

The Enclosed Document Is Provided For Your Convenience.

Please Email ALL Questions:
[MailTo:ContractAdministration@TampaGov.net](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 13-C-00039

**HOWARD F. CURREN AWTP ADMINISTRATION
BUILDING HVAC CONTROL SYSTEM**

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

JULY 2013

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

BID NOTICE MEMO

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

CONTRACT NO.: 13-C-00039; Howard F. Curren AWTP Administration Building HVAC Control System

BID DATE: August 13, 2013 **ESTIMATE:** \$400,000 **SCOPE:** The project comprises removal and replacement of the HVAC building control system with all new KMC controls to improve the temperature controls, and so that the system can be monitored from a central location, or via the internet. **PRE-BID CONFERENCE:** Tuesday, July 30, 2013, 10:00 a.m. at the Howard F. Curren AWTP located at 2700 Maritime Boulevard in the AWTP Maintenance Building Training Room . Please email the names and companies represented for all attendees a minimum of 24 hours in advance to richard.birchmire@tampagov.net and pamela.smith@tampagov.net to obtain security clearance. Attendance is not mandatory, but recommended.

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/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp.

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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NOTICE TO BIDDERS
CITY OF TAMPA, FLORIDA
Contract 13-C-00039; Howard F. Curren AWTP Administration Building HVAC Control System

Sealed Proposals will be received by the City of Tampa no later than 1:30 P.M., August 13, 2013, 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, removal and replacement of the HVAC building control system with all new KMC controls to improve the temperature controls, and so that the system can be monitored from a central location, or via the internet, replacement of (70) seventy existing pneumatic operated water control valves with new control valves with electric actuators for all systems, provide temporary cooling where specified, test and balance existing HVAC system after installation of new control system 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/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp. 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 Performance and Payment Bonds 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:

Director of Contract Administration, David Vaughn

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 Statutes.

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. Links to further information and a list of SLBEs are on the Department's Construction Project Bidding Web page. 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 Howard F. Curren AWTP Administration Building HVAC Control System 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 270 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 Ordinance, a goal of 15.7% 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 Goal Worksheet and as posted in the "SLBEs" link under this Contract's notice on the Department's Construction Project Bidding web page.

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 GFECF 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.

I-1.12 PUBLIC CONSTRUCTION BOND:

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the forms provided herein, each equal to 100 percent of the Contract price, such Bonds 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.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

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..."

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.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

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.

INSTRUCTIONS TO BIDDERS

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 item 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 waiver 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)

City of Tampa MBD Office

SLBE Goal Setting Firms Report

as of 7/11/2013



MECHANICAL CONTRACTING SERVICES

Apollo Construction & Engineering Services, Inc.

P.O. Box 5848
Sun City Center, FL 33571-5848

Phone (813) 645-4926

Fax (813) 645-3351

E-mail tkamprath@apollo-construction.com

Federal Number 59-2811166

Minority Small Business

Contact Thomas Kamprath

George G. Solar & Company, Inc.

P.O. Box 7438
Tampa, FL 33673

Phone (813) 875-9148

Fax (813) 879-2315

E-mail georgesolarcompany@verizon.net

Federal Number 59-1314899

Minority Small Business

Contact George Solar

McLain Plumbing & Mechanical

2403 East 4th Ave
Tampa, FL 33634

Phone (813) 876-9046

Fax (813) 873-9895

E-mail sandramclain01@yahoo.com

Federal Number 59-3261752

Minority Small Business

Contact Sandra McLain

First Plumbing & Air Conditioning of FL, Inc.

13932 Methodist Church Rd.
Dover, FL 33527

Phone (813) 770-0361

Fax (813) 764-9638

E-mail firstplumbing@msn.com

Federal Number 59-3389067

Minority Small Business

Contact Timothy Trujillo

Pro-Tech Diversified Services, Inc.

8267 Causeway Blvd. Suite F
Tampa, FL 33619-6520

Phone (813) 621-5888

Fax (813) 621-5885

E-mail info@protechbalance.com

Federal Number 59-3627128

Minority Small Business

Contact Gary Cummings

One Degree Air Condition & Refrigeration, LLC

PO Box 22684
Tampa, FL 33622

Phone (813) 244-0658

Fax (813) 884-4999

E-mail snakeeyes4204@aol.com

Federal Number 26-2553764

Minority Small Business

Contact Michael Mills

Dynamic Heating & Cooling, Inc.

19239 N. Dale Mabry Hwy # 3211
Lutz, FL 33548

Phone (813) 928-3646

Fax (813) 949-7489

E-mail darwin@dynamichvac.us

Federal Number 20-5499872

Minority Small Business

Contact Darwin Encarnacion

City of Tampa MBD Office



SLBE Goal Setting Firms Report

as of 7/11/2013

MECHANICAL CONTRACTING SERVICES

Main Commercial Cooking & Refrigeration Services

16705 Scheer Blvd.
Hudson, FL 34667

Phone (727) 868-8586

Fax (727) 868-8650

E-mail dee.costello@maincomm.com

Federal Number 59-2327199

Minority Small Business

Contact Martin Castello

Baez Enterprises Corp

7818 N. Armenia Ave., Suite 4
Tampa, FL 33604

Phone (813) 932-8140

Fax (813) 932-8142

E-mail ebaez@acrexpersts.net

Federal Number 33-1095056

Minority Small Business

Contact Ervis Baez

A & R Air Conditioning & Refrigeration, Inc.

P.O. Box 291048
Tampa, FL 33687-1048

Phone (813) 924-3696

Fax

E-mail a_rairconditioning@yahoo.com

Federal Number 27-2506848

Minority Small Business

Contact Rodney Thomas

Just Koolin Air Conditioning and Heating, Inc.

501 S. Falkenburg Road, Ste A5
Tampa, FL 33619

Phone (813) 444-2594

Fax (813) 354-2594

E-mail Justkoolinac@gmail.com

Federal Number 45-5494658

Minority Small Business

Contact Michael Solomon

PJ Ireland & Associates, Inc.

