedule. Please note the following:

1. Regular work hours for the Project (including deliveries) shall be limited to the hours between 7:00 a.m. and 5:00 p.m., Monday through Friday, in order to restrict project noise and disruption to daytime hours for the surrounding Channel District. No work shall be performed at night and shall normally be discontinued on Saturdays, Sundays, and all State and City designated holidays. Contractor shall submit request to the City Representative in writing at least 2 working days in advance, for permission to work beyond regular work hours.

2. The Contractor shall arrange work related tasks to minimize inconvenience to the public, including vehicular traffic. Provide ribbons, barricades, signage, etc., as needed and/or required to denote construction areas, as well as provide protection of existing materials to remain. All applicable Federal, State and/or Local regulations and permit conditions shall be adhered to.

3. Any adjacent property, sidewalks, streets (including detour routes) consisting of travel lanes, curbs, gutters and shoulders, outside the project area (not designated for construction), which are determined by the Engineer to have been damaged due to construction related operations and/or equipment, shall be restored by the Contractor to its original or better condition without any cost to the City and to the satisfaction of the Engineer.

4. Clean-up on this project is extremely important and the Contractor will be responsible for keeping the construction site neat and clean with debris being removed regularly as the work progresses.

   If project cleanliness and/or dust control reaches an unacceptable level in the opinion of the Engineer, the Engineer will notify the Contractor in writing. If the Contractor does not act to correct the situation within 4 hours in the case of dust control or within 24 hours in the case of general cleanliness, the Engineer may call upon outside forces to provide the appropriate services. Cost of all such activities shall be charged to the Contractor via contract change order.

5. A temporary street closure permit will be required for closure of a street, lane, or sidewalk within Rights-of-Way under the jurisdiction of the City of Tampa.

   These permits will establish the requirements for the closure related to number of lanes and/or time of day lanes or street may be closed. The Contract shall adhere to the requirements as described in the permit(s). The cost for obtaining temporary street closure permits shall be paid for by the Contractor.

   It is required that the construction and maintenance of the traffic conform to the Manual of Uniform Minimum Standards (Green Book), the Standard Index and Specifications current Edition, The M.U.T.C.D., and all other current guidelines, rules and procedures, including any particular Supplemental Specifications.

6. For temporary stockpiling of the excavated material within project limits (and anywhere within City limits) the Contractor shall adhere to the following procedure:

A. Public Right of Way:

The Contractor will not be allowed to stockpile suitable, excavated material within right- of-way for a period in excess of 30 calendar days, unless approved in advance by the City Representative. Unsuitable excavated material shall not be stockpiled within public right-of-way for a period in excess of 7 calendar days.

B. Location other than Public Right-of-Way, the Contractor shall:

1. Obtain written permission from the owner of the property where stockpiling is desired.

2. At its own expense present the above letter and a contour plan of the site to the Engineer for approval of stockpiling site.

3. At the conclusion of the stockpiling activity, the Contractor shall obtain a signed letter of release from the property owner that he/she is completely satisfied with the stockpiling operation and with the restoration of their property. A copy of the letter shall be furnished to the Engineer.

The time periods of stockpiling shall be specified by the Contractor in writing.

Upon removal of stockpiled material, the Contractor shall clean up and grade the site to its original contours and conditions.

The City of Tampa shall not be a party to any agreement between the Contractor and private property owner(s).Regardless of the location of stockpiling, it shall be the Contractor's responsibility to make sure that stockpiling in no way constitutes a public hazard, nuisance and does not interfere with the natural surface runoff in the area.

7. The work specified in this paragraph consists of the application of water within the limits of construction of the project or on streets used as detour routes in connection with the project, in accordance with these specifications. All dust control operations shall be performed by the Contractor at the time, location, and in the amount ordered by the Engineer. The application of water shall be under the control of the Engineer at all times. No water will be used to control dust without authorization of the Engineer. Water ordered by the Engineer to be applied (including on Saturdays, Sundays, or legal holidays) will be considered part of the required work and no additional compensation will be allowed therefore.

   Water used for dust control shall be free from pollution to the extent that its use will not constitute a nuisance or health hazard to anyone living in close proximity to the areas where it is used.

8. Contractor shall perform work in a manner to minimize noise, dust and debris. Use of dumpsters on adjacent property shall not be allowed. Trash and debris shall be removed from the site on a regular basis.

9. Contractor shall coordinate any site staging in the right-of-way and obtain all required permits. Usage of right-of-way shall be discussed with Owner prior to implementation.

10. Refer to SPECIFIC PROVISIONS for additional requirements.

END OF SECTION 01040

SUPPLEMENTAL SPECIFICATIONS
FOR SANITARY SEWER RELOCATION WORK

WORKMANSHIP AND MATERIALS **PAGE**

SECTION 1 - EXCAVATION - EARTH AND ROCK

W-1.01 General

Opencut excavations shall be made to the widths and depths necessary for constructing all structures, pipelines and other conduits included in the Contract, according to the Plans, and includes the excavation of any material which, in the opinion of the Engineer, is desirable to be excavated for any purpose pertinent to the construction of the work. Banks more than 5 feet high, where a danger of slides or cave-ins exist, shall be shored or sloped to the angle of repose.

Where excavations are to be made below groundwater, the Contractor shall submit to the Engineer for approval, in detail, his proposed method for control of groundwater, including a description of the equipment

he plans to use and the arrangement of such equipment. No such excavation shall be started until approval of the Engineer has been obtained. Dewatering work shall be included in the Contract Items for pipelines, box culverts, inlets, manholes and other structures, and pumping stations, and no separate payment will be made therefor.

W-1.02 Clearing

The site of all opencut excavations shall first be cleared of obstructions preparatory to excavation. This includes the removal and disposal of vegetation, trees, stumps, roots and bushes, except as specified under the subsection headed "Trench Excavation."

W-1.03 Authorized Additional Excavation

In case the materials encountered at the elevations shown are not suitable, or in case it is found desirable or necessary to go to an additional depth, or to an additional depth and width, the excavation shall be carried to such additional depth and width as the Engineer may direct in writing. The Contractor shall refill such excavated space with either Class D concrete, or select sand or crushed stone fill material, as ordered. Where necessary, fill materials shall be compacted to avoid future settlement. Additional earth excavations so ordered and concrete, or selected sand or crushed stone fill material ordered for filling such additional excavation and compaction of select sand or crushed stone fill material will be paid for under the appropriate Contract Items or where no such items exist, as extra work as specified in Article 7 of the Agreement.

W-1.04 Unauthorized Excavation

Wherever the excavation is carried beyond or below the lines and grades shown or given by the Engineer, except as specified in the subsection headed "Authorized Additional Excavation," all such excavated space shall be refilled with such material and in such manner as may be directed in order to ensure the stability of the various structures. Spaces beneath all manholes, structures or pipelines excavated without authority shall be refilled by the Contractor at his own expense, with Class D concrete, or select sand or crushed stone fill material, and properly compacted, as ordered by the Engineer, and no separate payment will be made therefor.

W-1.05 Segregation and Disposal of Material

Topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments shall be stockpiled separately on the site in locations approved by the Engineer. Excavated and other material shall not be stored nearer than 4 feet from the edge of any excavation and shall be so stored and retained as to prevent its falling or sliding back into the excavation. Surplus excavated material and excavated material unsuitable for backfilling or embankments shall become the property of the Contractor and shall be transported, as approved by the Engineer, away from the site of the work to the Contractor's own place of disposal.

W-1.06 Shoring and Sheeting

All excavations shall be properly shored, sheeted, and braced or cut back at the proper slope to furnish safe working conditions, to prevent shifting of material, to prevent damage to structures or other work, and to avoid delay to the work, all in compliance with the U. S. Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). The minimum shoring, sheeting and bracing for trench excavations shall meet the general trenching requirements of the safety and health regulations. Before starting excavation for jacking pits and structures, the Contractor shall submit

complete design calculations and working drawings of proposed sheeting and bracing arrangements which have been prepared, signed and sealed by a Professional Engineer registered in the State of Florida. Bracing shall be so arranged as not to place any strain on portions of completed work until the general construction has proceeded far enough, in the opinion of the Engineer, to provide ample strength. If the Engineer is of the opinion that at any point the sheeting or supports furnished are inadequate or unsuited for the purpose, he may order additional sheeting or supports to be installed. Whether or not such orders are issued, the sole responsibility for the design, methods of installation, and adequacy of the sheeting and supports shall be and shall remain that of the Contractor.

Tight sheeting shall be used in that portion of the excavation in City collector and arterial streets and in State and County highways below the intersection of a 1 on 1 slope line from the edge of the existing pavement to the nearest face of the excavation.

In general, sheeting for pipelines shall not be driven below the elevation of the top of the pipe. If it is necessary to drive the sheeting below that elevation in order to obtain a dry trench or satisfactory working conditions, the sheeting shall be cut off at the top of the pipe and left in place below the top of the pipe at no additional cost.

The sheeting and bracing shall be removed as the excavation is refilled in such a manner as to avoid the caving in of the bank or disturbance to adjacent areas or structures except as otherwise shown or directed. Voids left by the withdrawal of the sheeting shall be carefully filled by ramming or otherwise as directed.

Permission of the Engineer shall be obtained before the removal of any shoring, sheeting, or bracing. Such permission by the Engineer shall not relieve the Contractor from the responsibility for injury or to other property or persons from failure to leave such sheeting and bracing in place.

W-1.07 Sheeting Left in Place

The Engineer may order, in writing, any or all sheeting or bracing to be left in place for the purpose of preventing injury to the structures or to other property or to persons, whether such sheeting or bracing was shown on the Plans or placed at his direction or otherwise. If left in place, such sheeting shall be cut off at the elevation ordered, but, in general, such cutoffs shall be at least 18 inches below the final ground surface. Bracing remaining in place shall be driven up tight.

The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders.

Sheeting and bracing left in place, by written order of the Engineer, will be paid for under the appropriate Contract Item if included in the Proposal or otherwise by provisions of extra work as specified in Section 7 of the Agreement.

W-1.08 Removal of Water

At all times during the excavation period and until completion and acceptance of the work at final inspection, ample means and equipment shall be provided with which to remove promptly and dispose of properly all water entering any excavation or other parts of the work. The excavation shall be kept dry. No water shall be allowed to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set satisfactory to the Engineer and, in any event, not sooner than 12 hours after placing the masonry or concrete. Water pumped or drained from the work hereunder shall be disposed of in a safe and suitable manner without damage to adjacent property or streets or to other work under construction. Water shall not be discharged onto streets without adequate protection of the surface at the point of discharge. No water shall

be discharged into sanitary sewers. No water containing settleable solids shall be discharged into storm sewers. Any and all damage caused by dewatering the work shall be promptly repaired by the Contractor.

W-1.09 Structure Excavation

Excavations shall be of sufficient size and only of sufficient size to permit the work to be economically and properly constructed in the manner and of the size specified. The bottom of the excavation in earth and rock shall have the shape and dimensions of the underside of the structure wherever the nature of the ground will permit.

W-1.10 Trench Excavation

Before starting trench excavation, all obstructions which are to be removed or relocated shall be cleared away. Trees, shrubs, poles, and other structures which are to be preserved shall be properly braced and protected. All trees and large shrubs shall be preserved with damage to the root structure held to a minimum, unless otherwise shown or specified. Small shrubs may be preserved or replaced with equivalent specimens.

The width of trenches shall be such as to provide adequate space for workmen to place, joint, and backfill the pipe properly, but shall be kept to a minimum. Unless otherwise approved by the Engineer, the clear width of the trench at the level of the top of the pipe shall not exceed the sum of the outside diameter of the pipe barrel plus 24 inches.

In sheeted trenches, the clear width of the trench at the level of the top of the pipe shall be measured to the inside of the sheeting.

Should the Contractor exceed the maximum trench widths specified above, without written approval of the Engineer, he may be required to provide, at his own expense, concrete cradle or encasement for the pipe as directed by the Engineer, and no separate payment will be made therefor.

The Contractor shall excavate trenches to the respective depths, below the bottom of the pipe, for the various classes of pipe bedding shown on the Plans so that pipe bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for the pipe barrel and bells.

If unstable material is exposed at the level of the bottom of the trench excavation, it shall be excavated in accordance with the subsection headed "Authorized Additional Excavation." When in the judgment of the Engineer the unstable material extends to an excessive depth, he may advise the Contractor in writing to stabilize the trench bottom with a crushed stone, sand mat or gravel mat to ensure firm support for the pipe by other suitable methods. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as extra work as specified in Section 7 of the Agreement.

The open excavated trench preceding the pipe laying operation and the unfilled trench with pipe in place shall be kept to a minimum length causing the least disturbance to traffic and use of adjacent property. Ladders shall be provided and so located as to provide means of exit from the trench without more than 25 feet of lateral travel.

W-1.11 Rock Excavation

The term "rock" as used herein shall include all materials which have compressive strengths in excess of 300 psi in their natural undisturbed state and which, in the opinion of the Engineer, require drilling and blasting, wedging, sledging, barring or breaking with power tools not otherwise required for normal excavating.

Rock shall be excavated, within the boundary lines and grades as shown on the Plans, specified, or given by the Engineer. Rock removed from the excavation shall become the property of the Contractor and shall be removed by him away from the site of the work to his own place of disposal, and no separate payment will be made therefor.

All shattered rock and loose pieces shall be removed.

For trench excavation in which pipelines or other conduits are to be placed, the rock shall be excavated to a minimum depth of 6 inches below the bottom of the pipe and the excavated space refilled with pipe bedding material. Placing, compacting, and shaping pipe bedding material shall be included in the various classified unit price Contract Items for pipelines, and no separate payment will be made therefor.

For manhole excavation, the rock shall be excavated to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger, and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter and the excavated space refilled with crushed stone. Placing, compacting, and shaping crushed stone for manhole bases shall be included in the appropriate Contract Items for manhole bases, and no separate payment will be made therefor.

For cast-in-place structures, the rock shall be excavated only to the bottom of the structure or foundation slab.

Excavated space in rock below structures, pipelines, and manholes which exceeds the depths specified above shall be refilled with Class D concrete, crushed stone, or other material as directed by the Engineer. Refilling of over-excavated rock in rock shall be included as part of the rock excavation, and no separate payment will be made therefor.

Where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation" shall be followed.

Blasting may be performed only when approved by the Engineer and authorized by the Agency having jurisdiction over the subject location and in accordance with all laws, ordinances, and regulations of the Agency.

* * *

SECTION 2 - BACKFILLING

W-2.01 General

All excavation shall be backfilled to the original surface of the ground or to such other grades as may be shown or directed. For areas to be covered by topsoil, backfill shall be left 4 inches below the finished grade or as shown on the Plans. The time elapsing before backfilling is begun shall be subject to the approval of the Engineer. In all backfilling, all compressible and destructible rubbish and refuse which might cause later settlement and all lumber and braces shall be removed from the excavated space before backfilling is started, except that sheeting and bracing shall be left in place or removed as the work progresses.

Construction equipment used to backfill against and over cast-in-place concrete structures shall not be permitted to travel over these structures until the designated concrete strength has been obtained as verified by concrete test cylinders. In special cases where conditions warrant, as determined by the Engineer, the above restriction may be modified if the concrete has gained sufficient strength, as

determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.

W-2.02 Unsuitable Backfill Material

Before backfilling around structures, all rubbish shall be removed from behind the walls.

When the excavated material contains garbage, cinders, glass, tin cans, wood, or other trash or objectionable organic material, as determined by the Engineer, it shall not be used for backfill but shall be disposed of by the Contractor away from the site of the work to his own place of disposal. The unsuitable materials shall be replaced with backfill material which shall be sand, clay, gravel, sandy loam, or other excavated material free of objectionable organic matter, as approved by the Engineer.

W-2.03 Select Fill Material - General

Select fill material shall be used for pipe bedding, manhole bedding, trench and structure backfill, and other purposes as shown on the Plans, specified, and ordered in writing by the Engineer.

Select fill material shall be sand, conforming to the requirements of the subsections headed "Select Fill Material - Sand" or crushed stone or limestone screenings, conforming to the requirements of the subsection headed "Select Fill Material - Crushed Stone."

W-2.04 Select Fill Material - Sand

Sand used for pipe bedding or as select fill material for trench or structure backfill shall consist of job excavated sand or imported sand which can be readily and thoroughly compacted. Sand shall be reasonably well graded and shall fall within the following gradation limits:

Passing No. 4 sieve - 95 percent (minimum)
Passing No. 200 sieve - 10 percent (maximum)

Sand containing more than 10 percent of material passing the No. 200 sieve or sand which, in the opinion of the Engineer, would have a tendency to flow under pressure when wet will not be acceptable for use as pipe bedding or select fill material for trench or structure backfill

Sand shall not be used for bedding for manholes or other structures.

W-2.05 Select Fill Material - Crushed Stone

Crushed stone used for pipe bedding, manhole base bedding, or as select fill material for trench or structure backfill shall consist of clean, durable rock, angular in shape, which can be readily and thoroughly compacted. Crushed stone shall be reasonably well graded and shall be no greater than a No. 57 stone.

W-2.06 Pipe and Structure Bedding

All pipelines shall be bedded in well graded, compacted select fill material. Select fill material shall be sand, conforming to the subsection headed "Select Fill Material - Sand" and/or crushed stone, conforming to the subsection headed "Select Fill Material - Crushed Stone," as shown on the Plans, specified or ordered in writing by the Engineer. Pipe bedding shall be constructed in accordance with the details shown on the Plans.

When shown on the Plans or ordered in writing by the Engineer, pipelines (except PVC) shall be laid in Class D concrete cradle or encasement.

Precast concrete manhole bases shall be bedded on No. 57 stone, conforming to the subsection headed "Select Fill Material - Crushed Stone," as shown on the Plans.

Cast-in-place manhole bases and other foundations for structures shall be cast against undisturbed earth in clean and dry excavations.

Existing underground structures, tunnels, conduits and pipes crossing the excavation shall be bedded with compacted select fill material. Bedding material shall be placed under and around each existing underground structure, tunnel, conduit or pipe and shall extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

W-2.07 Bedding Placement for Pipelines

Select fill material, used as pipe bedding, shall be placed by hand, in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place. Select fill material pipe bedding shall extend to one foot over the top of the pipe.

Each layer of select fill shall be thoroughly tamped and compacted in place by hand or with suitable mechanical or pneumatic tools to a dry density not less than 95 percent of the maximum dry density as determined by AASHTO Des: T-180. No large stone fragments shall be placed in the pipe bedding nor closer than two feet to any point on any pipe.

W-2.08 Bedding Placement for Precast Concrete Manholes

No. 57 stone used for bedding beneath precast manhole bases shall be placed in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place with suitable mechanical or pneumatic tools.

W-2.09 Structure Backfill

Backfill around manholes, risers, and structures shall be suitable job excavated material, selected fill material, or other material approved by the Engineer. Such backfill shall extend from the bottom of the excavation or top of structure bedding to the bottom of pavement base course, subgrade for lawn replacement, the top of the existing ground surface, or to such other grades as may be shown or given by the Engineer.

The backfill shall be placed in uniform layers not greater than 18 inches in loose thickness and thoroughly compacted in place with suitable mechanical or pneumatic tools to a dry density of not less than 98 percent of the maximum dry density as determined by AASHTO Des: T-180.

W-2.10 Trench Backfill

Trenches shall be backfilled from 1 foot over the top of the pipe to the bottom of pavement base course, subgrade for lawn replacement, to the top of the existing ground surface or to such other grades as may be shown or given by the Engineer. Trench backfill shall be select fill material, suitable job excavated material or other material, as approved by the Engineer.

Except under pavements and railroad tracks, trench backfill shall be placed in uniform layers not greater than 18 inches in loose thickness and thoroughly compacted in place using heavy-duty tampers such as pneumatic jackhammers with tamping foot attachment or vibrating rollers if required. Each layer shall be compacted to a dry density of not less than 95 percent of the maximum dry density as determined by AASHTO Des: T-180.

Where railroad tracks or pavements and appurtenances for streets or highways are to be placed over trenches, the trench backfill shall be placed in uniform layers not greater than 12 inches in loose thickness and thoroughly compacted in place with equipment as specified above. Each layer shall be compacted to a dry density of not less than 98 percent of the maximum dry density as determined by AASHTO Des: T-180. On City of Tampa streets, each layer shall be compacted as specified above to the bottom of the subbase which is defined as 10 inches below the bottom of the base course. The subbase shall be compacted to 98 percent of modified proctor.

Trench backfilling work shall be done in a manner to prevent dropping of material directly on top of any conduit or pipe through any great vertical distance. In no case shall backfilling material from a bucket be allowed to fall directly on a structure or pipe and in all cases, the bucket shall be lowered so that the shock of falling earth will not cause damage.

Lumps shall be broken up and if there are any stones, pieces of crushed rock or lumps which cannot be readily broken up, they shall be distributed throughout the mass so that all interstices are solidly filled with fine material.

W-2.11 Backfill for Short Tunnel

Where pipelines are placed in short tunnels, the annular space between the outside of the pipe wall and the tunnel wall shall be completely filled with select fill material or suitable excavated material. Pipelines in short tunnels shall be suitably supported, to permit placing backfill which shall be suitably tamped in place.

W-2.12 Finish Grading

Finish grading shall be performed to meet the existing contour elevations and grades shown on the Plans or given by the Engineer and shall be made to blend into adjacent natural ground surfaces. All finished surfaces shall be left smooth and free to drain.

Grading outside of pipelines or structure lines shall be performed in such a manner as to prevent accumulation of water within the area. Where necessary or where shown on the Drawings, finish grading shall be extended to ensure that water will be carried to drainage ditches, and the construction area left smooth and free from depressions holding water.

W-2.13 Responsibility for After Settlement

Any depression which may develop in backfilled areas from settlement within one year after the work is fully completed and accepted shall be the responsibility of the Contractor. The Contractor shall, at his own expense, provide as needed additional backfill material, pavement base replacement, permanent pavement sidewalk curb and driveway repair or replacement, and lawn replacement and shall perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved by the Engineer.

W-2.14 Inspection and Testing of Backfilling

All backfill shall be subject to test by the Engineer with the assistance of the Contractor.

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SECTION 4 - CONCRETE MATERIALS

W-4.01 General

The materials covered under this section are cement, sand, crushed stone, gravel, and water for use in concrete, grout, and mortar.

W-4.02 Cement

Cement shall be from a source approved by the Engineer before the cement is ordered. Domestic manufacturers of cement shall furnish to the Engineer notarized Certificates of Manufacture as evidence that the cement conforms to the requirements of the Specifications. These certificates shall include mill test reports on the cement. Suppliers of foreign cements shall furnish to the Engineer test data from a testing laboratory approved by the Engineer to show conformance with all applicable requirements of ASTM Des: C 150. Samples for testing shall be taken in accordance with ASTM Des: C 183. The cost of tests on foreign cement shall be considered as part of the cost of the work and shall be included under the appropriate Contract items. No separate payment for such testing will be made. Cement shall be either air-entraining portland cement or standard portland cement, except as otherwise specified. If standard portland cement is used, an air-entraining agent meeting the requirements of ASTM Des: C 260 shall be added to the concrete at the time of mixing in an amount sufficient to produce from 4 to 6 percent entrained air in the concrete for plastic mixes having a slump of 2 to 4 inches. Standard portland cement shall meet the requirements of ASTM Des: C 150, Type I or Type II, and air-entraining cement shall meet the requirements of ASTM Des: C 150, Type IA or Type IIA.

W-4.03 High-Early Strength Cement

In case high-early strength cement is used in any special part of the work, it shall be true portland cement with no chemicals or other substances added to expedite hardening and shall be of a brand approved by the Engineer. The cement shall meet the requirements of ASTM Des: C 150 Type III or Type IIIa. High-early strength cement shall be used only with the approval of the Engineer.

W-4.04 Fine Aggregate

Fine aggregate shall be natural sand, washed clean, having hard, strong, sharp, durable, uncoated grains; and shall be free from injurious amounts of dust, lumps, soft or flaky particles, mica, shale, alkali, organic matter, loam, or other deleterious substances. Fine aggregate shall conform to the requirements of Section 902 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

W-4.05 Coarse Aggregate

Coarse aggregate shall consist of gravel or broken stone composed of strong, hard, durable, uncoated pebbles or rock fragments, washed clean and free from injurious amounts of shale, coal, clay, lumps, soft fragments, dirt, glass, and organic and other deleterious substances. It shall conform to ASTM Des: C 33. The size shall be No. 57, as specified in Table II of ASTM Des: C 33.

W-4.06 Admixtures

The use of admixtures will be permitted but must be approved by the Engineer. Set retarders shall be Pozzolith 100-R as manufactured by Master Builders Company, Cleveland, Ohio, or Plastiment as made by Sika Chemical Corporation, Lyndhurst, NJ, or equal. Retarding admixtures shall be used in strict accordance with the manufacturer's directions and the manufacturer shall make available, at no cost upon 72 hours notification, the services of a qualified full time field representative to assure proper use of the admixture.

Set retarding admixtures shall be used only with the approval of the Engineer. The amount of set retarder added shall be sufficient to keep the concrete workable during the period of placement and finishing.

W-4.07 Water

Water used in mixing concrete shall be clean and shall not contain deleterious amounts of acids, alkalies, or organic materials. All water shall be furnished from sources approved by the Engineer.

W-4.08 Fly Ash

Fly ash shall be a local product with cementitious properties, conforming to the requirements of ASTM C 618, Class C or F, with the following exceptions:

Loss on ignition- 5% maximum
Sulfur trioxide - 4% maximum

Fly ash shall have a uniform light color, and shall be from a source approved by the Engineer.

Fly ash shall be stored at the concrete mixing plant separate from the cement, in accordance with the requirements specified for storage of cement. Cement and fly ash shall not be intermixed prior to being added to the concrete mix.

* * *

SECTION 5 - CONCRETE

W-5.01 General

Concrete shall be divided into various grades, classified according to compressive strength, to be used in the respective places shown on the Plans, called for in the Specifications, or ordered by the Engineer. The classes of concrete mixtures are referred to as Class A, Class B, and Class D.

Class A concrete is intended principally for precast concrete units.

Class B concrete is intended principally for reinforced concrete structures, and shall be used for columns, walls, beams, slabs, equipment pads, and the like.

Class D concrete is intended principally for low strength concrete, plain or reinforced, used for soil stabilization, filling, and other similar purposes. For large volume, boulders or fragments of rock excavated during construction may be embedded in the concrete to provide added bulk. Care shall be taken in placing the boulders or rock fragments, so that there are no voids in the concrete.

W-5.02 Strength and Proportion

Concrete mixes shall be designed and proportioned to provide the following minimum compressive strengths and the proper workability without exceeding the stipulated maximum quantities of mixing water:

Class	Compressive Strength - psi 7-day Test	28-day Test	Maximum Water Gallons Per Sack
A	3,400	5,000	3-1/2
B	2,700	4,000	5-1/2
D	1,300	2,000	7-1/4

Concrete, except Class D, shall contain not less than 564 pounds (six standard 94-pound bags) of cement per cubic yard.

W-5.03 Moisture Content of Aggregates

The quantity of free water contained in the aggregate shall be determined from time to time as required by the Engineer, and this quantity shall be deducted from the water added at the mixer, but no change shall be made in the water-cement ratio.

The quantity of water used in each batch shall be the total quantity, including the free moisture contained in the aggregate.

W-5.04 Consistency

Proportions of ingredients shall be varied to secure the desired concrete consistencies when tested in accordance with ASTM Des: C 143, conforming to the following slump requirements:

Concrete Placement	Minimum and Maximum Slump in Inches Class A & B	Class D
Normal	3 to 4	3 to 5
Pumped	4 to 6	4 to 6

In all cases, the proportions of aggregates for concrete shall be such as to produce mixtures which will work readily into the corners and angles of the forms and around reinforcement, without permitting the segregation of materials or the collection of free water on the surface. The combined aggregates shall be of such composition of sizes that when separated on the No. 4 standard sieve, the weight passing the sieve shall not be less than 30 percent, nor greater than 45 percent of the total, unless otherwise required by the Engineer.

W-5.05 Field Tests

During the progress of the work, a reasonable number of test cylinders shall be made, cured, and stored in accordance with ASTM Des: C 31 and shall be tested in accordance with ASTM Des: C 39. Each test shall consist of three cylinders, one laboratory control cylinder to be tested at 7 days, and one field control cylinder to be tested at 28 days. If the 7-day cylinder is not satisfactory, the third cylinder, a laboratory control cylinder, will be tested at 7 days. Otherwise, the third cylinder will be tested at 28 days.

The Contractor shall hire an independent testing laboratory to prepare and make concrete test cylinders.

The average strength of all the cylinders shall be equal to or greater than the strengths specified, and at least 90 percent of all the tests shall indicate a strength equal to or greater than the strength specified. In cases where the strength of the test cylinders for any portion of the structure falls below the requirements specified herein, the Engineer may order a change in the mix or water content for the remaining portion of the work, and may require the Contractor to secure test specimens of the hardened concrete represented by these cylinders. The number of test specimens required to be taken shall be the same as the number of test cylinders made for each concrete placement. Specimens shall be secured and tested in accordance with ASTM Des: C 42. If the specimen tests further substantiate that the concrete represented by the cylinders and specimens is below the strength requirements specified herein, the Engineer may order such concrete removed and rebuilt at the expense of the Contractor.

W-5.06 Ready-Mixed Concrete

Ready-mixed concrete shall be mixed and delivered in accordance with the requirements set forth in ASTM Des: C 94, and subject to all provisions herein relative to materials, strength, proportioning, consistency, measurement, and mixing.

The rate of delivery of the mixed concrete shall be such that the interval between placing of successive batches shall not exceed 45 minutes. The elapsed time between the introduction of mixing water to the cement and aggregates and depositing concrete in the work shall not exceed 45 minutes including mixing and agitating time.

W-5.07 Forms - General

Forms shall conform to shape, lines, and dimensions of the member as shown on the Plans. They shall be substantial, properly braced, and tied together so as to maintain position and shape and to resist all pressures to which they may be subjected. Forms shall be sufficiently tight to prevent leakage of mortar. The size and spacing of studs and wales shall be determined by the nature of the work and the height to which concrete is placed. In all cases, wales shall be doubled, and the size of studs and wales used shall not be less than 2 by 6 inches. Joints shall be snug and shall occur at the designated locations only. Horizontal joints shall be level and vertical joints plumb.

The entire inside surfaces of forms shall be oiled with an approved form oil or shall be thoroughly wetted just prior to placing concrete.

The Contractor shall be responsible for the adequacy of all forms and for remedying any defects resulting from their use, notwithstanding inspection and prior approval by the Engineer.

W-5.08 Placing Concrete

Concrete shall be placed only in forms which have been approved by the Engineer and in his presence. Where the procedure is not specifically described herein, the placing of concrete shall be in accordance with the recommendations of ACI Standard 614.

After mixing, concrete shall be transported rapidly to the place of deposit. Concreting operations shall be continuous until the section, panel, or scheduled placement is completed.

Concrete may be conveyed in buckets, buggies, chutes, or other approved means. Apparatus used for conveying concrete shall be flushed thoroughly with water before and after each run. The point of delivery of concrete shall be as close to the work as possible and in no case more than 5 feet from the point of final deposit in the horizontal direction. Rehandling of concrete will not be permitted.

Concrete shall be deposited level in layers not to exceed 18 inches in a manner to prevent segregation of the ingredients.

Wall concrete shall be deposited through heavy duck canvas or galvanized iron chutes equipped with suitable hopper heads. Chutes shall be of variable lengths, so that the free fall of concrete shall not exceed 3 feet.

Freshly laid exposed concrete shall be protected in an approved manner against damage from the elements and unavoidable construction operations.

Special care shall be taken to place the concrete against the forms, particularly in angles and corners, in order to prevent voids, pockets, and rough areas. The concrete shall be rodded and spaded in a manner to work the coarse aggregate away from the forms, whether vibrators are used or not. Every precaution shall be taken to make all concrete masonry solid, compact, watertight, and smooth.

W-5.09 Cold Weather Requirements

When the atmospheric temperature at the work is 40 degrees F or below, or when the U.S. Weather Bureau forecasts such temperatures within 24 hours, the freshly placed concrete shall be protected against freezing.

W-5.10 Hot Weather Requirements

For placement of concrete in hot weather, the recommendations of ACI Standard 305 shall be followed.

W-5.11 Curing

Standard portland cement concrete surfaces normally exposed to the atmosphere shall be protected against excessively rapid drying by curing a minimum period of seven days. When average daily temperatures are above 70 degrees F, similarly exposed high-early strength concrete surfaces shall be cured for a minimum period of three days. When daily average temperatures are below 70 degrees F, the curing period for all concrete shall be extended as directed by the Engineer. The curing period shall commence immediately following the placing of the concrete. Curing shall be accomplished by a method approved by the Engineer. Should there be any delay in the application of the method of curing used, the concrete shall be covered with moistened burlap or kept wet by sprinkling.

W-5.12 Grout and Mortar

Grout for grouting around tunnel linings and for other locations as specified or directed shall be mixed in the proportions of one (1) part portland cement to one (1) part of sand by volume.

Non-shrink grout shall be a pre-blended mixture of a non-shrinking agent and shall be Embeco 636 as manufactured by the Master Builders Company, Cleveland, Ohio, or Propak as manufactured by Protex Industries, Denver, Colorado, or equal.

Lean grout for backfilling the space surrounding the sewer sections in tunnels or other areas as specified or directed shall be mixed in the proportion of one (1) part portland cement to twelve (12) parts of sand, by volume.

Mortar for brick or concrete block masonry shall be composed of one (1) part Type IIA portland cement to one (1) part of sand, by volume. Sufficient water shall be added to give the proper consistency. The mixture shall be thoroughly worked to produce a uniform mortar with all particles of aggregate well coated.

W-5.13 Water Stops

Water stops shall be installed in construction joints as shown on the Plans or specified. Water stops shall be made of extruded polyvinyl chloride. Reclaimed plastic material shall not be used in the manufacture of the water stops.

The water stop shall be 4 inches wide and not less than 1/8 inch thick at the narrowest point and 3/8-inch thick immediately adjacent to the center of the water stop. The water stop shall have longitudinal ribs with a hollow bulb center pleat. Water stops shall have a Shore A durometer hardness between 65 and 75, a finished tensile strength of not less than 2,000 psi, and a specific gravity of not more than 1.38.

In matters not covered herein, plastic water stops shall meet the requirements of the latest specifications of the Society of the Plastics Industry, Inc. for Polyvinyl Chloride Water Stops.

Field splices for water stops shall be made by heat fusion using a field splicing unit. Each water stop type shall have its own splice mold built to the size and shape of the water stop to be spliced. Splicing mold and materials, including splicing cement, solvent, splicing stock, and other items, shall be as furnished by the manufacturer of the water stop. Field splicing shall be performed in strict accordance with the manufacturer's directions and to cause as little damage as possible to the continuity of the ribbed strips, all to the satisfaction of the Engineer.

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SECTION 6 - REINFORCING STEEL

W-6.01 Standards

Reinforcing steel bars for concrete reinforcement shall be deformed bars meeting the requirements of ASTM Des: A 615, Grade 60, unless shown or specified otherwise. They shall be free from defects, kinks, and from bends that cannot be readily and fully straightened in the field. Test certificates of the chemical and physical properties covering each shipment shall be submitted for approval.

Reinforcing mesh shall be of the electrically welded type, with wires arranged in rectangular patterns, of the sizes shown or specified and shall meet the requirements of ASTM Des: A 185.

W-6.02 General

Reinforcing steel bars shall be supplied in lengths which will allow them to be conveniently placed in the work and provide sufficient lap at joints. Dowels of proper lengths, size, and shape shall be provided for

tying walls, beams, floors, and the like together when shown, specified, or ordered.

Stirrups and ties shall have a minimum inside radius of bend of 2-1/2 bar diameters. All other bars No. 7 and smaller shall have a minimum inside radius of bend of 3 bar diameters, and No. 8 bars and larger shall have a minimum inside radius of bend of 4 bar diameters.

Splices in all reinforcements shall be lapped as specified hereinafter in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" unless shown or specified otherwise. All splices shall be staggered, unless otherwise approved by the Engineer.

TABLE 1 - GRADE 60
REINFORCING BAR SPLICE LAPPING LENGTHS

Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11
Top Bars - ACI Class B	13	17	22	28	38	50	64	81	100
Top Bars - ACI Class C	17	23	29	37	50	66	83	106	130
Other Bars - ACI Class B	12	12	16	20	27	36	46	58	71
Other Bars - ACI Class C	12	16	20	26	36	47	60	75	93

Notes:

1. Splice length given in inches.

2. Top bars are all horizontal reinforcement so placed that more than 12 inches of concrete is cast in the member below the bar. This includes horizontal wall reinforcement.

3. Where lapping bars of different sizes, use lap required for larger bar.

4. For all bars spaced closer than 6 inches, increase lap length 25 percent.

5. Unless otherwise specified, the length of lap for splices shall be as shown for ACI Class B where no more than 50 percent of the bars are lap spliced, and as shown for ACI Class C where more than 50 percent of the bars are lap spliced.

W-6.03 Detailing

The Contractor shall submit detailed placing drawings and bar listed to the Engineer for approval in accordance with the requirements for "Working Drawings" of the General Provisions, except as otherwise specified herein.

All provisions of the latest ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures" shall be followed in the preparation of placing drawings and bar lists.

Wall and slab reinforcing shall not be billed in sections. Complete elevations of all walls and complete plans of all slabs must be shown, except that when more than one wall or slab are identical only one such elevation

or plan will be required. These plans or elevations need not be true views of the walls or slabs shown. Every reinforcing bar in a slab or a wall shall be billed on either a plan or an elevation. Where necessary, sections shall be taken to clarify the arrangement of the steel reinforcement. All bars shall be identified on such sections, but in no case shall bars be billed on such sections.

For all reinforcing bars, unless the location of a bar is perfectly obvious, the location of such bar or bars shall be given by a dimension to some structural feature which must be readily distinguishable at the time bars are placed.

The set of placing drawings shall be complete in and by themselves to the extent that the bar setters will have no occasion to refer to the design drawings.

Before submittal to the Engineer, every placing drawing and bar list shall be completely checked including the quantity, size, type, length, bend dimensions, and type of support for all bars or mesh, and all other information on the drawing and list. The checking shall be done by a qualified person and all necessary corrections made.

If after placing drawings and bar lists have been submitted to the Engineer for approval, a partial or spot check by the Engineer reveals that the placing drawings obviously have not been checked by a qualified person, they will be returned to the Contractor for such a check and corrections, after which they shall be resubmitted for approval by the Engineer.

W-6.04 Delivery

Reinforcing steel shall be delivered to the work in bundles strongly tied, and each group of both bent and straight bars shall be identified with a metal tag giving the identifying number corresponding to the shop drawings and bar schedules. All bars shall be properly stored in an orderly manner, at least 12 inches off the ground and kept clean and protected from the weather, as directed by the Engineer, after delivery at the site of the work.