1252 East Lake Dr
Tarpon Springs, FL 34688

Phone (727) 937-7272

Fax (727) 939-3443

E-mail peter.pjimechanical@gmail.com

Federal Number 59-3261978

Minority Small Business

Contact Kathleen Ireland

SLBE Contract Goal

Goal
15.7%

Instructions Regarding Use of the SLBE Goal Setting List

Bidders must solicit a subcontracting bid from ALL of the firms listed on the SLBEs list provided on the City's web site, and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms 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 attached 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)



Page 1 of 2
City of Tampa
Official Letter of Intent
(Form MBD-40)

A Letter of Intent is required for each WMBE/SLBE listed on the Schedule of Subcontractors to be Utilized (MBD 20 Form). Letter of Intent must be signed by both the Bidder/Service Provider and WMBE/SLBE firm.

Bid/Proposal/Contract Number: _____

Bid/Proposal/Contract Name: _____

A. To be completed by the Bidder/Service Provider

Name of Bidder: _____

Address: _____

Contact Person: _____

Telephone: _____ Fax: _____

Email: _____

B. To be completed by WMBE/SLBE

Name of WMBE/SLBE: _____

Address: _____

Contract Person: _____

Telephone: _____ Fax: _____

Email: _____

C. Identify the scope of work to be performed or item(s) to be supplied by the WMBE/SLBE. On unit price bids, identify to which bid line item the WMBE/SLBE's work scope or supply corresponds:

D. Cost of work to be performed by WMBE/SLBE: _____

E. Cost of work to be performed by WMBE/SLBE as a percent of total City contract amount: _____

Bidder/Proposer certifies that it intends to utilize the WMBE/SLBE listed above, and that the work described above is accurate. Bidder/Proposer will provide City with copy of the related subcontract agreement and/or purchase order prior to commencement of the WMBE/SLBE's work. The WMBE/SLBE firm certifies that it has agreed to provide such work/supplies for the amount stated above.

Bidder/Proposer: _____ Date: _____

Signature and Title

WMBE/SLBE Firm: _____ Date: _____

Signature and Title



Page 2 of 2
Official Letter of Intent Instructions
City of Tampa
Equal Business Opportunity Program

The Official Letter of Intent must be submitted to the soliciting department within ten (10) work days of the bid opening, prior to award. Not providing all letters of intent within the prescribed time frame may be cause to delay award or declare the bid to be non-responsive.

Bid/Proposal/Contract Number- Please provide bid/proposal/contract number provided by City of Tampa procuring department.

Bid/Proposal/Contract Name – Please provide bid/proposal/contract name provided by City of Tampa procuring department.

To be Completed by the Bidder/Service Provide – Please provide prime contractor or main bidders detailed company information as indicated.

To be completed by the WMBE/SLBE – Please provide WMBE/SLBE subcontractor detailed company information as indicated.

Bidder is to Identify the scope of work to be performed or item(s) to be supplied by the WMBE/SLBE. On unit price bids indentify, which bid line item the WMBE/SLBE’s scope of work or supply corresponds – Please provide details of the services or supplies the WMBE/SLBE will provide.

Cost of work to be performed by WMBE/SLBE – Provide agreed upon estimate of work or supplies total price (Unit prices are accepted if specific quantities have yet to be determined).

Bidder/Proposer – Signature of authorized agent for the prime contractor or main bidder with date signed.

WMBE/SLBE firm – Signature of authorized agent for the WMBE/SLBE subcontractor or supplier with date signed.

Contract Confirmation – A copy of the executed subcontract agreement and/or purchase order with the WMBE/SLBE must be filed with the City of Tampa immediately upon execution and/or prior to commencement of work by WMBE/SLBE.

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	<p>The work includes the furnishing of all labor, equipment, and material for the removal and replacement of the Administration Building HVAC control system with all new KMC controls to improve the temperature controls, and so that the system can be monitored from a central location, or via the internet, replacement of (70) seventy existing pneumatic operated water control valves with new control valves with electric actuators for all systems, provide temporary cooling where specified, test and balance existing HVAC system after installation of new control system, any Contingency Allowances that may be listed in SP-60, with all associated work required for a complete project in accordance with the Contract Documents.</p>	
		<p>_____ dollars and _____ cents (BASE BID) LS</p>	<p>\$ _____</p>

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 _____, 2013

(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 _____, 2013 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 _____, 2013 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 _____, 2013 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 Women/Minority Business Enterprise/Small Local Business Subcontracting
 City of Tampa - Equal Business Opportunity Program
 (MBD Form 50)

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 Women/Minority Business Enterprise/Small Local Business Enterprises, WMBE/SLBEs, on the referenced contract:

The goal for WMBE/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 WMBE/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 WMBE/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 WMBE/SLBEs to respond. The Bidder or Contractor must take appropriate steps to follow up initial solicitations with interested WMBE/SLBEs. See DMI report forms for subcontractors solicited. See enclosed supplemental data on solicitation efforts. Remarks:
- (2) Providing interested WMBE/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 WMBE/SLBEs that have submitted bids. Documentation of negotiation must include the names, addresses, and telephone numbers of WMBE/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 WMBE/SLBEs to perform the work. That there may be some additional costs involved in soliciting and using WMBE/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 WMBE/SLBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The WMBE/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 WMBE/SLBE subcontractors and suppliers and to select those portions of the work or material consistent with the available WMBE/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 WMBE/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 WMBE/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 WMBE/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 WMBE/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 WMBE/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 WMBE/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 WMBEs/SLBEs.
2. Solicitation of WMBE/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 WMBE/SLBE low quotes rejected, an explanation should be provided detailing negotiation efforts.
4. If a low bid WMBE/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 WMBE/SLBE directory can be useful in identifying additional subcontracting opportunities and firms not listed in the "WMBE/SLBE Goal Setting Firms List."
6. Contractor should not preclude WMBE/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 WMBE/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 WMBE/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 WMBE/SLBEs.



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.



Page 4 of 4DMI – Solicited/Utilized

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 13-C-00039; Howard F. Curren AWTP Administration Building HVAC Control System

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 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 13-C-00039, Howard F. Curren AWTP Administration Building HVAC Control System.

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 Performance Bond and Payment 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 _____, 2013.

Principal _____

BY _____

TITLE _____

BY _____

TITLE _____

Countersigned:
(SEAL)

Local Resident Producing Agent

Local Resident Producing Agent's Address

Name of Local 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 13-C-00039 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 _____, 2013, 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 13-C-00039; Howard F. Curren AWTP Administration Building HVAC Control System, shall include, but not be limited to, removal and replacement of the Administration Building HVAC control system with all new KMC controls to improve the temperature controls, and so that the system can be monitored from a central location, or via the internet 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 Contract.

(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 Contract 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 or 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 or 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 indemnify 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 Contract 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. _____

Justin R. Vaske, Assistant City Attorney

Contractor

By: _____
(SEAL)

Title:

ATTEST:

, Secretary

TAMPA PAYMENT (ACKNOWLEDGMENT OF PRINCIPAL)

STATE OF _____)
) SS:
COUNTY OF _____)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ____ of _____, 2013 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 _____, 2013 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 _____, 2013 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)

(Name of Surety)

(Principal Business Address)

(Surety Address)

By _____

By _____
(As Attorney in Fact)*

Title _____

Telephone Number of Surety

Telephone Number of Principal

Accepted by City of Tampa:

Countersignature:

By _____
Bob Buckhorn, Mayor

(Name of Local Agency)

Date: _____ 20__

(Address of Resident Agent)

By _____

Approved as to legal sufficiency:

Title _____

By _____
Assistant City Attorney

Telephone Number of Local Agency

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 the 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.

TEMPORARY STRUCTURES

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 constructed in accordance with the requirements of the Contract Documents.

SECTION 6

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.

**SECTION 13
CLEANING**

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.

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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SPECIFIC PROVISIONS

SP-1.G Scope

The work included under these Contract Documents is described in the Proposal.

The Contractor shall furnish all labor, materials and equipment for the accomplishment of all work as described in the Specifications, as shown on the Plans and as directed by the Engineer in accordance with the obvious or expressed intent of the Contract.

SP-2.TP Permits

The Contractor shall have in his possession the proper license to perform the work before submittal of his bid and shall obtain any required City/County building permits 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.

City permit fees will be paid by the City.

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 Inspectional Services Division of the Department of Housing and Development Coordination all required inspections and tests for all phases of work to obtain final approval thereof.

The Contractor is encouraged to contact the City's Permitting Department and Building Inspections Bureau prior to commencement of work to ascertain their respective requirements.

SP-5 Working Drawings

Prior to performing any work requiring working drawings, as specified on the Plans and in the Workmanship and Materials Sections, the Contractor shall submit the working drawings in accordance with the General Provisions section headed "Working Drawings."

SP-6 Environmental Protection

The Contractor will be held liable for the violation of any and all environmental regulations. Violation citations carry civil penalties and in the event of willful violation, criminal penalties. The fact that the permits are issued to the City does not relieve the Contractor in any way of his environmental obligations and responsibilities.

SP-9 Coordination and Cooperation

In performing work under this Contract, the Contractor shall coordinate his work with that of any adjacent

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contractors for the City, and others, and cooperate with them in every reasonable way, to the end that there shall be the minimum practicable interference with their operations.

SP-12 Releasing Facilities for Use

It is the intent of these Specifications that all newly constructed sewers and appurtenant facilities be placed in service as rapidly as an integrated portion of the facilities can be constructed, inspected and accepted by the Engineer. Acceptance or use by the City of any portion of the facilities prior to final acceptance shall not relieve the Contractor of any responsibilities, regarding such facilities, included in the Contract.

SP-13 Material and Equipment Approval

The Contractor shall not enter into any subcontracts, or place any order, for the furnishing of any material or equipment until he has received the Engineer's written approval of the manufacturers.

SP-14 Contractor Emergency Response Time

The Contractor must be available to service emergency calls seven (7) days a week, twenty-four (24) hours a day. The response time for emergency calls shall be within two (2) hours. A contact person and telephone number shall be provided to the Engineer for such purposes.

SP-15 Contractor's Field Office

Delete Article G-6.03 Contractor's Field Office on Page G-14 from GENERAL PROVISIONS. The Contractor or an authorized agent shall be present 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 the job site.

SP-16 Salvage

All existing pipe and appurtenances removed by the Contractor and which are not designated to be salvaged shall become the property of the Contractor and shall be removed from the site of the work to the Contractor's own place of disposal.

Items which are shown on the Plans or specified to be salvaged shall be removed by the Contractor, delivered, and unloaded at a location within the Department's service area, as directed by the Engineer. The cost of removing, disposing, delivering, and unloading as salvage items of pipe and appurtenances shall be included in the various classified unit price Contract Items or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

SP-17 Sequence of Operations

The Contractor shall develop with the Engineer a complete schedule of operations which, in the opinion of the Engineer, will permit use of the facility at the earliest possible date.

Taking over of parts of the work for operation before completion of the entire project shall not relieve the Contractor of any responsibility for proper integrated operations of all parts of the work, nor shall it act to relieve him of any responsibilities under Article A-6.04 of the Agreement, for guaranty of all parts of the work, for one year after the date of acceptance of all the work on the project.

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SP-23 Project Cleanup

Cleanup is extremely important and the Contractor will be responsible for keeping the construction site neat and clean with debris to be removed regularly as the work progresses.

SP-51 City Testing

The cost of retesting materials and/or workmanship, which has been initially tested by the City and found to be unacceptable, is to be borne by the Contractor.

SP-60 Contingency

Contractor shall include a Twenty Thousand Dollar (\$20,000) contingency sum, to be included as part of the total bid amount for this Contract. This contingency is for the purpose of compensating the Contractor for any incidental work that may arise as construction operations proceed and was not addressed as part of the original work portrayed in the Plans and Specifications.

The Twenty Thousand Dollar (\$20,000) contingency sum is an upset limit. Any amount of the contingency shall be paid only after negotiation.

SP-68 Water, Light and Power

Delete Article G-7.01 Water and G-7.02 Light and Power on Page G-14 from GENERAL CONDITIONS. The City currently provides water and electrical power facilities to the sites. The Contractor may use the electrical and water sources as presently configured. If necessary to modify, extend, or relocate either the electrical or water facilities to facilitate construction, all costs shall be the responsibility of the Contractor.

SP-71 Electrical Work

Where definite requirements are not set forth in the Specifications, all electrical equipment, materials, and work under this Division shall comply with the requirements of the Occupational Safety and Health Act (OSHA) and shall be in accordance with applicable ANSI, IEEE, IPCEA, and NEMA standards. The work shall be performed in compliance with the latest issue of the NEC, all applicable state and municipal regulations and codes, and the service rules of the Tampa Electric Company, unless otherwise specified or directed. All equipment and materials shall be listed and labeled as complying with the requirements of a Southern Building Code Congress International (SBCCI) recognized testing laboratory for the particular applications wherever available.