W-6.05 Protection

Reinforcing steel shall be delivered without rust other than that which may have accumulated during transportation to the work. It shall at all times be fully protected from moisture, grease, dirt, mortar, and concrete. Before being placed in position, it shall be thoroughly cleaned of all loose mill scale and rust and of any dirt, coatings, or other material that might reduce the bond. If there is a delay in depositing concrete, the steel shall be inspected and satisfactorily cleaned immediately before the concrete is placed.

W-6.06 Fabrication and Installation - Bars

Bars shall be cut to required length and accurately bent before placing. Bars shall be bent in the shop unless written approval of field bending is obtained from the Engineer. If field bending is permitted, it shall be done only when the air temperature where the bending operation is performed is above 30 degrees F.

The bars shall be placed in the exact positions shown with the required spacing and shall be securely fastened in position at intersections to prevent displacement during the placing of the concrete. The bars shall be fastened with annealed wire of not less than 18 gauge or other approved devices. Spacing chairs of a type approved by the Engineer shall be furnished and properly placed to support and hold reinforcing bars in position in all beams and slabs, including slabs placed directly on the subgrade. Chairs which rest on the forms for slabs, the underside of which will be exposed to view in the finished work, shall have those portions galvanized or plastic coated which come in contact with the forms.

Splices in all reinforcement shall be lapped as specified in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" in the subsection headed "General." Splices at points of maximum tensile stress shall be avoided wherever possible. Temperature bars shall have a minimum clear spacing of 2-1/2 diameters. All bar splices shall be staggered where possible.

All welded splices shall be full penetration, butt welds, made by certified welders in accordance with AWS D12.1. Thermite welding or Cadweld type couplers may be used where approved by the Engineer.

On any section of the work where horizontal bars run further than the length of the forms, the form or head against which the work ends shall be perforated at the proper places to allow the bars to project through a distance at least equal to the lap specified. The projecting ends, however, unless otherwise directed by the Engineer, shall be of different lengths so that in no place will laps in adjoining bars in the same place occur opposite each other.

W-6.07 Installation - Mesh

Reinforcing mesh shall be placed in the positions shown, specified, or required to fit the work. Suitable spacing chairs or supports as specified for bars shall be furnished and placed to maintain the mesh in correct location. Where a flat surface of mesh is required, the mesh shall be rolled or otherwise straightened to make a perfectly flat surface before placing. The length of laps not indicated shall be approved by the Engineer.

W-6.08 Concrete Protection for Reinforcing Steel

Reinforcing steel shall be placed and held in position so that the concrete cover, as measured from the surface of the bar to the surface of the concrete, shall be not less than the following, except as otherwise shown, specified, or directed:

1. General

    a. Concrete deposited directly against soil - 3 inches.
    b. Concrete in contact with soil or exposed to weather or sewage:
        (1) #6 bars or larger - 2 inches
        (2) #5 bars or smaller - 1-1/2 inches

2. Slabs (See Item 6)

    a. Troweled surfaces - 1-1/2 inches
    b. Elsewhere - 1 inch

3. Beams - Girders - Columns (See Item 6)

    a. To main reinforcement - 2 inches
    b. To ties - 1-1/2 inches

4. Walls (See Item 6)

    a. 12 inches or more thick - 2 inches
    b. Less than 12 inches thick:
        (1) #6 bars or larger - 2 inches
        (2) #5 bars or smaller - 1-1/2 inches

5. Footings and Base Slabs

a.	Top face	- 2-1/2 inches
b.	Sides and ends	- 3 inches
c.	Bottom, Concrete deposited directly against ground	- 3 inches
	Concrete deposited directly against lean concrete work mat	- 2 inches

6. Add 1/2 inch for surfaces contacting or exposed to water or sewage.

7. Laps - as specified in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" in the subsection headed "General."

8. Spacing - clear distance between parallel bars - 2 inches minimum.

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SECTION 8 - METAL CASTINGS

W-8.01 General

Metal castings include all miscellaneous ferrous and nonferrous castings.

Wheel guards, valve boxes, manhole frames and covers, stop log grooves, brackets and supports for piping, gutter inlets, floor, roof and gallery drains, stormwater inlets, beehive grates and frames, cleanout covers, and special malleable iron castings and inserts are included in this classification.

W-8.02 Materials

Metal castings shall meet the requirements of the following standards, except as otherwise specified herein.

Gray Iron	ASTM Des: A 48
Malleable Iron	ASTM Des: A 47
Carbon Steel	ASTM Des: A 27
Alloy Steel	ASTM Des: A 148
Aluminum	ASTM Des: B 26
Aluminum Bronze	ASTM Des: B 148
Silicon Bronze	Navy Spec. 46B28
Manganese Bronze	ASTM Des: B 132 or B 147
Ductile Iron	ASTM Des: A 536

W-8.03 Workmanship

Castings shall be made accurately to approved dimensions and shall be planed or ground where marked or where otherwise necessary to secure perfectly flat and true surfaces. Allowance shall be made in the patterns so that the specified thickness shall not be reduced. Manhole and cleanout frames and covers shall conform to the details shown on the Plans and shall be true and shall seat at all points. No plugging

of defective castings will be permitted. All castings shall be erected to accurate grades and alignment, and when placed in concrete, they shall be carefully supported to prevent movement during concreting.

W-8.04 Weights

No castings weighing less than 95 percent of the theoretical weight, based on required dimensions, will be accepted. The Contractor shall provide facilities for weighing castings in the presence of the Engineer, or shall furnish invoices showing true weights, certified by the supplier.

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SECTION 10 - DUCTILE IRON PIPE AND FITTINGS

W-10.01 General

All ductile iron pipe shall meet the requirements of AWWA C151. The type and configuration of pipe bedding for buried pipe shall be as shown on the Plans. Coatings and linings for ductile iron pipe and fittings shall conform to the subsection headed "Coatings and Linings," contained herein. Pipe joints shall be bell and spigot, flanged, or mechanical joint as shown on the Plans.

Ductile iron pipe and ductile iron fittings buried in the ground for force mains or installed in pumping stations shall have a minimum thickness of Class 52 unless specified otherwise as shown on the Plans. Ductile push-on iron pipe and fittings for gravity systems, including house laterals, shall be Class 54 and shall have an interior lining as specified in the subsection "Lining for Ductile Iron Gravity Pipe."

W-10.02 Flanged Pipe

Flanged pipe shall conform to the requirements of AWWA C115. Flanges shall be ductile iron and shall have long hubs. There shall be no leakage through the pipe threads, and the flanges shall be designed to prevent corrosion of the threads from outside.

W-10.03 Fittings

All ductile iron fittings shall meet the requirements of AWWA C110, and have a pressure rating of 250 psi, or as specified, whichever is larger.

W-10.04 Flanged Joints

Flanged joints shall meet the requirements of ANSI Specification B16.1. Flanges, flange facing drilling, and protecting shall be as specified for flanged pipe. Bolts and nuts for flanged joints shall be Type 316 stainless steel unless otherwise stated on the Plans or directed by the Engineer.

Except where otherwise directed by the Engineer, gaskets for flanged joints shall be of the full-face type, meeting the requirements of ANSI B16.21. Gaskets shall be rubber with cloth insertion, as made by the Crane Company, Garlock Packing Company, U.S. Rubber Company, or equal.

W-10.05 Mechanical Joints

Mechanical joints shall meet the applicable requirements of AWWA C111.

W-10.06 Push-on Joints

Push-on joints shall be of the bell and spigot type which employs a single, elongated grooved gasket to effect the joint seal. Push-on joints shall meet the applicable requirements of AWWA C111.

W-10.07 Wall Castings, Connecting Pieces, and Special Fittings

Wall castings and connecting pieces, such as bell and bell, bell and spigot, bell and flange, flange and flange, flange and spigot, and flange and flare, shall meet the requirements of ANSI Specification A21.10. Unless otherwise shown or specified, fittings 14 inches and larger shall have a pressure rating of 250 psi.

Where special fittings are required, they shall be of an approved design and shall have the same diameters and thicknesses as standard fittings, unless otherwise required, but their laying lengths and other functional dimensions shall be determined by their positions in the pipelines and by the particular piping materials to which they connect.

Where watertightness is essential and at other locations where indicated, wall castings shall be provided with an integrally cast intermediate collar located at the center of the wall.

W-10.08 Sleeve-Type Couplings

Except where standard solid sleeves or split sleeves are shown or specified, sleeve-type couplings for ductile iron pipe shall be Style 38 couplings as made by Dresser Industries, Inc., or Type 411 as made by Smith-Blair, or equal. Gaskets shall be of molded rubber, Dresser Plain Grade 27, Smith-Blair 003, or equal. Middle rings shall be without a pipe stop and shall be at least 1/4 inch thick and 5 inches wide for 8-inch and smaller pipe, 3/8 inch thick and 7 inches wide for 10-inch through 30-inch pipe, and 1/2 inch thick and 10 inches wide for 36-inch and larger pipe with follower rings of appropriate thickness, unless otherwise shown or specified.

Sleeve-type couplings shall be shop coated with Dresser Red "D" Shop-Coat, Smith-Blair Standard Blue Shop Coat, or equal nontoxic material compatible with the finished coatings specified.

W-10.09 Coatings and Linings

Pipe which is to be buried shall have the standard outside coating specified in AWWA C151-8.1.

Unless otherwise shown on the Plans or specified, all ductile iron pipe and fittings shall have a cement-mortar lining meeting the requirements of AWWA C151-8.2.

The weight and class designation shall be painted conspicuously in white on the outside of each pipe, fitting, and special casting after the shop coat has hardened.

W-10.10 Harnessing

Ductile iron pipe and fittings with mechanical joints that require harnessing shall be provided with ductile iron retainer glands, Megalug, as manufactured by EBAA Iron, or equal. The glands shall be installed in accordance with the manufacturer's recommendations. Set screws shall be tightened to 75 foot-pounds torque. Where the glands are to be buried or not exposed to view, the assembly shall be given 2 heavy coats of asphalt varnish after installation. Ductile iron pipe and fittings with push-on joints that require harnessing shall be Clow F-128 "Super Lock Joint," American Cast Iron Pipe "Lok-Fast Joint," U.S. Pipe and Foundry Company "TR Flex," or equal.

W-10.11 Lining for Ductile Iron Gravity Pipe

All ductile iron pipe and fittings, unless otherwise shown or specified, shall be provided with a special interior lining. For sizes 8 inches in diameter and above, the lining material shall be virgin polyethylene complying with ASTM D 1248 (40 mils thick) heat bonded to the interior of the pipe for all pipe sizes. For 6-inch diameter, the lining material shall either be the aforementioned polyethylene system or a 40 mil thick coal tar epoxy system. All pipe joint bells shall be coated on the inside with the same lining material as used in the pipe barrel. All field cuts shall be field coated with 40 mils of high build epoxy compatible with the lining.

W-10.12 Polyethylene Encasement

Polyethylene encasement shall be installed on all ductile iron pipe and fittings within the sections indicated on the Plans or as directed by the Engineer and in accordance with ANSI/AWWA C105/A21.5.

Although not intended to be a completely air-and-water-tight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill.

Polyethylene encasement shall be installed in accordance with the pipe manufacturer's instructions, or in a manner acceptable to the Engineer. Polyethylene encasement shall extend 1 foot beyond the joint in both directions (a total of 2-foot overlap) and shall be adhered to said joint with 2-inch wide green marking tape. The slack width shall be taken up at the top of the pipe to make a snug, but not tight, fit along the barrel of the pipe, securing the fold at quarter points. Upon installation of the encasement, any cuts or damaged portions of the polyethylene encasement shall be securely mended with tape or with a short length of polyethylene sheet, or a tube cut open, wrapped around the pipe to cover the damaged area, and secured in place.

Backfill material shall be the same as specified for pipe without polyethylene wrapping; however, extra care should be taken that the backfill be free from cinders, refuse, boulders, rocks, stones, or other materials that could damage the encasement. Special care shall be taken to prevent damage to the polyethylene wrapping when placing backfill.

Because prolonged exposure to sunlight will deteriorate polyethylene film, such exposure prior to backfilling the wrapped pipe shall be kept to a minimum.

W-10.13 Ductile Iron Pipe Exterior Coating

All pipe and fittings shall have an exterior asphaltic coating conforming to the following requirements:

Viscosity, KU at 25 degrees C	56-60
Flashpoint, degrees F (TCC)	40 degrees F Min
Dry set to touch, minutes	6
Dry hard, minutes	22

W-10.14 Force Main Identification

Ductile iron pipe sanitary force main shall be continuously spiral wrapped with 2-inch wide green stick-on vinyl tape prior to installation for permanent identification purposes. The tape shall have a minimum thickness of 6 mils with a minimum tensile strength of 22 pounds per inch and a minimum adhesive factor of 40 ounces per inch. The pipe shall be clean and dry when wrapped.

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SECTION 11 - PVC PIPE GRAVITY

W-11.01 General

All pipe and fittings, 6"-27" nominal diameter, shall be solid wall Polyvinyl Chloride (PVC) Pipe **MANUFACTURED** to standards as outlined in the following sections.

All references to ASTM Designations shall include Manufacturing (PVC Cell Classification) and Performance (Inspection, Sampling and Testing) Specifications, and the most recent shall govern. Pipe and fittings meeting **ONLY** the Performance Test Specification will not be acceptable. The minimum nominal diameter for mainline pipe is 8 inches and for laterals is 6 inches. The maximum laying length shall be 13.0 feet.

W-11.02 Standards (6"-15" Diameter)

Solid wall PVC pipe shall comply with ASTM D 3034 and all applicable ASTM documents as covered in Section No. 2 of ASTM D 3034. All pipe and fittings shall be made of PVC plastic having cell classifications as outlined in Section No. 5 "Materials" of ASTM D 3034 and as defined in ASTM D 1784. For depths of cut through 18 feet, a minimum wall thickness of SDR-35 is required. For depths of cut greater than 18 feet, a minimum wall thickness of SDR-26 is required. Fittings shall be either integrally cast (factory molded) or factory solvent welded and a separate section from the mainline pipe. SDR-26 fittings shall be used with SDR-26 pipe.

W-11.03 Standards (18"-27" Diameter)

Solid wall PVC pipe and fittings shall comply with ASTM F 679 and all applicable ASTM documents as covered in Section No. 2 of ASTM F 679. All pipe and fittings shall be made of PVC plastic having cell classifications as outlined in Section No. 4 "Materials" of ASTM F 679 and as defined in ASTM D1784. All pipe and fittings shall meet the wall thickness and cell classification requirements of either T-1 or T-2 of Table 1 "Pipe Dimensions and Minimum Pipe Stiffness" of ASTM F 679. Fittings shall be either integrally cast (factory molded) or factory solvent welded and a separate section from the mainline pipe.

W-11.04 Joints (6"-27" Diameter)

Joints for solid wall PVC pipe and fittings shall be gasket, bell and spigot, push-on type. Joints shall be a molded integral part of the pipe section. Joints or couplings furnished loose shall not be permitted. Solvent cemented joints shall not be permitted. Lubricant shall be as recommended by the pipe manufacturer. (Assembly of gasketed joints is outlined in the Section "Joining of PVC Pipe").

Joints for pipe and for fittings shall comply with ASTM D 3212 "Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals." Elastomeric gaskets shall meet the requirements of ASTM F 477. Joints for pipe and fittings shall comply with ASTM D 3034 for 6"-15" diameter, ASTM F 679 for 18"-27" diameter, and ASTM F 1336 for 6"-27" diameter.

W-11.05 Pre-installation Tests, Reports, Markings and Submittals

All 6"-15" pipe and fittings shall be marked per Section No. 12 "Marking" of ASTM D 3034. All 18"-27" pipe and fittings shall be marked per Section 11 "Marking" of ASTM F 679. All required information shall be marked on the pipe. If in code, the markings shall be decoded in writing by letter to the City in advance.

PRIOR TO SHIPMENT of the pipe and fittings to the project site, the Contractor shall submit to the Engineer certifications as described below duly certified by the manufacturer's testing facility or an independent certified testing laboratory demonstrating full compliance with the applicable ASTM specifications described above. Certification from the supplier is **not** acceptable.

An original plus four (4) copies of the following shall be submitted to the Engineer.

1. The name, address, and phone number of the pipe and fittings manufacturer and the location of the plant at which they will be manufactured.

2. A letter of certification stating that each lot of pipe used on this project has been manufactured, sampled, tested, and conforms to Section 8 "Test Methods" of ASTM D 3034 for 6"-15" diameter and Section 7 "Test Methods" of ASTM F 679 for 18"-27" diameter pipe. A letter of certification from the fittings manufacturer shall be provided stating that all fittings conform with ASTM D 3034 for 6"-15" diameter, ASTM F 679 for 18"-27" diameter, and ASTM F 1336 for 6"-27" diameter.

W-11.06 Bedding Requirements

Unless otherwise indicated on the Plans, solid wall PVC pipe shall be installed with Class "C" bedding as described in Section W-2 - Backfilling." If soil conforming to subsection W-2.04 "Select Fill Material-Sand" is not excavated at the project site, it shall be imported. Compaction requirements are described in subsection W-2.07 "Bedding Placement for Pipelines." In no case shall a concrete cradle be used. Crushed stone shall be NO GREATER THAN a #57 stone.

W-11.07 Post-installation Tests

SCOPE: Prior to final acceptance of the project all PVC pipelines shall be leakage tested, deflection tested, and T.V. inspected. The leakage test shall be performed by the Contractor or a reputable test lab after the subbase has been compacted. The Contractor or a Department of Sanitary Sewers approved test lab shall perform the deflection testing at the expense of the Contractor. The deflection test shall be performed a minimum of 7 days after the base has been compacted and sealed. The City shall perform the T.V. inspection only **AFTER** the pipelines have passed both the leakage and deflection tests.

DEFLECTION TESTING: The PVC pipe/soil system has been designed so that the maximum installed deflection does not exceed 5% or 7.2% of the base inside diameter of the pipe as listed in the following table:

INCHES

Nominal Size	Base Inside Diameter	5% Deflection after 7 days Mandrel	7.2% Deflection after 30 days Mandrel
		SDR-35	
8	7.665	7.28	7.09
10	9.563	9.08	8.85
12	11.361	10.79	10.51
15	13.898	13.20	12.86

Nominal Size	Base Inside Diameter	5% Deflection after 7 days Mandrel	7.2% Deflection after 30 days Mandrel
		TYPE T-1	
18	16.976	16.13	15.70
21	20.004	19.01	18.50
24	22.480	21.36	20.79
27	25.327	24.06	23.43
		SDR-26	
8	7.488	7.11	6.93
10	9.342	8.87	8.64
12	11.102	10.55	10.27
15	13.575	12.90	12.56
		TYPE T-2	
18	17.054	16.20	15.77
21	20.098	19.09	18.59
24	22.586	21.46	20.89
27	25.446	24.17	23.54

The Contractor shall have the option of testing for 5% deflection after the base has been compacted and sealed for 7 days; or for 7.2% deflection after the base has been compacted and sealed for 30 days.

If the pipe fails the 7 day, 5% deflection test, the Contractor shall immediately conduct a 7.2% deflection test. If the pipe passes the 7.2% deflection test, the Contractor has the option of repairing that section at that time or waiting until a minimum of 30 days after the base has been compacted and sealed and then re-testing for a maximum of 7.2% deflection.

If the pipe fails the 7.2% deflection test after 7 days or at 30 days, the Contractor shall repair that section immediately.

If the Contractor performs the deflection testing rather than employing an approved test lab, the following shall apply:

The Contractor shall furnish the mandrel, labor, materials, and equipment necessary to perform the tests as approved by the Engineer. The mandrel shall be pulled through by HAND or a HAND operated reel in the presence of the Engineer. Prior to performing the deflection tests, the Contractor shall submit to the Engineer certification that the 9-arm mandrels are preset as stated above. Each mandrel shall be engraved with the following:

Serial Number
Nominal pipe diameter
Either "ASTM D 3034," year and either "SDR-35" or "SDR26"
or "ASTM F 679," year and either "Type T-1" or "Type T-2"

% deflection as stated above.

If the mandrel fails to pass any section of pipe, the Contractor shall excavate and make all repairs necessary to correct the excessive deflection. The Contractor shall then backfill, recompact, and reseal the permanent pavement base, and retest the line. If the mandrel fails to pass a second time, the section shall be replaced. Re-rounding is **NOT** permitted.

W-11.08 Leakage Testing

The Contractor or a reputable test lab shall perform either an infiltration, exfiltration or an air leakage test as authorized by the Engineer. If the groundwater level is two (2) feet or more above the crown of the pipe, an infiltration test must be performed. The Contractor shall notify the Engineer of the date and time of the test a minimum of 5 days prior to the test.

The infiltration/exfiltration tests shall be performed as described in Section W-18.

AIR TESTING - The minimum time duration permitted for pressure drops of 1.0 psi and 0.5 psi are shown in Tables I and II on the following page and are based on a maximum allowable exfiltration rate of 0.0015 cu. ft./min./sq. ft. of internal pipe surface. Derivations may be found in the Uni-Bell PVC Pipe Association publication: "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe," UNI-B-6-85. (Available from Uni-Bell, 2655 Villa Creek Drive, Suite 155, Dallas, Texas 75234.

The test shall commence after the plugged line has reached a stabilized gauge pressure of 4.0± 1/2 psi. Air testing equipment shall be arranged so that it is located at the ground surface and shall have an approved air relief arrangement to prevent the sewer from being pressurized to greater than 9.0 psig.

If the pressure drops 1.0 psig (or 0.5 psig) before the appropriate time shown in Table I (Page SS-30) or Table II (Page SS-31) has elapsed, the line has failed. In such case, the Contractor shall structurally repair or replace all defective materials and/or workmanship to the satisfaction of the Engineer.

Sealants are **NOT** permitted. The completed pipe installation shall then be retested.

The lengths of lateral sewers may be ignored for computing required test times. In the event a test section (mainline and laterals), having a combined total internal surface area less than 625 square feet, fails to pass the air test when laterals have been ignored; the test time may be reduced per Section 9.4 of UNI-B-6-85. If the reduced test time is short enough to allow the section to pass, the computations shall be included with the test results.

W-11.09 Joining of PVC Pipe

The assembly of gasketed joints shall be performed as recommended by the pipe manufacturer. In all cases, clean the gasket and bell, especially the groove area and the spigot area with a rag, brush, or paper towel to remove any dirt or foreign material before the assembly. Lubricant shall be applied as specified by the pipe manufacturer.

Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Apply firm steady pressure either by hand or by bar and block assembly until the spigot easily slips through the gasket.

If undue resistance to insertion of the pipe end is encountered or the reference mark does not position properly, disassemble the joint and check the position of the gasket. If it is twisted or pushed out of its

seat ("fish-mounted"), inspect components, repair or replace damaged items, clean the components, and repeat the assembly steps. Be sure both pipe lengths are in concentric alignment. If the gasket was not out of position, verify proper location of the reference mark.

To join field-cut pipe, first square cut the pipe end. Use a factory-finished beveled end as a guide for proper bevel angle and depth of bevel plus the distance to the insertion reference mark. Bevel the end using a pipe beveling tool or a wood rasp which will cut the correct taper. Round off any sharp edges on the leading edge of the bevel.

W-11.10 Joining PVC Pipe to Clay Pipe

The joining of PVC to clay pipe shall be accomplished with flexible compression couplings. Such couplings shall meet the requirements of ASTM Des: C 425 and shall be Series No. 1002 flexible polyvinyl chloride couplings with stainless steel compression bands as manufactured by Fernco Joint Sealer Co., Ferndale, Michigan; Band-Seal couplings as manufactured by Mission Clay Products Corp., Whittier, California; or equal. Installation of flexible couplings shall be done in accordance with the manufacturer's instructions.

After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

W-11.11 Joining PVC Pipe to Ductile Iron Pipe

The joining of PVC pipe to ductile iron pipe shall be accomplished with rigid PVC C900 x SDR-35 adapter couplings. Such couplings shall be molded of PVC material meeting ASTM D-1784 specifications. Joints shall meet ASTM D-3213 requirements with gaskets conforming to ASTM F-477. The adapter couplings shall be manufactured by Harco, Lynchburg, Virginia, or equal. Installation of rigid couplings shall be done in accordance with the manufacturer's instructions.

After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

W-11.12 Connection to Manholes

The Contractor will be required to submit a shop drawing, detailing the method of connecting the proposed pipe to the manhole and making it watertight. For connecting PVC pipe, the Contractor shall use a flexible rubber boot, precast into the manhole. The boot shall have stainless steel bands to compress and seal to the proposed pipe or shall be a compression type, such as A-Lock.

Should the flexible rubber boot need to be relocated when connecting to an existing manhole, the Contractor shall perform the connection by one of two methods. The preferred method is to core the manhole and install a rubber boot. The rubber boot shall be manufactured by Kor-n-Seal, or equal. The boot shall be installed and the PVC pipe connection shall be in accordance with the manufacturer's instructions. If the manhole cannot be cored or if the manhole is constructed of brick, the connection shall be made with a PVC manhole adapter which has an exterior impregnated silica surface layer. The adapter shall be manufactured by GPK Products, Inc., Fargo, North Dakota, or equal. The adapter shall be installed and grouted into the manhole wall in accordance with the manufacturer's instructions with non-shrink grout. The PVC pipe shall be inserted through the adapter.

W-11.13 Storage of PVC Pipe

Pipe shall be stored at the job site in unit packages provided by the manufacturer. Caution shall be exercised to avoid compression, damage, or deformation to bell ends of the pipe. When unit packages of PVC pipe are stacked, ensure that the weight of upper units does not cause deformation to pipe in lower units.

PVC pipe unit packages shall be supported by racks or dunnage to prevent damage to the bottom during storage. Supports shall be spaced to prevent pipe bending.

PVC pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam line, engine exhaust, etc.

When unit packages of PVC pipe are stacked, ensure that the height of the stack does not result in instability which could cause stack collapse, pipe damage, bodily injury, and property damage.

The interior as well as all sealing surfaces or pipe, fittings, and other accessories shall be kept free from dirt and foreign matter.

Gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease.

W-11.14 Handling of PVC Pipe - Standard Procedures

When using fork lifts or other handling equipment, prevent damage to PVC pipe.

When handling PVC pipe, avoid severe impact blows, abrasion damage and gouging or cutting by metal surfaces or rocks. Avoid stressing bell joints and damage of bevel ends.

Pipe shall be lowered, not dropped, from trucks and into trenches.

In preparation for pipe installation, placement (stringing) of pipe shall be as close to the trench as practical and on the opposite side from excavated earth. Bell ends shall point in the direction of work progress.

The Engineer may reject any pipe that shows visible signs of damage resulting from poor storage and handling practices.

TABLE I

SPECIFICATION TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in)	Minimum Time (min:sec)	Length for Minimum Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

TABLE II

SPECIFICATION TIME REQUIRED FOR A 0.5 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in)	Minimum Time (min:sec)	Length for Minimum Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.483 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

SECTION 12 - PRECAST CONCRETE MANHOLES

W-12.01 General

Manholes shall be constructed of precast reinforced concrete sections. Each manhole shall have a base section or tee section, barrel section, and an eccentric or concentric cone top, all as required. Manholes shall be built without steps. Except as otherwise specified or shown, precast concrete manholes shall comply with ASTM Des: C 478.

Manholes are classified as either Standard Deep Type Manholes, Standard Shallow Type Manholes, or Standard Drop Manholes. The maximum depths permitted for Standard Shallow Type Manholes and the locations where Standard Drop Manholes are to be used shall be as shown on the Plans.

Manhole barrel sections shall be constructed with preformed openings properly located for making sewer line connections. The diameter of such openings shall be not more than 4 inches larger than the outside diameter of the pipe or pipe bell to be connected. The distance between the nearest edge of such openings and the shoulder of the barrel joint shall be 6 inches minimum.

W-12.02 Materials

Cement, sand, and water shall meet the requirements of the Workmanship and Materials section headed "Concrete Materials."

Brick shall meet the requirements of ASTM Des: C 32 Grade SM and shall have minimum dimensions of 2-1/4 inches by 3-1/2 inches by 7-1/2 inches. Brick shall be new, solid, sound, hardburned throughout, and uniform in size and quality.

Manhole frames and covers shall be of gray iron, shall meet the requirements of the Workmanship and Materials section headed "Metal Castings" and shall conform to the details shown on the Plans.

W-12.03.1 Manholes on Sewers 24 Inches or Less in Diameter

Base sections for Standard Deep Type and Shallow Type Manholes shall consist of a circular slab base with a minimum thickness of 8 inches, and shall be reinforced as shown on the Plans. The base slab may extend beyond the outside diameter of the barrel section a maximum of 6 inches, providing the extension is equal at all points on the circumference of the slab. The manhole shall be set on not less than 6 inches of thoroughly compacted #57 stone.

Barrel sections for Standard Deep Type Manholes shall have an inside diameter of 48 inches plus or minus 1/2 inch and a minimum wall thickness of 8 inches plus or minus 2/5 inch. The minimum cover from the inside face of the wall to the reinforcement shall be 4-1/4 inches, and the minimum cover from the outside face of the wall to the reinforcement shall be 1-1/4 inches. The bottom section of manhole barrel shall be integrally precast with the manhole base section.

Top sections for Standard Deep Type Manholes shall be eccentric cones as shown on the Plans, with a minimum wall thickness of 8 inches plus or minus 2/5 inch. The minimum cover from the inside face of the cone to the reinforcement shall be 4-1/4 inches, and the minimum cover from the outside face of the cone to the reinforcement shall be 1-1/4 inches.

Standard Drop Manholes shall comply with all applicable sections of the specifications for Standard Deep Type manholes and shall conform to the details as shown on the Plans.

W-12.03.2 Manholes on Sewers 27 to 42 Inches in Diameter

Base sections for Standard Deep Type and Shallow Type Manholes shall consist of a circular slab base, 5 feet or 6 feet in diameter as shown on the Plans, with a minimum thickness of 8 inches, and shall be T-Lok lined and reinforced as shown on the Plans. The base slab may extend beyond the outside diameter of the barrel section a maximum of 6 inches, providing the extension is equal at all points on the circumference of the slab. The manhole shall be set on not less than 8 inches of thoroughly compacted #57 stone.

Barrel sections for Standard Deep Type Manholes shall have an inside diameter of 48 inches plus or minus 1/2 inch, be T-Lok lined and a minimum wall thickness of 5 inches plus or minus 1/4 inch, and the minimum cover from the outside face of the wall to the reinforcement shall be 1-1/4 inches.

Top sections for Standard Deep and Shallow Type Manholes shall be a flat slab as shown on the Plans, with a minimum thickness of 10.5 inches and shall be T-Lok lined.

Standard Drop Manholes shall comply with all applicable sections of the specifications for Standard Deep Type manholes and shall conform to the details as shown on the Plans.

W-12.03.3 Manholes on Sewers 48 Inches or Greater in Diameter

Base sections for Standard Deep Type and Shallow Type Manholes shall be precast reinforced concrete pipe tees in the sewer lines as shown on the Plans. The run of each tee shall have the same diameter as the sewer and shall have the same joints. The run section shall conform to the requirements for Class V pipe, ASTM Des: C 76.

Barrel sections for Standard Deep Type Manholes shall have an inside diameter of 48 inches plus or minus 1/2 inch, T-Lok lined and a minimum wall thickness of 5 inches plus or minus 1/4 inch. The minimum cover from the inside face of the wall to the reinforcement shall be 1-1/4 inches, and the minimum cover from the outside face of the wall to the reinforcement shall be 1-1/4 inches. The bottom section of the manhole barrel shall be integrally precast with the manhole base section.

Top sections for Standard Deep Type Manholes shall be a flat slab, T-Lok lined as shown on the Plans, with a minimum wall thickness of 10.5 inches.

Standard Drop Manholes shall comply with all applicable sections of the specifications for Standard Deep Type Manholes and shall conform to the details as shown on the Plans.

W-12.04 Workmanship

Mortar shall be composed of one part cement to two parts sand.

Concrete for the base invert shall be Class D. The invert shall be constructed as shown in detail on the Plans and shall have a smooth channel with a circular shaped bottom with a radius equal to the inside radius of the sewer section.

Connections to pipes shall be without projections or voids. Connections to pipes shall be made with flexible type boot, cast integrally into the wall of the manhole and stainless steel bands, as detailed on the Plans, or equal.

Manhole sections shall be joined with rubber gaskets as specified for reinforced concrete pipe sewers, except that a preformed joint sealing compound, Waterstop-RX Cold Joint Water Stop, Volclay Waterproofing Systems as manufactured by American Collord Co.; Ram-Nek, manufactured by Hamilton-Kent, Kent, Ohio; or equal, be applied in accordance with the manufacturer's instructions. This may be substituted for the rubber gasket in manholes on sewers 42 inches or less in diameter. Sufficient preformed joint sealing compound shall be installed so as to completely fill the joint and show a "squeeze-out" on the inside and outside of the joint. Annular spaces on the inside and outside of joints with rubber gaskets shall be filled with mortar.

The elevation of the top rim of manhole frames shall be set to conform with grades and transverse slopes furnished by the Engineer. Precast concrete manhole components shall not be ordered until such elevations are issued by the Engineer. Manhole frames shall be firmly embedded in mortar. Wedges of shims shall be provided to ensure accurate placing of the frame.

W-12.05 Curing

All precast concrete manhole sections shall be cured in accordance with any one of the methods specified in ASTM Des: C 478. The facilities for curing shall, however, be subject to review and prior approval of the Engineer. No precast concrete manhole sections shall be delivered to the job site until the specified minimum compressive strength of 4,000 psi (6,000 psi in the case of manhole base sections on sewers 48 inches or larger in diameter), as determined by crushing tests on cured concrete cylinders, has been obtained.

W-12.06 Inspection and Testing of Precast Concrete Manholes

All precast concrete manholes shall be inspected by an independent, certified testing laboratory, approved by the Engineer, to establish the strength of the concrete and the adequacy of curing, to certify the date that the manhole were cast and to confirm that the steel has been properly placed, all in accordance with the Plans and Specifications. The cost of these tests shall be included in the various unit price Contract Items, and no special payment will be made therefor. This testing shall be performed by the laboratory at the Contractor's manufacturing plan, prior to shipment.

All concrete cylinders must be cured in a natural environment. At least three (3) cylinders shall be taken each day that manholes are cast, with batch samples to be designated by the laboratory representative. At least one set of cylinders shall be taken for each 9 cubic yards of concrete used in the construction of the manhole sections. These samples shall be tested for strength. If the samples fail to meet minimum concrete strength requirements set forth in the Specifications, all manhole sections manufactured from the concrete from which the cylinders were made will be considered rejected.

In addition, the City reserves the right to core manholes either at the site or point of delivery to validate strength of concrete and placement of steel. If cores fail to demonstrate the required strength or indicate incorrect placement of reinforcing steel, all sections not previously tested will be considered rejected until sufficient additional cores are tested, at the Contractor's expense, to substantiate conformance to these requirements.

W-12.07 Transportation and Delivery

Every precaution shall be taken to prevent injury to the precast manhole sections during the transportations and unloading of the sections. The precast sections shall be unloaded using skids, pipe hooks, rope slings, or suitable power equipment, if necessary, and the sections shall be under perfect control at all times. Under no conditions shall the precast sections be dropped, dumped, or dragged.

If any precast section is damaged in the process of transportation, or handling, such section shall be rejected and immediately removed from the site and replaced at the Contractor's expense.

W-12.08 Test Reports

Each manhole delivered to the construction site must have a concrete test report indicating a minimum of 4,000 psi strength. If the manhole sections are produced from different pours, each section must have a concrete test report. Test reports must be submitted to the Engineer prior to shipment of the manholes.

* * *

SECTION 15 - LAYING AND JOINTING PIPE FOR FORCE MAINS AND SEWERS

W-15.01 General

The installation, delivery, transportation, unloading, and stringing of pipes, fittings, and accessories for force mains and sewers shall be done in accordance with AWWA C600 for ductile iron pipe and ASTM Des: C 12 for clay and concrete pipe and ASTM D 2321 and pipe manufacturer's recommendations for PVC pipe, as modified or supplemented by the specifications of this section and by the details shown on the Plans.

Proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of the pipe and fittings shall be used.

Suitable fittings shall be used where shown and at connections where grade or alignment changes require offsets greater than those recommended by the pipe manufacturer.

Pipes and fittings shall be thoroughly cleaned before they are laid and shall be kept clean until they are accepted in the completed work.

All lines shall be closed off with bulkheads when pipe laying is not in progress.

Before being laid, all pipe and specials shall be thoroughly examined for defects, and no piece shall be installed which is known to be defective. If any defective piece should be discovered after having being installed, it shall be removed and replaced with a sound one in a satisfactory manner by the Contractor at his own expense.

Pipe shall be thoroughly cleaned before it is laid and shall be kept clean until it is accepted in the completed work. Special care shall be exercised to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any such particles are discovered before the final acceptance of the work, they shall be removed and the pipe cleaned at the Contractor's expense.

Pipe laying for sewers shall begin at the low end of a run and proceed upgrade. Generally, all such pipe shall be laid with bells or grooves pointing uphill. Each pipe shall be carefully placed and checked for line and grade.

Adjustments to bring pipe to line and grade shall be made by scraping away or filling in granular material under the body of the pipe, but in no case by wedging or blocking up the barrel. The faces of the spigot ends and the bells shall be brought into fair contact, and the pipe shall be firmly and completely shoved home. As the work progresses, the interior of the pipelines shall be cleaned of all dirt and superfluous materials of every description. All lines shall be kept absolutely clean during construction. Pipelines shall be laid accurately to line and grade.

Gaskets for pipe joints shall be stored in a cool place and protected from light, sunlight, heat, oil, or grease until installed. Any gaskets showing signs of checking, weathering, or other deterioration will be rejected.

Pipe shall be of the types, sizes, and classes shown on the Plans or as listed in the Contract Items.

Each piece of pipe shall be inspected and cleaned before it is lowered in the trench and any lumps or projections on the face of the spigot or tongue end or the shoulder shall be cut away. No cracked, broken, or defective pieces shall be used in the work.

Concrete pipe manufactured with a plastic sheet liner shall be laid so that the liner is on the crown of the pipe and placed symmetrically about the vertical centerline of the pipe.

Pipe laying will be permitted only in dry trenches having a stable bottom. Where groundwater is encountered, the Contractor shall make every effort to secure an absolutely dry trench bottom.

If, in the opinion of the Engineer, the Contractor has failed to obtain an absolutely dry trench bottom by improper or insufficient use of all known methods of trench dewatering, the Engineer may then order the Contractor to excavate below grade and place sufficient selected fill material, crushed stone, or Class D concrete over the trench bottom at the Contractor's own expense.

If all efforts fail to obtain this condition and the Engineer determines that the trench bottom is unsuitable for pipe foundation, he will order in writing the kind of stabilization to be constructed.