Where listing is not available for the device as a whole, refer to the provision entitled "Electrical Equipment Certification" for submittal requirements.

SP-72 Operation and Maintenance Manual, Submittals / Request for Information / Shop Drawings, and Asset Tracking Form

Operation and Maintenance Manuals

The Contractor shall prepare and submit to the Engineer four (4) hardcopies and one (1) high resolution color, bookmarked, and unsecured electronic post document format (PDF) of an Operation and Maintenance Manual for all equipment and associated control systems furnished and installed under this Contract. Black and white copies will not be accepted. When the work reaches 75 to 80 percent completion, the Contractor shall submit to the Engineer for approval one (1) PDF electronic copy 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 PDF submittal, the Contractor shall furnish to the Engineer four (4) hardcopies 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. 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.

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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 four (4) hardcopies 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 therefor.

Submittals / Request for Information / Shop Drawings

Contractor shall prepare and submit up to four (4) hardcopies and one (1) bookmarked, unsecured electronic post document format (PDF) file for all Submittals, RFI, and Shop Drawings. Each electronic submission must be in a high resolution color format and shall be original electronic documents from the manufacturer. Hardcopies shall be high quality printed in color. Scanned printouts or poor quality resolution PDF files will not be accepted.

Asset Tracking Form

The Asset Tracking Form (ATF) is a general spreadsheet that is intended to begin tracking assets and their respective preventative maintenance at an early stage in the project. An ATF shall be prepared and submitted by Contractor (in electronic format) during two phases of the project. The first phase ATF shall be submitted after procurement of each piece of equipment and will include general information and specifications on the equipment such as, but not limited to, model, voltage, amperage, horsepower, material, and preventative maintenance tasks. The second ATF submission shall accompany the final submission of the Operation and Maintenance Manuals. Information included during this submission will include specific information on the equipment such as, but not limited to, serial numbers, equipment number, location, runtime hours, etc.

The City of Tampa Wastewater personnel will provide a blank electronic copy of the ATF in Microsoft Office 2007. Any submission must be in the same format.

SP-73 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 an Authorization to Proceed with Extra Work letter 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.

SP-81 Services of Manufacturers' Representatives

The services of manufacturers' representatives shall be provided on the site as required for the supervision of installation, the adjustment and placing in satisfactory trouble-free operation of such equipment, and instructing City personnel in the operation and maintenance of such equipment for which such specialized services are specified, directed,

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or required.

Such manufacturers' services shall be of sufficient time and include a minimum period of one 8-hour day for instruction of City personnel. Additional time shall be provided if necessary.

The cost of all services of manufacturers' representatives shall be included in the various Contract Unit Price Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

SP-83 Identification (Will usually need the above)

The Contractor shall provide a Photo I.D. card for each employee. Each Photo I.D. card shall be encapsulated in plastic and be provided with a clip for fastening to each employee's apparel. Each Photo I.D. card shall be approximately 2 inches by 3 inches in size and shall include the following:

1. Employee photograph mounted on the left half of the card.
2. Name of employee and name of Contractor located on the right half of the card.

Each employee shall display the Photo I.D. card on outer apparel at all times when on the plant site.

Any person found on the site without the required Photo I.D. card will be directed to leave the site immediately.

The cost of Photo I.D. cards shall be included in the various Contract Unit Price Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

SP-84 Piping and Equipment Identification

All piping and equipment shall be identified as follows:

1. All painted piping and equipment shall be color coded. Such coding on pipelines shall include painted or plastic tape banding at 10-foot intervals. The Engineer will select the colors. Underground pipelines with plastic tape wrapping shall be wrapped with colored tape and include additional colored bands as directed. Polyethylene or hot bituminous wrapped underground pipelines shall have plastic tape bands. Polyethylene wrapping for ductile iron sewage or force main piping shall be green. Tape bands shall be placed at 10-foot intervals and all colors shall be selected by the Engineer.
2. All equipment and slide gates shall have an identification nameplate. The nameplates shall be of Type 304 stainless steel, No. 6 finish, not less than No. 16 gauge with indented stamped lettering. Nameplates shall be attached to equipment bases in accessible locations. Nameplates shall be fastened, in a permanent manner arranged not to damage equipment, with not less than four stainless steel fasteners. All nameplates shall be of the same size (approximately 3- by 8-inch) and shall conform to the following standard sample:

Sewage Pump	(Name of item)
SC-P-1	(General type of designation, final list furnished by Engineer)
	(12 digit number) (Furnished by Engineer)

Lettering shall be block style in size and spacing to suit the nameplate. A sample nameplate including fastenings

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shall be submitted to the Engineer for approval prior to manufacture of any of the nameplates. Stainless steel identification nameplates shall not be painted.

3. Piping shall be identified with a designation and directional flow arrow. The designation will be furnished by the Engineer. The designation will comprise a maximum of 20 letters. The designations and flow arrows shall be painted on after completion of color coding using suitable stencils and colors. Designations and flow arrows shall be arranged to be clearly in view from the normal operating or access space all as directed and approved by the Engineer. Designations and flow arrows shall be located along straight runs at intervals of not more than 50 feet, near valves, branches and junction points, and where pipes pass through walls or ceilings. Underground piping wrapped with polyethylene shall be provided with colored material selected by the Engineer.

The cost of piping and equipment identification shall be included in the various Contract Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

SP-87.TP Use of Site for Storage and Field Office

Space, on the site, for storage and field office for the Contractor shall be as directed by the Engineer. Any structures or facilities needed for storage or field office shall be constructed by the Contractor at his own expense and no separate payment will be made therefor. All security requirements for such facilities shall be provided and maintained by the Contractor.

Upon completion of the work, and as directed, the Contractor shall clean up the areas, remove any temporary facilities and finish grade as necessary, all as approved.

SP-97 Protection of Existing Building

The Contractor shall protect the existing buildings as indicated on the Plans.

The Contractor shall hire a certified testing company to monitor vibration levels at buildings while construction takes place in the vicinity.