W-15.02 Transportation and Delivery

Every precaution shall be taken to prevent injury to the pipe during transportation and delivery to the site. Extreme care must be taken in loading and unloading the pipe and fittings. Such work must be done slowly with skids or suitable power equipment, and the pipe shall be under perfect control at all times. Under no condition shall the pipe be dropped, bumped, dragged, pushed, or moved in any way which will cause damage to the pipe or coating. When handling the pipe with a crane, a suitable pipe hook or sling around the pipe shall be used. Under no condition shall the sling be allowed to pass through the pipe unless adequate measures are taken to prevent damage to the pipe ends.

If in the process of transportation, handling, or laying, any pipe or special is damaged, such pipe or pipes shall be replaced or repaired by the Contractor at his own expense.

The Contractor shall furnish and install suitable blocking and stakes so as to prevent the pipe from rolling. The type of blocking and stakes, and the method of installation, shall be approved by the Engineer.

W-15.03 Pipe Laying - Trenches

Pipelines shall be laid in trench excavation on bedding material as specified under the Workmanship and Materials section headed "Backfilling," Class D concrete cradle or other foundations as shown on the Plans, specified, or ordered in writing by the Engineer. The pipe shall be properly secured against movement and pipe joints shall be made in the excavation as required.

The pipe bedding shall be carefully graded, compacted, and formed to fit the bottom quadrant of the pipe. Bell holes shall be cut out for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.

Where pipelines are laid in Class D concrete cradle or encasement, the installation shall conform to the requirements of the Workmanship and Materials section headed "Pipe Cradles and Encasements."

Pipelines laid on other type foundations shall be installed as specified for such other foundations or as directed in writing by the Engineer.

W-15.04 Lateral Detection Tape

Detectable underground marking tape shall be installed over all laterals from the edge of pavement to the property line. The tape shall be Lineguard encased aluminum foil, or equal. The 2-inch wide tape shall be APWA green and reverse printed bearing the identification of the sewer line below it and a warning such as "CAUTION."

The tape shall be buried 4-6 inches. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill.

W-15.05 Mechanical Joints for Ductile Iron Pipe

In making up mechanical joints, the spigot shall be centered in the bell. The surface with which the rubber gasket comes in contact shall be cleaned thoroughly and the gasket shall be washed thoroughly with soapy water just prior to assembly of the joint. The gasket and gland shall be placed in position, the bolts inserted, and the nuts tightened fingertight. The nuts then shall be tightened by means of a torque wrench in such a manner that the gland shall be brought up evenly into the joint. The following range of bolt torques shall be applied:

Bolt Size Inches	Range of Torque Foot-Pounds
5/8	45 - 60
3/4	75 - 90
1	80 - 100
1-1/4	105 - 120

If effective sealing is not obtained at the maximum torque listed above, the joint shall be disassembled and reassembled after a thorough cleaning.

All bolts and nuts shall be field coated with a bituminous coating after assembly of the joint.

W-15.06 Push-on Joints for Ductile Iron Pipe

In making up push-on joints, the gasket seat in the socket shall be cleaned thoroughly and the rubber gasket shall be wiped clean with a cloth. The gasket shall be placed in the socket and a thin film of lubricant shall then be applied to the inside surface of the gasket that will come in contact with the entering pipe. The plain end of the pipe to be entered shall be cleaned thoroughly and placed in alignment with the bell of the pipe to which it is to be joined. The joint shall be made up by exerting sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket.

W-15.07 Joining Clay Pipe

The joining of clay pipe with flexible plastic joints shall be done in accordance with the manufacturer's instructions. The joint surface on both the bell and spigot ends shall be wiped clean and coated with a lubricant furnished by the manufacturer to facilitate assembly. The spigot end shall be inserted in the bell and pressure applied sufficient to seat the pipe properly. After the joint has been completed, any voids in the excavation beneath the spigot shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

W-15.08 Joining of PVC Pipe-Gravity

The assembly of gasketed joints shall be performed as recommended by the pipe manufacturer. In all cases clean the gasket and bell, especially the groove area and the spigot area, with a rag, brush or paper towel to remove any dirt or foreign material before the assembly. Lubricant shall be applied as specified by the pipe manufacturer.

Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Apply firm steady pressure either by hand or by bar and block assembly until the spigot easily slips through the gasket.

If undue resistance to insertion of the pipe end is encountered or the reference mark does not position properly, disassemble the joint and check the position of the gasket. If it is twisted or pushed out of its seat ("rolled"), inspect components, repair or replace damaged items, clean the components, and repeat the assembly steps. Be sure both pipe lengths are in concentric alignment. If the gasket was not out of position, verify proper location of the reference mark.

To join field-cut pipe, first square cut the pipe end. Use a factory-finished beveled end as a guide for proper bevel angle and depth of bevel plus the distance to the insertion reference mark. Bevel the end using a pipe beveling tool or a wood rasp which will cut the correct taper. Round off any sharp edges on the leading edge of the bevel.

W-15.09 Joining Concrete Pipe

Before joining concrete pipe using flexible rubber gaskets, the joint surfaces of both the bell and spigot (tongue and groove) ends shall be wiped clean. Any lumps, projections, burrs, or chips which would interfere with the proper compression of the gasket shall be repaired. The spigot or tongue end with the gasket in place and with all surfaces lubricated as recommended by the manufacturer, shall be inserted into the bell or groove. Pressure shall be applied to seat the pipe properly in the bell or groove. Voids under the pipe shall be tamped full of granular material to provide full bearing for the pipe.

Curves for reinforced concrete pipe sewers shall be constructed with standard pipe where the opening of the joint on the outside of the curve is less than 1/2 inch. Where greater opening of the joint would be required, the curves shall be constructed using beveled or radius pipe with standard joints.

Curves for reinforced concrete pressure pipe or prestressed concrete pipe shall be constructed with standard pipe sections, where the opening of the joint on the outside of the curve is less than 1/2 inch, or with beveled pipe, precast elbows or combination of these methods.

W-15.10 Concrete Pipe Rubber Gasket Joints

Rubber gaskets shall be of the O-ring type or equivalent cross section approved by the Engineer. The composition and properties of the gaskets for gravity flow sewers shall meet the requirements of ASTM Des: C 443.

Composition and properties for concrete pressure pipe gaskets shall meet the requirements of the specifications for the concrete pressure pipe with which the gasket will be used.

In making O-ring rubber gasketed joints, the gasket and the pipe socket shall be lubricated with an approved rubber gasket lubricant, and the gasket shall be stretched over the spigot and placed accurately in position. The tongue or spigot end shall be carefully centered in the socket of the preceding pipe so as to avoid displacement of the gasket, and the pipe shall be drawn home fully compressing the gasket. Adjustments to line and grade shall be made in such a manner that the compressed rubber gasket will not be disturbed. Before proceeding with backfilling, the joint shall be felt completely around to determine whether the gasket is in its proper position. If the gasket can be felt out of place, the pipe shall be withdrawn and the gasket examined for cuts or breaks. If the gasket has been damaged, it shall be replaced with a new one before the pipe is replaced.

Rubber gaskets shall be stored in a cool place and protected from light, sunlight, heat, oil, or grease until installed. Any gaskets showing signs of checking, weathering, or other deterioration will be rejected.

W-15.11 Temporary Bulkheads

At the ends of contract sections, where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected, temporary bulkheads, approved by the Engineer, shall be built. Such bulkheads encountered in connecting sewers or structures included in the Contract, or pipelines or structures previously built, shall be removed by the Contractor when the need for them has passed or when ordered by the Engineer.

W-15.12 Testing

The testing of pipelines shall be done in accordance with the requirements of the Workmanship and Materials section headed "Leakage Tests."

W-15.13 Joining Clay, Solid Wall PVC, or PVC Composite to Ductile Iron Pipe

The joining of clay pipe to ductile iron pipe shall be accomplished with flexible compression couplings. Such couplings shall meet the requirements of ASTM DES: C 425 and shall be Series No. 1002 flexible polyvinyl chloride couplings with stainless steel compression bands as manufactured by Fernco Joint Sealer Co., Ferndale, Michigan; Band-Seal couplings as manufactured by Mission Clay Products Corp., Whittier, California; or approved equal. Installation of flexible couplings shall be done in accordance with the manufacturer's instructions. After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

The joining of PVC pipe to ductile iron pipe shall be accomplished with rigid PVC C900 x SDR-35 adapter couplings. Such couplings shall be molded of PVC material meeting ASTM D-1784 specifications. Joints shall meet ASTM D-3213 requirements with gaskets conforming to ASTM F-477.

The adapter couplings shall be manufactured by Harco, Lynchburg, VA, or equal. Installation of rigid couplings shall be done in accordance with the manufacturer's instructions. After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

W-15.14 Connection to Manholes

The Contractor will be required to submit a shop drawing, detailing the method of connecting the proposed pipe to the manhole and making it watertight:

1. For connecting vitrified clay or ductile iron pipe, the Contractor shall use nonshrink grout to seal the opening between the pipe O.D. and manufactured opening in the manhole or flexible rubber boot, precast into the manhole. The boot shall have stainless steel bands to compress and seal to the proposed pipe or shall be a compression type, such as A-Lock.

2. For connecting PVC pipe, the Contractor shall use a flexible rubber boot, precast into the manhole. The boot shall have stainless steel bands to compress and seal to the proposed pipe or shall be a compression type, such as A-Lock. Should the flexible rubber boot need to be relocated or when connecting to an existing manhole, the Contractor shall perform the connection by one of two methods. The preferred method is to core the manhole and install a rubber boot. The rubber boot shall be manufactured by Kor-n-Seal, or equal. The boot shall be installed and the PVCP connection shall be in accordance with the manufacturer's instructions. If the manhole cannot be cored or if the manhole is constructed of brick, the connection shall be made with a PVC manhole adapter which has an exterior impregnated silica surface layer. The adapter shall be manufactured by GPK Products, Inc., Fargo, ND, or equal. The adapter shall be installed and grouted into the manhole wall in accordance with the manufacturer's instructions with nonshrink grout. The PVCP shall be inserted through the adapter.

W-15.15 Joint Grouting

Joints for concrete pipelines using rubber gaskets and steel end rings shall be grouted on the outside with cement mortar composed of one part Type IA portland cement to one part sand by volume. The materials shall be thoroughly mixed to produce a uniform mortar with all aggregate particles well coated.

The joint grouting shall not advance closer than two pipe lengths to the laying operations. In grouting the joint, a cloth diaper shall be used to encase the outside diameter of the bell of the pipe and adequately straddle the joint recess so as to keep out dirt and to serve as a form for grouting. The joint space shall be filled with cement mortar, just thin enough to run around the joint. The diaper is to be left in place permanently. Before the mortar has taken its initial set, the diaper shall be examined, and if not completely filled, additional mortar shall be forced into the joint.

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SECTION 18 - LEAKAGE TESTS

W-18.01 General

All pipelines will be tested and inspected for infiltration or leakage by the Engineer with the assistance of the Contractor prior to final acceptance of the work. All tests and inspections will be conducted in a manner to minimize as much as possible any interference with the Contractor's work or progress.

The Contractor shall notify the Engineer when the work is ready for testing and inspecting, and tests and inspections shall be made as soon thereafter as practicable under the direction of the Engineer. Personnel for reading meters, gauges, or other measuring devices will be furnished by the Engineer. The Contractor shall furnish all other labor, materials, services, and equipment, including power, fuel, meters and gauges, pumps, bulkheads, backflow preventers, water, and other items and apparatus necessary for making leakage tests, preparing pipelines for testing, assembling, placing, and removing testing equipment, and placing pipelines in service, all to the satisfaction of the Engineer. Only City water shall be used for testing unless otherwise approved by the Engineer. The water shall be obtained and metered from sources approved by the Engineer. After testing, the water shall be disposed of by the Contractor into storm sewers or drainage courses approved by the Engineer.

W-18.02 Tests of Sewer – General

All sewers shall be tested for infiltration or leakage after completion of backfilling. All wyes, house connections, and stubs shall be suitably plugged or bulkheaded to the satisfaction of the Engineer prior to testing. All sewers shall be cleaned and pumped out as necessary prior to testing.

Sewers shall be tested for infiltration, unless otherwise ordered by the Engineer. If the Engineer determines that groundwater conditions are not suitable for infiltration testing, sewers shall be tested for leakage. Sewers may be tested for leakage by measuring leakage out of the sewer or by air testing. The length of sewer to be tested shall be subject to prior approval by the Engineer.

The length of house connections, if any, will be included in the total length of sewer under test when computing infiltration or leakage.

All testing equipment and the arrangement of such equipment shall be subject to the prior approval of the Engineer. Sections of sewers under test shall be arranged to prevent the internal pressure on any joint from exceeding 10 psi.

Refer to Section 11 - PVC Pipe Gravity for specific requirements for infiltration and leakage testing for PVC gravity pipe.

W-18.03 Infiltration Test of Sewers

Infiltration tests shall be performed when the groundwater level is a minimum of 2 feet above the crown of the sewer at the highest point in the test section. No such tests shall be started until the infiltration conditions are established in the work to be tested. The Contractor shall provide suitable observation wells along the line of the work or other approved means to determine the groundwater level.

Infiltration tests will be made by measuring the infiltrated flow of water over a measuring weir set up in the invert of the sewer a distance, as approved by the Engineer, from a temporary bulkhead or other limiting point of infiltration. Testing shall be for a minimum period of 4 hours. The quantity of infiltration for any section of the sewer shall not exceed 50 gallons/mile/day/inch of pipe diameter.

W-18.04 Leakage Test of Sewers

Leakage tests shall be performed by bulkheading the section of sewer under test at the manhole, at the lower end, and filling the sewer with clear water until the water level is up a minimum of 2 feet above the crown of the sewer or a minimum of 2 feet above the groundwater level, whichever is greater, in the manhole at the highest point in the section. Leakage will be the measured amount of water added to maintain the level in the higher end manhole. Tests shall be carried on a minimum of 4 hours with readings at 30-minute intervals. The quantity of leakage for any section of the sewer shall not exceed the limits specified for infiltration in the subsection headed "Infiltration Test of Sewers."

W-18.05 Air Leakage Test of Sewers

Air pressure leakage tests shall be limited to sewers 30 inches in diameter and smaller. The maximum allowable air leakage is based on prewetted pipe walls. The contractor may, therefore, fill the pipe with clear water and then empty the pipe prior to air testing. When pipe walls are prewetted, air leakage tests shall be completed within 24 hours after filling the sewer section to be tested.

Air pressure tests shall be made by placing the sewer under 3.0 psig air pressure and measuring the volume of air required to maintain this pressure. The rate of air leakage shall be determined when the system reaches an equilibrium state and air flow shall be read by means of an approved rotameter.

The maximum rate of air loss shall be 0.003 cfm per square foot of interior pipe surface, and the maximum air flow shall not exceed 2.0 cfm when the total pressure on the sewer is maintained at 3.0 psig. When the groundwater level is above the invert of the sewer, but below a level adequate for infiltration testing, the maximum air loss shall be reduced 6 percent for each foot of groundwater above the sewer invert.

Air testing equipment shall be arranged so that compressors, valving, gauges, and other test devices are located at the ground surface. Air testing equipment shall have an approved air relief arrangement to prevent the sewer from being pressurized to greater than 10.0 psig.

W-18.06 Leakage Tests of Force Mains

Force mains shall be tested as a whole or in sections valved or bulkheaded at the ends. The mains shall be tested under an average hydrostatic pressure of not less than 100 pounds per square inch, unless otherwise indicated in the Specific Provisions. The pressure shall be applied to the pipeline through a tap in the pipe by means of a hand pump or other method and shall be maintained for a minimum of 4 hours. Air shall not be used for testing force mains.

The leakage for all force mains, as determined by the above test, shall not exceed the allowable leakage for iron water mains as given by the following formula in Section 4.2.2. of AWWA Specification C600:

$$L = \frac{SD \times \sqrt{P}}{133{,}200}$$

in which L is the allowable leakage, in gallons per hour, S is the length of force main tested in feet, D is the nominal diameter of the pipe in inches, and P is the average test pressure in psi gauge.

During the test, each valve shall be operated through several complete cycles of closing and opening. In addition, each valve, when in the closed position, shall have the test pressure applied to one end of the valve only. Each end of the valve shall be tested in this manner. There shall be no visible leakage through the valves, and the valves shall not show any evidence of structural distress.

All harnessed sections of the buried force main shall be completely backfilled before such sections are tested.

W-18.07 Repairing Leaks

When infiltration or leakage occurs in excess of the specified amount, defective manholes, pipe, pipe joints, or other appurtenances shall be located and repaired at the expense of the Contractor. If the defective portions cannot be located, the Contractor, at his own expense, shall remove and reconstruct as much of the original work as necessary to obtain a sewer or force main within the allowable infiltration or leakage limits upon such retesting as necessary and directed by the Engineer.

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SECTION 20 – MAINTAINING EXISTING SANITARY SEWER IN OPERATION

W-20.01 General

It shall be the Contractor's responsibility to preserve all existing sanitary sewer services without interruption while performing the work included in this project. The Contractor shall furnish all labor, materials, and equipment required to bypass wastewater flow around the working area to an acceptable point of discharge. Also, if deemed necessary by the engineer, the Contractor will be responsible to provide necessary noise suppression devices to minimize bypass pump noise.

The Contractor shall not be permitted to pump or otherwise direct the flow of sanitary sewage into storm sewers, streams, or other open channels or onto streets or alleys at any time during the course of the work.

W-20.02 Bypass Pumping

The Contractor shall submit the proposed plan to the Engineer for approval prior to proceeding with the work. All required agency approvals and permits shall be the responsibility of the Contractor. The hydraulic design of the bypass pumping arrangement shall be the sole responsibility of the Contractor.

Pumping equipment shall be of a type suitable for pumping raw unscreened sewage over an indefinite period without clogging or requiring shutdown for routing maintenance. Bypass pumping shall be continuous during the entire length of time each portion of the work is being accomplished. The Contractor shall submit drawings and equipment specifications, detailing the proposed pumping equipment and the method of installation, to the Engineer for approval.

The Contractor shall take all means necessary to minimized the noise associated with the bypass system. The noise associated with the machinery shall not exceed 40 decibels, A-weighed when measured from a distance of 15 feet, or at the property line.

The Contractor shall possess at least one (1) backup pump, no smaller than the largest pump in use, on site for every 1 to 3 bypass pumps in operation. An additional backup pump shall be required on site for each increment of 3 pumps in operation as illustrated on the following table:

Operating Bypass pumps	Required Backup Pumps On Site
1 – 3	1

4 – 6	2
7 – 9	3

W-20.03 Connections

All house laterals and connections to lateral sewers shall be maintained in operation without leakage or backup during the work.

W-20.04 Street Closures

The Contractor shall be responsible for coordination of maintenance of traffic and all street closures with the City of Tampa, Department of Public Works.

W-20.05 Cleanup

When the repair or reconstruction has been completed, all temporary connections and bulkheads shall be removed. Sewers shall be cleaned of all settled solids.

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SECTION 24 - PVC PIPE - FORCE MAIN

W-24.01 General

All pipe and fittings, 4"-48" nominal diameter, shall be solid wall polyvinyl chloride (PVC) pipe manufactured to standards as outlined in the following sections.

W-24.02 Pipe standards

For PVC force mains, 4" through 12", the pipe shall be AWWA C900, DR-18 (class 150). For PVC force mains 14" through 48", the pipe shall conform to AWWA C905, DR-25 The outside diameter dimensions shall be identical to ductile iron pipe dimensions. The pipe shall have integral bell push on type joints conforming to ASTM D3139. Bell ends shall be equipped with elastomeric gaskets meeting the requirements of ASTM F477. The color shall be green and the nominal laying length per pipe section shall be 20 ft.

W-24.03 Pre-Installation Tests, Reports, Markings and Submittals

All pipe and fittings shall be marked per Section 2.6 "Marking Requirements" of AWWA C900.

PRIOR TO SHIPMENT of the pipe and fittings to the project site, the Contractor shall submit to the Engineer test reports and certifications as described below, duly certified by the manufacturer's testing facility or an independent certified testing laboratory demonstrating full compliance with AWWA C900 or C905. Certification from the supplier is not acceptable.

An original, plus four (4) copies of the following, shall be submitted to the Engineer.

1. The name, address, and phone number of the pipe and fittings manufacturer and the location of the plant at which they will be manufactured.

2. **CERTIFICATION AND CERTIFIED TEST REPORTS** that each **LOT** of pipe and

fittings has been manufactured, sampled, and tested per AWWA C900 or C-905. The City shall be provided in writing with the means to cross-reference the markings with the certification and test reports (i.e. date of manufacturer, lot number and shift number etc.). If this information is marked on the pipe in a code, the markings shall be decoded in writing.

W-24.04 Bedding Requirements

Unless otherwise indicated on the Plans, the PVCP force main shall be installed with Class "C" bedding as shown on the plans. If suitable fill material is not excavated at the project site, it shall be imported. Compaction requirements are described in subsection W-24.12 "Bedding Placement for Pipelines". In no cases shall a concrete cradle be used. In the event the Contractor opts to install crushed stone, it shall be **NO GREATER THAN A #57 STONE**.

W-24.05 Fittings

Both PVC and ductile iron fittings are acceptable unless the plans specifically call for PVC fittings. For standard angles, in sizes 4" through 8", fittings shall be injection molded in accordance with AWWA C907 and CSA B137.2.. For larger sizes (10" and greater) and for non-standard angles, fittings shall conform to the requirements of CSA B137.3 and shall be fabricated in a factory from AWWA C900/905 pipe.

Injection molded fittings shall have a dimensional ratio of 18 (DR18) and fabricated fittings shall have a dimensional ratio equal to that of the pipe they are being installed on.

All PVC fittings shall incorporate integral elastomeric gasket bell joints.

Materials used in the manufacture of PVC fittings shall equal or exceed cell class 12454 (ASTM 1784) with a hydrostatic design basis of 27.58 Mpa at 23°C as outlined in AWWA C900 and C905, and CSA B137.3.

Fabricated fittings shall be manufactured from segments of PVC pipe to the requirements of AWWA C900 and C905, and CSA B137.3. Segments shall be bonded together and over wrapped with fiberglass-reinforced polyester. All bends, up to and including 45°, shall be constructed from a single section of PVC pipe, without joints, bonding or fiberglass-reinforced polyester wrapping.

The pressure rating of the fittings shall be equal to the pressure rating of the pipe they are being installed on.

The manufacturer shall meet all the qualification test requirements as outlined in CSA B137.3

All injection molded fittings shall conform to CSA B137.2 and fabricated fittings shall conform to CSA B137.3

All fittings shall be marked with the following identifications:

- Nominal size, CIOD
- Manufacturers name or trademark
- AWWA pressure rating/pressure class and standard number to which the fitting is made
- CSA Standard number
- Proper handling label

W-24.06 Harnessing

Joint restraint devices for all pipes and fittings shall meet requirements as specified under the "RESTRAINING DEVICES" specification. Thrust blocks shall not be allowed.

All wedge devices assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid Xylan fluoropolymer coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be Mega-Bond as manufactured by EBAA Iron, Inc., Eastland, Texas, or approved equal.

W-24.07 Marking and Locating

Two strands of #12 gauge green insulated copper tracing wires shall be attached to the pipe with duct tape at regular intervals in the 10 and 2 o' clock position. The wires shall be looped around each bell. See Section W-13 "Directional Drilling HDPE Pipe" requirements for directional drilled pipe. Wire insulation must be suitable for buried service such as HDPE or HMWPE. Nylon insulation is not acceptable. Wires must be spliced together with wire connectors suitable for buried service such as DBR Kit by 3M, Snakebite by Copperhead Industries or equal. Twisting wires together and sealing with electrical tape is not acceptable. No payment will be made for pipe that does not pass a continuity test through the wires after installation. See standard details for additional requirements.

The locating wire shall terminate at the top of each valve box, air release valve box and manhole and must be capable of extending 24" above the top of the box (or manhole) in such a manner so as not to interfere with the valve operation.

W-24.08 Installation

Installation of PVCP force mains shall comply with the requirements of AWWA Standard C605 "Underground Installation Of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings For Water".

Pipe bending shall not be allowed.

Joint deflections up to a maximum of 1 degree will be permitted at integral bell and spigot joints. Joint deflections up to a maximum of 3 degrees will be permitted by utilizing twin-gasketed couplings instead of integral bell and spigot joints. Deflections larger than 3 degrees may be accomplished with factory molded or fabricated standard angle fittings; or, a standard deflection shall be accomplished with a factory fabricated fitting of the proper angle. Refer to Section W-24.05.

Air release valves shall use service saddles to attach the corporation stop connection to the PVC pipe. The service saddle body shall be sized exactly to the outside diameter of the pipe, with double straps anchored with a minimum of a four bolt pattern. The service saddle body shall be ductile iron, the sealing gasket shall be BUNA-N rubber and the straps shall be corrosion resistant alloy steel.

W-24.09 Testing

Testing of PVCP force mains shall comply with the requirements of AWWA Standard C605 "Underground

Installation Of Polyvinyl Chloride (PVC) Pressure Pipe And Fittings For Water" Section 7 (less references to disinfecting). The hydrostatic and leakage testing may be performed simultaneously. The average hydrostatic test pressure shall be 100 psi.

Air pressure testing of installed pressure pipe is expressly prohibited due to the catastrophic nature of failure should failure occur.

W-24.10 Storage of PVC Pipe

Pipe shall be stored at the job site in unit packages provided by the manufacturer. Caution shall be exercised to avoid compression, damage, or deformation to bell ends of the pipe. When unit packages of PVC pipe are stacked, the Contractor ensure that the weight of upper units does not cause deformation to pipe in lower units.

PVC pipe unit packages shall be supported by racks or dunnage to prevent damage to the bottom during storage. Supports shall be spaced to prevent pipe bending.

PVC pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam line, engine exhaust, etc.

When unit packages of PVC pipe are stacked, ensure that the height of the stack does not result in instability which could cause stack collapse, pipe damage, bodily injury, and property damage.

The interior as well as all sealing surfaces of pipe, fittings, and other accessories shall be kept free from dirt and foreign matter.

Gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease.

W-24.11 Handling of PVC Pipe - Standard Procedures

When using fork lifts or other handling equipment, prevent damage to PVC pipe.

When handling PVC pipe, avoid severe impact blows, abrasion damage and gouging or cutting by metal surfaces or rocks. Avoid stressing bell joints and damage of bevel ends.

Pipe shall be lowered, not dropped, from trucks and into trenches.

In preparation for pipe installation, placement (stringing) of pipe shall be as close to the trench as practical and on the opposite side from excavated earth. Bell ends shall point in the direction of work progress.

The Engineer may reject any pipe that shows visible signs of damage resulting from poor storage and handling practices.

W-24.12 Bedding Placement for Pipelines

Select fill material, used as pipe bedding, shall be placed by hand, in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place. Select fill material pipe bedding shall extend to one foot over the top of the pipe.

Each layer of select fill shall be thoroughly tamped and compacted in place by hand or with suitable mechanical or pneumatic tools to a dry density not less than 95 percent of the maximum dry density as

determined by AASHTO Des: T-180. No stone larger than 4 inches in diameter shall be placed closer than two feet to any point on any pipe.

W-24.13 Trench Backfill

Trench backfilling work shall be done in a manner to prevent dropping of material directly on top of any conduit or pipe from a vertical distance greater than 5 feet. In no case shall backfilling material from a bucket be allowed to fall directly on a structure or pipe and in all cases, the bucket shall be lowered so that the shock of falling earth will not cause damage.

Lumps shall be broken up and if there are any stones, pieces of crushed rock or lumps which cannot be readily broken up, they shall be distributed throughout the mass so that all interstices are solidly filled with fine material.

W-24.14 Backfill for Short Tunnel

Where pipelines are placed in short tunnels, the annular space between the outside of the pipe wall and the tunnel wall shall be completely filled with select fill material or suitable excavated material. Pipelines in short tunnels shall be suitably supported, to permit placing backfill which shall be suitably tamped in place.

W-24.15 Inspection and Testing of Backfilling

All backfill shall be subject to test by the Engineer.

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SECTION 26 - FILLING OF EXISTING SANITARY OR STORM SEWER SYSTEM

W-26.01 General

All void spaces in sewers, manholes, and structures designated to be filled shall be completely filled and closed. The Contractor shall submit to the Engineer for approval a complete description of the equipment, methods, and materials proposed to be employed in demolishing and filling sewers and appurtenances. The Contractor shall be solely responsible for the protection of all utilities, structures and trees, and for the safety of his workmen and the public during the course of the work. All damage to existing utilities, structures, and trees caused by the Contractor's operations shall be promptly repaired by the Contractor to the satisfaction of the Engineer. If, in the opinion of the Engineer, the equipment, methods, and materials proposed by the Contractor may result in damage to nearby structures and utilities or may not assure complete filling of all voids in the sewer and appurtenances to be filled, the Contractor shall alter the equipment, methods, and materials to the satisfaction of the Engineer.

W-26.02 Filling Existing Sewers

Where existing sewers and appurtenances are designated to be filled, the Contractor shall completely fill all sewers, manholes, and other structures with concrete. The concrete shall have a minimum 28-day compressive strength of 500 psi. Fly ash and admixtures, including water reducing agents, plasticizers, and air-entraining agents will be permitted in the mix design for the concrete. No sand will be permitted in the mix design. The concrete mix shall be designed to facilitate flow for long distances by pumping (only) with minimum separation of materials.

Before beginning the grouting operation, the Contractor shall pump clean water through each run of pipe to ensure that there are no obstructions and that the intake/discharge/vent tube system is functional. Prior to and during filling of existing sewers with concrete, the Contractor shall pump or drain water from the storm sewers being filled to other storm sewers, and shall pump or drain water and sewage from the sanitary sewers being filled to other sanitary sewers, as directed by the Engineer to prevent dilution of the fill concrete. Sediment in existing sewers may remain in place.

The Contractor shall fill the sewers with concrete by pumping (only) through vertical pipes passing through bulkheads, all installed by the Contractor and penetrating the pipe to be filled. All intake, discharge, and intermediate vent pipes shall be, at minimum, 4 inches in diameter and installed at regular intervals close enough to ensure complete filling. Filling shall be accomplished in stages as directed by the Engineer. While filling is in progress through one manhole or fill-pipe, the Engineer will observe the level of concrete in the adjacent manhole(s) or pipe(s). If, in the opinion of the Engineer, complete filling of all voids in the sewers and appurtenances is not assured, the Contractor shall install additional fill-pipes or alter his methods of filling, or both, as directed by the Engineer. If, in the opinion of the Engineer, complete filling is still not assured, the Contractor shall excavate and open the top of the pipe at regular intervals as directed by the Engineer to confirm that the entire run is completely filled.

Manhole frames and covers and all other castings and appurtenances shall be removed and conveyed by the Contractor to his own place of disposal unless otherwise directed by the Engineer. The top 2 feet of the manholes shall be removed. Where the manholes are located in grassed areas, 2 feet of top soil shall be placed and the area sodded. Where the manholes are located in the street, the top 2 feet shall be filled with base material or asphalt. All fill-pipes shall be withdrawn and the holes completely filled with concrete. The surface at each manhole and fill-pipe location shall be restored to match the adjacent undisturbed surface to the satisfaction of the Engineer.

Prior to commencing any filling operations, the Contractor shall submit his proposed plan for filling and the proposed concrete mix design for approval by the Engineer. The plan shall show the proposed locations of all fill pipes as well as the location of all existing manholes and structures along the sewer. The plan and mix design shall be revised by the Contractor as considered necessary by the Engineer.

W-26.03 Television Inspection

Prior to grouting of any line, the Contractor shall inspect the pipe by use of a radial view, closed circuit television cameras and shall make a DVD video of the pipe to be grouted so as to identify areas that may have voids in the soil outside of the pipe.

* * *

SECTION 27 - DEMOLITION

W-27.01 General

Demolition includes all work necessary for the removal and disposal of masonry, steel, reinforced concrete, plain concrete, wastewater equipment, piping, electrical facilities, and any other material or equipment shown or specified to be removed. Dust control shall be provided and provision made for safety.

Demolition shall be carried out in such a manner that adjacent structures, which are to remain, shall not be endangered. The work shall be scheduled so as not to interfere with the day to day operation of the existing

facilities, all in accordance with the Sequence of Operations specified in the Specific Provisions. Doorways or passageways in existing facilities shall not be blocked.

Care shall be taken to assure that concrete shall be broken and removed in reasonably small masses. Where only parts of a structure are to be removed, the concrete shall be cut along limiting lines with a specially designed saw so that damage to the remaining structure is held to a minimum.

W-27.02 Requirements Prior to Demolition

The Contractor shall visit the site and inspect all existing structures. Special care shall be taken to observe and record any defects, which may exist in buildings or structures adjacent to but not directly affected by the demolition work. Prior to commencing the demolition, the Contractor shall provide the Engineer with a copy of this inspection.

Drawings of existing structures and equipment will be available for inspection by the Contractor at the office of the Engineer and Owner.

Warning signs, protection barriers and red warning lights shall be provided as necessary adjacent to the work as approved by the Engineer and shall be maintained during the demolition period.

Demolition work shall not be undertaken until all mechanical and electrical services affected by the work have been properly disconnected. Interconnecting piping or electrical services that are to remain in service either permanently or temporarily shall be capped, rerouted or reconnected in a manner that will not interfere with the operation of the remaining facilities.

Where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

W-27.03 Requirements During Demolition

The use of explosives will not be permitted.

All mechanical and electrical equipment shall be carefully protected against dust and debris.

All debris shall be removed from the structures during demolition and not allowed to accumulate in piles.

Safe access to and egress from all working areas shall be provided at all times with adequate protection from falling material.

Adequate scaffolding, shoring, bracing and protective covering shall be provided during demolition to protect personnel and equipment against injury or damage. Floor openings not used for material drops shall be covered with material substantial enough to support any loads placed on it. The covers shall be properly secured to prevent accidental movement.

Adequate lighting shall be provided at all times during demolition.

Areas below demolition work shall be closed to workmen while removal is in progress.

No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected.

No workmen shall stand on any wall to remove material except when adequate staging or scaffold protection is provided at a distance not exceeding 12 feet below the top of such walls and other reasonable precautions are taken. Whenever a workman is required to work at a height of more than 12 feet above a floor, platform, scaffold or the ground, he shall be equipped with a safety belt with a life line attached.

W-27.04 Disposal of Materials

All debris, rubbish, scrap pieces, equipment, and materials resulting from the demolition shall become the property of the Contractor and shall be removed from the site, except for the items designated by the Engineer to be salvaged.

* * *

SECTION 32 - VALVES

W-32.01 General

This section includes all plug and check valves. Plug valves for buried application shall be provided with mechanical joints. Plug and check valves for pumping stations shall be provided with flanges.

All valves of the same type shall be from a single manufacturer. Parts of valves of the same type and size shall be interchangeable.

The Contractor shall prepare and submit for approval complete detail drawings of all valves which shall include submittals for interior and exterior coatings.

All valves shall be carefully erected in their respective positions, free from all distortion and strain, and shall be packed and left in satisfactory operating condition.

W-32.02 Flanges

Flanges shall be cast solid and faced accurately at right angles to the axis of the casting. Flanges shall be faced and drilled and shop coated with a rust preventive compound before shipment.

Dimensions and drillings of flanges shall meet the requirements of ANSI B16.1 for working pressures of 125 pounds per square inch. Special drillings shall be provided where required.

W-32.03 Check Valves

Check valves, unless otherwise specified, shall be APCO Series 100, Val-matic Series 500, or equal of the horizontal, swing type designed to allow full diameter passage and to operate with a minimum loss of pressure.

Check valves shall have body and body cover of heavily constructed cast iron meeting requirements of ASTM A48, Class 30. Check valve body shall have integrally cast-on end flanges. The flapper shall be rubber and have an "O" ring seating edge and be internally reinforced with steel. The flapper shall be easily replaced while the valve remains in place.

W-32.04 Eccentric Plug Valves

Plug valves shall be of the eccentric valve design for not less than 100 psig water, oil, or gas operating pressure; stainless steel bearings that do not require lubrication, bolted bonnet, resilient faced eccentric plug which moves into raised eccentric seat from open to closed position and provides dead-tight shutoff; cast iron body conforming to ASTM A 126 Class B with welded-in nickel seats, straight through flow with port area a minimum of 100% of pipe area and accessibility to multiple packing rings without disassembly of the valve, wrench operated to 8-inch, gear operated 10-inch and larger, chains and chain wheels 7 feet or more above a floor. Valves shall be DeZurik Series PEF.

W-32.05 Knife Gate Valves

Valves shall be of the bonnetless knife gate type with wafer face-to-face flanged connections and shall have a round port equal to or greater than 100 percent of the area of the connecting pipe. Flanges shall be drilled to the ANSI 125/150 pound standard. The valve shall have a pressure rating of 150 psi and shall have a metal-to-metal seat. The valves shall be DeZurik Series L or equal.

The wetted parts of the valve shall be constructed of 316 stainless steel conforming to ASTM A240. The exterior parts of the valve and the valve superstructure shall be constructed of cast iron, ASTM A126, Class B and ASTM A36 carbon steel, respectively. The valve stem shall be stainless steel and have single lead threads. The yoke sleeve shall be constructed of acid-resistant bronze in accordance with ASTM B30, Alloy 84400. The sleeve shall be equipped with a grease fitting for lubrication of the sleeve and threads. The valve body shall incorporate gate guides and jams to assist the seating.

The valve packing shall consist of multiple layers of square or chevron, braided flax and shall be impregnated with marine or petroleum-based lubricants. The packing gland shall be plastic coated or constructed of stainless steel to prevent corrosion. The gate shall have a knife edge and both sides of the gate shall be finished ground.

Valves shall be equipped with a handwheel actuator and shall be mounted as shown on the construction drawings.

W-32.06 Ball Valves for CPVC Piping

Manually operated ball valves for CPVC piping shall be CPVC ball valves having renewable Teflon ball seats and EPDM seals. Ball valves shall block in both seating directions, leaving full pressure on the opposite end of the valve. The CPVC ball valves shall be rated at not less than 150 psi working pressure at 75 degrees F, self-lubricating, and shall have socket end connectors. The ball valves shall be of true union design to allow for inspection or removal. CPVC ball valves shall be as manufactured by Hayward Industrial Products, Inc., or equal.

W-32.07 Ball Check Valves for CPVC Piping

Ball check valves for CPVC piping shall be constructed of solid CPVC and shall have a CPVC ball. The check valve shall have EPDM O-rings and shall be capable of operating either horizontally or vertically. The check valve shall have a full flow design that provides a free open area that is equivalent to the connecting pipe size. The check valves shall have socket end connectors and shall be of the true union design to allow for inspection and removal of the valve. Ball valves for CPVC piping shall be as manufactured by Hayward Industrial Products, or equal.

W-32.08 Testing

All valves shall be given hydrostatic shop pressure tests at twice the working pressure specified. The valves shall be tested, first by applying the hydrostatic pressure with the valve open and then with the valve closed. The valves shall be tight and secure under the test pressure.

Valves shall be tested in place by the Contractor, as far as practicable, and any defects in valves or connections shall be corrected to the satisfaction of the Engineer.