All costs associated with protection of the facilities and vibration monitoring services shall be included in the price of the work to which they are incidental.

SP-129.TP 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 one (1) hardcopy and (1) electronic high resolution color PDF copy 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. Upon request the City will provide AutoCAD drawings.

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SP-130 SAFETY:

A. Responsibility: Employees shall immediately report any unsafe work practice or unsafe condition to their supervisor(s). The Contractor is solely responsible for the safety of their workers, and shall comply with all applicable requirements [i.e.: 29 CFR 1910 -Occupational Safety and Health Standards, 29 CFR 1926 - Safety and Health Regulations for Construction, etc] and industry safety standards while at the work site. The fact that City personnel may bring un-safe conditions to the attention of any member of the Contractors work force does not relieve the Contractor of this responsibility.

Suggest, all Contractors employees and sub-contractors be given a copy of SP-130.

The Contractor shall have a designated Safety Officer within his organization. At the Pre-Construction meeting, the Contractor shall provide the name and contact information of the Safety Officer to the Engineer.

At the Pre-Construction meeting, the Contractor will be given pertinent safety related information, necessary forms and instructions (i.e.: AWTP Lockout/Tagout Procedures, AWTP Hot Work Permits, etc) that pertain to any work that might be utilized during the contract. The Contractor shall be responsible to disseminate that information to their employees and sub-contractors. Special care shall be taken by the Contractor to ensure that any new employee or sub-contractor to the work site shall be briefed on these safety instructions.

If warranted by the project and directed by the Engineer, the Contractor shall develop and implement a comprehensive health and safety plan for their employees that will cover all aspects of onsite construction operations and activities associated with the contract. This plan must comply with all applicable health and safety regulations and any project specific requirements that the contract has specified.

B. Incident Reporting: All accidents that result in personal injury, illness or property damage shall be immediately reported and investigated, regardless of the extent of injury, illness or property damage. Employees must report accidents within one hour (or as soon as practical) from the time of occurrence to their immediate supervisor who in turn will report it to the City's inspector. The City inspector will record the incident in their daily report and report it to the Risk Management Division (274-5708).

C. Air-Borne Debris: All personnel in close proximity to drilling, sawing, sanding, scraping, spraying, power-washing or other work being done, either in enclosed spaces or in the open, that creates dust or air-borne debris shall wear eye protection [29 CFR 1910.133] and a respirator [29 CFR 1910.134].

D. Hot Work: All welding, soldering, brazing, acetylene cutting or any other work at the AWTP or any pump station; that produces high temperatures shall require a AWTP "Hot Work Permit" and may require one or more fire watches. The number and location of fire watches (if any) shall be a condition of the Hot Work Permit. A current, portable, fully charged fire extinguisher shall be located with each person performing hot work and each fire watch. The Hot Work Permit shall be signed off by the appropriate personnel and maintained in the project file.

E. Confined Spaces: OSHA defines a confined space as having limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. Confined spaces include, but are not limited to: vaults, tanks, manholes, wet-wells, pipelines, utility tunnels, etc.

The Contractor shall take measures [29 CFR 1910.146 (c)(5)] to ensure that atmospheric conditions in confined spaces are not hazardous to occupants. This can be accomplished by forcing a sufficient amount of clean air through

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the confined space and testing the atmosphere by using a portable certified, calibrated, atmosphere monitor that meets OSHA requirements [29 CFR 1910.146(c)(5)(ii)(C)]. The atmosphere monitor should record oxygen content, flammable gases and vapors and toxic air contaminants, such as the Industrial Scientific TMX-412.

F. Air-Borne Gases: The AWTP is located in an industrial area and as such there are several different substances, either on or off site, that can escape and become dangerous fumes such as: chlorine, methanol, anhydrous ammonia, etc. The AWTP currently has nine (9) Shelter In Place (SIP) locations that are designated as safe havens in the event of release of hazardous gases. These SIP's are stocked with necessary instructions and supplies to protect City and any Contractor's personnel.

The first day on site, City personnel will show all the Contractor's personnel present where the several closest SIP's are located, explain the alarm signals and provide the current alarm testing schedule. It shall be the Contractor's responsibility to show any future employee and/or sub-contractor that comes on site the location of the SIP's and explain the alarm signals.

In the event of an alarm, the Contractor's personnel shall immediately and hastily proceed to the nearest SIP along with the City personnel and remain there until further notice, taking guidance from and following the instruction of the senior City employee present.

G. Lockout / Tagout Policy: The AWTP Lockout / Tagout program is designed to set standards to help safeguard all employees from hazardous electrical or mechanical energy while they are performing service or maintenance on machines and equipment at the AWTP or any pump station. This program will also identify the practices and procedures to shut down and Lockout or Tagout machines and equipment. The Contractor shall be given a copy of the AWTP "LOCKOUT / TAGOUT POLICY AND PROCEDURES" instruction and shall make all of his employees and sub-contractors aware of this program.

No padlock (lockout) shall be removed except by the individual that installed it or if not available, by a City of Tampa AWTP team leader.

No tag (tagout) shall be removed except by the individual that installed it or if not available, by a City of Tampa AWTP team leader, except in an Emergency and the tag states "Do Not Use Unless in an Emergency". In that event, the Contractor shall notify the City of Tampa AWTP team leader, who will prepare the necessary follow up report.

H. Trench Safety: Any excavation deeper than four (4) feet shall adhere to the requirements contained in 29 CFR 1926.650 thru 652 and the Florida Trench Safety Act [Florida Statutes, ss 553.60 - 553.64].

I. Open Flames: No fires shall be allowed. No open flames necessary for any construction activity shall ever be left un-attended. A current, portable, fully charged fire extinguisher shall be located with each activity requiring an open flame.

J. Sparks: Any activity lasting more than 10 continuous minutes, that creates sparks, such as grinding or chipping shall have a dedicated fire watch in attendance. A current, portable, fully charged fire extinguisher shall be located with each activity creating sparks, regardless if a fire watch is required or not.

K. First Aid: The Contractor shall furnish appropriate First Aid Kits [29 CFR 1910.151] and shall be responsible to ensure his employees are properly trained to render first aid. If injurious corrosive materials are to be utilized, eye wash and body wash facilities must be provided in the immediate area.