W-32.09 Painting and Coating

The exterior of buried plug valves and the exteriors of check and plug valves for pumping stations shall receive the following coating system:

a) Shop Coat - One, 1.5 mils, MDFT, Sikagard #62 (thinned 10-15%), or equal.

b) Field Coat - Two coats, 10 mils MDFT each, Sikagard #62, No. 300M, or equal.

The iron or steel interior surfaces of plug and check valves shall be factory coated with an approved system.

* * *

SECTION 33 - LEAKAGE TESTS - PUMPING STATIONS

W-33.01 General

All pipelines and structures required to be watertight shall be tested for leakage by the Contractor under the direction of the Engineer. Air and gas lines shall be tested with compressed air and all other pipelines shall be tested with water under the pressures specified herein.

All tests shall be conducted in a manner to minimize as much as possible any interference with the Contractor's work or progress.

The Contractor shall notify the Engineer when the work is ready for testing, and tests shall be made as soon thereafter as possible. Personnel for reading meters, gauges, or other measuring devices, will be furnished by the Engineer, but all other labor, equipment, air, water, and materials, including meters, gauges, smoke producers, blower, fuel, bulkheads, and accessory equipment, shall be furnished by the Contractor.

W-33.02 Pressure Tests

Pressure tests of pipelines shall be made by maintaining the fluid in the pipe at the specified pressure for a period of 30 minutes. The pipelines shall show no leakage.

Test pressures for the various pipelines shall be as follows:

Type of Pipeline	Test Pressure psi
Sewage (Pump Suctions)	5
Sewage (Pressure) - Pump Discharge	100
Water	125
Sump pump discharge	25
Compressed air	200

Drains 5

W-33.03 Tests of Structures

Leakage tests of wet wells and similar purpose structures shall be made before backfilling by filling the structure with water to the overflow height and observing the water surface level for the following 24 hours. Inspection for leakage will be made of the exterior surface of the structure, especially in the area around the construction joints.

Leakage will be accepted as within the allowable limits for structures from which there are no visible leaks and in which the water surface drops not more than 1/2 inch during the 24 hour test.

If visible leaks appear, the structure shall be repaired by removing and replacing the leakage portions of the structure, waterproofing the inside, or by other methods approved by the Engineer. Water for the initial filling of the structure will be supplied by the City. Water for subsequent fillings, if required, shall be at the expense of the Contractor.

SECTION 35 - SUBMERSIBLE PUMPING STATION STRUCTURE WITH CONCRETE PIPE WET WELL

W-35.01 Wet Pit

The wet pit shall be of precast, reinforced concrete sections constructed to the dimensions shown on the Plans. The entire interior surfaces of the top slab and barrel sections shall be covered with plastic sheet lining conforming to the Workmanship and Materials section headed "Plastic Sheet Lining" and the details shown on the Plans. Complete details of all joints in the plastic sheet lining shall be submitted for approval. Reinforcing in the wet pit base and top slabs shall be as shown on the Plans. Reinforcing in the wet pit barrel walls shall comply with ASTM C 76, Class II, Wall "B" except that elliptical reinforcing cages shall not be used. Wet pit barrel sections shall be jointed with a preformed joint sealing compound, Ram-Nek, manufactured by K. T. Snyder Company, Inc., Houston, TX; Kent-Seal, manufactured by Hamilton-Kent, Kent, OH; or equal, applied in accordance with the manufacturer's instructions. Sufficient preformed joint sealing compound shall be installed so as to completely fill the joint and show a "squeeze-out" on the inside and outside of the joint. All excess joint sealing compound shall be cleaned off the interior surfaces of wet pit barrel sections to be lined with plastic sheet liner. All wet pit barrel sections shall be cured in accordance with any one of the methods specified in ASTM C 478. The facilities for curing shall, however, be subject to the review and prior approval of the Engineer. No wet pit barrel sections shall be delivered to the job site until a minimum compressive strength of 4,000 psi as determined by crushing tests on cured concrete cylinders, has been obtained. Preformed openings shall be properly located in the precast sections for making pipe connections. Bedding under the wet pit base slab shall be as shown on the Plans. The wet pit base slab shall be reinforced and placed as shown on the Plans. All anchor bolts for the pump discharge connections shall be cast in the concrete to the dimensions recommended by the pumping equipment manufacturer.

The access covers for the wet pit and valve vault shall be installed in the top slab at the location shown on the Plans. The door leaves shall be 1/4-inch aluminum diamond pattern plate capable of withstanding a minimum live load of 300 pounds per square foot and shall be equipped with an automatic hold-open arm, flush drop handle and locking bar. The door frames shall be 3-inch by 3-inch by 1/4-inch thick aluminum angle with strap anchors bolted to the exterior. All access covers over the wet well shall have 1/4" thick aluminum skirting attached that runs depth of the top slab. Aluminum skirting shall have a flat two-inch return at the bottom of top slab, for the plastic liner of the wet well top slab to terminate on prior to pouring concrete top slab. Contractor shall submit shop drawings detailing the installation and configuration. All

hardware shall be stainless steel. The access cover frame shall be painted as specified under the subsection headed "Painting and Coating" and shall be cast in the concrete top slab. The manufacturer of the access cover shall furnish a guarantee, to the satisfaction of the Engineer, for proper operation and against defects in material and workmanship for a period of five years.

W-35.02 Valve Vault

The valve vault shall be constructed of reinforced concrete to the dimensions shown on the Plans. The valve vault shall be constructed on compacted earth. Wall castings and openings for pipe shall be accurately located to the dimensions and elevations shown on the Plans. Construction joints will be permitted only at the junction of the base slab and the walls and at the junction of the walls and top slab.

W-35.03 Painting and Coating

The access cover frame for the wet pit and for the valve vault shall receive the following coating system:

a) Shop Coat - One, 1.5 mils, Coal Tar Epoxy.

b) Field Coat - Two coats, 10 mils Coal Tar Epoxy.

W-35-04 Inspection and Testing of Precast Concrete Wet Well

All precast concrete wet wells shall be inspected by an independent, certified testing laboratory, approved by the Engineer, to establish the strength of the concrete and the adequacy of curing, to certify the date that the wet wells were cast and to confirm that the steel has been properly placed and sized, all in accordance with the Plans and Specifications and approved submittals. The cost of these tests shall be included in the various unit price Contract Items, and no special payment will be made therefor. This testing shall be performed by the laboratory at the Contractor's manufacturing plant, prior to shipment.

All concrete cylinders must be cured in a natural environment. At least three (3) cylinders shall be taken each day that wet wells are cast, with batch samples to be designated by the laboratory representative. At least one set of cylinders shall be taken for each 9 cubic yards of concrete used in the construction of the wet wells sections. These samples shall be tested for strength. If the samples fail to meet minimum concrete strength requirements set forth in the Specifications, all wet well sections manufactured from the concrete from which the cylinders were made will be considered rejected.

In addition, the City reserves the right to core wet wells either at the site or point of delivery to validate strength of concrete and placement of steel. If cores fail to demonstrate the required strength or indicate incorrect placement of reinforcing steel, all sections not previously tested will be considered rejected until sufficient additional cores are tested, at the Contractor's expense, to substantiate conformance to these requirements. The Contractor is responsible to patch "core holes" in concrete walls and the plastic liner. No additional payment will be made for patching operations.

W-35.05 Transportation and Delivery

Every precaution shall be taken to prevent injury to the precast wet well sections during the transportation and unloading of the sections. The precast sections shall be unloaded using skids, pipe hooks, rope slings, or suitable power equipment, if necessary, and the sections shall be under perfect control at all times. Under no conditions shall the precast sections be dropped, dumped, or dragged.

If any precast section is damaged in the process of transportation, or handling, such section shall be rejected and immediately removed from the site and replaced at the Contractor's expense.

W-35.06 Test Reports

Each wet well delivered to the construction site must have a concrete test report indicating the correct minimum concrete strength. Test reports must also verify that the correct size and placement of reinforcing steel to meet ASTM C-76 requirements. If the wet well sections are produced from different pours, each section must have a concrete test report. Test reports must be submitted to the Engineer prior to shipment of the wet well.

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SECTION 36 - PAINTING

W-36.01 General

Painting includes furnishing all labor, materials, and services to paint all structures and equipment specified and required to complete the work, including, but not limited to, the following: preparation of surfaces; field painting of existing and proposed structures, piping, conduit, ductwork and equipment as specified, and the marking of existing piping and electrical conduit. The work shall include furnishing samples of paints and color charts.

Paint and other materials shall be of the type and quality of the manufacturer on which the coating schedule is based. All coats of paint for any particular surface and thinners used shall be from the same manufacturer. The treatment of the surface to be painted and the application of paint shall be in accordance with the instructions of the manufacturer and as approved by the Engineer. The colors of paints shall be as approved by the Engineer. Specimens, approximately 8 by 10 inches in size, shall be prepared and submitted to the Engineer. The minimum number of specimen custom mixed colors submitted shall be 6 not including color coding colors. Only paint of approved manufacturers shall be delivered and stored at the site.

All painting shall be in accordance with the schedules included in this specification. A supplementary schedule of paint products shall be submitted, with mil thickness, to cover all paint applied. The schedule shall be in accordance with the recommendations of the manufacturer of the paint. The total mil thickness of all coatings shall be not less than the schedule included in this section.

W-36.02 Delivery and Storage

Paints, stains, varnish, or ingredients of paints to be mixed on the job shall be prepared, packed and labeled, and guaranteed by an approved manufacturer. All material shall be delivered to the site in original, unbroken containers.

The manner of and place for storing the painting materials at the site shall be as approved by the Engineer. The storage space shall be kept clean at all times. Every precaution shall be taken to eliminate fire hazards.

W-36.03 Surface Preparation

Prior to painting, all surfaces shall be prepared and cleaned in strict accordance with the paint manufacturer's recommendations and as directed by the Engineer. Surfaces shall be dry before any paint is applied. Special surface preparation work shall be as directed by the manufacturer of the paint specified to be applied to the surface.

Metal Surfaces:

This includes all exterior and interior steel surfaces and all nonferrous metals. This applies to structural and miscellaneous steel, motors, designated housings and protective guards, piping, valves, stairs, and in general, all surfaces to be painted as designated in these specifications.

All surfaces shall be cleaned in accordance with Steel Structures Painting Council standards SSPC - SP1 Solvent Cleaning for removal of grease and oil. This standard allows for pressure washing, detergent cleaning, etc. Additional rust, loose paint, loose mill scale, etc., shall be removed in accordance with SSPC - SP2 Hand Tool Cleaning or SSPC - SP3 Power Tool Cleaning. All welds, beads, blisters or protuberances, other than identification markings shall be ground smooth. Pits and dents shall be filled with a suitable product as approved by the Engineer, and other imperfections shall be removed. Painted edges shall be sanded smooth with adjacent bare metal surfaces.

Where aluminum surfaces come in contact with incompatible metals, lime, mortar, concrete or other masonry materials, these areas shall be given two coats of asphalt varnish conforming to Fed. Spec. TT-V-51F.

Concrete and Wood Surfaces:

Surface preparation of all exterior concrete and wood surfaces shall be pressure washed to remove cobwebs, dirt, dust, and other surface contaminations. Mildew shall be treated with a 22% chlorine solution or otherwise by mixing equal parts solution bleach and water to the affected area. Loose paint and other defects shall be removed by hand; brushing, sanding, chipping or other hand tools or by power; brushes, impact tools, grinders, sanders or other power tools or by any combination thereof. Painted edges shall be sanded smooth to match adjacent bare surfaces.

All interior concrete and wood surfaces including ceilings, walls, and floors shall be cleaned similar to SSPC - SP1 Solvent Cleaning standards. Loose paint and other defects shall be removed by hand; brushing, sanding, scraping, chipping or other hand tools or by power; brushes, impact tools, grinders, sanders or other power tools or by any combination thereof. Painted edges shall be sanded smooth to match adjacent bare surfaces.

Priming shall be performed with Porter Acri-Pro 100, 100% Acrylic, or equal. First and second coats shall be performed with Porter Acri-Shield, 100% Acrylic, or equal. Concrete, concrete masonry, and wood shall be thoroughly dry prior to painting."

W-36.04 Coatings

All paints and similar materials shall be mixed in galvanized iron pans or pails or other approved containers of adequate capacity. All paint shall be stirred thoroughly before being taken from the containers, shall be kept stirred while using, and all ready-mixed paint shall be applied exactly as received from the manufacturer without addition of any kind of drier or thinner, except as specified or as permitted or directed by the Engineer. Successive coats of paint shall be tinted to make various coats easily distinguishable. Undercoats of paint shall be tinted to the approximate shade of the final coat of paint. The paint shall be a minimum temperature of 60 degrees F before application.

Only skilled painters shall be used on the work, and specialists shall be employed where required. Paint shall be applied by brush, roller, or sprayer in accordance with the manufacturer's recommendation. Finished surfaces shall not show brush marks or other irregularities. Top and bottom edges of doors shall be painted.

Undercoats on hollow metal work shall be thoroughly and uniformly sanded with No. 00 sandpaper or equal abrasive to remove all surface defects and provide a smooth, even surface.

Painting shall be a continuous and orderly operation to facilitate adequate inspection. All paint application methods shall be in accordance with the instructions of the paint manufacturer and as approved by the Engineer. Access panels, pipes, pipe covering, ducts, and other building appurtenances built into or adjoining walls to be painted shall be painted the same color as adjacent walls, unless otherwise directed by the Engineer. Hardware and accessories, fixtures, and similar items placed prior to painting shall be removed or protected during painting and replaced on completion of painting. All wall surfaces to be concealed by equipment shall be painted before installation of the equipment.

Areas under and adjacent to painted work shall be fully protected at all times and dripped or splattered paint shall be promptly removed. Painting shall not be done when the temperature is below 60 degrees F, or in dust-laden air, or until moisture on the surface has completely disappeared. If necessary, sufficient heating and ventilation shall be provided to keep the atmosphere and all surfaces to be painted dry and warm until each coat of paint has hardened. Any painting found defective shall be removed and repainted or touched up as directed by the Engineer.

Coatings must be allowed to cure before being recoated or placed into service. Drying time requirements recommended by the manufacturer should be followed exactly.

The final colors shall be as selected by the Engineer from the manufacturer's color charts.

Coverage shall be complete. When color on undercoats shows through the final coat of paint, the work shall be covered by additional coats until the paint is of uniform color and appearance and coverage is complete, at no additional cost.

Rooms or areas being painted shall be supplied with sufficient temporary ventilation during painting operations to keep the atmosphere safe from harmful or dangerous fumes and harmful dust levels for personnel.

All application tools and equipment shall be in good working order and suitable for proper applications. It shall be the Contractor's responsibility to ensure that no paint mist or spatter falls or blows to other objects, vehicles, equipment, buildings, etc.

Coating Schedule:

All painting shall be in accordance with the following schedule. The number of coats shall not be less than the number shown on the schedule.

COATING SCHEDULE					
			Coats		
Surfaces	**SHOP COAT**	**Primer**	**1ST**	**2ND**	**3RD**
Aluminum	A		B	C	
Electrical Conduit	A		B	C	
Steel Pipe, Valves, and Fittings	A		B	C	
Galvanized Steel	A		B	C	
Ductile Iron Pipe, Valves, and Fittings	A		B	C	
Miscellaneous Steel and Ironwork	A		B	C	
Machinery, Interior, and Nonsubmerged		A	B	C	
Exterior Concrete or Masonry		D	E	E	

The designations in the following list are given solely for the purpose of indicating the type and quality of materials desired. Approved equivalent material of other manufacturers may be substituted. All coats of paint for any particular surface shall be from the same manufacturer.

ALPHABETICAL DESIGNATIONS OF PRODUCTS		
Symbol	**Product Name and Number**	Minimum Dry Film Thickness **Mils per Coat**
A	Tnemec N-140 Pota Pox Epoxy	4.0 – 6.0
B	Tnemec Series 446 Perma-Shield	5.0 - 7.0
C	(Above Grade) Tnemec 1074U Endurashield (Below Grade) Tnemec Series 446 Perma-Shield	4.0 - 6.0 5.0 – 7.0
D	Porter Acri-Pro 100, 100% Acrylic	1.2
E	Porter Acri-Shield, 100% Acrylic	1.4

W-36.05 Safety

The Contractor shall be responsible for exercising all necessary precautions to ensure that no accidents or damage to personnel, equipment, or buildings shall occur. The Contractor shall further determine any special operations which could influence the safe workmanship of his personnel with respect to electrical, mechanical, or chemical fumes or fire hazard situations.

When painting in confined areas or otherwise in areas where explosive fumes or gases need to be ventilated, the Contractor shall use suction type fans designated specifically for the safe removal of explosive fumes or gases, and all equipment involved shall meet all OSHA (Occupational Safety Hazard Act) requirements and MSHA (Mine Safety and Health Administration) approved. The Contractor shall be responsible in all respects for the safe conduct of his personnel when using any of the rigging or equipment involved in the accomplishment of the work specified herein.

W-36.06 Cleaning

The Contractor shall touch up and restore any damaged finish. Paint or other finishes spilled, splashed, or splattered shall be removed from all surfaces. Care shall be taken not to mar any surface finish or item being cleaned.

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SECTION 38 - SEWAGE PUMPING EQUIPMENT

W-38.01 General

Sewage pumping equipment shall include the installing of totally submersible, electrically operated sewage pumps complete with all accessories and appurtenances necessary for a complete installation in the pumping station.

Each pump shall be an ITT Flygt, Pump, and shall comply with the drawings and specifications for this project. A single source certificate of conditions and circumstances was executed for this pump. The certificate states that no other pump shall be considered an “or equal” for this project in accordance with the

City's standardization program. The "or equal" clause applies to all other equipment in this project, unless specifically excluded by a single source certificate.

Each pump shall have a substantial guide bracket to permit vertical sliding along not less than two unthreaded stainless steel guide rails from an automatic pump discharge connection at the bottom of the wet pit to the wet pit access cover for inspection, maintenance, and removal of the pump without requiring personnel to enter the wet pit. The pump shall be easily removable from the guide rails and shall require no bolts, nuts, or other fasteners to be disconnected. The guide brackets shall be of stainless steel and shall be an integral part of the pumps. The guide rails shall be Type 304, Schedule 40 stainless steel pipe and shall be connected to the automatic pump discharge connection at the bottom and supported at the top by substantial stainless steel brackets bolted to the concrete sides of the wet pit access opening. The automatic pump discharge connection shall be cast-iron, flanged by plain-end, 90 degree vertical bend with an integral cast-iron support. The support shall be bolted to the floor with not less than four, 3/4-inch diameter stainless steel anchor bolts cast into the concrete. The pump volute discharge shall have a machined flange, which when the pump is lowered into pumping position will automatically and firmly mate with the plain-end of the discharge connection without the need of adjustment, fasteners, clamps, or similar devices. No motion other than vertical shall be required to seat the mating flange of the pump volute to the discharge connection. Sealing of the discharge interface shall be accomplished by only metal contact and the use of a diaphragm, O-ring, or other device will not be permitted. The pump, with its appurtenances, shall be capable of continuous submergence under water without loss of watertight integrity to a depth of 65 feet. No portion of the pump shall bear directly on the floor of the wet pit. Each pump shall be fitted with a stainless steel, welded link chain of adequate length to permit the raising and lowering of the pump for inspection and removal.

W-38.02 Not applicable

W-38.03 Construction

The stator casing, oil casing, sliding bracket, volute, and impeller of each pump shall be of hard, closegrained gray cast iron. All surfaces coming into contact with sewage shall be protected by a coat of Nylon-II, heat fused to the metal. All external bolts and nuts shall be of stainless steel.

The impeller of each pump shall be of non-clog design capable of passing a 3-inch spherical solid, fibrous material, and heavy sludge and shall be constructed with long throughlet without acute turns. The impeller shall be statically and dynamically balanced. Static and dynamic balancing operations shall not deform or weaken the impeller. The impeller shall be firmly secured to the shaft by a stainless steel key and lock nut in such a way that it cannot unscrew or become loosened due to torque resulting from rotation in either direction.

A renewable Buna-N rubber wearing ring shall be installed at the inlet of each pump to provide protection against wear to the impeller.

Each pump shaft shall be of stainless steel conforming to ASTM Des: A 582, Type 416. The shaft shall be accurately machined and polished and of sufficient diameter to carry the maximum load imposed, to assure rigid support of the impeller and to prevent excessive vibration at all operating speeds. The shaft shall be provided with two guide bearings of the ball type of ample size to carry the loads imposed under continuous service without overheating.

Each pump shall be provided with a tandem double mechanical seal running in an oil reservoir having separate, constantly hydro-dynamically lubricated lapped seal faces. The lower seal unit between the pump and oil chamber shall contain one stationary and one positively driven rotating tungsten-carbide ring. The upper seal unit between the oil sump and motor housing shall contain one stationary tungsten-carbide ring

and one positively driven rotating carbon ring. Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Shaft seals without positively driven rotating members or conventional double mechanical seals with a common single or double spring acting between the upper and lower units, requiring a pressure differential to offset external pressure and effect sealing shall not be considered acceptable nor equal to the dual independent seal system specified. The shaft sealing system shall be capable of operating submerged to depths of or pressures equivalent to 65 feet. No seal damage shall result from operating the pumping unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

The pump motors shall be housed in an air-filled watertight casing and shall have Class F moisture resistant insulation. The temperature at any point in the windings shall not exceed 155 degrees C at any load which could be imposed by the pump at any point on its curve. The motors shall be 460-volt, 3-phase, 60-hertz, squirrel-cage induction motors. Each motor shall have a minimum full load efficiency of 85 percent and a minimum full load power factor of 80 percent. Each motor shall be U.L., Inc. or Factory Mutual Engineering Corporation listed for installation and operation in a Class I, Division 2, Group C and D hazardous locations. Each motor shall have a facility for winding high temperature alarm. Each motor shall be provided with a leakage sensor to provide an alarm indication prior to liquid reaching the stator coils. The pumps shall not load the motor beyond its nominal (nameplate) rating at any point on the pump curve. Each pump motor shall be furnished with a minimum service factor of 1.15 or the horsepower rating of the motor shall be a minimum of 15 percent greater than the maximum BHP required over the full range of the pump curve. Electrically and mechanically each pumping unit (pump and motor) shall be capable of a minimum of ten (10) starts per hour.

The motor cable entry water seal shall be such that precludes specific target requirements to ensure watertight and submersible seal. Epoxies, silicones, or other secondary sealing systems shall not be required or used. The cable entry junction box and motor shall be separated by a stator lead sealing gland or terminal board which shall isolate the motor interior from foreign materials gaining access through the pump top. The pump motor cable shall be suitable for submersible pump applications, and this shall be indicated by a code or legend permanently embossed on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be adequate size to allow motor voltage conversion without replacing the cable.

All mating surfaces of major parts shall be machined and fitted with nitrile O-rings where watertight sealing is required. Machining and fitting shall be such that sealing is accomplished by automatic compression in two planes and O-ring contact made on four surfaces, without the requirement of specific torque limits to affect this. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered adequate or equal. Tolerances of all parts shall be such that allows replacement of any part without additional machining required to ensure sealing as described above. No secondary sealing compounds, greases, or other devices shall be used.

Each unit shall be provided with an adequately designed cooling system. Thermal radiators integral to the stator housing, cast in one unit, are acceptable. Where water jackets alone or in conjunction with radiators are used, separate circulation shall be provided. Cooling media channels and ports shall be non-clogging by virtue of their dimensions.

W-38.04 Field Tests

After installation of the pumping units, control equipment, and all appurtenances, each pumping unit will be subjected to a field running test of not less than 24 hours duration under actual operating conditions. The field test shall be made by the Contractor in the presence of and as directed by the Engineer. The field test shall demonstrate that under all conditions of operation, each unit:

1. Had not been damaged by transportation or installation.
2. Has been properly installed.
3. Has no mechanical defects.
4. Is in proper alignment.
5. Has been properly connected.
6. Is free of overheating of any parts.
7. Is free of all objectionable vibration.
8. Is free of overloading of any parts.

The tests shall also demonstrate that the control systems perform as specified and meet all operating criteria.

Any defects in the equipment or operating controls or failure to meet the requirements of the Specifications shall be promptly corrected by the Contractor.

W-38.05 Service

Authorized service facilities must be available in Florida. The pump supplier will stock at the facility one set of recommended spare parts as described below for the pumps specified in this Contract.

Inspection Plug Washers
Impeller Bolt
Impeller Key
Upper Bearing
Lower Bearing
Upper Mechanical Seal
Lower Mechanical Seal
Wear Rings
Motor Cable
Cable Entry Washer/Grommet
Complete Set of O-rings

W 38-.06 Mix-Flush Valves

The Contractor shall supply pumps with mix-flush valves installed on the volutes. The volute shall have an integral mounting pad on which to mount the mix-flush valve. The mounting of the valve shall not void the pump manufacturer's warranty. The valve shall be mounted by the valve manufacturer or agent to assure proper installation and operation.

The mix-flush (or flush) valves shall be hydraulically activated and shall not contain any electromechanical components. The mix-flush system shall be intrinsically safe and suitable for pumps used in hazardous locations Class 1, Division 1, Groups C and D. The flush valve shall be fully automatic and shall operate each time the sewage pump cycles into running mode. The length of time for the flushing action shall be adjustable to a period of between 20 and 50 seconds. A means of adjustment shall be provided on the outside of the valve to obtain the desired flushing period.

The mix-flush valve shall be a standard production item of the pump manufacturer and warranted by the pump manufacturer for a period of 15 months from date of substantial completion. The warranty station shall be within 100 miles of the installation and replacement units shall be kept in stock at all times.

Each new pump shall be provided with a volute plug along with the mix-flush valves.

W-38.07 Spare Parts

One complete set of mechanical seals shall be furnished for each different model of pump furnished in this Contract (unless otherwise specified on the Plans).

* * *

SECTION 43 - MASONRY

W-43.01 General

The Contractor shall provide labor, material, and accessories for the construction of a masonry wall as shown in the Drawings. The wall shall be constructed of 8-inch masonry units as specified herein. The wall shall match the existing privacy wall as nearly as practicable regarding elevations, bond pattern, construction details, and troweled stucco finish.

W-43.02 Concrete Masonry Materials

1. Unit Masonry

All masonry units shall be made of carefully prepared aggregate and shall meet the current ASTM C-90 or ASTM C-129, Grade N requirements as appropriate. Bond beams, lintels, and other structural elements shall be of reinforced concrete or standard weight, hollow concrete units.

2. Mortars

Mortar for masonry walls shall conform to the requirements of ASTM C270 for Type S mortar. Grout for reinforced lintels and concrete masonry bond beams shall be portland cement-lime-sand, Type M mortar conforming to ASTM C 270, consisting of one part portland cement, one-quarter part hydrated lime or lime putty, two parts sand, and two parts pea gravel passing a 3/8-inch sieve. Sufficient water shall be added to produce a consistency for placing without segregation of the constituents.

Mortar shall be freshly mixed, and the quantity of each batch shall not be in excess of the amount that will be used before it has started to set. No retempering will be permitted. Ingredients for each batch shall be accurately measured by volume and combined in the proportions specified. Mortar shall be mixed in mechanically operated mortar batch mixers of the drum type. The drum shall be completely emptied after each batch. No mortar shall be mixed on the ground or floors, and hand mixing will be permitted only for small quantities when approved.

Lime putty shall be made from pulverized quicklime, granular quicklime, or hydrated lime. Quicklime shall be thoroughly slaked in accordance with the directions in the Appendix to ASTM C 5, and the recommendations of the manufacturer. The quicklime shall be allowed to stand not less than 72 hours before using. Hydrated lime shall be soaked at least 12 hours prior to use.

Mortar materials shall be delivered in ample time to facilitate inspection and tests. Mortar and mortar tests shall conform to ASTM C 270, unless otherwise specified.

3. Masonry Accessories

Metal Accessories. Anchors and ties shall be heavily dipped galvanized metal, galvanized after

cutting and fabrication and furnished as specified, unless otherwise indicated. The design of anchors and ties and joint reinforcement shall be as approved by the Engineer. Approved anchors and ties shall be provided as required to secure masonry to adjoining construction. The anchors, ties, and reinforcement shall meet the requirements of ASTM A 82, ASTM A 116 Class 1, and ASTM A 153-B2.

Horizontal Joint Reinforcement. A. A. Wire Products Co., horizontal joint reinforcement product numbers listed are given solely for the purpose of indicating the type and quality of materials desired. Equivalent material of Dur-O-Wal Inc., or other manufacturers may be substituted. The width of the horizontal reinforcing shall be 2 inches less than the actual thickness of the wall or partition in which it is to be placed. Splicing of horizontal reinforcing, including corner and partition reinforcing, shall be done by providing a 6-inch overlapping of side rods.

Corners shall be reinforced with Blok-Trus Corner-Lok, standard 9-gauge (.148) S/R by 9-gauge (.148) C/R.

Intersections between walls and partitions shall be reinforced horizontally with Blok-Trus Partition-Lok, standard 9-gauge (.148) S/R by 9-gauge (.148) C/R, or equal, spaced at 16-inch centers vertically, in the same course as the wall reinforcing.

Solid interior masonry walls shall be reinforced horizontally with Blok-Trus AA600, standard 9-gauge (.148) S/R by 9-gauge (.148) C/R, or equal, spaced at 16-inch centers vertically.

Bolts, Metal Wall Plugs, or other approved metal fastenings shall be provided for securing furring to masonry, and elsewhere as necessary.

W-43.03 Materials, Delivery, Handling, and Storage

Masonry units shall be handled in a manner to prevent undue breakage or chipping. Concrete masonry units shall be unloaded with clamps. All masonry units shall be stored on platforms under shelter or in any other approved manner to protect these materials from soil and weather.

Concrete masonry units that are warped, cracked, or of inferior quality will be rejected and removed from the work and not offered again for inspection.

Cement, lime, and any other accessory materials shall be delivered in their original, unbroken packages or containers with the manufacturer's label thereon and stored clear of the ground in weathertight sheds. Sand shall be delivered under conditions that will permit identification and be stored and protected from contamination by other foreign matter.

Masonry accessories and related materials shall be carefully packed, handled, and stored to prevent soil or damage of any kind at the building site.

W-43.04 Erection - General

Masonry shall not be erected when the ambient temperature is below 40 degrees F with a falling temperature, or when there is a probability of such a condition existing within 48 hours, unless special provisions are made for heating the materials and protecting the work from freezing. Protection shall consist of heating and maintaining the temperature of the masonry materials at not less than 40 degrees F but not more than 160 degrees F, and maintaining an air temperature above 40 degrees F on both sides of the masonry for not less than 72 hours. Work will not be permitted with or on frozen materials. Masonry work which has frozen

before the mortar has set shall be removed and replaced. No units having a film of frost on their surfaces shall be laid in the walls.

Masonry walls shall be carried up level and plumb all around. One section of the walls shall not be carried up in advance of the others, unless specifically approved. Masonry units shall be handled with care to avoid chipping, cracking, and spalling of faces and edges. Drilling, cutting, fittings, and patching to accommodate the work of others shall be performed by masonry mechanics. Masonry shall be cut with masonry saws in exposed work. Structural steelwork, bolts, anchors, inserts, plugs, ties, lintels, and miscellaneous metalwork specified elsewhere shall be placed in position as the work progresses. Chases of approved dimensions for pipes and other purposes shall be provided where indicated or necessary.

Unfinished work shall be stepped back for jointing with new work; toothing will not be permitted, except where specified. All loose mortar shall be removed and the exposed jointing thoroughly wetted for not less than 12 hours before laying new work.

Surfaces of masonry not being worked on shall be properly protected at all time during the construction operation. When rain or snow is imminent and the work is discontinued, the tops of exposed masonry walls and similar surfaces shall be covered with a strong waterproof membrane, well secured in place.

All exposed masonry shall be cleaned after the mortar has set and again upon completion.

All large particles of mortar shall be removed with a putty knife or chisel before cleaning.

W-43.05 Sample Panel

The Contractor shall erect a sample composite panel 4 feet long by 3 feet high. The sample panel shall include the bond pattern and tooled joints with reinforcing and indicate quality of workmanship. The panel may be built as part of a wall.

Masonry work shall not start on the remainer of the wall until the sample panel is approved. The panel shall be used as a standard comparison for all masonry work built of the same material. The panel shall not be destroyed or moved until the work is completed and accepted.

W-43.06 Erection - Concrete Masonry Unit Work

All concrete masonry units shall be true, plumb, and built to the thickness indicated in a running bond pattern. Special units shall be furnished and used where indicated and as specified. Cutting of units shall be avoided insofar as possible. Cutting at the site shall be done with a power-driven carborundum saw. Units shall not be wetted prior to use.

The first course of concrete masonry units shall be laid in a full bed of mortar for the full width of the unit. Bed joints of a concrete masonry unit shall be formed by applying the mortar to the entire top surfaces of the inner and outer face shells, and the head joints shall be formed by applying the mortar for a width of about 1 inch to the ends of the adjoining units laid previously. Mortar for joints shall be smooth, not furrowed, and of such thickness that it will be forced out of the joints as the units are being placed in position. Where anchors, bolts, and ties occur within the cells of the units, such cells shall be filled with mortar or grout as the work progresses. Concrete brick shall be used for distributing concentrated loads and elsewhere as indicated.

Concrete masonry units shall be washed with clean water and soap powder. Fiber brushes shall be used to apply the soap solution and for wiping the work. Wire brushes or acid shall not be used for cleaning concrete masonry units.

W-43.07 Cutting and Patching

Cutting and patching of masonry required to accommodate the work of others shall be performed by masonry mechanics.

W-43.08 Cement Plaster (Stucco)

The Contractor shall apply a troweled, cement plaster (stucco) finish to the exterior face and top of the proposed masonry walls. The color and texture of this finish shall match the finish of the existing masonry walls as nearly as practicable.

The portland cement plaster shall meet the requirements of ASTM C-926. Prior to its application, all unsound concrete, grease, oil, paint, and other foreign materials that will inhibit performance shall be removed. Scratch or brown coats shall be evenly cured and firm enough to receive the finish stucco.

Mixing of the stucco shall conform to applicable sections of ASTM C-926 and product manufacturers' instructions. No retempering of the mix shall be allowed.

Stucco shall be applied in three coats in accordance with ASTM C-926 Standard Specification for Application of Portland Cement Based Plaster. The first and second coats (brown and scratch coats) shall have a minimum thickness of 1/4 inch and the third and final coat shall have a minimum thickness of 1/8 inch.

Curing of the stucco shall be in accordance with manufacturers' instructions and recommendations, depending upon weather conditions. Under conditions of high temperature, low humidity, wind, or other adverse conditions, the Contractor shall apply fog spray or apply a polyethylene film to the stucco in order to minimize the loss of surface water.

* * *

SECTION 60 - PLASTIC SHEET LINING

W-60.01 General

Plastic sheet lining shall be installed on the inside surfaces of concrete pipe, manholes, and structures as shown on the Plans or listed in the Contract Items.

Plastic sheet lining shall be Ameron T-Lock or Plain Sheet Amer-Plate as manufactured by Ameron Protective Linings Products, Brea, California, or equal. All plastic sheet lining and accessories shall be supplied by a single manufacturer.

The manufacturer of the plastic sheet lining shall submit to the Engineer, for approval, samples of the type of sheet and strip proposed for use. No changes in formulation will be permitted without prior approval by the Engineer.

W-60.02 Properties of Materials

The material used in all sheets of plastic liner and in all joint, corner, and weld strips and other accessories shall be a high molecular weight polyvinyl chloride resin and other necessary ingredients compounded to

make permanently flexible sheets and strips for lining concrete pipe and structures. Polyvinyl chloride resin shall constitute not less than 99 percent by weight of the resin used in formulation. Copolymer resins will not be permitted.

All plastic liner sheets including locking extensions, all joint, corner, and welding strips shall be free of cracks, cleavages, or other defects adversely affecting the protective characteristics of the material. Except at shop welds, all plastic liner sheets, joint, corner and weld strips shall have the following properties when tested at 77°± 5°F:

Property	Initial	After exposure for 112 days in chemical solution herein
Tensile Strength	2,200 psi min.	2,100 psi min.
Elongation at break	200% min.	200% min.
Shore durometer, Type D	Within 1 sec. 50-60 ±5 10 sec. 35-50 ±5	(with respect to initial test results)
Weight Change	- ±1.5%	

W-60.03 Details and Dimensions

Plastic liner sheet, strip, and other accessory pieces shall conform to the details and dimensions specified herein and as shown on the Plans.

The minimum thickness of sheet and strip shall be as follows:

Materials	Thickness (inches)
Sheet, integral locking extension	0.065
Sheet, plain	0.094
Joint strip	0.065
Weld strip	0.125

All plastic liner sheets including corner, joint, and weld strips shall be white in color.

Sheets of liner used for pipe shall be sized to provide the coverage required by the Plans. Joint strips, where permitted, shall be 4 inches ±0.25 inch in width and shall have each edge beveled prior to application. Welding strips shall be 1 inch ±0.125 inch in width. All welding and outside corner strips shall have edges beveled at time of manufacture.

All liner to be embedded in concrete shall have integral T-shaped locking extensions. Locking extensions shall be of the same material as the liner, shall be integrally molded or extruded with a height of 0.375 inch and a minimum web thickness of 0.085 inch. They shall be not more than 2-1/2 inches apart and shall be such that when the extensions are embedded in concrete, the liner will be held permanently in place. Locking extensions shall be parallel and continuous except where interrupted for joint flaps, weep channels, strap channels, and for other purposes shown on the Plans or permitted by the Engineer. The liner sheet edge

which will be the lower terminal edge in the pipe shall not extend beyond the base of the final locking extension more than 3/8 inch.

W-60.04 Material Testing

At any time during the manufacture or prior to the final acceptance of the work, the Engineer may sample specimens taken from sheets, strips, or welded joints for testing.

Samples taken as required by the Engineer from sheets, joints, or weld strips may be tested by the City's duly authorized inspection engineers to determine material properties. Determination of tensile strength and elongation will be in accordance with ASTM D 412 using Die B. Determination of indentation hardness will be in accordance with ASTM D 2240 using a Type D durometer, except that a single thickness of material will be used. Determination of change of weight and indentation hardness will be made on 1 x 3-inch specimens. Thickness of specimens will be the thickness of the sheet or strip. The physical properties of the specimens will be determined initially and after exposure to chemical solutions. Test specimens will be conditioned to constant weight at 110°F before and after submersion in the following solutions for a period of 112 days at 77°F ±5°F:

Chemical Solution	Concentration
Sulfuric acid	20%*
Sodium hydroxide	5%
Ammonium hydroxide	5%*
Nitric acid	1%*
Ferric Chloride	1%
Soap	0.1%
Detergent (Linear alkyl, benzyl sulfonate, or LAS)	0.1%
Bacteriological	BOD not less than700 ppm.
*Volumetric percentages of concentrated reagents of C.P. grade.	

At 28-day intervals, specimens will be removed from each chemical solution and tested. If any specimen fails to meet the 112-day requirements specified in the previous subsection before completion of the 112-day exposure, the material will be subject to rejection.

Linear locking extensions embedded in concrete shall withstand a test pull of at least 100 pounds per linear inch, applied perpendicularly to the concrete surface for a period of one minute, without rupture of the locking extensions or withdrawal from embedment. This test, if performed, will be made at a temperature between 70°F to 80°F.

Shop-welded joints, used to fuse individual sections of liner together, shall be at least equal to the minimum requirements of the liner for thickness, corrosion resistance, and impermeability. Welds shall be completely fused, shall show no cracks or separations, and shall be tested for tensile strength. Tensile strength measured across the welded joint in accordance with ASTM D 412 using Die B will be at least 2,000 psi. Test temperature shall be 77°F ±5°F, and the measured minimum width and thickness of the reduced section will be used.

All liner and shop welds shall be tested by the manufacturer at the manufacturer's plant with an approved, properly calibrated, fully charged, electrical hole detector set at 10,000 volts. Sheets having holes shall be

properly repaired in the shop prior to shipment from the manufacturer's plant. Repairs shall be made only by welders qualified as specified in the subsection headed Qualifications for Welders.

W-60.05 Qualifications for Welders

The jointing of plastic sheet lining by hot-air welding is considered highly specialized work. Personnel performing such work shall be adequately trained in welding techniques and shall demonstrate their ability as specified herein.

The Contractor shall secure the services of the lining manufacturer's technical representative to train all welders, including those performing shop welding at the pipe and manhole manufacturing plants and those performing field welding in installed pipe, manholes, and structures. The training shall include instruction in all applicable aspects of the proper technique of hot-air welding of plastic liner, use of welding tools, preparation of joints and materials, testing, and repair of welds and safety precautions. The technical representative shall be thoroughly experienced and shall demonstrate his welding ability in the presence of the Engineer by successfully passing the welding test specified herein. The training sessions shall be conducted within the City of Tampa. The Contractor shall advise the Engineer one week in advance of all training sessions in order to permit the Engineer to attend. The training sessions shall be of adequate duration to provide proper and thorough instruction and experience for the welders. Each welder shall pass a welding test, conducted by the Contractor, in the presence of the Engineer and the lining manufacturer's technical representative as follows:

1. Two pieces of liner, at least 15 inches long and 9 inches wide, shall be lapped 1-1/2 inches and held in a vertical position.

2. A welding strip shall be positioned over the edge of the lap and welded to both pieces of liner. Each end of the welding strip shall extend at least 2 inches beyond the liner to provide tabs.

The weld specimen shall be tested in the presence of the Engineer as follows:

1. The test specimen shall be visually inspected and probed with a putty knife. A bead of molten plastic shall be visible continuously along each side of the weld strip and the weld shall not be able to be separated by probing with the putty knife.

2. Each welding strip tab, tested separately, shall be subject to a 10-pound pull normal to the face of the liner with the liner secured firmly in place. There shall be no separation between the welding strip and liner.

3. The weld shall be tested with an electrical hole detector, recommended by the lining manufacturer, set for a minimum of 20,000 volts, and properly grounded. There shall be no holes or flaws in the weld.

4. The test specimen shall be cut perpendicular to the weld with a sharp instrument across the entire width of the specimen at three locations. At each cut, the weld shall demonstrate complete fusion between the weld strip and the liner sheet.

5. If considered necessary by the Engineer, each of the three sections of the test specimen will be tested in tension across the weld by the City's duly authorized inspection engineers in accordance with ASTM D 412 using Die B at 2,000 psi. No cracks or separations shall occur in the welds.

Upon successful completion of the welding test, the Contractor shall obtain, for each and every welder, a written certification from the lining manufacturer's technical representative stating that the welder has been trained to perform production welding and has successfully passed the specified welding test. Four copies of such certifications shall be submitted to the Engineer before any production welding is performed by the welders at any location on the job or at the pipe or manhole manufacturer's plants. Only certified welders will be permitted to perform any welding of plastic sheet lining under this Contract.

In the event the Contractor desires to add new welders during the course of the work, he shall again secure the services of the manufacturer's technical representative to train, test, and certify the new welders.

All welders shall be observed and given additional on-the-job training for a period of not less than three days by the lining manufacturer's technical representative.

Welding shall not exceed a rate of 6 linear inches per minute unless the Contractor can demonstrate to the complete satisfaction of the Engineer that properly fused welds can be achieved at a faster rate.

The Contractor shall also secure the services of the manufacturer of the electrical hole detector, recommended by the lining manufacturer, to adequately train the welders in the proper use, maintenance, and calibration of the instrument. Training sessions shall be held concurrently with the welding training sessions in the City of Tampa and the Engineer shall be given at least one week's advance notification. The Contractor shall maintain the instruments so that they are properly charged and calibrated whenever used for testing. The Contractor shall make available such electrical hole detectors to the Engineer whenever required for inspection and testing.

All costs associated with the classroom and field training and certification of welders by the lining manufacturer's technical representative and training in the use of the electrical hole detectors shall be included under the various classified Contract Items, and no separate payment will be made therefor.

W-60.06 Installation of Plastic Liner Sheet in Precast Concrete Pipe

Plastic sheet lining shall be installed in concrete pipe to the minimum circumferential coverage limits indicated on the Plans. Complete shop drawings of all plastic liner and accessories and details of installation shall be submitted for approval to the Engineer. All liner installed in pipe shall be positioned so that the T-shaped locking extensions are parallel to the axis of the pipe. The liner shall be centered with respect to the vertical centerline of the pipe when the inner form is positioned. The liner shall be set flush with the inner edge of the bell or socket end of a pipe section and shall extend 4 inches beyond the spigot end to form a joint flap with the locking extensions removed. This 4-inch extension shall be an integral part of the liner sheet and shall not be made by welding a joint strip or other extension to the liner sheet. Care shall be taken to protect the flap from damage. Excessive tension and distortion in bending the flap shall be avoided.

Unless alternate methods are approved by the Engineer, liner required to be secured to the inner form with straps shall have strap channels at not more than 32 inches on center perpendicular to the locking extensions. The channels, 1 inch wide maximum, shall be formed by removing the locking extensions at strap locations so that a maximum of 3/16 inch of the base remains in the strap channel. Strap channels shall not be provided in the final two locking extensions adjacent to the terminal edge of the liner coverage.

At longitudinal intervals approximately 9 feet apart along the sewer, a space not less than 1 inch nor more than 4 inches shall be left in the T-shaped locking extensions to provide transverse weep channels.

Joints in plastic liner sheets shall be kept to a minimum. Where joints are necessary, they shall be permanently welded. The entire circumference of outlets in lined pipe shall be covered in accordance with details shown on the Plans. All welding shall be done only by certified welders qualified as specified in the subsection headed Qualifications for Welders.

When transverse flaps are specified or required, they shall be fabricated by removing locking extensions so that a maximum of 0.032 inch of the base of the locking extensions remains on the sheet.

The liner sheets shall be fastened securely in place on the concrete pipe forms before the reinforcing steel or concrete is placed. Concrete placed against liner shall be carefully vibrated so as to avoid damage to the liner and to produce dense concrete securely anchoring the locking extensions into the concrete. External vibrators shall be used in addition to internal vibrators, particularly along the lower terminal edge of the liner. Stiffeners used along locking extensions of liner, installed in forms for pipe, shall be withdrawn completely during the placement of concrete in the forms. The concrete shall be revibrated to consolidate the concrete in the void spaces caused by the withdrawal of the stiffeners.

In removing forms, care shall be taken to protect liner from damage. Sharp instruments shall not be used to pry forms from lined surfaces. Banding straps used in securing liner to forms for pipe shall be removed within the limits of the unlined inverst; and voids left in the invert at the edge of the liner shall be filled with cement mortar or other material approved by the Engineer.

After the concrete has completely cured, but before shipment from the plant, each section of pipe or fitting will be thoroughly inspected and tested by the City's duly authorized inspection engineers. All lined surfaces and all welds will be inspected visually, probed where necessary with a putty knife, and electrically tested with a properly calibrated and grounded, fully-charged hole detector, recommended by the lining manufacturer, set at 20,000 volts, to detect holes or non-fused welds. All holes and non-fused welds shall be repaired by certified welders in strict conformance to the lining manufacturer's instructions. The repairs will then be retested not less than 48 hours after the repairs were made. When the repairs successfully pass retesting, and after the requirements for inspection and testing specified under the Workmanship and Materials section headed Concrete Sewer Pipe have been met, the pipe section may be shipped from the plant. The Contractor shall obtain, review, and submit to the Engineer four copies of certified reports of all tests on plastic sheet lining made by the City's inspection engineers at the pipe manufacturing plant.

W-60.07 Installation of Plastic Liner Sheet in Precast Concrete Manholes

Plastic sheet lining shall be installed on all interior surfaces of precast concrete manholes on sewers 48 inches in diameter or larger and in other manholes where shown on the Plans or specified. Complete shop drawings of all plastic liner and accessories and details of installation shall be submitted for approval to the Engineer.

Liner sheet in manhole barrel shall be installed as specified in the subsection headed Installation of Plastic Liner Sheet in Precast Concrete Pipe, except that the liner on adjacent manhole barrel sections may be jointed by means of a separate 4-inch wide joint strip rather than an integral, 4-inch long joint flap extending beyond the spigot of one section, at the Contractor's option.

Where manhole cones are lined, the Contractor shall require the manhole manufacturer to have the lining cut to special patterns by the surface of the cone. The manhole manufacturer shall furnish the lining manufacturer sufficient data on the shape of the cones to allow the latter to specially cut the liner so that it may be installed in the cone with the minimum number of joints and welds.

All welding at the manhole manufacturer's plant shall be done only by certified welders qualified as specified in the subsection headed Qualifications for Welders.

Plastic sheet lining and welds in manhole sections may be tested by the City's duly authorized inspection engineers after the concrete is completely cured, but before shipment from the plant, as specified in the subsection headed Installation of Plastic Line Sheet in Precast Concrete Pipe. The Contractor shall obtain, review, and submit to the Engineer four copies of certified reports of all tests on plastic sheet lining made by the City's inspection engineers at the manhole manufacturing plant.

W-60-08 Installation of PVC Sheet Liner on Existing Concrete Surfaces

The concrete surface preparation and installation of the PVC sheet liner with mechanical anchors shall be done as detailed on the plans and in strict accordance with the liner manufacturer's application instructions. The PVC liner shall be installed at the locations shown on the Plans. Complete shop drawings of all plastic liner and accessories and details of the installation shall be submitted to the engineer for approval.

All field welding shall be done only by certified welders qualified as specified in the subsection headed Qualification of Welders.

W-60.09 Installation of Plastic Liner Sheet in Cast-in-Place Structures

The Contractor shall submit complete, detailed shop drawings showing the location of all plastic sheet liner, accessories, connections, and welds for all cast-in-place structures to the Engineer for approval. The Contractor shall secure the assistance of the lining manufacturer in preparing these drawings and arranging layout of liner sheets and location of joints in order to reduce the number of welds to a minimum.

Liner installed in cast-in-place structure walls shall be positioned so that the locking extensions are vertical except in the walls of channels where the locking extensions shall be parallel to the direction of flow. The liner shall be closely fitted to inner forms. Sheets shall be cut to fit curved and warped surfaces using a minimum number of separate pieces. The Engineer may require field sketches or the use of patterns or the marking of sheet layouts directly on the forms where complicated or warped surfaces are involved. At transverse joints between sheets of liner, the space between ends of locking extensions, measured longitudinally, shall not exceed 4 inches. Where sheets are cut and joined for the purpose of fitting irregular surfaces, this space shall not exceed 2 inches. Where form ties or form stabilizing rods pass through the liner, provisions shall be made to maintain the liner in close contact with the forms during concrete placement. Concrete shall be prevented from flowing around the edges of sheets at joints by welding a weld strip over the back of the joint.

At transverse joints in the liner in cast-in-place structures, a gap nor less than 2 inches nor greater than 4 inches shall be left in all locking extensions to provide a transverse weep channel. If locking extensions are removed to provide a weep channel at joints, the base of the extension left on the sheet shall not exceed 0.032 inch. Provisions shall be made to permit any water accumulated behind the liner of concrete manhole shafts to drain into the weep channels of the lined structure.

Joints in liner sheet shall be made by any of the following methods:

1. A 4-inch joint strip shall be centered over the joint between two sheets and secured to each adjacent liner sheet by means of a continuous weld strip. The space between the adjacent liner sheets shall not exceed 1/2 inch.

2. One liner sheet shall overlap he adjacent sheet by not less than 1-1/2 inches nor more than 4 inches. The overlap shall be secured to the adjacent sheet by means of a continuous weld strip. The upstream sheet shall overlap the downstream sheet when the liner is installed in a channel. Locking

extensions shall be removed from the overlapping piece. A weld strip shall also be applied to the back of the joint before concrete is placed.

3. Two adjacent liner sheets shall be butted together and a weld strip applied to both the back and the front of the joint.

Concrete placed against the liner shall be carefully vibrated so as to avoid damage to the liner and to produce dense concrete securely anchoring the locking extensions into the concrete. In removing forms, care shall be taken to protect liner from damage. Sharp instruments shall not be used to pry forms from liner surfaces. When forms are removed (if applicable), any nails that remain in the liner shall be pulled without tearing the liner and the resulting holes clearly marked. Form tie holes shall be marked before ties are broken off and all areas of abrasions of the liner shall be marked. Following completion of form removal, all holes and abrasions shall be repaired as directed by the Engineer.

W-60.10 Jointing of Liner

After lined concrete pipe is installed, the offset of each longitudinal terminal edge of sheet on adjoining pipe shall not be greater than 1-1/2 inches.

All jointing of plastic sheet liner shall be done by hot-air welding and shall be done only by welders qualified and certified in accordance with the subsection headed Qualifications for Welders. Weld strips shall be fusion welded to joint strips and liners. The welding operation at any joint shall be continuous until that joint has been completed. In pipelines welding shall be accomplished by two-man teams.

The Contractor shall provide adequate, continuous mechanically supplied or induced fresh air ventilation at all times in pipelines, manholes, and structures where welding or related work is in progress.

All surfaces to be welded shall be properly and thoroughly cleaned and dried before welding in strict accordance with the lining manufacturer's instructions. Only water soluble or water dispersible, non-flammable cleaners, approved by the lining manufacturer, shall be used. Weld strips shall be centered over the cleaned surfaces to be joined and fused across the entire width of the strip and along its entire length. Incomplete fusion, charred or blistered welds will be rejected.

Hot air welding guns shall be only of the type recommended by the lining manufacturer and shall provide clean effluent air at a constant pressure to the surfaces to be jointed within a temperature range between 500° F and 600° F. The Contractor shall have an approved method for regularly testing the temperature and pressure emitted from all welding guns used in the work. Welding shall not exceed a rate of 6 linear inches per minute unless the Contractor can demonstrate to the complete satisfaction of the Engineer that property fused welds can be achieved at a faster rate.

Unless otherwise permitted by the Engineer, field welding shall not be undertaken in any section of installed pipe that has not successfully passed the specified leakage test.

The termination of lining in lined concrete pipe entering unlined manholes and the termination of lining in concrete pipe, manholes, and structures at openings or pipe stubs shall be as shown on the Plans or as directed by the Engineer.

W-60.11 Inspection and Testing

Unless otherwise specified in the Specific Provisions, formal inspection and testing of installed plastic sheet lining and welds will be performed in two phases as follows:

1. Preliminary inspection will be performed at least 30 days but not more than 60 days after the completion of all lining installation and welding in the entire Contract.

2. Final inspection will be performed at least 30 days but not more than 60 days after the completion of all lining installation and welding in the entire Contract.

The Contractor shall notify the Engineer when the pipeline and structures are ready for each inspection. The Engineer will then schedule each inspection and arrange for a certified welder to be present during the preliminary inspection and the manufacturer's representative to be present during the final inspection. All costs associated with securing the services of the certified welder and the lining manufacturer's technical representative to be present at the inspections to assist the Engineer and report the findings of the inspections and to make recommendations for any necessary remedial action shall be included in the prices bid by the Contractor for the various Contract Items, and no separate payment will be made therefor. The Contractor shall furnish all equipment including, but not limited to, ladders, lights, electrical hole detectors, hard hats, and ventilation equipment. All electrical hole detectors shall be approved by the lining manufacturer and properly calibrated. The Contractor shall provide adequate, continuous mechanically supplied or induced fresh air ventilation in all sections of pipe, including manholes and structures, under inspection. All costs associated with furnishing equipment and ventilation shall be included in the various classified Contract Items, and no separate payment will be made therefor.

Each preliminary inspection will include the following testing and repair procedures:

1. All plastic sheet lining and all welds will be visually inspected. A continuous bead of molten plastic shall be visible on each side of each weld strip.

2. All weld strips will be probed as required with a putty knife to test for possible separations and non-fused welds.

3. All plastic sheet lining and each side of each weld strip will be tested with an electrical hole detector set at 20,000 volts.

4. All holes and flaws will be suitably marked and recorded.

5. Welds suspected of not being properly fused may be cut perpendicular to the weld strip and the cross section of the weld examined to ascertain whether or not it has been properly fused. Such faulty welds will be suitably marked and recorded.

6. The Engineer will then obtain a written report from the certified welder summarizing the findings of each preliminary inspection, listing the flaws and holes detected and specifying specific, remedial action instructions for repair and/or replacement of welds and lining in accordance with the manufacturer's recommendations.

7. All holes shall be repaired by the Contractor in strict accordance with the written instructions.

8. All non-fused welds shall be replaced or repaired by the Contractor in strict accordance with the written instructions.

9. Upon completion of all repairs, the repairs only will be probed with a putty knife and retested using a properly calibrated and grounded, fully charged electrical hole detector set at 20,000 volts.

10. Any flaws in the repairs shall be repaired by the Contractor in strict accordance with the recommendation of the lining manufacturer.

11. All plastic sheet lining and welds which have successfully passed testing with the electrical hole detector will not be retested hereby during preliminary inspections.

The final inspection will include the following testing and repair procedures:

1. The Engineer, with the assistance of the lining manufacturer's technical representative, will randomly select one pipe joint weld as a test weld.

2. Each test weld will be visually inspected, probed as required with a putty knife, and tested with a properly calibrated and grounded, fully charged electrical hole detector set at 20,000 volts.

3. If, in the opinion of the Engineer and the lining manufacturer's technical representative, all of the test welds are satisfactory, the remaining welds in the pipeline, structures, and manholes will be visually inspected only.

4. If, in the opinion of the Engineer and the lining manufacturer's technical representative, any of the test welds are not satisfactory, the remaining welds in the pipeline, structures, and manholes or any selected portion thereof will be subjected to probing with a putty knife and tested with an electrical hole detector.

5. All holes and flaws will be suitably marked and recorded.

6. Welds suspected of not being properly fused may be cut perpendicular to the weld strip and the cross section of the weld examined to ascertain whether or not it has been properly fused. Such faulty welds will be suitably marked and recorded.

7. The Engineer will then obtain a written report from the lining manufacturer summarizing the findings of the final inspection, listing the flaws and holes detected, and specifying specific, remedial action instructions for repair and/or replacement of welds and lining.

8. All holes shall be repaired in strict accordance with the written instructions of the lining manufacturer.

9. All non-fused welds shall be replaced or repaired in strict accordance with the written instructions of the lining manufacturer.

10. Upon completion of all repairs, the repairs only will be probed with a putty knife and retested using a properly calibrated and grounded, fully charged electrical hole detector set at 20,000 volts. The lining manufacturer's technical representative shall be present at all retesting during the final inspection.

11. Any flaws in the repairs shall be repaired in strict accordance with the instructions of the manufacturer.

12. No further testing will be conducted with an electrical hole detector.

13. Upon successful completion of final inspection and testing, the Engineer will obtain from the lining manufacturer a certification stating all welds and plastic sheet lining and accessories and all repair

work have been inspected and tested as required and that, based on the inspection and testing, the quality of the installation appears to meet the standards required by the lining manufacturer for the proper and adequate protection of the lined pipe, structures, and manholes.

Any lining or welds may be visually inspected by the Engineer at any time prior to the expiration of guaranty specified under Article 6.04 Maintenance and Guaranty of the Agreement. Any welds or lining thus found to be separated or defective in any way shall be promptly repaired by the Contractor.

W-60.12 Protection of Liner

The Contractor shall take all measures and precautions necessary to prevent damage to all plastic sheet liner and accessories prior to final acceptance of the work. Any damage occurring to the lining prior to final acceptance shall be repaired by the Contractor as directed by the Engineer. If, in the opinion of the Engineer, damage to the liner is severe, he may require the Contractor to secure the services of the manufacturer's technical representative to inspect the damage and specify remedial action, all at the Contractor's expense.

* * *

SECTION 69 - STEEL SHEETING

W-69.01 General

Steel sheet piling and all necessary structural shapes, bracing, connections, and other items shall be of the form, weights, shapes, and lengths shown, specified, or required. The Contractor shall submit to the Engineer for approval detail drawings of the type of steel sheet piling, shoring and bracing which he intends to use, and the procedure he intends to follow in performing the work.

W-69.02 Materials

Steel sheet piling shall conform to the requirements of ASTM Des: A 328. It shall consist of rolled sections of the continuous interlocking type. The minimum thickness of web and flange metal shall be 3/8 inch, unless otherwise specified.

Rivet steel and structural material in fabricated connections and accessories used with steel sheet piling shall conform to the requirements of ASTM Des: A 502 and A 36.

All sheet piles shall be furnished with standard pulling holes located approximately four inches below the top of the pile, unless specified otherwise.

W-69.03 Driving

Sheet piles shall be carefully located as shown on the Plans, specified, or required, and shall be driven to a plumb position. Sheet piling shall be driven straight, to the lines and grades shown, specified, or required, and shall penetrate to approved depths in firm subsurface material with secure interlocking for the entire lengths. Damaged piling or piles with faulty alignment shall be withdrawn and new piling driven properly in its place. The cost of removing and replacing such piling shall be borne by the Contractor.

Steel sheet piling shall be framed with and connected to other structural members and shapes as shown on the Plans.

Jetting will be permitted only with the written permission of the Engineer. Excavation shall not commence in advance of the steel sheet piling.

W-69.04 Pile Driving Equipment

Pile hammers shall be of approved sizes and types and shall be maintained in proper alignment during driving operations by the use of suitable leads or by guides attached to the hammer. A protecting cap of approved design shall be employed in driving, when required, to prevent damage to the tops of the piles.

* * *

SECTION 113 - DISPOSAL OF DEBRIS

W-113.01 General

The Contractor shall furnish all labor, materials, and equipment required to transport and dispose of debris removed from all pipelines and structures. Debris shall be defined as all material existing in the pipeline for which removal is required to provide a clean pipeline.

W-113.02 Scope of Work

The Contractor will be permitted to transport and temporarily store debris at the Howard F. Curren AWT Plant at 2700 Maritime Boulevard between the hours of 6:00 a.m. to 6:00 p.m., as directed by the Engineer. Within 30 days after the completion of the work, the Contractor will be responsible for hauling the stored debris from the Treatment Plant to an approved disposal site. Final payment will not be issued until the debris is entirely removed from the temporary storage area. The Contractor shall also be responsible for providing all equipment required for dumping and collecting debris at the temporary storage area. No Treatment Plant personnel or equipment will be provided for this purpose. In addition, the Contractor will have the following responsibilities:

a. Be solely responsible to handle, transport, test, permit, and dispose of debris in accordance with all applicable regulatory requirements.

b. For transportation between project site and disposal site.

c. To apply for, pay fees, and obtain all required environmental or transportation permits prior to handling debris. Permitting agencies include, but are not limited to, EPA, DER, DOT, Hillsborough County, City of Tampa, and Expressway Authority.

d. To perform all necessary tests as required by permit and all applicable regulatory requirements.

e. To select a disposal site and acquire approval from the disposal site owner for disposal of debris. The Contractor is responsible to pay all applicable disposal fees.

* * *

SECTION 560 - GALVANIZED STEEL FENCE

W-560.01 General

Fencing shall be the chain link type with diamond mesh woven wire fabric.

All chain link fence shall have a continuous top rail and a tension wire at the bottom.

All fabric, supports, and fittings shall be of steel, except as hereinafter specified.

All fencing and accessories shall be installed according to the manufacturer's recommendations.

Pipe sizes and weights shall meet the requirements of ANSI B36.10 Table 2 and ASTM A 120 Table 1. All pipe sizes listed are nominal, unless otherwise indicated.

W-560.02 Fabric

The fabric shall be one piece woven 2-inch mesh chain link of 6-gauge steel wire with a minimum breakload of 2170-lbs/ft. and be interwoven to form a continuous fabric with no splices and be hot-dip galvanized after weaving. The top selvage shall be knuckled and the bottom selvage shall be twisted and barbed. The fabric shall be cleaned of all grease and foreign matter before shipping. The fabric shall be tightly stretched approximately two inches above grade level and attached to terminal or gate posts by beveled tension bands and tension bars.

W-560.03 Tension Wire

Tension wire for the fence bottom shall be minimum 7-gauge galvanized coil spring steel. The tension wire shall be attached to the bottom of the fabric by hog rings spaced at 24-inch intervals and to the terminal posts by brace bands.

W-560.04 Top and Brace Rails

The top rail shall be furnished in approximately 20-foot lengths with couplings approximately 6 inches long for each joint. One coupling in each 5 shall have an expansion spring. The rail shall be continuous from end-to-end for each run of fence. Brace rails shall be provided at all terminal posts, located midway between the top and bottom of the fabric and shall extend from the terminal post to the first adjacent line post. They shall be securely fastened at both ends. Top and brace rails shall be galvanized steel.

Top and brace rails shall be 1-1/4-inch, Schedule 40 pipe or shall be a 1.625-inch by 1.25-inch roll-formed section with minimum bending strength of 192 pounds on 10-foot span.

W-560.05 Posts

All posts shall be galvanized steel pipe or roll-formed sections.

Pipe posts shall be as follows:

End, Corner, and Pull Posts: 2-1/2-inch Schedule 40 pipe

Line Posts: 2-inch Schedule 40 pipe

Gate Posts: For leaves up to 6 feet wide
2-1/2-inch Schedule 40 pipe

For leaves over 6 feet to 12 feet wide
3-1/2-inch Schedule 40 pipe

For leaves over 12 feet to 18 feet wide
6-inch Schedule 40 pipe

Roll-formed or tube posts shall be as follows:

	Minimum Bending* Strength lbs.
End, Corner, and Pull Posts:	
3.5 x 3.5 roll-formed	452
2-1/2-inch square tube	547
Line Posts:	
For fences 8 feet-0 inch max. height	
1.875 x 1.625 C Section	245
For fences over 8 feet-0 inch high	
2.25 x 1.703 C Section	347
Gate Posts:	
For leaves up to 6 feet wide	
3.5 x 3.5 roll-formed or	452
2-1/2-inch square tube	645
For leaves over 6 feet wide to 12 feet wide and for leaves over 12 feet wide to 18 feet wide, same as for pipe posts above.	

*Minimum bending strength in pounds under a 6-foot cantilever loading.

Posts shall be set plumb in concrete encasement at not more than 10-foot centers in the line of the fence with the tops properly aligned. Concrete encasement for line posts shall extend a minimum of 3 feet below finish grade with a minimum diameter of 10 inches. Concrete encasement for terminal, corner, and gate posts shall extend 40 inches below finished grade, except gate posts for leaves greater than 6 feet, for which the encasement shall extend 54 inches below grade. The minimum diameter of encasement for terminal, corner, and gate posts shall be sufficient to provide not less than 4 inches between any part of the post and the face of the concrete and in no case shall the diameter be less than 12 inches. Line posts shall be set 32 inches into the concrete and all other posts shall be set 36 inches, except gate posts for leaves greater than 6 feet wide, which shall be set 48 inches into the concrete. The top exposed surface of the concrete shall be sloped to shed water and provide a neat appearance.

W560.06 Gates

The perimeter construction for gates with leaves up to 6 feet wide shall be 1-1/2-inch Schedule 40 pipe or 1-1/2-inch square steel tube, and for gates with leaves greater than 6 feet wide shall be 2-inch Schedule 40 pipe or 2-inch square steel tube.

The gates shall have sufficient horizontal and vertical members and bracing to ensure structural stability to prevent sagging and provide for attachment of fabric, hardware, and accessories. Gates shall have diagonal cross bracing consisting of 3/8-inch diameter adjustable length truss rods where necessary to provide frame rigidity without sag or twist.

Gates shall be equipped with hinges, latches, center stops, hasps, and holdbacks. Hinges, latches, center stops, hasps, and holdbacks shall be cast-iron, malleable iron, or pressed steel hot-dip galvanized after fabrication. Double gates shall be provided with a center drop bar and gate holdbacks.

Gate latches shall be positive locking, pivoting type with the padlocking arrangement accessible from either side of the gate.

The City shall furnish padlocks for the gate.

All gates shall be hung on offset hinges to permit swinging the gate through a 180-degree arc to lie, when not obstructed, along and parallel to the line of the adjacent fence.

W-560.07 Attachments

Tension bars shall be 3/16-inch by 3/4-inch galvanized carbon steel attached to the terminal posts by means of beveled edge bands.

Truss rods shall be 3/8-inch diameter galvanized carbon steel. Truss rods shall be securely mounted between the line post end of the brace rail and the base of the terminal post.

Post tops of galvanized pressed steel or malleable iron shall form weathertight caps for pipe or tube posts. Provision shall be made for installation or passage of the top rail.

Brace bands and tension bands shall be galvanized steel, of the "unclimable" beveled edge type with 3/8-inch diameter square shouldered aluminum carriage bolts, nonremovable from outside of the fence.

Rail couplings shall be of the outside sleeve type, not less than 6 inches long, self-centering, and providing for expansion and contraction. Rail couplings shall be galvanized steel.

Fabric ties shall be of 9 gauge alloy 1100-H18 or equal aluminum wire. Fabric ties shall be spaced approximately 14 inches apart on the line posts and 24 inches apart on the rails. Clips used with C-section posts shall be galvanized 11 gauge steel wire.

Hog rings shall be 11 gauge wire, aluminum alloy, Type 6061-T6.

W-560.08 Galvanizing

Galvanizing shall meet the requirements of Workmanship and Materials section headed "Galvanizing."

W-560.09 PVC Coating

The galvanized steel fence shall be provided with PVC coating as shown on the plans, specified, and directed by the Engineer. The PVC coating shall be green in color.

The PVC coating shall comply with the following requirements:

Fabric - 7 mils (minimum)
Tension-wire - coated to match fabric
Posts, rails, etc. - 10-15 mils

All PVC coating shall be in accordance with ASTM F-668.

* * *

SECTION W-800 SERIES - HIGH DENSITY POLYETHYLENE PIPE (HDPE)

W-800.01 General

The purpose of this specification is to cover the requirements for the manufacturing, materials, testing, couplings, fittings and delivery of High Density Polyethylene Pipe (HDPE) to the City of Tampa.

W-800.02 Standards

The HDPE pipe shall be manufactured from a PE 4710 resin. The resin material shall meet the specifications of ASTM D 3350 with a minimum cell classification of 445574CC. Pipe shall have a manufacturing standard of ASTM F 714. The pipe shall have ductile iron size (DIPS) outside diameter unless noted otherwise. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

W-800.03 Fittings

A. BUTT FUSION FITTINGS: Molded butt fusion fittings shall be in accordance with ASTM D 3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe. The fitting shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

B. ELECTROFUSION FITTINGS: Electrofusion Fittings shall be PE 4710 HDPE, minimum cell classification of 445574C meeting ASTM D 3350 and be the same base resin as the pipe. Electrofusion Fittings shall have a manufacturing standard of ASTM F 1055.

C. FLANGED AND MECHANICAL JOINT ADAPTERS: Flanged and Mechanical Joint Adapters shall be PE 4710 HDPE, Cell Classification of 445574C meeting ASTM D 3350 and be the same base resin as the pipe. All adapters shall be pressure rated to provide a working pressure rating no less than that of the pipe.

D. MECHANICAL RESTRAINT: Mechanical restraint for HDPE may be provided by mechanical means separate from the mechanical joint gasket sealing gland. The restrainer shall provide wide, supportive contact around the full circumference of the pipe and be equal to the listed widths. Means of restraint shall be machined serrations on the inside surface of the restrainer equal to or greater than the listed serrations per inch and width. Loading of the restrainer shall be by a ductile iron follower that provides even circumferential loading over the entire restrainer. Design shall be such that restraint shall be increased with increases in line pressure. Serrated restrainer shall be

ductile iron ASTM A 536 with a ductile iron follower; bolts and nuts shall be corrosive resistant, high strength alloy steel. The restrainer shall have a pressure rating of, or equal to that of the pipe on which it is used or 150 PSI whichever is lesser. Restrainers shall be EBAA Iron Megalug or approved equal.

Nominal Size	Restraint Width	Serrations per inch
4", 6"	1-1/2"	8
8" 10 & 12"	1-3/4"	8

Pipe stiffeners shall be used in conjunction with restrainers. The pipe stiffeners shall be designed to support the interior wall of the HDPE. The stiffeners shall support the pipe's end and control the "necking down" reaction to the pressure applied during normal installation. The pipe stiffeners shall be formed of 304 or 316 stainless steel to the HDPE manufacturers published average inside diameter of the specific size and DR of the HDPE. Stiffeners shall be by JCM Industries or approved equal.

W-800.04 Joining

A. BUTT FUSION: Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself.

B. SIDEWALL FUSION: Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.

C. MECHANICAL: Bolted joining may be used where the butt fusion method cannot be used. Flange joining will be accomplished by using a HDPE flange adapter with a 316 stainless steel back-up ring. Mechanical joint joining will be accomplished using either a molded mechanical joint adapter or the combination of a Megalug Restrainer and Pipe Stiffener as manufactured by EBAA Iron, Inc. or approved equal. Either mechanical joint joining method will have a ductile iron mechanical joint gland.

D. OTHER: Socket fusion, hot gas fusion, threading, solvents, and epoxies may not be used to join HDPE pipe.

W-800.05 Pipe Packaging, Handling & Storage:

The manufacturer shall package the pipe in a manner designed to deliver the pipe to the project neatly, intact and without physical damage. The transportation carriers shall use appropriate methods and intermittent checks to insure the pipe is properly supported, stacked and restrained during transportation such that the pipe is not nicked, gouged, or physically damaged.

Pipe shall be stored on clean, level ground to prevent undue scratching or gouging. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by chokers or lifting equipment.
Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the heat fusion joining method.

Fused segments of the pipe shall be handled so as to avoid damage to the pipe. Chains or cable type chokers must be avoided when lifting fused sections of pipe. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections.

CITY OF TAMPA MODIFIED SPECIFICATIONS FOR ASPHALTIC PAVEMENT

SECTION 330

HOT BITUMINOUS MIXTURES

This subsection shall Replace and/or Modify Portions of F.D.O.T Standard Specifications for Road and Bridge Construction 330,331, and 334. All references to the CITY OF TAMPA shall mean the local agency. All references to the Engineer shall mean the designated Engineer of the local agency. Any incorrect references to FDOT specifications, test methods, or standards should be brought to the attention of the Engineer for clarification.

330-1 Description. Construct plant-mixed hot bituminous pavements and bases. Establish and maintain a quality control system that provides assurance that all materials, products and completed construction submitted for acceptance meet Contract requirements.

330-1.1 General: Meet the requirements of Section 320 for plant and equipment, and meet the general construction requirements of Section 330. The Engineer will accept the work based on one of the following methods as described in 334-5 and 334-6: 1) **Asphalt Work Category 1,** 2) **Asphalt Work Category 2,** 3) **Asphalt Work Category 3**

330-1.2 Quality Control/Acceptance Testing: The contractor's submittal of documentation for quality control testing may be waived by the Engineer; however, the contractor shall not be exempt from implementing quality control procedures regarding material and workmanship. The local agency shall perform the quality acceptance testing, or utilize a licensed private testing laboratory of the Engineer's choice.

END OF SECTION HOT BITUMINOUS MIXTURES

CITY OF TAMPA MODIFIED SPECIFICATIONS FOR ASPHALTIC PAVEMENT

SECTION 331

331-1 Description.

331-1.1 General: Construct a Type S Hot Mix Asphalt (HMA) pavement course as specified by the Contract. The general composition and physical test properties for all mixes shall be met per F.D.O.T Standard Specifications for Road and Bridge Construction. Meet the applicable requirements for plants, equipment, and construction requirements.

Where Type S Asphalt Concrete is specified in the Contract, if approved by the Engineer, the equivalent fine Type SP Asphalt Concrete mixture (Traffic Level C) meeting the requirements of Section 334 may be selected as an alternate at no additional cost to the Department. The equivalent mixes are as follows:

Type S-I ..... Type SP-12.5
Type S-II ..... Type SP-19.0
Type S-III ..... Type SP-9.5

Meet the requirements for plant and equipment specified in Section 320. Meet the general construction requirements specified in Section 330.

331-1.2 Layer Thicknesses:

331-1.2.1 Structural Layers: The allowable layer thicknesses for Type S Asphalt Concrete mixtures used in structural and overbuild applications is as follows:

Type S-III... 3/4 – 1 1/4 inches [20 – 30 mm]
Type S-I .. 1 1/4 – 2 1/2 inches [30 – 60 mm]
Type S-II .....2 – 2 3/4 inches [50 – 70 mm]

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on Type S mixtures when used as a structural course:

Type S-III – Limited to the final (top) structural layer, one layer only.

Type S-I – May not be used in the first layer of courses over 3 1/2 inches [90 mm] thick, nor in the first layer of courses over 2 3/4 inches [70 mm] thick on limited access facilities.

Type S-II – May not be used in the final (top) structural layer.

331-1.2.2 Additional Requirements: The following requirements also apply to Type S Asphalt Concrete mixtures:

1. A minimum 1 1/2 inch [40 mm] initial lift is required over an Asphalt Rubber Membrane Interlayer (ARMI).
2. When construction includes the paving of adjacent shoulders (#5 feet [#1.5 m] wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless shown differently in the plans.
3. All overbuild layers shall be Type S asphalt concrete. Use the minimum and maximum layer thicknesses as specified in 331-1.2.1 unless shown differently in the plans. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch [13 mm], and the maximum allowable thickness may be increased 1/2 inch [13 mm], unless shown differently in the plans. Other variations from these thicknesses must be approved by the Engineer.

331-4 General Composition of Mixture.

331-4.3 Mix Design: Prior to the production of any asphalt mixture, obtain the Engineer's conditional approval of the mix design. If required by the Engineer, send representative samples of all component materials, including asphalt binder to a laboratory designated by the Engineer for verification. The Engineer will consider any marked variations from original test data for a mix design or

any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and at his discretion, the Engineer may no longer allow the use of the mix design. Furnish the following information:

1. The specific project on which the mixture will be used.
2. The source and description of the materials to be used.
3. The gradation and approximate proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use.
4. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly No. 200 [75 µm]) should be accounted for and identified for the applicable sieves.
5. A single percentage of asphalt by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%. For structural mixes (S-I, S-II and S-III) establish the optimum asphalt content at a level corresponding to a minimum of 4.5% air voids. For FC-3 mixes, establish optimum asphalt content at a level corresponding to a minimum of 5.0% air voids.
6. A single temperature at which the mixture is intended to be discharged from the plant.
7. The laboratory density of the asphalt mixture for all mixes except Open-Graded Friction Courses.
8. Evidence that the completed mixture will meet all specified physical requirements.
9. The name signature dated of the individual responsible for the Quality Control of the mixture during production.