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L. Related Costs: All costs associated with these or any safety measures shall be included in the total lump sum contract price or the various contract item unit prices, as applicable, and no separate payment shall be made thereof.

SP-133 Tampa Port Authority Access

The Tampa Port Authority has restricted access in accordance with Florida Statute 311.12. Procedures for Tampa Port Authority access are included in these Specific Provisions. All costs to comply with these procedures shall be included in the total Price for this project, and no separate payment shall be made therefore.

* * *



Page 1 of 2 –DMI Payment
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	Company Name Address Phone & Fax	Total Sub Contract Or PO Amount	Amount Paid To Date	Amount To Be Paid For This Period
Trade/Work Activity			Amount Pending Previously Reported	Sub Pay Period Ending Date
[]Sub []Supplier				
Federal ID				
			\$	\$
			\$	\$
			\$	\$
			\$	\$
			\$	\$
			\$	\$

(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: _____



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 if 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.

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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.

Improvement Project



Mayor Bob Buckhorn

Project Contact:
Jim Hudock, P.E.
Contract Administration
City of Tampa
jim.hudock@tampagov.net



For information call:
(813) 635-3400

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

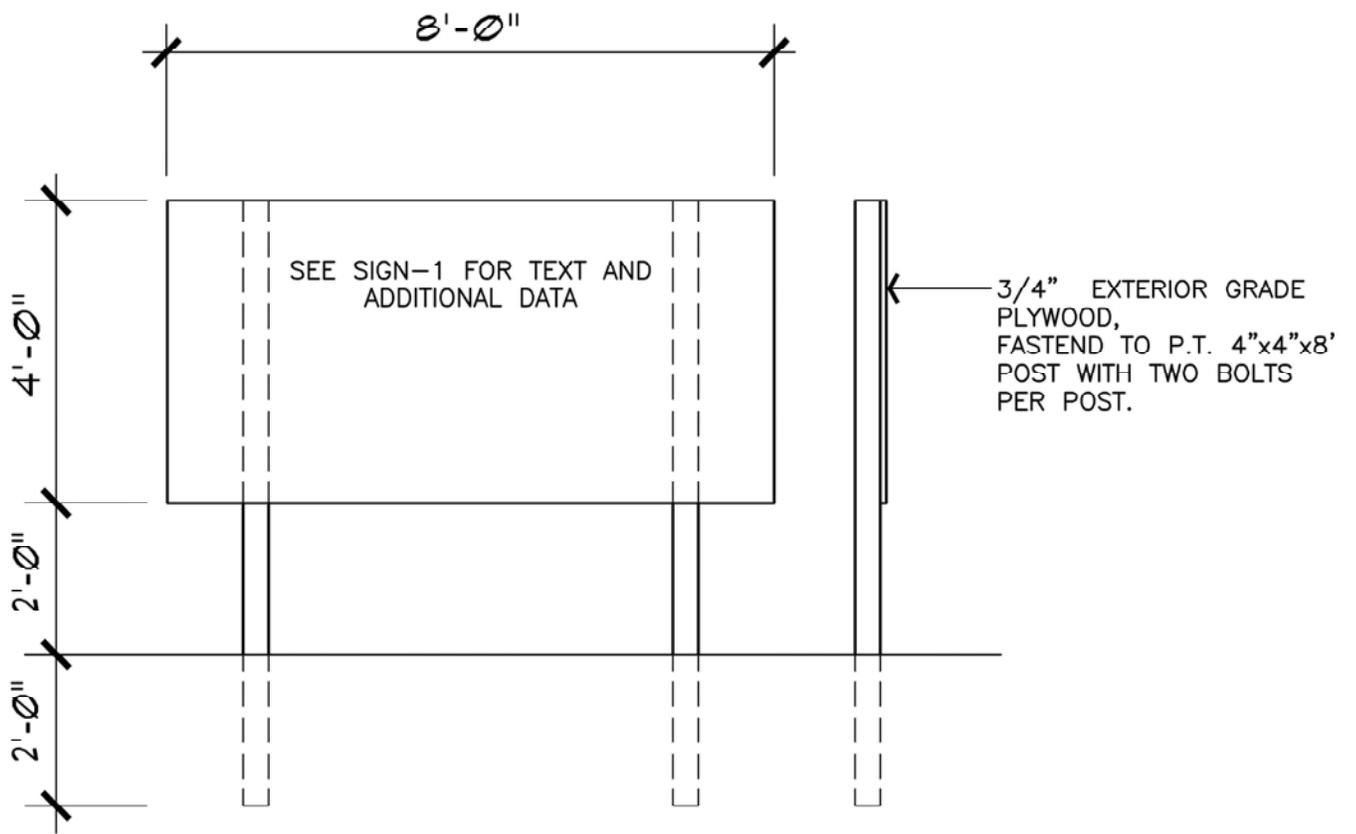
Font

Franklin Gothic

SIGN-1

SIGN EXAMPLE ONLY GRAPHIC TO BE DEVELOPED BY CONTRACTOR

scale: 3" 3"



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 noted on the color schedule.

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					
Surfaces	SHOP COAT	Primer	Coats		
			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.

* * *

SECTION 76 - CONDUIT, WIRE, AND GROUNDING

W-76.01 General

Conduit, wire, and grounding includes furnishing and installing all conduits, underground ducts, bus ducts, wires, cables, and grounding systems as shown, specified, and required for a complete installation. The work includes the furnishing and installation of wires and cables in flexible and rigid conduits, underground ducts, all as required, shown, and specified.

Descriptive literature and technical information relative to conduits, wires, and grounding shall be submitted by the Contractor in conformance with the requirements of the General Provisions.

The Contractor shall, with reference to approved drawings of equipment being installed, prepare detailed plans showing the layout and size of all conduits, ducts, bus ducts, cables and wires, connections between the point of service connection and all utilizing equipment. These plans shall be in sufficient detail to serve as working drawings for the installing electricians. The drawings shall be to scale not less than the Plans and be prepared as the work develops with approval by the Engineer before major steps of work are undertaken.

During construction, careful notes shall be kept of all deviations or changes in the layout or connection diagrams. Upon completion of the work, all working drawings shall be corrected and then marked "Record Drawings." Four sets of final prints, along with an equal number of bound instruction manuals and parts lists shall be given to the Engineer at the end of the job.