331-4.4 Contractor Quality Control: Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and roadway for quality control purposes.

331-5 Acceptance Procedures:

331-5.1 General Construction Requirements: shall meet same requirements as 334-5 General Construction Requirements (with exception to requirements regarding SP spread rates, unless specified by the Engineer).

331-6 Acceptance of the Mixture: shall meet same requirements as 334-6 Acceptance of the Mixture (with exception to Table 334-3 to be replaced with Table 331-6).

Table 331-6
Tolerances for Acceptance Tests

Characteristic	Tolerance
Asphalt Binder Content	±0.55%
Passing No. 4 [4.75 mm] sieve	±7.00%
Passing No. 10 [2.00 mm] sieve	±5.50%
Passing No. 40 [425 µm] sieve*	±4.50%
Passing No. 200 [75 µm] sieve	±2.00%
*Applies only to Types S-I, S-II, S-III, and FC-	

331-7 Acceptance of the Mixture at the Roadway: shall meet same requirements as 334-6 Acceptance of the Mixture (with exception to Table 334-3 shall be replaced with Table 331-6).

Table 334-7
Roadway Density Acceptance Values

Characteristic	Tolerance
Roadway Density (average of three cores)	92.0% Gmm (proposed mix design)
Roadway Density (avg.of 5 tests nuclear method)	95.0% Gsb (proposed mix design)
Roadway Density (avg.of 5 tests nuclear method)	96.0 % Gsb (lab density)

END OF SECTION 331

CITY OF TAMPA MODIFIED SPECIFICATIONS FOR ASPHALTIC PAVEMENT

SECTION 334

334-1 Description.

334-1.1 General: Construct a Type SP Hot Mix Asphalt (HMA) pavement based on the type of work specified in the Contract and the Asphalt Work Categories as defined below. Meet the applicable requirements for plants, equipment, and construction requirements as defined below. Use a HMA mix that meets the requirements of this specification.

334-1.2 Asphalt Work Mix Categories: Construction of Hot Mix Asphalt Pavement will fall into one of the following work categories:

334-1.2.1 Asphalt Work Category 1: Includes the construction of bike paths.

334-1.2.2 Asphalt Work Category 2: Includes the construction of new HMA turn lanes, paved shoulders and other non-mainline pavement locations.

334-1.2.3 Asphalt Work Category 3: Includes the construction of new mainline HMA pavement lanes, milling and resurfacing.

334-1.3 Mix Types: Use the appropriate HMA mix as shown in Table 334-1.

Table 334-1
HMA Mix Types

Asphalt Work Category	Mix Types	Traffic Level
1	Type SP-9.5 , or equivalent as determined by the Engineer	A
2	Type SP-9.5, SP-12.5, or equivalent as determined by the Engineer	B or C
3	Type SP-9.5, SP-12.5	C

A Type SP mix one traffic level higher than the traffic level specified in the Contract may be substituted, at no additional cost (i.e. Traffic Level B may be substituted for Traffic Level A, etc.).

334-1.4 Gradation Classification: HMA mixes are classified as either coarse or fine, depending on the overall gradation of the mixture. Coarse and fine mixes are defined in 334-3.2.2. Use only fine mixes.

The equivalent AASHTO nominal maximum aggregate size Superpave mixes are as follows:

Type SP-9.5 ..... 9.5 mm
Type SP-12.5 ..... 12.5 mm

334-1.5 Thickness: The total pavement thickness of the HMA Pavement will be based on a specified spread rate or plan thickness as shown in the Contract Documents. Before paving, propose a spread rate or thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan spread rate or thickness. When the total pavement thickness is specified as plan thickness, the plan thickness and individual layer thickness will be converted to spread rate using the following equation:

$$\text{Spread rate (lbs/yd}^2\text{)} = t \times Gmm \times 43.3$$

where: t = Thickness (in.) (Plan thickness or individual layer thickness)

Gmm = Maximum specific gravity from the mix design

For target purposes only, spread rate calculations shall be rounded to the nearest whole number.

334-1.5.1 Layer Thicknesses: Unless otherwise called for in the Contract Documents, the allowable layer thicknesses for HMA mixtures are as follows:

Type SP-9.5 ..... 3/4 - 1 1/2 inches
Type SP-12.5 ..... 1 1/2 - 2 1/2 inches

334-1.5.2 Additional Requirements: The following requirements also apply to HMA mixtures:

1. When construction includes the paving of adjacent shoulders (5 feet wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless otherwise called for in the Contract Documents.
2. For overbuild layers, use the minimum and maximum layer thicknesses as specified above unless called for differently in the Contract Documents. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch, and the maximum allowable thickness may be increased by 1/2 inch, unless called for differently in the Contract Documents.

334-1.6 Weight of Mixture: The weight of the mixture shall be determined as provided in 320-2.2 of the Florida Department of Transportation (FDOT) specifications.

334-2 Materials.

334-2.1 Superpave Asphalt Binder: Unless specified elsewhere in the Contract or in 334-2.3.3, use a PG 67-22 asphalt binder from the FDOT Qualified Products List (QPL).

334-2.2 Aggregate: Use aggregate capable of producing a quality pavement. For Category 2 and 3 projects, require the aggregate supplier to certify that the material meets FDOT requirements.

334-2.3 Reclaimed Asphalt Pavement (RAP) Material:

334-2.3.1 General requirements: RAP may be used as a component of the asphalt mixture if approved by the Engineer. Usage of RAP is subject to the following requirements:

1. Limit the amount of RAP material used in the mix to a maximum of 50 percent by weight of total aggregate.
2. Do not use RAP material in any friction course mixes.
3. Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles which are soft or conglomerates of fines.
4. Provide RAP material having a minimum average asphalt content of 4.0 percent by weight of total mix. The Engineer may sample the stockpile to verify that this requirement is met.
5. Use a grizzly or grid over the RAP cold bin, in-line roller crusher, screen, or other suitable means to prevent oversized RAP material from showing up in the completed recycle mixture. If oversized RAP material appears in the completed recycle mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

334-2.3.2 Material Characterization: Assume responsibility for establishing the asphalt binder content, gradation, viscosity and bulk specific gravity (G_{sb}) of the RAP material based on a representative sampling of the material.

334-2.3.3 Asphalt Binder for Mixes with RAP: Select the appropriate asphalt binder grade based on Table 334-2. Maintain the viscosity of the recycled mixture within the range of 4,000 to 12,000 poises.

Table 334-2
Asphalt Binder Grade for Mixes Containing RAP

Percent RAP	Asphalt Binder Grade
<20	PG 67-22

20 – 29	PG 64-22
≥30	Recycling Agent

334-3 Composition of Mixture.

334-3.1 General: Compose the asphalt mixture using a combination of aggregates, mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

334-3.2 Mix Design:

334-3.2.1 General: Design the asphalt mixture in accordance with AASHTO R35-04, except as noted herein. Submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. Prior to the production of any asphalt mixture, obtain the Engineer's conditional approval of the mix design. If required by the Engineer, send representative samples of all component materials, including asphalt binder to a laboratory designated by the Engineer for verification. The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and at his discretion, the Engineer may no longer allow the use of the mix design.

334-3.2.2 Mixture Gradation Requirements: Combine the aggregates in proportions that will produce an asphalt mixture meeting all of the requirements defined in this specification and conform to the gradation requirements at design as defined in AASHTO M323-04, Table 3. Aggregates from various sources may be combined.

334-3.2.2.1 Mixture Gradation Classification: Plot the combined mixture gradation on an FHWA 0.45 Power Gradation Chart. Include the Control Points from AASHTO M323-04, Table-3, as well as the Primary Control Sieve (PCS) Control Point from AASHTO M323-04, Table 4. Fine mixes are defined as having a gradation that passes above or through the primary control sieve control point. Use only fine mixes

334-3.2.3 Gyratory Compaction: Compact the design mixture in accordance with AASHTO T312-04. Use the number of gyrations as defined in AASHTO R35-04, Table 1.

334-3.2.4 Design Criteria: Meet the requirements for nominal maximum aggregate size as defined in AASHTO M323-04, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in AASHTO M323-04, Table 6.

334-3.2.5 Moisture Susceptibility: Test 4 inch specimens in accordance with FM 1-T 283. Provide a mixture having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (unconditioned) of 100 psi. If necessary, add a liquid anti-stripping agent from the FDOT's Qualified Products List, or hydrated lime in order to meet these criteria.

In lieu of moisture susceptibility testing, add a liquid anti-stripping agent from the FDOT Qualified Products List. Add 0.5% liquid anti-stripping agent by weight of binder.

334-3.2.6 Additional Information: In addition to the requirements listed above, provide the following information on each mix design:

1. The design traffic level and the design number of gyrations (N_{design}).
2. The source and description of the materials to be used.
3. The FDOT source number and the FDOT product code of the aggregate components furnished from an FDOT approved source (if required).
4. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation caused by handling and processing as necessary.
5. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly material passing the No. 200 sieve)

should be accounted for and identified. The bulk specific gravity (G_{sb}) value for each individual aggregate and RAP component.

6. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1 percent.

7. A target temperature at which the mixture is to be discharged from the plant and a target roadway temperature. Do not exceed a target temperature of 330°F for modified asphalts and 315°F for unmodified asphalts.

8. Provide the physical properties achieved at four different asphalt binder contents. One shall be at the optimum asphalt content, and must conform to all specified physical requirements.

9. The name of the Mix Designer.

10. The ignition oven calibration factor.

334-4 Contractor Quality Control.

Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and roadway for quality control purposes.

334-5 General Construction Requirements.

334-5.1 Weather Limitations: Do not transport asphalt mix from the plant to the roadway unless all weather conditions are suitable for the laying operations.

334-5.2 Limitations of Laying Operations:

334-5.2.1 General: Spread the mixture only when the surface upon which it is to be placed has been previously prepared, is intact, firm, and properly cured, and is dry.

334-5.2.2 Air Temperature: Spread the mixture only when the air temperature in the shade and away from artificial heat is at least 40°F for layers greater than 1 inch (100 lb/yd^2) in thickness and at least 45°F for layers 1 inch (100 lb/yd^2) or less in thickness (this includes leveling courses). The minimum temperature requirement for leveling courses with a spread rate of 50 lb/yd^2 or less is 50°F.

334-5.3 Mix Temperature: Heat and combine the ingredients of the mix in such a manner as to produce a mixture with a temperature at the plant and at the roadway, within a range of ±30°F from the target temperature as shown on the mix design. Reject all loads outside of this range.

334-5.4 Transportation of the Mixture: Transport the mixture in vehicles previously cleaned of all foreign material. After cleaning, thinly coat the inside surface of the truck bodies with soapy water or an asphalt release agent as needed to prevent the mixture from adhering to the beds. Do not allow excess liquid to pond in the truck body. Do not use diesel fuel or any other hazardous or environmentally detrimental material as a coating for the inside surface of the truck body. Cover each load at all times.

334-5.5 Preparation of Surfaces Prior to Paving:

334-5.5.1 Cleaning: Clean the surface of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.

334-5.5.2 Patching and Leveling Courses: Where the HMA is to be placed on an existing pavement which is irregular, wherever the plans indicate, or if directed by the Engineer, bring the existing surface to proper grade and cross-section by the application of patching or leveling courses.

334-5.5.3 Application over Surface Treatment: Where an asphalt mix is to be placed over a surface treatment, sweep and dispose of all loose material from the paving area.

334-5.5.4 Tack Coat: Apply a tack coat on existing pavement structures that are to be overlaid with an asphalt mix and between successive layers of all asphalt mixes, unless directed otherwise by the Engineer. Use a tack coat product meeting FDOT specifications. Use an emulsified tack coat spread rate of 0.02 to 0.08 gal/sy or as specified by the Engineer.

334-5.6 Paving:

334-5.6.1 Alignment of Edges: With the exception of pavements placed adjacent to curb

and gutter or other true edges, place all pavements by the stringline method to obtain an accurate, uniform alignment of the pavement edge. Control the unsupported pavement edge to ensure that it will not deviate more than ± 1.5 inches from the stringline.

334-5.6.2 Rain and Surface Conditions: Immediately cease transportation of asphalt mixtures from the plant when rain begins at the roadway. Do not place asphalt mixtures while rain is falling, or when there is water on the surface to be covered. Once the rain has stopped and water has been removed from the tacked surface to the satisfaction of the Engineer and the temperature of the mixture caught in transit still meets the requirements as specified in 334-5.3, the Contractor may then place the mixture caught in transit.

334-5.6.3 Checking Depth of Layer: Check the depth of each layer at frequent intervals, and make adjustments when the thickness exceeds the allowable tolerance. When making an adjustment, allow the paving machine to travel a minimum distance of 32 feet to stabilize before the second check is made to determine the effects of the adjustment.

334-5.6.4 Hand Spreading: In limited areas where the use of the spreader is impossible or impracticable, spread and finish the mixture by hand.

334-5.6.5 Spreading and Finishing: Upon arrival, dump the mixture in the approved paver, and immediately spread and strike-off the mixture to the full width required, and to such loose depth for each course that, when the work is completed, the required weight of mixture per square yard, or the specified thickness, is secured. Carry a uniform amount of mixture ahead of the screed at all times.

334-5.6.6 Thickness of Layers: Construct each course of Type SP mixtures in layers of the thickness shown in 334-1.5.1.

334-5.7 Leveling Courses:

334-5.7.1 Patching Depressions: Before spreading any leveling course, fill all depressions in the existing surface more than 1 inch deep by spot patching with leveling course mixture, and compact thoroughly.

334-5.7.2 Spreading Leveling Courses: Place all courses of leveling with an asphalt paver or by the use of two motor graders, one being equipped with a spreader box. Other types of leveling devices may be used upon approval by the Engineer.

334-5.7.3 Rate of Application: When using Type SP-9.5 (fine graded) for leveling, do not allow the average spread of a layer to be less than 50 lb/yd^2 or more than 75 lb/yd^2. The quantity of mix for leveling shown in the plans represents the average for the entire project; however, the Contractor may vary the rate of application throughout the project as directed by the Engineer. When leveling in connection with base widening, the Engineer may require placing all the leveling mix prior to the widening operation.

334-5.8 Compaction: For each paving or leveling train in operation, furnish a separate set of rollers, with their operators.

When density testing for acceptance is required (Asphalt Work Category 3), select equipment, sequence, and coverage of rolling to meet the specified density requirement. Regardless of the rolling procedure used, complete the final rolling before the surface temperature of the pavement drops to the extent that effective compaction may not be achieved or the rollers begin to damage the pavement.

When density testing for acceptance is not required (Asphalt Work Categories 1 and 2), use a rolling pattern approved by the Engineer.

Use hand tamps or other satisfactory means to compact areas which are inaccessible to a roller, such as areas adjacent to curbs, headers, gutters, bridges, manholes, etc.

334-5.9 Joints.

334-5.9.1 Transverse Joints: Construct smooth transverse joints, which are within 3/16 inch of a true longitudinal profile when measured with a 15 foot manual straightedge.

334-5.9.2 Longitudinal Joints: For all layers of pavement except the leveling course, place each layer so that longitudinal construction joints are offset 6 to 12 inches laterally between successive layers. Do not construct longitudinal joints in the wheelpaths. The Engineer may waive these

requirement where offsetting is not feasible due to the sequence of construction.

334-5.10 Surface Requirements: Construct a smooth pavement with good surface texture and the proper cross-slope.

334-5.10.1 Texture of the Finished Surface of Paving Layers: Produce a finished surface of uniform texture and compaction with no pulled, torn, raveled, crushed or loosened portions and free of segregation, bleeding, flushing, sand streaks, sand spots, or ripples. Correct any area of the surface that does not meet the foregoing requirements in accordance with 334-5.10.4.

334-5.10.2 Cross Slope: Construct a pavement surface with cross slopes in compliance with the requirements of the Contract Documents.

334-5.10.3 Pavement Smoothness: Construct a smooth pavement meeting the requirements of this Specification. Furnish a 15 foot manual and a 15 foot rolling straightedge meeting the requirements of FM 5-509. Make them available at the job site at all times during paving operations for Asphalt Work Category 3 and make them available upon request of the Engineer for Asphalt Work Categories 1 and 2.

334-5.10.3.1 Asphalt Work Category 3:

334-5.10.3.1.1 Acceptance Testing: Straightedge the final Type SP structural layer and friction course layer with a rolling straightedge. Test all pavement lanes where the width is constant using a rolling straightedge and document all deficiencies on a form approved by the Engineer. Notify the Engineer of the location and time of all straightedge testing a minimum of 48 hours before beginning testing.

334-5.10.3.1.2 Rolling Straightedge Exceptions: Testing with the rolling straightedge will not be required in the following areas: intersections, tapers, crossovers, parking lots and similar areas. In addition, testing with the rolling straightedge will not be performed on the following areas when they are less than 50 feet in length: turn lanes, acceleration/deceleration lanes and side streets. However, correct any individual surface irregularity in these areas that deviates from the plan grade in excess of 3/8 inch as determined by a 15 foot manual straightedge, and that the Engineer deems to be objectionable, in accordance with 334-5.10.4. The Engineer may waive or modify straightedging requirements if no milling, leveling, overbuild or underlying structural layer was placed on the project and the underlying layer was determined to be exceptionally irregular.

334-5.10.3.1.3 Final Type SP Structural Layer: Straightedge the final Type SP structural layer with a rolling straightedge behind the final roller of the paving train. Correct all deficiencies in excess of 3/16 inch in accordance with 334-5.10.4.2, and retest the corrected areas.

334-5.10.3.1.4 Friction Course Layer: At the completion of all paving operations, straightedge the friction course. Correct all deficiencies in excess of 3/16 inch in accordance with 334-5.10.4.3. Retest all corrected areas.

334-5.10.3.2 Asphalt Work Categories 1 and 2: If required by the Engineer, straightedge the final structural layer with a rolling straightedge, either behind the final roller of the paving train or as a separate operation. Correct all deficiencies in excess of 5/16 inch in accordance with 334-5.10.4.2. Retest all corrected areas. If the Engineer determines that the deficiencies on a bicycle path are due to field geometrical conditions, the Engineer will waive corrections with no deduction to the pay item quantity.

334-5.10.4 Correcting Unacceptable Pavement:

334-5.10.4.1 General: Correct all areas of unacceptable pavement at no additional cost.

334-5.10.4.2 Structural Layers: Correct deficiencies in the Type SP structural layer by one of the following methods:

a. Remove and replace the full depth of the layer, extending a minimum of 50 feet on either side of the defective area for the full width of the paving lane.

b. Mill the pavement surface to a depth and width that is adequate to remove the deficiency. (This option only applies if the structural layer is not the final surface layer.)

334-5.10.4.3 Friction Course: Correct deficiencies in the friction course layer by removing and replacing the full depth of the layer, extending a minimum of 50 feet on either side of the defective area for the full width of the paving lane. Corrections may be waived if approved by the Engineer.

334-6 Acceptance of the Mixture.

334-6.1 General: The asphalt mixture will be accepted based on the Asphalt Work Category as defined below:

1) Asphalt Work Category 1 – Certification by the Contractor as defined in 334-6.2.
2) Asphalt Work Category 2 – Certification and quality control testing by the Contractor as defined in 334-6.3
3) Asphalt Work Category 3 – Quality control testing by the Contractor and acceptance testing by the Engineer as defined in 334-6.4.

334-6.2 Certification by the Contractor: On Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project was in substantial compliance with the Specifications. The Engineer may run independent tests to determine the acceptability of the material.

334-6.3 Certification and Quality Control Testing by the Contractor: On Asphalt Work Category 2 construction, submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project was in substantial compliance with the Specifications, along with supporting test data documenting all quality control testing as described in 334-6.3.1. If so required by the Contract, utilize an Independent Laboratory as approved by the Engineer for the quality control testing. The mix will also require visual acceptance by the Engineer. In addition, the Engineer may run independent tests to determine the acceptability of the material.

334-6.3.1 Quality Control Sampling and Testing Requirements: Perform quality control testing at a frequency of once per day. Obtain the samples in accordance with FDOT Method FM 1-T 168. Test the mixture at the plant for gradation (P_{-8} and P_{-200}) and asphalt binder content (P_b). Test the mixture on the roadway for density using six-inch diameter roadway cores obtained at a frequency of three cores per day or by Nuclear Density Method if approved by Engineer.

Determine the asphalt content of the mixture in accordance with FM 5-563. Determine the gradation of the recovered aggregate in accordance with FM 1-T 030. Determine the roadway density in accordance with FM 1-T 166 or with FM 1-T 238. The minimum roadway density will be based on the percent of the maximum specific gravity (Gmm) from the approved mix design. If the Contractor or Engineer suspects that the mix design Gmm is no longer representative of the asphalt mixture being produced, then a new Gmm value will be determined from plant-produced mix with the approval of the Engineer. Roadway density testing will not be required in certain situations as described in 334-6.4.1. Assure that the asphalt content, gradation and density test results meet the criteria in Table 334-3.

Table 334-3
Quality Control and Acceptance Values

Characteristic	Tolerance
Asphalt Binder Content (percent)	Target ± 0.55
Passing No. 8 Sieve (percent)	Target ± 6.00
Passing No. 200 Sieve (percent)	Target ± 2.00

Roadway Density (average of three cores)	91.5% Gmm
Roadway Density (any single core)	90.0 % Gmm
Roadway Density (any single core)	90.0 % Gmm
Roadway Density (avg.of 5 tests nuclear method if approved by Engineer)	91.5% Gmm

334-6.4 Quality Control Testing by the Contractor and Acceptance Testing by the Engineer: On Asphalt Work Category 3, perform quality control testing as described in 334-6.3.1. In addition, the Engineer will accept the mixture at the plant or at the site with respect to gradation (P_{-8} and P_{-200}) and asphalt binder content (P_b). The mixture will be accepted on the roadway with respect to density. The Engineer will sample and test the material as described in 334-6.3.1. The Engineer will randomly obtain at least one set of samples per day. Assure that the asphalt content, gradation and density test results meet the criteria in Table 334-3. Material failing to meet these acceptance criteria will be addressed as directed by the Engineer.

334-6.4.1 Acceptance Testing Exceptions: When the total quantity of any mix type in the Project is less than 200 tons, or on Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. The Engineer may run independent tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, variable thickness overbuild courses, leveling courses, first lift of asphalt base course placed on subgrade, miscellaneous asphalt pavement, or any course with a specified thickness less than 1 inch or a specified spread rate less than 100 lbs/sy. In addition, density testing for acceptance may not be performed on the following areas when they are less than 100 feet in length: crossovers, intersections, turning lanes, acceleration lanes, deceleration lanes, or ramps. Compact these courses in accordance with a standard rolling procedure approved by the Engineer. In the event that the rolling procedure deviates from the approved procedure, placement of the mix will be stopped.

334-7 Method of Measurement.

For the work specified under this Section, the quantity to be paid for will be the weight of the mixture, in tons.

The bid price for the asphalt mix will include the cost of the liquid asphalt or the asphalt recycling agent and the tack coat application as specified in 334-5.5.4. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix.

END OF SECTION 334

SECTION 16010

ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SCOPE OF DIVISION:

A. Work shall include all materials, equipment and labor necessary for a complete and properly functioning electrical installation in accordance with local and state codes, and contract drawings and specifications. Work shall be understood to include all work specified in Division 16 (electrical section numbers 16000 through 16999), General Provisions, Supplementary General Provisions, Specific Provisions, Special Conditions and Division 1 sections, inclusive, of the specifications.

B. It is the intent of the specifications that all materials and equipment shall be installed by the CONTRACTOR in accordance with the good practice of the several trades involved, ready to operate in the manner indicated or manifestly implied, irrespective of whether or not such completeness, workmanship or practices are detailed herein. Any item not specifically required by the specifications, drawings and plans but which is necessary for a complete, working installation shall be provided by the CONTRACTOR at no additional cost to the CITY.

C. Motors specified in Division 16 shall be furnished and installed as specified in other divisions, unless otherwise noted.

1.02 EXAMINATION OF SITE:

A. Bidders shall visit the site and familiarize themselves with existing conditions and satisfy themselves as to the nature and scope of the work and the difficulties that attend its execution. The submission of a bid will be construed as evidence that such an examination has been made, and that existing conditions have been allowed for in his bid.

B. CONTRACTOR shall be responsible for field verification of scale dimensions, exact equipment locations, cable lengths, bills of materials and other construction data.

C. All fees and permits in connection with electrical services shall be included in this contract.

1.03 CODES AND STANDARDS:

A. Materials and installation, as a minimum, shall conform with local and state codes and ordinances. Equipment, where applicable, shall be Underwriters Laboratories, Inc. listed and shall conform to National Electrical Manufacturers Association (NEMA) Standards. Do not reduce standards of quality and workmanship established by Drawings and Specifications by any of these codes and ordinances.

B. The following codes set minimum requirements for work specified in Division 16:

1. National Fire Protection (NFPA) 70-2014.
2. Occupational and Safety Hazard Act (OSHA).
3. State and local ordinances.
4. Others as specified.

1.04 DRAWINGS AND SPECIFICATIONS:

A. Drawings and specifications are intended to agree and be mutually explanatory. Specific notes on drawings take precedence over general terminology of the specifications.

B. Electrical drawings are diagrammatic but shall be followed as closely as actual construction of the building and the work of other trades will permit.

C. Because of the small scale of the drawings, it is not possible to indicate all of the offsets, fittings and accessories required. CONTRACTOR shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, furnishing fittings, bends, junction boxes, pull boxes, access panels and accessories required to meet such conditions.

D. Field coordinate with other trades in ample time to build all chases and openings, set all sleeves, inserts and concealed materials, and provide clearances that may be required to accommodate materials and equipment. Electrical work shall be laid out so that in case of interference with other items, the layout may be altered to suit conditions encountered.

E. The Engineer reserves the right to make any reasonable changes (approximately 6 feet) in the location of outlets, fixtures, switches, receptacles or equipment, prior to the rough-in of such, without additional cost to the CITY.

F. No deviations from the plans and specifications shall be made without the full knowledge and consent of the Engineer. Should the CONTRACTOR find, at any time during the progress of the work, that, in his judgment, a modification of the requirements of any particular item is necessary, he shall report such item promptly to the Engineer for his decision and instruction.

G. CONTRACTOR shall notify all other Contractors of any deviations or special conditions necessary for the installation of his work. Interferences between the work of various Contractors shall be resolved prior to installation. Work installed not in compliance with the drawings and specifications and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled by the CONTRACTOR without additional cost to the CITY. The Engineer or his Representative shall be the mediating authority in all deviations and conflicting disputes arising on the project.

H. Insofar as it is possible to determine in advance, the CONTRACTOR shall consult with the masonry contractor and others so as to leave the proper chases and openings for his work; and he shall place all of his outlets, anchors, sleeves and supports prior to pouring concrete or installing masonry work. Should the CONTRACTOR neglect doing this, any cutting and/or patching shall be done at the CONTRACTOR's expense.

1.05 CUTTING AND PATCHING:

A. Any routine damage caused by cutting or in any other way caused by the electrical contractor in the performance of his contract shall be repaired or replaced under the separate heading for the type material included and in a manner satisfactory to the Engineer.

B. Any unnecessary damage caused by the CONTRACTOR, due to installation of the electrical work, brought about through carelessness or lack of coordination, shall be corrected under the separate heading for the type of materials involved and paid for by the CONTRACTOR.

1.06 ACCESS PANELS: The CONTRACTOR's attention is called to access panels. It is a requirement of these specifications that all access panels required in architectural finishes or surfaces to provide access to junction boxes, smoke detectors, strip heaters, ballasts or other devices be provided and located by the trade requiring access. The access panel shall be installed by the trade constructing the base to which the access panel will be anchored.

1.07 STRUCTURAL SUPPORT:

A. Provide shop drawings for fabrication and erection of structure framing required for attachment of hangers or other devices to support electrical equipment.

B. Framing members shall be standard rolled steel shapes, ASTM 36 steel, except those members welded to main structural member. Framing shall be "simple beam" type with end connections welded or bolted for shear loads. Cantilevers may be used only when detailed or specifically approved. Location of supplementary framing shall be subject to approval. Welding shall be done by certified welders.

C. Framing members shall be designed for their actual loads, with allowable stresses set forth in the AISC code, without excessive deflection and with consideration for rigidity under vibration, in accordance with standard structural practices.

D. Supplementary framing, including design loads, member size and location, shall be clearly shown on shop drawings.

E. When supplementary framing is indicated, the CONTRACTOR shall verify that dimensions are suitable and that framing is structurally adequate for the equipment furnished.

F. No cutting or drilling of holes in structural members will be permitted, except where written permission has been obtained from the Engineer.

1.08 OPERATIONS AND MAINTENANCE:

A. Furnish nine (9) copies of manufacturer's operating and maintenance manuals. Include for each piece of equipment; product data sheets, wiring diagrams, maintenance recommendations, parts lists, and instruction sheets. Prepare manuals to include all systems and equipment shown and/or specified.

B. Instruct representatives of the CITY in operation and maintenance of installed systems. Furnish letter naming the CITY's personnel receiving instruction. Have maintenance manual available, and acquaint the CITY's representatives with its contents during instruction.

C. Operating and maintenance manuals shall be prepared and submitted in accordance with the requirements of the section entitled "Submittal Data".

D. Reference the CITY's Specific Provision SP-2.10, Operations and Maintenance Manual, for additional operations and maintenance manual requirements.

1.09 RECORD DRAWINGS:

A. Maintain two (2) extra sets of black-line or black-line print drawings for use as Record Drawings. Records shall be kept daily, using colored pencil. As the work is completed, relevant information shall be transferred to a reproducible set, and copies made to be given to the Engineer.

B. Comply with the following for all work specified in Division 16. As-built information shall be shown to scale, using standard symbols listed in the legend. As a minimum, show the following:

1. Location of stub-outs, dimensioned from permanent building lines.
2. Location and depth of under-slab and in-slab raceways.
3. All routing of raceways.
4. Corrected panelboard and equipment schedules.
5. Corrected circuit numbers as they appear on panelboard directories.
6. Corrected motor horsepower and full load amperages.
7. Number, size, type of insulation and number of wires in each conduit or multi-conductor cable whether in conduit or exposed.
8. Location of junction boxes, pullboxes and splices.
9. Location of access panels.

C. Each "as-built" drawing provided by the CONTRACTOR shall be signed and dated with changes clearly noted in red. Additionally, the printed name of the individual signing the "as-built" drawings along with that person's company affiliation shall be included. If no change was made during construction, a note designating "no changes" shall be included on the drawing, as well as, the previously stated information and signature.

D. Reference the CITY's Specific Provision SP-2.11, As-Built Plans, for additional record drawing requirements.

1.10 ELECTRICAL SERVICE:

A. Electrical service characteristics shall be as indicated on drawings. Furnish metering and service entrance arrangement in accordance with requirements of the utility. Consult with representatives of the utility immediately after award of construction contract, and reach agreement with its representatives as to details of service for this project. See drawings for additional requirements.

B. CONTRACTOR shall leave the required length of free cable in the transformer's secondary compartment of the utility transformer(s) or in the utility company connection pedestal at the base of the utility power pole, as applicable. Furnish suitable connectors for attaching cables to the secondary bushings in the utility transformer(s) or secondary conductors from pole-mounted transformers in accordance with utility company requirements. See drawings for additional requirements.

1.11 TELEPHONE SERVICE: Provide 1" spare conduit for telephone cable (communications backup). Install a No. 14 galvanized steel pullwire in each conduit. Number at each outlet with corresponding number on each end of pull wire.

1.12 INTERFACE WITH WORK SPECIFIED IN OTHER DIVISIONS: Note that work specified under other divisions requires coordination and cooperation of the subcontractor performing work under Division 16. Attend necessary coordination and scheduling meetings and be informed so interfacing is accomplished to result in complete and operating systems.

1.13 TEMPORARY LIGHTS AND POWER:

A. CONTRACTOR shall provide a temporary electrical distribution system of 120/240 volt, 3-phase, 200 amp minimum. All temporary work shall be installed in a neat and safe manner.

B. The CONTRACTOR shall furnish and install power outlets and lighting necessary for construction. Power outlets shall be 30-amp, 1-phase; fused disconnect switches shall be for 120/240 volts as necessary for construction activities.

C. The service and panelboards required for the above light and power outlets shall be furnished and installed by CONTRACTOR, and power consumption shall be paid for by the CONTRACTOR.

D. Temporary electrical power distribution and wiring shall be removed when no longer required.

1.14 APPLICABLE DOCUMENTS: The listed publications form a part of this specification and, where referred to by basic designation only, are applicable to the extent indicated.

A. American Society for Testing and Materials (ASTM).

1. (A 36-75) Specification for Structural Steel.
2. (A 153-73) Specification for Zinc Coating (Hot dip) on iron and steel hardware.

B. American Institute of Steel Construction (AISC).

1. "Specification for the design, fabrication and erection of structural steel for the buildings", with commentary, herein, designated as the AISC Specification.

PART 2 - PRODUCTS

2.01 UNIFORM PRODUCTS:

A. Equipment and materials of the same type or classification and used for the same purpose, shall be products of the same manufacturer.

B. Materials and equipment shall conform in all respects to the requirements set forth in these specifications and the accompanying drawings. However, wherever a product is identified by name, equal products which meet the Engineer's written approval may be used.

C. Except as otherwise specified, materials and equipment shall be new and bear the approval label of Underwriters Laboratories, Incorporated.

2.02 SHIPPING DATES FOR MAJOR ITEMS OF EQUIPMENT: Not later than six weeks after the Notice to Proceed is issued to the CONTRACTOR, the CONTRACTOR shall furnish to the Engineer a complete list of all major items of electrical equipment including pad mounted transformers, primary switchgear, unit substation, low voltage switchboards, panelboards, bus duct, dry type transformers, lighting fixtures, etc., along with vendors, dates orders were placed and scheduled delivery dates.

2.03 SHOP DRAWINGS:

A. As soon as practical, after the notice to proceed is issued, in order that work under this contract will not be delayed, submit to the Engineer, for review, complete descriptive and dimensional data on:

1. Wire (600 volts and below).
2. Conduit.
3. Outlet cover plates.
4. Wiring devices.
5. Wiring.
6. Panelboards.
7. Magnetic contactors.
8. Automatic transfer switches.
9. Emergency generator units.
10. Lighting fixtures.
11. Enclosures.
12. Transformers.
13. Control panel(s).

B. Corrections or comments made on shop drawings during the review do not relieve CONTRACTOR from compliance with requirements of contract documents, plans and specifications. Shop drawings will be checked for general conformance with the design concept of the project and general compliance with information given in the contract documents. Review of the shop drawings shall not relieve the CONTRACTOR from responsibility for confirming and correlating all quantities and dimensions, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner. Review of shop drawings shall not permit any deviation from plans and specifications.

C. The CONTRACTOR shall submit four (4) complete sets of shop drawings.

D. Reference the CITY's General Provisions, Section 3.

2.04 EQUIPMENT MANUALS:

A. Before the project is finally accepted, the CONTRACTOR shall furnish to the Engineer three bound sets of descriptive, dimensional parts data on:

1. Wire (600 volts and below).
2. Conduit.
3. Outlet cover plates.
4. Wiring devices.
5. Wiring.
6. Panelboards.
7. Magnetic contactors.
8. Automatic transfer switches.
9. Emergency generator units.
10. Lighting fixtures.
11. Enclosures.
12. Transformers.
13. Control panel(s).

B. Each set of this literature shall be bound in a permanent type hard cover ring binder and shall be suitably indexed.

C. Equipment manuals shall include complete details of equipment such as the pumping station control panel, complete with wiring diagrams.

D. Equipment manuals shall also include warranties, guarantees, and manufacturer's instructions shipped with equipment.

E. Reference the CITY's Specific Provision SP-2.10, Operations and Maintenance Manual, for additional operations and maintenance manual requirements.

PART 3 - EXECUTION

3.01 GENERAL:

A. The CONTRACTOR shall, at his own cost, obtain all necessary permits (City-issued permits are fee waived - no cost to the CONTRACTOR), pay all legal fees and charges, and comply with all state and local building and safety laws, ordinances, and regulations relating to building and public health and safety. A final inspection certification from the local inspection authorities shall be furnished to the Engineer.

1. Reference the CITY's Specific Provision SP-2.08, Permits, for additional permitting requirements.

B. The CONTRACTOR shall keep the work installed by him in perfect working order for one year from date of final written acceptance of the project, said guarantee to be based upon defective materials and/or workmanship. CONTRACTOR shall furnish to the CITY materials and labor necessary to comply with this guarantee.

C. All defects with the equipment which develop during the testing or during the initial installation shall be repaired and corrected by the CONTRACTOR at no cost to the CITY. After each/any repair or correction, the CONTRACTOR must retest the equipment. The CONTRACTOR shall bear the expense of any repair or retest necessitated by his faulty workmanship or material. The CITY shall not bear the expense of repairs, readjustment and retest resulting from the use of faulty materials supplied by the CONTRACTOR.

D. All work shall be neat and installed in a craftsmanlike manner. Return calls (second or later trips) or installation revisions which are necessary to repair equipment/correct installation obviously made necessary as a result of incorrect work by the CONTRACTOR will be the responsibility of and at the expense of the CONTRACTOR.

E. The CONTRACTOR shall inspect all electrical equipment upon receipt. Any damaged or missing items shall be reported by the CONTRACTOR to the Engineer.

F. Erection of all equipment and materials shall be done in a neat and workmanlike manner, aligned, leveled and adjusted for satisfactory operation. Equipment shall be installed so that all functional parts are easily accessible with adequate clearance for inspection, operation, maintenance, repair and replacement. Coordinate layout with all trades.

G. Work required to pierce any waterproofing shall be done with care and after the part piercing the waterproofing has been set in place, the opening made for this purpose shall be sealed and made absolutely watertight in accordance with recommendations of waterproofing manufacturer.

3.02 PROTECTION AND FINISH:

A. Where marring or disfigurement has occurred, replace or refinish the damaged surfaces as directed.

B. Equipment or components exposed to the weather shall be sealed weather-tight. All equipment outlets and conduit openings shall be protected with temporary plugs or caps at all times that work is not in progress.

C. Prepare all exposed raceways, fittings, boxes, supports and panelboards for painting by removing all oil, grease and dirt. Employ the necessary precautionary methods to prevent painting over or obscuring any nameplates or designations on all electrical apparatus and devices.

D. All surfaces of ferrous metal on equipment exposed to the weather and all ferrous metal not otherwise specified shall be given a rust inhibiting treatment, consisting of hot-dipped galvanizing after fabrication followed by the application of rust inhibiting primer and finish paint. Weight of the coating shall be in accordance with ASTM A153.

3.03 STORAGE OF MATERIALS: Prior to and during installation, store materials to protect them from damage, ingress of dust, moisture or deterioration. Material shall not be stored in contact with ground or floor. In determining required protection for stored materials, consider use for which the equipment was designed. If suitable storage areas are not available at the job site, provide temporary construction or store materials off-site in suitable warehouses. Do not remove manufacturer's packing materials until ready to install. Materials showing signs of corrosion, improper handling or storage shall be replaced.

3.04 TESTS AND INSPECTIONS: Prior to acceptance inspection, clean and where required, paint all equipment installed under Division 16. Factory applied finishes that have been scratched or otherwise damaged shall be touched up with color matched paint furnished by the manufacturer.

END OF SECTION

SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 APPLICABLE SECTIONS:

A. Drawings and general provisions of the contract, including general and supplementary conditions and all division specification sections, apply to work of these Division 16 sections.

B. Excavation and backfill for work under this Section shall conform to the requirements specified in the Supplemental Specifications for Sanitary Sewer Relocation Work, Section 1 - Excavation; and Section 2 - Backfilling.

1.02 WIRING METHODS: All wiring for power, control and signal systems shall be installed in raceway systems specified herein, unless specifically exempted.

1.03 EQUIPMENT CONNECTIONS:

A. In general, provide electrical power and control system connections to all equipment shown on the drawings. Included are wiring, raceways, disconnects and other devices shown. Excluded are devices furnished integrally with the manufacturer's package and work specified in other sections of these specifications.

B. All electrical work required for the installation shall be provided as shown on the electrical drawings or called for in the electrical specifications.

1.04 APPLICABLE PUBLICATIONS: NFPA No. 70 - National Electrical Code.

END OF SECTION

SECTION 16095

SUBMITTAL DATA

PART 1 - GENERAL

1.01 Drawings and general provisions of the contract, including general and supplementary conditions and all division specification sections, apply to work of this Section.

1.02 STANDARD FOR MATERIALS: It is the intention of these specifications to indicate a standard of performance and quality for all materials incorporated in this work. Manufacturer's names and catalog numbers are used to designate the item of equipment or material as a means of establishing grade and quality. Where several manufacturers are named, only those named manufacturers' products will be considered and the CONTRACTOR's bid shall be on their products. The first named of several manufacturers is the manufacturer whose product was used in engineering the project. Manufacturers of products other than those specified, although acceptable as manufacturers, shall guarantee that their product will perform as specified and will meet space requirements. Where performance characteristics of such equipment differs from the equipment scheduled on the drawings, the Engineer shall reserve the right to reject it. Where use of such equipment requires different quantity or arrangement of foundations, supports, ductwork, piping, wiring, conduit and any other equipment, the CONTRACTOR shall furnish said changes and additions and pay all costs for all changes to the work and the work of others affected by using such equipment.

1.03 SUBMITTAL DATA:

A. Materials List:

1. Disconnect switches.
2. Rigid metal conduit and fittings.
3. Rigid nonmetallic conduit and fittings.
4. Specialty conduit fittings.
5. Outlet boxes.
6. Conductors.
7. Wiring devices.
8. Lamps.
9. Materials specified on drawings.
10. Enclosures.

B. Product Data:

1. Fuses and time-current curves.
2. Circuit breakers and time-current curves.
3. Panelboards.
4. Magnetic contactors.
5. Automatic transfer switches.
6. Emergency generator units.
7. Transformers.
8. Lighting fixtures.

9. Material specified on drawings.
10. Receptacles, switches, etc.
11. Control panel(s).

END OF SECTION

SECTION 16110

ELECTRICAL CONDUIT

PART 1 - GENERAL

1.01 SCOPE: This section includes requirements for conduit and fittings.

1.02 SUBMITTALS: Submit manufacturer's catalog data for all conduit and fittings proposed for use.

PART 2 - PRODUCTS

2.01 CONDUIT:

A. Liquid Tight Flexible Non-Metallic Conduit: Shall be used to connect equipment subject to motion or vibration. Conduit shall be liquid tight and have a circular cross section. The conduit shall be resistant to oil, water, heat, sunlight, corrosion, most acids, ozone, alkali, strains, abrasions and crushing. The conduit shall be rated for continuous use at 140°F and shall be UL listed. Compatible liquid tight non-metallic fittings shall be used for conduit installation.

Acceptable: Carlon, Kellems, K-Flex or equal.

B. Electrical Plastic Conduit: PVC conduit shall be encased in concrete or direct buried in non-vehicular traffic areas. Polyvinyl chloride, Schedule 40, heavy wall, UL listed for application. NEMA designation EPC-40-PVC. Compliance: NEMA TC-2, UL 651. Use only below grade unless specifically indicated otherwise.

C. Rigid Aluminum Conduit: Rigid aluminum conduit shall be used for most exposed locations. Rigid aluminum conduit shall be 6063 aluminum alloy, T-1 temper. Compliance: ANSI C80.5, UL 6.

Acceptable: Wheatland, Robroy, and Allied.

D. PVC Coated Conduit: Polyvinyl chloride (PVC) coated conduit shall be used in highly corrosive areas, or direct buried under driveways. PVC coated conduit shall be rigid aluminum coated with a 40 mil (0.040") PVC coating on the exterior and a 2 mil (0.002") urethane coating on the interior. The conduit shall meet the requirements of ANSI C80.5 and UL Standard #6. The PVC coating shall be UL listed for UV resistance.

Acceptable: Robroy Industries Plasti-Bond Red, Thomas & Betts Ocal-Blue.

2.02 CONDUIT FITTINGS:

A. Plastic Conduit Fittings: Polyvinyl chloride, UL approved for application. Manufacturer's standard solvent cement. Compliance: NEMA TC-3, UL 514B.

B. Expansion Fittings: Designed for use across structural expansion joints and meeting NEC code requirements for electrical continuity.

Acceptable: O-Z/Gedney.

C. Aluminum Conduit Fittings: Couplings and fittings for use with the rigid aluminum conduit shall be 6063 alloy, T-1 temper and of the same manufacturer as the conduit.

Acceptable: Wheatland, Robroy and Allied.

D. PVC Coated Conduit Fittings: Couplings and fittings for use with PVC coated conduit shall be of the same manufacturer as the conduit. The couplings and fittings shall be aluminum with a 40 mil (0.040") PVC coating bonded to the exterior and a 2 mil (0.002") urethane coating bonded to the interior. Flexible, overlapping, pressure-sealing sleeves shall be on each coupling and fitting to protect the connections. Fastening hardware for fittings shall be stainless steel and shall be encapsulated for maximum corrosion protection.

Acceptable: Robroy Industries Plasti-Bond Red, Thomas & Betts Ocal-Blue.

2.03 ACCEPTABLE: Manufacturer's names and series numbers listed for conduit fittings are for reference to type, materials, and finish intended for use. Equivalent fittings manufactured by Appleton, Crouse-Hinds, T&B, Raco, Efcor, O.Z. and Steel City will be acceptable provided such fittings meet the express requirements of this specification.

2.04 Concrete for encasing conduits shall be steel reinforced cement, lime, aggregate and all other concrete components with aggregate size not exceeding 3/8-inch. Concrete shall have a minimum compressive strength at 28 days of 3,000 psi.

There shall be not less than 3-inches of concrete between the outside of a duct and the earth. There shall be not less than 2-inches of concrete between adjacent ducts. All duct line concrete pours shall be continuous between manholes or hand holes and between manholes or hand holes and structures. Where duct lines pass through concrete walls, the concrete envelopes shall be extended through and finished flush with inside surfaces. Water-tight construction joints of an approved type shall be provided.

Duct banks shall be reinforced with steel as shown in the drawings. Install No. 4 steel reinforcing bars on 6" centers each way, extending the length of the concrete encasement. Additionally, No. 4 steel hoops surrounding the ducts shall be placed on 24" centers along the length of the duct bank.

Duct bank lines shall be laid in trenches on mats of gravel not less than 6 inches thick and well graded. The minimum cover for duct lines shall be 24-inches unless otherwise permitted by the Engineer.

Concrete for duct bank encasement shall be dyed red for easy identification.

PART 3 - EXECUTION

3.01 GENERAL: Conduits concealed below finish level of floors which have water barriers shall be located within slab, where practicable, to avoid penetrating water barriers. Where electrical conduits are completely concealed in concrete slab, conduits shall be secured to the upper side of the bottom reinforcing steel or to the lower side of the top reinforcing steel. Conduit shall not interfere with the functioning of the concrete or the reinforcing steel.

Install exposed conduits plumb where vertical and parallel to floors and walls where horizontal. Group parallel conduits where possible with spaces between adjacent conduits kept to a minimum. Support individual conduits with standard conduit straps.

Where conduits are not adjacent to structure, support by adjustable galvanized steel pipe hangers or trapeze hangers. Perforated strap hangers or tie wire will not be permitted. Install conduit to clear all piping, ductwork, structural members and equipment. Independently support conduit from the structure and not from ductwork, piping, ceiling framing members or equipment without written permission from Engineer. All conduit fittings shall be properly installed and made up mechanically and electrically tight. Provide grounding type bushings where necessary. Branch circuit conduits for recessed lighting in suspended ceilings may be supported from the ceiling suspension system if the suspension system is not compromised, and provided suitable fasteners, intended for the purpose, are used.

Conduits shall be supported at maximum intervals of 10 feet. Additional supports shall be provided at bends, fittings, and fixtures as necessary to keep the conduit system rigid and vibration free. Supports shall be adequate for the loads imposed.

Pull-points shall be installed so that no conduit run has more than four 90-degree bends.

If conduit runs exceed the equivalent of a 150-foot straight run or contain more than the equivalent of three 90-degree bends, pull fittings shall be provided. One 90-degree bend shall be considered equivalent to 50 feet of straight run.

Underground conduit bends shall be “long radius” bends. Radius of bends for special cases shall be calculated.

Where bends or offsets are required, they shall be made with suitable conduit bending equipment. Uniform circular cross section of the conduit shall be maintained at such bends. No single bend shall be greater than 90 degrees.

Couplings or other fitting shall not be installed in the curved portion of bends. Where unions are required because of a bend, they shall be installed at least one joint from bends.

All conduits (including those installed underground) shall be installed at right angles to or parallel to equipment and building base lines unless otherwise noted on the drawings.

Underground conduits shall be installed a minimum of twenty-four (24) inches below grade. The backfill shall be free from refuse, scrap and boulders. The backfill shall be tamped about the conduit and in successive six-inch (6”) layers. Whenever conduit is stubbed vertically out of the ground, provision shall be made to ensure that the conduit is rigidly fixed.

All underground conduits for feeders, instrumentation wiring, control wiring, and communication wiring shall be PVC conduits and shall be encased in reinforced concrete as shown, unless otherwise noted. Conduits shall be installed as shown and shall be sloped approximately 3-inches per 100 feet uniformly between the elevations shown. Manufactured fitted plastic duct spacers shall be used for installation spacing of conduits.

Concrete for the encasement shall be Class B using aggregate not exceeding 3/8-inch and shall be reinforced as shown. Ducts shall drain to the manholes or end structures. End bell fittings shall be provided on the ducts in manholes.

Appropriate expansion fittings or other approved methods shall be used in the installation of plastic ducts so as to avoid expansion and distortion prior to encasement in concrete. Spacers shall be located a maximum of 8 feet on centers and the duct spacings center-to-center shall not vary in excess of 1/16 inch from the specified spacings shown, prior to and after encasement.

Each duct shall be carefully cleaned before and after installation. All inside surfaces shall be free from imperfections likely to injure the cable. After installation of complete duct runs in sizes 2 inches and larger, ducts shall be snaked with an approved tube cleaner equipped with an approved cylindrical mandrel of a diameter not less than 85 percent of the nominal diameter of the duct. Ducts through which the mandrel will not pass shall not be incorporated in the work. After snaking, the ends of dead-ended ducts shall be protected with standard conduit caps to prevent the entrance of water or other foreign matter.

Where ducts enter buildings or at stub-ups to equipment, transitions to metallic conduits (rigid aluminum) shall be made. Where it is not otherwise shown, all ducts entering buildings and structures, exclusive of manholes, shall have transitions to metallic conduit at least 5 feet from the outermost edge of the pile cap or footing supporting the outermost vertical wall of the building or structure.

Transition from above-grade metallic conduit to nonmetallic conduit shall be accomplished with a threaded adapter. Metallic conduit installed above grade and extending below grade shall include the first 90° elbow. All metallic conduit extending below grade shall be coated with two coats of an asphaltum-type paint along its entire length below grade and extending 6” above grade or above the top of the finished slab. The asphaltum-type paint shall conform to Fed. Spec. TT-V-51 and equivalent to Koppers Bitumastic Super Service Black.

Install a warning ribbon approximately 12-inches below finished grade and a minimum of 12-inches above all underground duct banks. The identifying ribbon shall be a PVC tape, 3-inches wide, yellow color, permanently imprinted with, “CAUTION BURIED ELECTRIC LINE BELOW” in black letters. Cut tape every 15 feet.

All metallic conduit shall be terminated with insulated bushings to prevent damage to wire during pulling operations, except in enclosures where hub design is adequate to prevent insulation damage.

PVC coated conduit and fittings shall be installed with tools specifically designated for the installation of coated conduit systems. All damages to the PVC coating, including nicks and abrasions, shall be repaired with touch-up coating compounds recommended by the manufacturer of the PVC coated conduit.

END OF SECTION

SECTION 16120

LOW VOLTAGE ELECTRICAL WIRE AND CABLE

PART 1 - GENERAL

1.01 SCOPE: The work of this Section includes wiring for systems operating at 600 volts or less.

1.02 COOPERATION WITH OTHER TRADES: It shall be the responsibility of the CONTRACTOR to coordinate all electrical power, control and interlock wiring and installation between the various trades involved so that all equipment and devices furnished under other Sections are properly wired and installed to perform their intended functions. All necessary materials, equipment and labor to perform this work shall be provided without change in the contract amount.

1.03 SUBMITTALS: Submit list of material proposed for use.

1.04 APPLICABLE STANDARDS: Provide only UL listed or labeled products.

PART 2 - PRODUCTS

2.01 600 VOLT POWER AND CONTROL WIRING:

A. General: New, copper, soft drawn, annealed, wiring free of kinks, cuts and abrasions, single conductor type. All conductors shall be stranded unless otherwise designated or approved in writing. All wiring insulation shall be color coded.

B. Insulation:

1. Building Wires: The following types are acceptable: Type THHN/THWN polyvinyl chloride insulation, nylon jacket, 600 volt listed by UL for 75°C operation in wet locations. Type THHW, cross link polyethylene insulation, 600 volt, listed by UL for 75°C operation in wet locations. Minimum size building wires, No. 12 AWG conductor.

2. Direct Current Carrying Wires: For circuits operating at 50 volts or more in direct current (DC) applications, Type RHH/RHW hypalon insulation, 600 volt listed by UL for 75°C operation in wet locations. Minimum size conductor, No. 12 AWG.

3. Fixture Wires: In accordance with Article 402 of the NEC. Minimum size, #16 AWG.

4. Ground Wires: Bare or Type TW, green, thermoplastic, 600 volt, listed by UL for 60°C operation, wet or dry locations.

5. Control Wires: Except for specialized multi-conductor control systems, type TW thermoplastic, 600 volt, listed by UL for 60°C operation, wet or dry locations. Minimum size, #14 AWG except where permitted otherwise.

2.02 600-VOLT INSTRUMENTATION CABLES: Wiring for instrumentation signals (e.g. 1-5 VDC, 4-20 mA DC) shall be shielded two-conductor no. 16 AWG cables. Instrumentation cables shall have stranded copper conductors with 600-volt insulation. Cable pairs shall be twisted and shielded. Conductor insulation shall be polyethylene. Shields shall be overlapped metalized tape providing 100 percent coverage with tinned copper drain wire. Cable outer jacketing shall be of polyvinyl chloride. Cables shall be as manufactured by Belden, Dekoron, or equal.

2.03 WIRE CONNECTORS:

A. Compression Type: Solderless, UL approved compression type.

B. Twist Type: Insulated shell, helical spring steel twist-on type connector for connection only in dry locations. No. 10 AWG maximum conductor size. Twist type wire connectors shall be used in lighting applications only.

PART 3 - EXECUTION

3.01 GENERAL: Install all wire and cable in conduit. Size as indicated on drawings. Identify feeders and branch circuit building wires as follows:

Wire	120/208 Volt	120/240 Volt	277/480 Volt
Phase A	Black	Black	Black
Phase B	Red	Orange	Orange
Phase C	Blue	Blue	Yellow
Neutral	White	White	Gray
Switch Leg	Purple	Purple	Purple
Ground	Green	Green	Green

Motor control circuits shall be identified as follows:

Wire	Color
Stop	Red
Start	Blue
Common	Yellow
Pilot Light	Orange *

* Use white when connected to control circuit neutral.

3.02 IDENTIFICATION OF CONDUCTORS: Identification shall be by colored insulation on conductors or by use of colored, non-aging plastic tape. Tape shall be permitted only for #8 AWG and larger conductor sizes. Where tape is used to identify conductors, apply at all terminations, junction boxes, pull boxes and wireways. Apply tape, butt lapped, for a minimum distance of 2" and, where applied to ends of conductors, start at cut end of the conductor insulation. Signal and control conductors shall be color coded or labeled as necessary for clear identification. Use terminal strips for terminating control wiring in all control equipment and terminal cabinets. The conductivity and insulation of all joints in wire and cables shall not be less than that of the original conductors. Use solderless lugs and compression type connectors only.

When pulling wires, use appropriate wire pulling lubricants recommended by conductor manufacturer. Do not pull wire or cable through any box, fitting or enclosure where change of raceway alignment or direction occurs; do not cut strands from conductors to fit lugs or terminals; and do not bend conductors to less than recommended radius.

3.03 WIRING IN ENCLOSURES: Train in a neat and orderly manner all conductors in panelboards, cabinets, control panels, motor controllers, motor control centers, wireways and wiring troughs. Where conductors cannot be properly trained otherwise, secure with "Ty-Raps" or other suitable lacing. Identify all control, instrumentation and alarm wiring at cabinets and boxes using suitable conductors tags.

3.04 TERMINATIONS: Lugs shall be required for stranded wire #10 AWG and larger and where so designated in the drawings.

END OF SECTION

SECTION 16195

ELECTRICAL EQUIPMENT IDENTIFICATIONS

PART 1 - GENERAL

1.01 NAMEPLATES:

A. Engraved phenolic nameplates shall be installed on each panel, disconnect (safety) switch, motor starter, dry transformer, equipment cabinet, terminal cabinet, and circuit breaker in main switchboard hereinafter specified.

B. Nameplates for 120/208 volt (or 120/240 volt) shall be white letters on a black background.

C. Nameplates for 277/480 volt shall be black letters on a white background.

D. Nameplates for equipment on emergency equipment shall be similar to those specified in 1.01 B and 1.01 C, except that background shall be red.

E. Nameplates shall include equipment designation as indicated on drawings, branch of service, and voltage.

1. Typical panelboard nameplate (example):

Panel A
120/208 volt - 3∅, 4W.
LIFE SAFETY

2. Nameplates for disconnect (safety) switches and motor starters shall be similar to those indicated in E. 1 above.

F. Nameplates shall be three-ply phenolic - black-white-black, white-black-white or red-white-red, as required - engraved through the first layer. Lettering shall be 0.5 cm (3/16") minimum. Edges of all nameplates shall be beveled at 45 degrees.

PART 2 - EXECUTION

2.01 Nameplates shall be secured by screws to the equipment. Use of glue is not permitted.

END OF SECTION

SECTION 16400

ELECTRIC DISTRIBUTION AND SERVICE

PART 1 - GENERAL

1.01 SCOPE: This Section includes requirements for providing electric distribution and service to all elements of the project as indicated on the drawings and as specified within the various sections of Division 16 specifications.

1.02 SHOP DRAWINGS AND DATA: As required under the various sections of Division 16 specifications.

1.03 COORDINATION: The CONTRACTOR shall coordinate the electrical distribution system with the local utility company to ensure suitable locations and type of instrument transformers, meters, cable terminations, conduit and other necessary materials and equipment.

1.04 TESTS: Upon completion of installation of the complete electric distribution and service, CONTRACTOR shall demonstrate to the Engineer that the complete system is properly installed and properly functioning. All factory certifications and field test reports as required under various sections of Division 16 specifications shall be submitted to the Engineer prior to demonstration of system.

1.05 DESCRIPTION OF SYSTEMS:

A. General: Electrical power for the project will be provided by the local utility company to the utility transformer. The CONTRACTOR shall provide all elements of the system on the load side of the utility transformer and shall assist the utility as necessary to ensure a properly working system. CONTRACTOR shall provide underground ductbank and manholes as indicated on the drawings.

B. Voltages: Voltage at the secondary terminals of the utility power transformer(s), as provided by the local utility company, will be as shown on the drawings. This system voltage shall be connected to the main disconnects and distributed to various loads as shown on the drawings.

C. Distribution: Electric power for the project shall be distributed generally as indicated on the drawings. Distribution shall include bus and cables, as specified in various sections of Division 16 specifications.

PART 2 - PRODUCTS

2.01 As specified in various sections of Division 16 specifications.

PART 3 - EXECUTION

3.01 As specified in various sections of Division 16 specifications and in conformance with all regulatory codes, the National Electrical Code.

END OF SECTION

SECTION 16450

ELECTRICAL SYSTEM GROUNDING

PART 1 - GENERAL

1.01 SCOPE: All grounding shall be in accordance with Article 250 of the NEC, except where specifically indicated otherwise. In no case shall a grounding conductor be smaller than #12 AWG.

1.02 SUBMITTALS: Submit to Engineer a list of all materials plus manufacturer's catalog data for all connection devices.

PART 2 - PRODUCTS

2.01 GENERAL: Use copper and copper alloy materials specifically intended for electrical grounding.

2.02 CONDUCTORS: Grounding conductors shall be copper only, stranded, and sized as indicated or as necessary. Conductors may be bare or have type TW insulation unless otherwise indicated. Insulated conductors shall have green color insulation.

2.03 CONNECTIONS: Copper and copper alloy only.

A. Mechanical Type:

1. Connection to water pipe shall be copper alloy body, single conductor, "U" bolt clamp.

2. Connection to bus or other flat surfaces shall be copper body, compression type, two bolt lug.

3. Acceptable: O.Z. C.G. series, Thomas and Betts and Burndy.

B. Welded Type: All grounding connections made below grade (or which are made in inaccessible locations) shall be made by exothermic welds (such as Cadweld).

PART 3 - EXECUTION

3.01 GENERAL: All grounding shall be electrically continuous to grounding electrodes. Provide grounding type bushings and copper jumpers at switchboard and elsewhere to provide suitable raceway grounding where conduits cannot be properly terminated with lock nuts at sheet metal enclosures.

3.02 GROUND THE FOLLOWING: All non-current carrying metal parts of all electrical apparatus, conduits and cabinets for power, lighting and communications shall be grounded. Provide additional grounding where indicated or specified and as required by code.

3.03 EQUIPMENT GROUNDS: All circuits, including feeders and 3-phase motors, shall have a separate green colored insulated grounding wire pulled in same conduit with power wires. Ground wires shall be solidly grounded at all termination points, panelboards, and other equipment as necessary and shall be solidly grounded to system ground.

3.04 CONDUIT BONDING:

A. The conduit shall not serve as the sole ground connection. However, the conduit shall be provided with proper fittings to bond the conduit to the associated power equipment.

B. Conduits that enter switchgear, motor control center and similar open-bottom or top entry enclosures shall be terminated in the insulated ground-type bushings that are bonded together by a minimum AWG size of number 6 bare copper conductor and connected to the equipment ground bar or to the enclosure.

3.05 RECEPTACLES: Receptacles shall be grounded with a self-grounding clip on the receptacle except where separate green ground is indicated on drawings.

3.06 SEPARATELY DERIVED SYSTEMS: The neutral of all separately derived systems shall be solidly grounded at the points designated only. These shall be the only points in the entire electrical distribution system where the neutral is grounded. The neutral at all other points shall be fully insulated from ground.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.01 SCOPE: This Section includes requirements for panelboards constructed for use with circuit breakers or fusible switches as indicated on the drawings.

1.02 SUBMITTALS: Submittals shall be in accordance with section entitled "Submittal Data".

1.03 SHOP DRAWINGS: Submit shop drawings for each panelboard provided. Include circuit breaker and/or fusible switch data.

PART 2 - PRODUCTS

2.01 GENERAL: Panelboards shall be designed, constructed and tested in accordance with NEMA and UL standards for panelboards, cabinets and boxes. Circuit breaker type or fusible switch type panelboards shall be provided as indicated with number of circuit protective devices and spaces indicated. Provide main protective device where indicated. Panelboards shall be completely dead front design.

2.02 SERVICE ENTRANCE: Where panelboards are used as service entrance equipment, they shall be labeled as suitable for that purpose.

2.03 BUSES:

A. General: All buses for panelboards shall have copper buses. All buses shall be braced for the indicated short circuit duty or a minimum of 22,000 AIC where no interrupting rating is specified.

B. Phase Buses: Power buses shall be full size from top to bottom and rated to carry the full current indicated on the drawings. Phase sequence shall be A-B-C from left to right as viewed from the front. Buses shall be fully drilled and tapped for all cross and center connectors and complete with all connections necessary for main and branch protective devices.

C. Neutral Bus: The neutral bus shall be full rated, electrically isolated and complete with solderless connectors for all feeder and branch neutral conductors. Material shall be the same as phase buses.

D. Ground Bus: The ground bus shall be solid copper, electrically bonded to panelboard box and complete with solderless connectors for all feeder and branch grounding conductors. Provide for all panelboards. Where ground buses are not necessary, provide ground lugs suitable for feeder grounds and other grounding conductors, all electrically bonded to the panelboard enclosure. Set screw type bonding connection (at neutral bus or ground connection) will not be permitted.

2.04 BOXES: Boxes shall be stainless steel construction. Wiring gutters shall conform to the requirements of Article 312.6 of the NEC but in no case, less than 4-inches on all sides. Boxes for panelboards having parallel conductors for feeders or branches or having sub-feed lugs or through feed conductors shall have increased size gutters in accordance with Article 312.6 of the NEC. Boxes for mains or branches rated 101 to 225 amperes shall have a minimum of 6-inches of wiring space, and for mains or branches rated greater than 225 amperes shall have a minimum of 8-inches of wiring space.

2.05 INTERIORS: Interiors shall be completely factory assembled with all main and branch circuit protective devices. Branch circuits shall be arranged in a double row configuration where practical, and it shall be possible to remove or add branch devices without disturbing adjacent units. Unless otherwise indicated, all main and branch circuit protective devices shall be bolt-on type. The "dead front" cover on all 480 volt panels shall be clearly labeled with 1/2" letters designating 480 VAC.

2.06 FRONTS: All panelboards shall be provided with fronts having hinged doors. Construction shall be code gauge steel. All doors shall be complete with cadmium plated tumbler locks and all shall be keyed alike. Units shall be so designed that with doors open, no live parts are exposed. Doors more than 40-inches high shall be equipped with 3-point latching. Provide directory frame with directory card and transparent cover on the inside of each door.

2.07 FLUSH PANELS: Fronts for flush panels shall have minimum 3/4 inch overlap trim on all sides, and shall have concealed hardware and trim clamps.

2.08 SHORT CIRCUIT RATINGS: Each panelboard shall be braced and rated to withstand the full RMS symmetrical short circuit current of the lowest rated protective device contained therein, but in no case less than ratings where indicated on the drawings or 22,000 amperes, whichever is higher.

2.09 Panelboards shall be fully rated for operation at the voltages indicated on the drawings.

2.10 PROTECTIVE DEVICES: Main and branch circuit protective devices shall be either molded case circuit breakers or fusible switches as indicated on the drawings. Refer to sections entitled "Molded Case Circuit Breakers" and "Fusible Switches" as appropriate.

2.11 FINISH: Panelboards shall be finished with manufacturer's standard enamel.

2.12 ACCEPTABLE: Siemens, Eaton, GE and Square D.

PART 3 - EXECUTION

3.01 Secure panelboards rigidly to structure using framing channel as necessary. All surface mounted panelboards shall be mounted using channel behind panelboard to secure it to the structure. The top of the panelboard shall be mounted 6 feet above the floor. The height to the highest mounted device operating handle shall not exceed 6'-6" above floor. Make up all wiring and conduit terminations and ensure ground continuity between raceway and box. Align box and trim to ensure a flush, plumb installation. Provide typewritten directory and other labeling as necessary and/or specified.

END OF SECTION

SECTION 16475

MOLDED CASE CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SCOPE: This Section includes provisions for molded case circuit breakers rated up to 1200 amperes.

1.02 SUBMITTALS: Submit manufacturer's catalog data for each frame size circuit breaker proposed for installation.

1.03 TESTS: Each circuit breaker used as main service entrance equipment, and each circuit breaker 225 ampere frame size and larger shall be tested for proper operation.

PART 2 - PRODUCTS

2.01 GENERAL: Molded case circuit breakers shall have a molded insulated case and shall be bolt-on or plug-in style of the frame size and trip rating indicated on the drawings. Circuit breakers shall be listed by UL and shall conform to the applicable standards of NEMA publication AB 1-1993 and Federal Specification W-C-375b. Circuit breakers used as main service entrance equipment shall be so listed by UL. Operating handles shall be toggle style, operable at the front of the circuit breaker.

2.02 CONTACTS: Circuit breaker contacts shall be silver plated and rated for the continuous current indicated by the circuit breaker frame size.

2.03 OPERATOR: Mechanism for operation shall be quick-make, quick-break and of trip free design so that contacts cannot be held closed against a short circuit or overload. Units shall be designed for common tripping of all poles.

2.04 TRIP MECHANISM: The trip mechanism shall be a combination thermal-magnetic type. Thermal elements shall have inverse time characteristics for overload conditions and magnetic element shall protect against short circuits by providing instantaneous trip. Magnetic trip shall be adjustable for all circuit breakers of 225 amperes or larger frame size.

2.05 VOLTAGE RATINGS: Circuit breaker shall be rated for use at the voltages indicated on the drawings.

2.06 INTERRUPTING RATINGS: Circuit breakers shall be rated for short circuit duty at not less than the RMS symmetrical current values indicated on the drawings, but in no case less than the following ratings:

Interrupting Rating in RMS Symmetrical Amperes

Frame Size	Poles	120 Volts	240 Volts	277 Volts	480 Volts
100 amp.	1-P	10,000	----	14,000	----
100 amp.	2,3-P	----	10,000	----	14,000
225 amp.	2,3-P	----	25,000	----	22,000
400 amp.	2,3-P	----	42,000	----	30,000
600 amp.	2,3-P	----	42,000	----	30,000
800 amp.	2,3-P	----	42,000	----	30,000
1200 amp.	2,3-P	----	42,000	----	30,000

2.07 ENCLOSURES: Circuit breakers shall be suitable for and rated for use in panelboards, switchboards and other enclosures.

2.08 INDIVIDUAL ENCLOSURES: Where indicated, circuit breakers shall be installed in separate steel enclosures. Enclosures shall be NEMA 1 for general indoor use, NEMA 3R for general outdoor use, and NEMA 4X stainless steel, where indicated on the drawings.

2.09 ACCEPTABLE: Siemens, Eaton, GE and Square D.

PART 3 - EXECUTION

3.01 PANELBOARDS AND SWITCHBOARDS: Circuit breakers shall be factory installed in panelboard or switchboard assemblies as indicated on the drawings. Devices shall be bolted in place. Make up all conductor terminations.

3.02 INDIVIDUAL ENCLOSURES: Circuit breaker enclosures shall be suitably supported on structures using framing channel as necessary. Where practical, locate the top of the enclosure 6 feet above the floor. The circuit breaker operating handle shall not be less than 4 feet above the floor. Make up all conductor terminations and conduit.

3.03 TRIP ADJUSTMENT: Magnetic trip adjustments on all adjustable trip breakers shall be set in accordance with the manufacturer's directives and in accordance with the drawings.

END OF SECTION

SECTION 16620

GENERATOR SYSTEM

PART 1 - GENERAL

1.01 SCOPE: This Section includes all requirements for a complete and working diesel engine driven electrical generator set, complete with controls, starting system, cooling system, exhaust system, fuel system and other necessary components. Fuel piping is provided under the Mechanical division of these specifications. The generator set shall be a standard model or series in regular production.

A. Engine/Generator Set: Provide one (1) engine/generator set consisting of engine, generator, controls, starting system, cooling system, exhaust system, fuel system, steel support framing, spring isolation and other necessary materials to ensure a properly operating system. Rated output for prime duty service shall be not less than 90 KW, 112.5 KVA when operated at 0.8 power factor, 277/480 volts wye, 60 Hertz with fan and all auxiliaries connected.

B. Transfer Switch: Provide one (1) automatic transfer switch (ATS) to automatically switch the load from utility power to generator power.

C. Fuel System: Fuel tank and piping shall be provided by engine/generator supplier.

D. Unit Enclosure: Provide an enclosure to protect the engine/generator from the weather.

E. Standard Products: All elements of the system shall be standard products of a manufacturer regularly engaged in the manufacture of such products.

F. Basis of Design: Detroit Diesel as indicated on drawings. Generac, Onan, KATO and Caterpillar are approved equals. Kohler is not acceptable.

1.02 SERVICE FACILITIES: Manufacturer shall show satisfactory evidence that a local distributor maintains a fully equipped service organization, within a 50 mile radius of the project site, capable of furnishing to this system adequate inspection and maintenance service, including standard replacement parts.

1.03 RATING: Rating of the engine/generator set shall be based on operation of the set at rated generator RPM when equipped with all the necessary operating accessories such as radiator, air cleaners, lubricating oil pumps, jacket water pump, governor, alternating current generator and exciter. The engine/generator set shall be capable of delivering to the load its rated KW output at 0.8 power factor continuously without exceeding the temperature rise specified herein when operated in a 110°F ambient temperature.

Output rating shall not be less than specified. Unit shall be capable of operating the entire connected load in a single step, including inrush from any one of the connected motors, unless specified otherwise herein or in the drawings. System shall be capable of starting, coming up to rated speed, frequency and voltage and transferring load within 10 seconds. The engine shall not exceed the manufacturer's published prime duty rating.

1.04 WARRANTY: Provide a two (2) year warranty against defects in material or workmanship from the date of acceptance (start-up) of the equipment/system. An authorized representative of the manufacturer shall be available at the site to certify that the equipment/system has been installed to his satisfaction and sign the documents necessary to put the warranty clause into effect.

1.05 SERVICE CONTRACT: The supplier of the generator power system shall include a five (5) year full service contract for maintenance of the complete engine/generator set. Scheduled oil sampling shall be included in order to forecast and minimize engine failure. The supplier of the equipment shall provide a quarterly (every three months) oil sample analysis.

1.06 SYSTEM OPERATION: It is intended that the generator power system shall operate automatically in response to start signals from the transfer switch(es). In addition, it shall be possible to start the engine/generator set manually without load transfer for testing and exercise. The general operating sequence for automatic operation shall be as follows:

A. Upon signal (contact closure), automatically start up engine.

B. Upon signal to stop (contact opening), automatically stop engine after specified cool down period.

1.07 SUBMITTALS:

A. Provide shop drawings and technical descriptive data for complete system including diesel engine, generator, starting system, exhaust system, controls and vibration isolators. Provide complete installation drawings.

B. The requirements of this specification are for a prime duty engine/generator set. All submittals and technical data shall be for a prime duty engine/generator set. Any submittal containing references, rating or technical data on a stand-by rated engine/generator set will be rejected.

C. After two (2) submittal reviews have been rejected by the Engineer, the Engineer shall be paid, prior to each subsequent submittal, the cost anticipated by the Engineer for each submittal review. This review fee, charged by the Engineer, shall be paid by the engine/generator supplier.

1.08 TESTS:

A. Factory: Load test shall include one (1) 4-hour running test at full rated KW load at 1.0 P.F. Manufacturer shall provide certified copies of factory testing.

B. On Site: Conduct operating tests to show the generator set will start automatically, pick up the load, shut down and reset as specified. In addition, manual operation shall be satisfactorily demonstrated. Load test shall include two (2) separate 4-hour running tests at full rated KW load after installation at the site. Starting tests shall include two (2) automatic starts with engine cold. Demonstrate capability of five (5) 15 second crankings at firing speed with a 15 second rest between each cranking. Demonstrate capability of picking up the connected load. Voltage dip upon addition of any prescribed load shall not exceed 20%.

1.09 INSTRUCTION MANUALS: Include four (4) sets of complete instructions for operation, maintenance, service, wiring diagrams, spare parts, name and location of closest service facility, and other pertinent data. The information provided for each manual shall be contained in 3-ring binders.

1.10 RELATED SECTION: The following section of this specification is referenced in regard to the overall performance and installation of the engine/generator set.

A. Section 16475 Molded Case Circuit Breakers.

PART 2 - PRODUCTS

2.01 GENERAL: Engine/generator set shall be designed, constructed and tested in accordance with UL 2200, Standard for Safety for Stationary Engine Generator Assemblies.

2.02 ENGINE:

A. General: Provide a stationary, liquid cooled, fuel injected, full compression, solid state ignition type engine, either vertical or V-type. Nominal brake horsepower rating shall be 1.5 BHP per rated KW. Engine speed shall be 1800 RPM at normal full load operation. Under any condition of steady load, over the range from no load to full load, the governor shall maintain the engine speed within 1/2% of the average value at that load and governor droop shall not exceed 3% from no load to full load.

B. Fuel Injection Equipment: Injection pumps and injection valves shall be of a type not requiring adjustment in service. Fuel injection pumps shall be positive action, constant stroke pumps, actuated by gear drive from the engine. Fuel lines between injection pumps and valves shall be heavy duty seamless tubing and of the same length for all cylinders (to eliminate irregularity of fuel injection).

The fuel system shall be equipped with fuel filters having replaceable elements which may be easily removed from their housing for replacement without breaking any fuel line connections or disturbing the fuel pumps or any other part of the engine. All fuel filters shall be conveniently located in one accessible housing, ahead of the injection pumps so that fuel is thoroughly filtered before it reaches the pumps. No screens or filters requiring cleaning or replacement shall be used in the injection pump or in the injection valve assemblies. The engine shall be equipped with a built-in gear type, self priming, engine driven fuel transfer pump capable of lifting fuel against a head of 3.5 feet and supplying fuel from the main fuel storage tank through the filters to the injection pump at a constant pressure.

C. Cylinder Liners: Provide removable wet type cylinder liners of close-grained alloy iron, heat treated for proper hardness to obtain maximum liner life.

D. Lubrication: Provide an engine driven gear type lubricating oil pump for supplying oil under pressure to main bearings, crank pin bearings, pistons, piston pins, timing gears, camshaft bearings, valve rocker mechanism and governor. Provide effective lubricating oil filters, so located and connected that all circulated oil is continuously filtered and cleaned. Filters shall be accessible, easily removed and cleaned, and equipped with a spring loaded bypass valve to safeguard against stopping of lubricating oil circulation in the event filters become clogged.