Excavation, backfill, form work, concrete, and reinforcing shall be in accordance with the applicable Workmanship and Materials sections.

W-76.02 Underground Ducts

In general, underground ducts for feeders and control wiring shall be plastic conduit. The plastic conduit shall be PVC, Schedule 80, and U.L. Inc. listed for direct burial, as manufactured by Carlon, Triangle, Allied Tube, or equal. The conduit shall be buried a minimum of 18 inches below grade. Manufactured fitted plastic duct spacers shall be used for installation spacing.

Ducts installed under streets, roads, alleys, driveways, and parking lots shall be rigid aluminum conduit covered with not less than 40 mils of PVC, as manufactured by Robroy, Ocal, or equal. The PVC material shall conform to the applicable ASTM standards. The conduit shall be buried a minimum of 24 inches below grade.

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 aluminum conduits shall be made as noted and detailed. Where it is not otherwise shown, all ducts entering buildings and structures shall have transitions to aluminum 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.

Transitions from above-grade rigid aluminum conduit to nonmetallic conduit shall be accomplished with a threaded adapter. Rigid aluminum conduit installed above grade and extending below grade shall include the first 90° elbow. All rigid aluminum conduits 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.

W-76.03 Liquidtight Flexible Nonmetallic Conduit (size 2 inch or less)

All flexible conduits size 2 inch or less in non-classified areas shall be nonmetallic, liquidtight, 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 degrees F and be U.L. Inc. listed. Compatible liquidtight nonmetallic fittings shall be used for conduit installation. The flexible conduit and fittings shall be as manufactured by Carlon, Kellems, K-Flex, or equal.

W-76.03(a) Liquidtight Flexible Metallic Conduit (greater than 2 inch)

All flexible conduits greater than 2 inch in non-classified areas shall be metallic, liquidtight, and have a circular cross section. The conduit shall be of a light-weight aluminum core, coupled with a PVC jacket. The conduit shall be resistant to sunlight, acid, and oil. The conduit shall be rated for a working temperature between -20 degree C to 80 degree C and U.L. Inc. listed. Compatible liquidtight metallic fittings shall be used for conduit installation. The flexible conduit and fittings shall be as manufactured by Thomas & Betts or equal.

W-76.04 Metallic Conduit and Boxes

All conduit shall comply with the requirements of the U.L. Inc. Standards. Conduit shall be delivered to the job site in standard bundles having each length suitably marked with the manufacturer's name or trademark and bearing the label of the U.L. Inc. inspection service. The minimum size conduit service shall be 3/4 inch.

All exposed conduit within buildings and exposed on outdoor structures shall be rigid heavy wall, Alloy 6063T-42 aluminum conduit. Aluminum conduit shall conform to Fed. Spec. WW-C-540 and ANSI C80.5.

All conduit encased in building structures, exposed in the screen room/wet well area, or otherwise noted, shall be rigid aluminum covered with not less than 40 mils of PVC outside, and 2 mils of urethane inside, as manufactured by Robroy, Ocal, or equal. The physical properties of the PVC and urethane materials shall conform to the applicable ASTM standards.

Cast aluminum shall be used for outlet boxes and fittings in aluminum conduit systems.

Outlet and junction boxes shall be of proper dimensions for each application. Cast metal boxes shall have watertight gaskets and covers secured with nonferrous screws.

PVC coated boxes and fittings shall be used in PVC coated conduit systems.

Conduit fittings, such as elbows, tees, couplings, caps, bushings, nipples, and locknuts shall be threaded to provide watertight connections.

Where it is necessary to use electrical unions, Universal, Erikson, or equal conduit couplings shall be used.

W-76.05 Conduit Installation

All conduits shall be installed as required. The conduit system shall be installed complete with all accessories, fittings, and boxes, in an approved and workmanlike manner to provide proper raceways for electrical conductors.

The Contractor shall note that conduit runs shown are for the purpose of outlining the general method of routing the conduits to avoid interferences.

All other conduit shall be run exposed, except where shown otherwise.

Sizes not shown shall be one size larger than indicated in Tables 1 or 4, Chapter 9, of the NEC. Exposed conduit shall be run parallel to or at right angles from walls or beams and plumb on columns and on walls. Conduit shall not be run through beams except where approved by the Engineer or specifically detailed. Where possible, conduit shall be pitched slightly to drain to the outlet boxes or otherwise installed to avoid trapping of condensate. Where necessary to ensure drainage, Appleton Type ECD, Crouse-Hinds, or equal, 1/4-inch drain fitting shall be installed in the trapped conduit at low points.

Factory made bends or elbows shall be used wherever possible. Field bends shall be carefully made to prevent conduit damage or reduction in the internal area. The bending radius shall be not less than six times the nominal diameters of the conduit with carefully matched bends on parallel runs to present a neat appearance. The number of crossovers shall be kept to a minimum.

All conduit shall be reamed to remove burrs before installation. Aluminum conduit shall be cut with a saw to prevent reduction in internal area. All threads in steel conduit shall be given a coat of zinc dust in oil or other approved corrosion-preventive compound before making connections. Threads on aluminum conduit shall be given a coat of graphite or other approved compound. All connections and joints in all conduit runs shall be watertight and ensure a low resistance ground path in the conduit system. All conduit runs shall be swabbed to remove foreign matter before wires are pulled in. Conduit terminations in boxes, panels, switchboards, motor control centers, and other sheet metal enclosures shall be bonded together for grounding and be fitted with insulating bushings, O.Z./Gedney Type A, Thomas and Betts, or equal. Where grounding bushings are required by code or shown, O.Z./Gedney Type SBLG, Thomas and Betts, or equal shall be furnished.

Conduit shall be neatly grouped where several lines follow a parallel course, and shall be

well supported, using galvanized clips or hangers of the ring or trapeze type. Clips, hangers, and support rods shall be held by self-drilling anchors, power-driven fasteners, or steel channel insets in the concrete ceilings or walls. Perforated strap hangers will not be accepted.

Conduit runs that enter the building from outdoors, or that pass through refrigerated or air conditioned areas, are subject to moisture accumulation due to condensation. A pull box shall be provided in the conduit run near the point of temperature change to prevent trapping of moisture within the conduit system. A 1/4-inch weep hole shall be drilled in the bottom of the pull box. After the wires and cables are installed, the end of the conduit continuing into the warmer area shall be packed with a nonsetting sealing compound.