E. Air Cleaner: Provide one or more dry type air cleaners of sufficient capacity to protect effectively the working parts of the engine from dust and grit. Provide a signal to indicate when the air cleaner requires changing due to clogged filters.

F. Fuel: The engine shall be capable of satisfactory performance on a commercial grade of distilled petroleum fuel oil such as No. 2 domestic burner oil. Diesel engines requiring a premium fuel will not be considered.

G. Prevention of Carbonization: The engine shall be capable of operating at light loads for extended periods of time with provisions for pre-combustion of the fuel or a similar means to prevent carbonization.

H. Starting: Equip engine with an automatic electric starting system, 24 volts D.C. minimum. Provide controls to automatically start the engine and automatically shut down the engine. Automatic starting controls shall be arranged to provide five (5) 15 second cranking intervals without lockout. Each cranking interval will have a 15 second rest period. The starter shall be a positive shift, gear engaging type designed to automatically disengage when engine starts.

I. Jacket Water Heater: Provide a jacket water heater (1-phase, 240 VAC) to maintain engine at 100°F for rapid starting. The jacket water heater shall be complete with an integral temperature switch with adjustable settings.

J. Cooling: Provide a cooling system of sufficient capacity for properly cooling the engine when delivering full rated horsepower. Provide unit mounted radiator and fan of a type and capacity recommended by the engine manufacturer for use in ambient temperature up to 110°F. The engine shall have an engine driven, centrifugal type water circulating pump for circulating water through the cooling system. Provide and fill the engine and radiator with the manufacturer's recommended anti-freeze for operation down to 0°F.

K. Safety Devices: Provide safety devices to shut down the engine in the event of low lubricating oil pressure, excessive jacket water temperature, engine overspeed or engine overcrank. Provide an individual alarm light for each safety device and a common audible signal.

2.03 GENERATOR:

A. The generator shall be designed for the rated KW capable of full KW output at 60 Hertz, 3-phase operation in accordance with the standards and criteria established in NEMA Standards Publication No. MG1-2009. The generator shall conform to NEMA and IEEE standards and shall have a minimum efficiency of 92% at rated output. Windings shall have class F insulation protected by 100% epoxy vacuum impregnation and anti-fungus treatment. Provide a static silicon rectifier type voltage regulator. The voltage regulator shall be shock mounted and have a regulation voltage adjustment of ± 5%. The generator shaft shall be connected to the engine flywheel through a suitable flexible coupling. Provide a direct connected, brushless type generator exciter matched with generator. The exciter shall be a permanent magnet generator (PMG) type with solid state hermetically sealed silicon rectifiers mounted on the armature and directly connected to generator field windings. Stable alternator operating conditions shall be re-established within two seconds following any sudden change in load between no load and full load or between full load and no load. Stable alternator operation is defined as operation with terminal voltage held constant within ± 1% of rated voltage.

B. The unit shall have the following ratings:

Prime Duty	90 KW 112.5 KVA
Power Factor	0.8
Frequency	60 Hertz
Voltage	277/480
Speed	1800 RPM
Ambient Temperature	110°F
Insulation Class	NEMA Class F
Temperature Rise	80°C by resistance (based on a 40°C ambient)

C. The generator shall be equipped with a 1-phase, 120 VAC space heater to prevent condensation in the generator. The space heater shall be switched off by the control panel when the generator is in operation.

2.04 CIRCUIT BREAKER:

A. A 100% rated main circuit breaker and in accordance with Specification Section 16475 shall be provided for the generator output power.

B. Provide a 3-pole, thermal magnetic, molded case, circuit breaker sized as shown on the drawings. The long time trip rating of the circuit breaker shall not be less than 115% of the generator rated output ampacity at unity power factor.

C. The circuit breaker shall be connected from the generator terminals to the line side of the breaker.

D. Lugs shall be provided on the load side of the circuit breaker for field connection of the feeder conductors designated on the drawings.

E. An insulated neutral block shall be provided in the circuit breaker enclosure to field connect the feeder neutral. The generator neutral shall be connected to the neutral block. The neutral block shall be isolated from ground.

F. The generator circuit breaker, the insulated neutral block and an equipment ground lug connection shall be contained in the generator circuit breaker enclosure. The circuit breaker shall be operable without opening the circuit breaker enclosure.

G. The circuit breaker shall be mounted on the engine/generator skid.

2.05 ENGINE/GENERATOR CONTROL PANEL:

A. General: The control panel shall be constructed of code gauge steel and shock mounted on the engine/generator set. Mount all control devices in the panel with operators, instruments and indicators mounted on the front for easy access to all terminals and components. Provide necessary cable lugs for power cables. Provide the following instruments and controls:

1. AC voltmeter, digital display, 2% accuracy.
2. AC ammeter, digital display, 2% accuracy.
3. Frequency meter, digital display.
4. Voltmeter phase selector switch, 4-position, including “off”.
5. Ammeter phase selector switch, 4-position, including “off”.
6. AC load circuit breaker (molded case circuit breaker) with auxiliary contact for remote signaling of “OPEN”.
7. Voltage adjustment rheostat.
8. Totalizing type running time hour meter.
9. Dial-type oil pressure gauge.
10. Coolant temperature gauge.
11. Panel illumination lights and switch.
12. Automatic start-stop controls and terminals for field connections.
13. Dry contacts wired to terminal strips for remote alarms.

B. Alarm Signal Annunciator: Provide an annunciator with individual latching visual signals at the generator control panel for indication of the following conditions.

1. Generator running.
2. Low battery voltage.
3. High battery voltage.
4. Normal battery voltage.
5. Overcrank.
6. Overspeed.
7. High water temperature.
8. Low oil pressure.
9. Low coolant level.
10. Low fuel level.
11. Fuel tank leak.

C. Provide an alarm reset push button for the alarm annunciator.

D. Sensing elements shall be provided to monitor the specified alarm conditions. These sensing elements shall be connected to the control panel with wiring that is properly labeled for easy identification. Wiring shall be routed in rigid and flexible conduit in areas where the wiring is unprotected from physical damage.

E. Provide a "local-remote" selection switch and a "stop-off-auto-run" switch for engine control. With the selector switch in the "local" position, the engine may be operated from the engine control panel and remote operation shall be inhibited. With the selector switch in the "remote" position, operation and control shall only be remote. "Stop" position shall always stop the engine regardless of selector switch mode. "Local" selection and "stop" position shall cause a remote alarm condition.

2.06 BATTERIES AND CHARGER:

A. Provide a 24-volt minimum, lead acid type battery bank with steel rack suitably treated to inhibit rust and finished with acid resistant paint. The batteries shall be mounted in a molded high-density polyethylene containment tray arranged in a shock and vibration proof assembly. Batteries shall be sized as recommended by manufacturer. Provide a voltage relay to signal a low battery voltage condition at approximately 90% of cell voltage. Provide flame retardant caps.

B. A current limiting battery charger two rate (2.17 volts per cell normal charge/2.33 volts per cell equalized charge) with 120 volt, 60 Hertz input voltage, shall be provided and mounted on the engine/generator skid. The charger shall have a DC ammeter and DC voltmeter to indicate the charging current and voltage. The charger shall be equipped with a manually operated float equalize timer switch and equalize charge indicator pilot light. An AC circuit breaker shall be provided on the input power and a DC fuse shall be provided on the output.

2.07 FUEL SYSTEM:

A. Main Storage Tank: Furnish and install a UL 142 listed double-walled sub-base fuel tank with a capacity of 475 gallons. Tank shall be constructed of 10 gauge welded steel plate and shall be suitable for diesel fuel use. Tank shall be equipped with level gauge and low fuel level fuel sensor with annunciation on the control panel.

Provide a sensor between the fuel tank walls to indicate a leak in the primary fuel tank. The storage tank and associated piping shall be in compliance with Chapter 62-762 of the Florida Administrative Code, "Petroleum Storage Systems". The sensor shall be mounted on the fuel tank in a location that is accessible for routine inspection. Additionally, the sensor shall be mounted to the tank with a union fitting to facilitate its removal and flexible electrical connections to allow inspection of the sensor.

The sub-base fuel tank shall form the floor of the unit enclosure. The tank shall incorporate the appropriate structural members to support the engine/generator skid. The top tank surface shall have appropriate stiffeners to provide a sound and rigid walking surface.

B. Flow Controls: Provide level control switches and a solenoid valve to control the flow of fuel from the sub-base fuel tank to the diesel engine. Controls shall be operated from 120 VAC control voltage and shall be wired complete. Provide the necessary control power transformer, relays, enclosure, fuses and wiring to operate the flow controls from the generated voltage.

C. Fuel Lines: Fuel lines between the sub-base fuel tank and the diesel engine shall be of approved flexible type. All fuel lines and connections shall be pressure tested prior to introducing fuel.

D. Fill Connection: The storage tank filling connection shall be equipped with spill containment equipment of sufficient volume to prevent the discharge of pollutants contained in the transfer hose when it is detached from the storage tank filling connection.

E. Final Fill: The fuel storage tank shall be filled with diesel fuel prior to on-site testing. Upon completion of all testing the remote storage tank and day tank shall be "topped off" so a full 475 gallon fuel supply is provided.

2.08 EXHAUST SYSTEM:

A. Silencer: Provide Cowl Spiral Silencer model "TXS" series as manufactured by Temro Automotive, mounted directly to the engine exhaust manifold with vertical discharge through the unit enclosure roof.

B. The exhaust piping and silencer shall be supported from the engine/generator skid and the unit enclosure. The exhaust piping and silencer shall be oriented outside the unit enclosure as shown on the drawings. The exhaust piping and silencer supports shall be designed and connected so as to allow for thermal expansion and contraction. The weight of the silencer shall not be supported by the engine.

C. The exhaust piping, flexible joints, flange nuts and bolts, and silencer shall be fabricated of 316 stainless steel.

D. Exhaust piping shall be insulated and guarded for personnel protection against high temperature surfaces.

2.09 UNIT SKID:

A. The engine/generator skid shall be properly mounted on a steel reinforced concrete slab. The engine/generator unit shall be mounted on a steel skid suitable for maintaining correct alignment of the engine/generator unit when the skid is installed on the concrete slab.

B. The skid shall have lifting eyes for lifting the entire engine/generator unit.

2.10 PROTECTIVE ENCLOSURE:

A. A unit enclosure shall be provided to afford adequate protection from the elements for the engine/generator systems. The unit shall provide sufficient flow through ventilation for cooling and combustion and have easy access to control panel and serviceable engine components.

B. The enclosure shall be formed of aluminum construction, modular design, with side and rear accessibility. The structure and roof shall be constructed of 12 gauge sheet aluminum with 14 gauge doors and with adequate exhaust silencer supports. The assembled enclosure shall provide a complete free-standing, weatherproof unit.

C. The unit enclosure, including walls, roof panels, framings, bracing and enclosure cladding and components, shall be designed and constructed in accordance with the latest edition of the Florida Building Code and ASCE 7-05. The enclosure's components and cladding, including doors, windows, glazing, louvers and all attachments, shall be designed and constructed to meet the Florida Building Code requirements for wind loading and anchorage. Submit product approval drawings and design data for the enclosure, components and cladding.

D. The roof shall be pitched and have a rainlip at the control panel door end.

E. Side panels and doors shall not exceed 42" width. All doors and hinged louvers shall have stainless steel hinges with stainless steel pins and 2-point recessed door handles with key locking provisions. All doors will be keyed alike and the rear door shall have a print pocket. All screws, nuts and washers shall be cadmium plated.

F. Air intake louvers shall be formed and welded construction and shall be sized for a minimum of 150% of the radiator exhaust area.

G. The enclosure shall have lifting eyes for lifting the enclosure only.

H. The radiator exhaust cut out shall be sized and located for the particular unit to be installed according to information supplied by the engine supplier. Provide flexible cowl to connect radiator exhaust flange to exhaust cut out. The enclosure shall have a radiator access cap on the enclosure roof panel.

I. All grilles and openings shall be screened to prevent the entrance of birds and rodents.

J. The enclosure shall have a 3" channel base.

K. The enclosure shall be a minimum of 60" high, 40" wide and 100" long; larger engine/generator configurations may merit a larger enclosure. Coordinate exact requirements and dimensions with enclosure manufacturer.

L. The enclosure shall be manufactured by the engine supplier.

M. Mount inside the unit enclosure a 150 watt incandescent with die cast aluminum housing and porcelain socket with guard and globe; light switch and a duplex receptacle outlet. All conduit within the unit enclosure shall be rigid aluminum conduit secured in place with 316 stainless steel fasteners and hardware. The use of EMT is not acceptable. Quality of materials and installation methods shall conform with the drawings and other sections of this specification.

N. Provide sound baffles to reduce noise level to no more than 85 dB when measured at any point at a distance of 10 feet from the enclosure. The differential between the highest and lowest readings shall not be greater than 3 dBa.

O. Provisions shall be made in the base of the unit enclosure and in the fuel tank to allow entry of the conduit installed at the site to be connected to the circuit breaker enclosure and to the generator control panel enclosure. This conduit will enter the unit enclosure from below grade as indicated on the drawings.

P. Unit shall be installed in a workmanlike manner and be painted with the manufacturer's standard paint system. The color of the final finish paint coat shall be approved by the CITY. Three (3) 12-ounce spray cans of the final finish paint coat shall be furnished to touch-up any scratches or other blemishes.

Q. Submit shop drawings for approval.

2.11 STRUCTURAL SUPPORT VIBRATION ISOLATORS: The engine/generator set shall be mounted on a common welded steel base and vibration isolators shall be provided which shall effectively isolate engine vibration from the building and surrounding area. Vibration isolators shall be provided as part of the engine generator assembly.

2.12 SCHEDULED OIL SAMPLINGS:

A. In order to forecast and minimize engine failure, supplier of the equipment shall include, as part of his proposal, quarterly (every three months) oil sampling analyses for a period of one year from acceptance date.

B. All equipment needed to take oil samples shall be provided in kit form at the time of acceptance and shall include the following:

1. Sample gun kit.
2. Bottles (20).
3. Mailers (20).

2.13 AUTOMATIC TRANSFER SWITCH:

A. Furnish and install a switch sized and located as shown on the drawings. It shall be listed and rated under UL1008 and capable of switching all classes of load for continuous duty. The switch shall be installed in a NEMA 3R gasketed enclosure.

B. An insulated neutral block shall be provided in the transfer switch enclosure on which to terminate all the neutral conductors. The neutral block shall be isolated from ground.

C. The automatic transfer switch shall be mechanically held in both the emergency and normal side, solenoid operated and rated for continuous duty. The switch shall be double throw with the main contacts rigidly and mechanically interlocked to ensure only two possible positions: Normal or Emergency.

D. A manual operator shall be provided to enable hand operation of the switch to both the emergency and normal positions.

E. All main contacts shall be silver alloy, wiping action type. The operating transfer time in either direction shall not exceed 1/6 second. All replaceable contacts, coils, springs and control elements shall be conveniently removable from the front of the transfer switch without major disassembly or disconnection of power conductors.

F. The automatic transfer switch shall be provided with the following features:

1. Voltage monitors on all phases set at 90% pick-up, 70% dropout.
2. Adjustable time delay on transfer to emergency.
3. Adjustable time delay on engine start.
4. Re-transfer to normal time delay adjustable 0-30 minutes. Set the re-transfer time to 15 minutes after utility power is normalized.
5. A cool-off period of 2-25 minutes after re-transfer. Set the cool-off time period to 10 minutes.
6. Test switch.
7. Pilot light to indicate normal source.
8. Pilot light to indicate emergency source.
9. One set of NO and NC auxiliary contacts.

2.14 SIGNAGE:

A. Provide a sign posted on each side of the engine/generator skid which reads, "WARNING THIS EQUIPMENT STARTS AUTOMATICALLY".

B. This sign shall be in accordance with OSHA requirements in size and color. Colors shall be black letters with a yellow background.

2.15 ACCEPTABLE MANUFACTURERS: Generac, Onan, Caterpillar, KATO and Detroit Diesel.

PART 3 - MODE OF OPERATION

3.01 NORMAL: The load shall be continuously supplied by the commercial utility company through the transfer switch and panels as shown on the plans.

3.02 COMMERCIAL LINE FAILURE: When the transfer switch senses a loss of voltage at 70% or below for a period of 6 seconds, a set of contacts will start the engine/generator set. When the generator voltage and frequency reaches 90% of operating voltage (4 seconds maximum), the transfer switch will switch to the generator power and feed the load.

3.03 RETURN OF COMMERCIAL POWER: When commercial power has returned to 90% of rated voltage and frequency for a period of 15 minutes, the transfer switch will switch back to normal position and feed the load.

3.04 COOLING PERIOD: After a cool-off period of 10 minutes after re-transfer to commercial power, the engine will shutdown and be ready for the next power outage. The cool-off time period shall be adjustable for up to 30 minutes after re-transfer.

3.05 AUTOMATIC EXERCISER: An automatic exerciser shall be provided. The exerciser shall be programmable to select a schedule to exercise the engine/generator set on a weekly, bi-weekly or calendar (365 days) basis. The day of the week, time-of-day and duration of the engine/generator set starting and running shall be programmable. The option to run the engine/generator set under load or unloaded shall be selectable. All selectable and programmable options shall be entered through a touch pad which is integral to the exerciser module or part of the transfer switch assembly.

PART 4 - PERFORMANCE CRITERION

4.01 The engine/generator shall start and operate continuously with the loads noted in the drawings. The loads will be applied in steps, sequenced with a 10 second interval between the application of each step load. The generator must withstand the step loads noted below without exceeding the 20% voltage dip specified.

4.02 The loads and sequence of step loads will be:

Step No.	Load
Step 1	Lighting and miscellaneous loads: 20 KVA
Step 2	Pump #1: 25 HP - with full voltage motor starter.
Step 3	Pump #2: 25 HP - with full voltage motor starter.
Step 4	Pump #3 (future): 25 HP - with full voltage motor starter.

PART 5 - EXECUTION

5.01 ENGINE/GENERATOR SET: Cushion mounting on a welded structural steel base shall be provided for suitable mounting to any level surface.

5.02 EXHAUST SYSTEM: The exhaust manifold system and piping shall be mounted inside the generator housing and properly supported. The exhaust silencer shall be mounted outside the housing. Make up all exhaust system joints tightly to preclude leaks. Provide rain shields and collars where exhaust penetrates the roof or wall. Opening shall be free of all leaks.

5.03 WIRING: Provide all wiring and conduit and install in accordance with the appropriate provisions of other sections of Division 16 Electrical Work. All electrical connections to the engine/generator set shall be flexible connections.

5.04 COORDINATION: CONTRACTOR shall coordinate framing system of generator set to suit flooring supports. Provide installation shop drawings indicating necessary framing and supports to provide a safe and working installation.

5.05 FOUNDATION: The concrete foundation pad for the engine/generator set shall extend a minimum of 12” beyond the unit enclosure perimeter.

5.06 INSPECTION AND INSTRUCTION: The equipment manufacturer shall furnish the services of a competent and experienced representative, who has complete knowledge of proper operation and maintenance of the equipment, for a period of not less than one (1) day to inspect the installed equipment, supervise the initial test run, and to provide instructions to the operating personnel. The visit will be for checking and inspecting the equipment after it is installed, and shall be allocated solely to the instruction of operating personnel in operation and maintenance of the equipment. This instruction period shall be scheduled at least ten days in advance with the CITY and shall take place prior to start-up and acceptance by the CITY. The final copies of operation and maintenance manuals shall be delivered to the CITY prior to scheduling the instruction period.

END OF SECTION

SECTION 16940

CONTROL PANELS

PART 1 - GENERAL

1.01 SCOPE: This Section includes requirements for providing a wastewater pumping station control panel and related equipment to control the pumps, levels, processes, etc., as indicated within the drawings.

1.02 RELATED WORK:

Section 16010; Electrical General Provisions
Section 16475; Molded Case Circuit Breakers

1.03 QUALITY ASSURANCE:

A. Unit Responsibility: The control panel, frame and cover shall be supplied by the panel manufacturer to ensure unit responsibility.

B. Guaranteed Parts Stock Program: The panel supplier shall have a guaranteed parts stock program in the State of Florida.

1.04 SUBMITTALS:

A. Shop Drawings: The CONTRACTOR shall provide shop drawings prepared by the manufacturer and submitted to the Engineer for review prior to the manufacture of the equipment. The shop drawings shall include outline dimensions and external connection diagrams. A list of components, control panel one-line wiring diagram, specifications, and a copy of the manufacturer's warranty shall be included with the submitted data. In addition, the shop drawings shall include the following:

1. Control panel drawing, including material, showing components on the door front, showing components on the back panel and showing wiring diagram.
2. Warranties.

B. Operating Instructions: For all control panels furnished under this Section, the CONTRACTOR shall submit operation and maintenance manuals which include the following items:

1. General - equipment function, description and normal and limiting operating characteristics.
2. Installation instructions - assembly procedures and alignment and adjustment procedures.
3. Operation instructions - start-up procedures, normal operating conditions, emergency and normal shutdown procedure.
4. Maintenance instructions.
5. Trouble-shooting guide.
6. Parts list and predicted life of parts subject to wear.

7. Drawings - cross sectional view, assembly and wiring diagrams.

C. Factory Performance Test Data: A factory representative who has complete knowledge of proper operation and maintenance of the control panel, shall be provided for one day to instruct representatives of the CITY and the Engineer on proper operation and maintenance. With the permission of the CITY, this work may be conducted in conjunction with the inspection of the installation and test run as provided in this Section. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional services shall be provided at no cost to the CITY.

D. Certifications: The CONTRACTOR shall furnish the Engineer with a written certification signed by the manufacturer's representative that the equipment has been properly installed, tested, calibrated and operated under full load conditions, and satisfactory operation has been obtained.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Deliver a complete system ready to install as job progress requires.

B. Store in weathertight building or suitable covering to protect against damage of any nature.

C. Handle during delivery, storage and installation in a manner to prevent damage of any nature.

1.06 WARRANTY AND GUARANTEES: All equipment shall be guaranteed against defects in material and workmanship for a minimum period of one year from the date of the CITY's final inspection and acceptance to the effect that any defective equipment shall be repaired or replaced without cost or obligation to the CITY.

PART 2 - PRODUCTS

2.01 GENERAL: A control panel shall be provided as noted above.

A. Control panel shall be designed, constructed and tested in accordance with applicable NEMA, UL and ISA standards. The latest edition of the NEC, as well as, all state and local codes and regulations, shall govern the materials, fabrication and installation of the control panel.

B. All components used within the control panel shall bear a UL label.

2.02 OPERATING VOLTAGE: The control logic shall operate at the power characteristics specified on the drawings.

2.03 ENCLOSURE: The control panel enclosure shall be NEMA 4X (prior to modifications) and constructed of 14 gauge minimum 304 stainless steel with a deadfront aluminum inner door.

A. A stainless steel, heavy-duty, padlocking-type, door handle with a three-point latch shall be provided.

B. The outer door shall be hinged continuously along its length.

C. A white 12 gauge steel backplate shall be provided for internally mounted components.

D. A door stop kit shall be provided.

E. The enclosure shall be mounted on a concrete pedestal as shown on the drawings.

F. All exterior mounted hardware, fasteners and accessories shall be constructed of stainless steel or copper-free aluminum.

G. The following devices, as applicable, shall be mounted inner door (SP2):

1. Pump run lights.
2. Seal/temperature alarm lights.
3. HOA switches.
4. Elapsed time meters.
5. Alarm lights shown on the drawings.
6. Alarm reset pilot light push buttons.

H. The exterior surfaces of the enclosure shall be properly cleaned and prepared for coating and shall be coated with Signal White polyester-based powder coat finish, matching color RAL 9003. Coating shall have a minimum dry film thickness of 2.5 mils. Coating shall be provided by Sherwin-Williams Powdura or equal.

2.04 Control circuits, including motor contactor coils, shall operate at 120 volts AC.

2.05 CIRCUIT BREAKERS: The control power circuit breaker(s) shall be a thermal-magnetic molded case circuit breaker of the ampere rating shown in the drawings with a minimum of 10,000 AIC unless otherwise specified. The control power circuit breakers shall be Square D FAL series or equal.

2.06 PROTECTIVE RELAYING:

A. A combination discrete/analog phase voltage monitor relay shall be provided and connected to the line side of the panel main circuit breaker in the control panel.

B. An undervoltage/phase failure condition shall de-energize the motor(s) controlled by the panel and prevent the motor(s) from running again until the phase failure/undervoltage condition has been corrected.

C. The relay shall be preset to operate when voltage on any phase falls to <380 VAC.

D. The monitor shall provide a DC output current proportional to the voltage of Phase A and Phase C referenced to Phase B.

E. Provide a Wilkerson DR6305 or equal.

2.07 MOTOR CIRCUIT BREAKER: Each motor controlled by the panel shall be equipped with a thermal magnetic circuit breaker. Square D (FA, KA, or LA) or equal. The circuit breaker shall be provided with provisions for locking it in the "off" position.

2.08 MAGNETIC STARTERS:

A. Each motor controlled by the panel shall be controlled with a NEMA sized, full voltage non-reversing (FVNR), AC magnetic starter complete with Class 20 solid state type overload relays.

B. The motor starters shall be across the line starters with individual overload protection on each power phase.

C. Contactor coils shall be 120 VAC unless otherwise noted.

D. Starters shall be Square D Class 8536 or equal.

2.09 MOTOR RUN LIGHTS:

A. Each motor shall have a pilot light to indicate the motor running status. When the motor is on, the pilot light shall be on.

B. The pilot lights shall operate from the 120 VAC control voltage.

C. The pilot lights shall be 30.5 mm, heavy duty, oiltight, NEMA 4X (watertight), push-to-test, light emitting diode (LED) type with yellow colored lenses. Square D SKT38LYY9 or equal.

2.10 ALARM LIGHTS:

A. Alarm statuses shall be indicated through pilot lights as noted on the drawings and within these specifications.

B. The pilot lights shall operate from the 120 VAC control voltage.

C. The pilot lights shall be 30.5 mm, heavy duty, oiltight, NEMA 4X (watertight), push-to-test, light emitting diode (LED) type with red colored lenses. Square D SKT38LRR9 or equal.

2.11 ILLUMINATED PUSH BUTTON:

A. Alarm Reset push buttons shall be illuminated.

B. Push buttons shall have 1 - N.O. & 1 - N.C. contacts with AC - NEMA A600 ratings, 30.5 mm and NEMA 4X, momentary, fully guarded, black operators with light emitting diode (LED) type pilot light with lenses. Square D catalog number SK2L38LRRH13 or equal.

2.12 HAND-OFF-AUTOMATIC (HOA) SELECTOR SWITCH:

A. A HOA Selector Switch to control each pump shall be mounted on the panel inner door as designated in the drawings.

B. HOA Switches shall have contacts with AC - NEMA A600 ratings with a 30.5 mm, NEMA 4X, maintained 3-position selector operators and standard black knob. Square D catalog number SKS43BH13 or equal.

2.13 ELAPSE TIME METER: Elapse time meters shall be 120 VAC non-reset type to indicate pump total running time in hours and tenths of hours to 99999.9 hours. Cramer 635 or equal.

2.14 DUPLEX SERVICE RECEPTACLE: A duplex 15 amps, 125 volt AC, specification grade ground fault receptacle ivory in color shall be provided. Hubbell catalog number GF 5262 or equal.

2.15 CONTROL ELEMENTS:

A. The control system components shall include, but not be limited to, a 120 volt AC transformer, plug-in relays with plug-in screw terminal sockets and conductivity alarm relays.

B. All control wiring shall be color coded (minimum 18 colors) AWG 12, rated for 600 volts, stranded tinned copper, 90°C rated PVC insulated and installed in plastic wiring duct with cover.

C. Each wire shall be identified at each end with wire markers.

2.16 TERMINALS:

A. Terminals shall be provided and labeled for all field wiring connections by others, including float switches, control contacts, 120 VAC power and 480 VAC power.

B. Control wiring terminals shall be Square D type GC6 or equal, complete with end barriers, end clamps and mounting channel.

C. Grounding lugs shall be provided for grounding conductors.

D. Field connected power conductors will be terminated directly on the circuit breakers and motor starters as shown on the drawings.

2.17 NAMEPLATES:

A. Pilot lights, push buttons, switches, circuit breakers, components and devices shall be labeled with nameplates as noted on the drawings. Internal panel control components shall be labeled, identifying the component tag or function as applicable.

B. All nameplates shall be three-ply phenolic, black-white-black, engraved through the first black layer. Lettering shall be 0.5 cm (3/16") minimum. Edges of all nameplates shall be beveled at 45 degrees.

C. Nameplates shall be fastened to the equipment by means of two stainless steel screws or by means of epoxy cement.

D. A permanently affixed 11" x 17" (minimum) 20 gauge anodized aluminum plate, photographically etched shall be attached to the inside of the enclosure door. This etched plate shall detail the panel wiring schematic.

2.18 PUMP CONTROLLER / SCADA / RADIO (PCSR):

A. The Pump Controller / SCADA / Radio subassembly comprises a programmable logic controller (PLC) based system engineered to provide pump control, supervisory control and data acquisition (SCADA), and radio telemetry in one assembled package. The components shall be mounted on an aluminum sub-panel and be fully wired, tested, and ready for field connections via conveniently located interface terminals. The subassembly shall operate on a 120 volt, 60 Hertz, single-phase power supply and shall have integral transient voltage protection.

B. The PCSR shall be a Motorola ACE 3600 package as distributed by DCR Engineering Services Inc., SCADA One, and Revere Controls. The CONTRACTOR shall coordinate his efforts with the SCADA Integrator to ensure system compatibility, performance, and security. The CONTRACTOR shall provide and install a complete control system package, as programmed by DCR, SCADA One, or Revere Controls.

C. The following is a partial list of PCSR features:

1. Motorola ACE 3600 remote terminal unit (RTU) with surge / lighting protection for power line and antenna shall be provided.

2. Digital input and output modules and analog input and output modules shall be provided as shown on the drawings.

3. Motorola MTS conventional radio: 403-470, 450-512 MHz shall be provided.

4. The pump controller shall operate independently of the SCADA / telemetry system in the event of communications loss.

5. DC power circuits derived from the RTU and feeding external loads shall be individually fused as required. Fuses shall have indicator LED's to indicate fuse has blown.

6. A back-up pump controller shall be provided to facilitate emergency overflow protection in the event of RTU failure.

7. Interposing control relays shall be provided as required.

8. Terminal blocks shall be arranged, and separated as follows: main power distribution block; 120 VAC power; 24 VDC power; RTU DC power bus.

9. All wires shall be permanently identified using a computer generated labeling system. All terminal numbers and identifying nomenclature shall correspond to and be shown on the electrical diagrams and schematics.

10. All external wiring shall terminate on terminal blocks.

11. The RTU shall provide both digital and analog inputs for use in monitoring and control. Simultaneous monitoring of analog and digital level sensing devices shall be supported where the analog level sensing device shall be primary. The RTU shall contain routines for detecting sensor failures and utilize the alternate level sensing device(s).

12. Battery back-up power shall be provided for the RTU so that monitoring is maintained during utility power failures. The batteries shall have the capacity of operating the RTU for a minimum of four hours. The power supply shall keep the batteries at float charge. The RTU shall contain a low battery cutout circuit, and the batteries shall not be damaged by deep discharges.

13. Local manual pump control is provided by Hand-Off-Auto (HOA) switches located in the pump control panel. In the absence of RTU power or in the case of RTU failure, the pump motor starters shall remain operational in the HAND position. In no case shall the RTU have the capability to operate or override the pumps in the HAND or OFF positions.

14. The capability to remotely override or disable individual pumps shall be provided (local switches must be in the AUTO position).

15. The RTU shall have the capability to test the back-up pump controller by creating a high level condition and verifying that the back-up controller functions properly. In the event of a controller failure, the RTU will send an alarm to the Central HMI.

16. Capability shall be provided to configure from one to three pumps.

17. Individual pump run status shall be reported to the Central HMI.

18. The following pump failures shall be reported to the Central HMI: fail to start; fail to stop; premature stop; motor controller fault; and stator overtemperature.

19. RTU configuration parameters shall be adjustable locally and remotely from the Central HMI.

20. A fail-safe input shall be provided indicating cabinet intrusion.

21. The RTU shall have the latest RTU SCADA application license compatible with the existing Central HMI configuration.

2.19 WET WELL LEVEL MONITORING SYSTEM:

A. The wet well level monitoring system shall be of the ultrasonic type. It shall consist of a transducer element and a transmitter/electronics package.

B. The transducer shall use a PZT ceramic element with a nominal operating frequency of 50 kHz. The transducer shall have a range of 1 to 32.8 ft. The transducer shall convert a 24-volt input from the electronics package to a 3,000-volt peak-to-peak echo pulse. The transducer shall be Factory Mutual (FM) approved for use in a Class I, Division 1, Group A, B, C or D location. The transducer shall be rated intrinsically safe for zone 0.

C. The transmitter/electronics package shall operate from 115 VAC, 60 Hertz or 10 to 28 VDC power source. The unit shall automatically switch to the dc source when utility power is lost. The transmitter shall be compatible with a full line of transducers. The unit shall be simple to program with a hand-held programmer or laptop computer. Basic set-up and advanced echo analysis and diagnostics software shall be provided. A 4-20 mA output and two alarm relays shall be provided. A flashing LED shall indicate healthy status. The accuracy shall be 0.25% of measured range and the resolution 0.1% of measured range. The unit shall be housed in a NEMA 4X enclosure.

D. The wet well monitoring system shall be tropicalized as manufactured by Pulsar, Inc., or equal (Transducer - DB10-30-0-000-0-0; Transmitter - Blackbox 130-110-300-00P-KP-TROP).

2.20 SURGE PROTECTIVE DEVICE (SPD):

A. The SPD shall be able to suppress lightning induced voltage surges three times greater than the industry standards. The rated line voltage for SPD shall be 277/480 VAC, 3-phase, 4-wire wye. The maximum single impulse current shall be 80kA per phase.

1. The SPD shall have line to neutral protection on all phases, and also neutral to ground protection.

2. The SPD shall have a 5-year warranty. Under that warranty, the SPD shall be replaced if it is destroyed by lightning or other impulses.

3. The SPD shall have an LED failure indicator on all three phases.

4. The clamp voltages for the SPD shall be the following:

Line-to-neutral - 700 volts
Line-to-ground - 700 volts
Neutral-to-ground - 700 volts
Line-to-line - 1200 volts

B. The Surge Protective Device shall be Advanced Protection Technologies model TE04XDS104X or equal.

2.21 SEAL LEAK DETECTOR:

A. The seal leak detector shall be compatible with the submersible pump supplied and be Underwriters Laboratories (U.L.) listed for use in pumping applications. The detector shall have the following features:

1. The unit shall employ low voltage, low current, conductivity probe type liquid level detection.
2. 120 VAC, 60 Hertz, operating voltage.
3. The alarm output shall be an SPDT 10 amp, 250 VAC relay contact with a minimum 2000 VAC isolation to probe.
4. Probe supply characteristics - sensitivity, 4.7K to 100K OHM, adjustable; voltage, 24 VAC, 60 Hertz; current, 2 mA maximum.
5. Eight pin octal-type plug (provide matching screw terminal sockets).
6. The unit shall be housed in a high-impact plastic dust cover.

B. The seal leak detector shall be Syrelec model PNRU110 or equal.

PART 3 - PANEL CONTROL OPERATIONAL REQUIREMENTS

3.01 PUMP CONTROL PANEL:

A. General: The control panel shall control the operation of two (2) wastewater pumps, with provisions for a future third wastewater pump. Liquid levels within the Wet Well will determine the running statuses of the pumps.

B. Operation:

1. The two (2) pumps shall operate in a lead/lag configuration.

2. The lag pump shall supplement the pumping capacity of the lead pump in the event the liquid level continues to rise while the lead pump is operating.

3. The lead pump and lag pump shall be alternated automatically on a periodic basis to equalize the run time of each pump. When alternated, the lead pump will assume lag pump status and lag pump will then become the lead pump.

4. A delay of 5 seconds shall be provided between the starting of any pump.

5. Liquid Level Controls:

a. Liquid level set points shall be inferred by the Pump Controller / SCADA / Radio (PCSR) from the Wet Well Level Monitoring System.

b. The float switch shall provide control actions independent of the PCSR.

c. The “all pumps off” set point shall ensure all pumps are off.

d. The “lead pump on” set point shall turn the first pump on.

e. The "lag pump" set point shall turn the second pump on.

f. A contact closed signal from Float Switch (FL) shall turn pump 1 and pump 2 on through the backup pump controller PC-1.

6. Pump Control:

a. Provide a normally open contact from the PCSR to control the "on/off" operation of each of the two (2) pumps.

b. Each of the normally open contacts shall be field connected to an interposing control relay, associated with each pump motor starter.

c. A closed contact will allow the pump motor to operate. Opening this same contact will turn the pump motor off.

d. The pump control contacts shall be wired to terminals for field connections.

PART 4 - EXECUTION

4.01 INSTALLATION:

A. All materials and equipment shall be installed as shown on the Drawings and as recommended by the manufacturer.

B. Additional items of construction necessary for the complete installation of the system shall conform to specific details on the Drawings and shall be constructed of first-class materials conforming to the applicable portions of these Specifications.

4.02 INSPECTION AND TESTING:

A. Personnel: The services of a factory trained, qualified representative shall be provided to inspect the completed installation, make all adjustments necessary to place the system in trouble-free operation, and instruct the operating personnel in the proper care and operation of the equipment prior to the final acceptance of the control panel and its associated installation.

B. Field Test: When the pumping facility is complete and ready for operation, then the control panel shall be inspected and tested for compliance with the Contract Documents. Test of the equipment shall be made by the CONTRACTOR in the presence of the CITY's Engineer, the Electrical Subcontractor, the equipment manufacturer's representative, and the CITY's representative. The equipment tests shall include, but not be limited to, the following:

1. Controls: Controls shall be tested to determine satisfactory performance for starting and stopping at the proper liquid levels, pump sequence and alarm actuation.

2. Electrical: CONTRACTOR shall record readings of voltage and amperage on all electrical components at start and steady state operating conditions. Such readings shall be recorded on a form provided by the manufacturer and the results shall meet the manufacturer's prescribed limits. If a tested item fails to meet its requirements, then it shall be replaced. Results of the tests, including the serial number of the accessories tested, shall be given to the Engineer.

3. Inspection: A thorough inspection of all mechanical and electrical equipment and controls, fittings, brackets, mountings, seals, conduit, painting, components and features shall be made while the station is being tested to determine performance and compliance with design requirements and specifications.

4. Repairs, Adjustments and Replacements: The CONTRACTOR shall make any and all necessary repairs, adjustments and replacements until performance has been demonstrated to the satisfaction of the Engineer. The CONTRACTOR shall bear the cost of any repair, adjustment and replacement.

END OF SECTION