W-76.06 Conduit Connections to Equipment

The conduit system shall terminate at the terminal box or at the conduit connection point of electric motors, devices, and equipment. Terminations of conduits at such locations shall permit direct wire connections to the motors, devices, or equipment.

Conduit connections shall be made with rigid conduit if the equipment is fixed and not subject to adjustment, mechanical movement, or vibration. Rigid conduit connections shall have union fittings to permit removal of equipment without cutting or breaking the conduit.

Conduit connections shall be made with approved flexible nonmetallic conduit if the equipment is subject to adjustment, mechanical movement, or vibration. Flexible conduit connections shall be watertight.

W-76.07 Expansion Fittings

Expansion fittings shall be installed at all expansion joints and where required by codes. Conduit expansion fittings shall be Crouse-Hinds Type XD, O.Z./Gedney Type DX, or equal.

W-76.08 Terminal, Junction, and Pull Boxes

Junction and pull boxes shall be installed as shown and as required.

Surface-mounted junction and pull boxes, unless specified otherwise herein, shall be of cast aluminum complete with mounting lugs, threaded entry bosses and flange or rabbeted gasketed covers.

Surface-mounted junction and pull boxes which would exceed 50 pounds weight if cast or which are shown as fabricated sheet metal boxes shall be made of 1/8-inch sheet aluminum with sides return channel flanged around the cover opening or with approved welded angle or channel supporting frames. Sheet aluminum boxes shall be provided with mounting lugs or channels and with conduit termination hubs. All seams in sheet aluminum boxes shall be continuously welded and ground smooth. All surface boxes larger than 6 inches square shall be mounted a minimum of 3/4 inch clear of the mounting surface by means of offset lugs or support channels.

Fabricated junction and pull boxes which are partially or fully encased in concrete shall be made of 10-gauge sheet stainless steel and fabricated in a similar manner to the sheet aluminum pull boxes specified herein, complete with mounting lugs or channels and conduit termination hubs.

Cast steel boxes shall be provided in smaller sizes where required for full or partial encasement in concrete.

All junction and pull boxes shall be provided with covers or doors as shown or required. Covers and doors shall be fabricated of materials equal in weight, gauge, structure, and metallic composition as the basic box. All covers shall be gasketed and held in place with nonferrous captive knurled head screw slot bolts. All pull and junction boxes shall be provided with hinged doors. Doors shall have continuous hinges, and 3-point catches with external handles and hasps for padlocks. All doors shall be gasketed.

All boxes shall be provided with partitions as shown and as required.

Fabricated boxes shall be NEMA 12 enclosures as manufactured by Hoffman, Hope, or equal.

W-76.09 Hazardous Areas

All conduit and equipment installed in or run through hazardous areas, as well as other electrical appurtenances installed therein, shall be installed to conform in every respect to Chapter 5 of the NEC for Class I, Division 1, Group D hazardous locations. All material installed in hazardous areas shall be listed as complying with the requirements of the U.L. Inc. for use in Class I, Group D atmospheres.

Sealing shall be provided for all conduits within and leaving hazardous areas as required.

W-76.10 Grounding System

A complete grounding system shall be in accordance with applicable ANSI, IEEE, and NEC Standards and local codes.

All noncurrent-carrying metal parts of the electrical wiring system shall be grounded. The grounding system shall include, but not be limited to, the following:

1. Motor control center controllers, ground bus, and enclosures.
2. All motor frames.
3. All conduit systems.
4. All mechanical equipment and structures.
5. Distribution and lighting panelboards.
6. Control, relay, and instrumentation panels.
7. Lighting fixtures and receptacles.
8. Fans, blowers, pumps, and similar equipment.
9. Hoist beams, cranes, and similar items.

A grounding connection from the transformer to the City water pipe shall be provided. The wire and conduit shall be attached to the City water pipe with a U.L. Inc. listed cast bronze U-bolt connector with silicon bronze bolts and nuts.

Motor frames shall be grounded by means of stranded, 600-volt insulated copper cables

installed within the motor feeder conduit system. The cable shall be lug bolted to the motor terminal box and the ground bus of the motor control center serving the motor.

An equipment grounding conductor shall be installed in all electrical raceways, and shall be sized in accordance with Article 250-95 of the National Electrical Code (NEC).

Exposed or buried ground conductors shall be bare copper wires or bars of the proper sizes.

All exposed ground cables or bars shall be firmly and neatly supported in place at proper intervals. Where subjected to mechanical abuse, protective enclosures shall be provided.

Grounding conductors run in conduits with circuit conductors shall be stranded cable with 600-volt green XHHW, TW, THW, or RHW Code insulation.

Stainless steel ground rods shall be 5/8-inch diameter with the length as required, and made up of a 10-foot section with 5-foot sections added as required. Rods shall be driven to permanently moist soil.

Connections to ground rods, transformer case ground bus bars, case grounds, bare ground grid conductors, and the like, shall be made by an exothermic welding process or by clamps specifically designed for this application.

Ground conductor connections to ground bus bars in motor control centers, and the like, shall be cable lug bolted terminations equal to line conductor terminations specified hereinafter.

Welds embedded in the ground or concrete shall be cleaned and painted with an asphaltum base paint.

Tests shall be conducted by the Contractor and witnessed by the Engineer to determine the ground impedance for the entire system. The test shall be accomplished by using a ground loop impedance tester. The result shall not exceed 2 ohms at any point of test. If necessary, additional ground rods shall be installed at locations approved by the Engineer.

Care shall be exercised to ensure good electrical connections between the conduits and metallic enclosures of switchgear, control centers, and the like, Grounding jumpers shall be installed where necessary to accomplish this purpose.

W-76.11 Wires and Cables - General

Wires and cables required for all systems shall be complete, connecting all equipment and control components. Conductors shall be of ample size, with suitable insulation as specified hereinafter.

W-76.12 600-Volt Wire and Cable - Conductors

All ground conductors and power, control, and lighting conductors shall be soft-drawn or annealed stranded copper wire meeting the requirements of ASTM B 3 or B 33. For lighting fixture and convenience outlet wiring only, conductors No. 10 AWG and smaller may be solid conductor.

Conductors shall be sized to limit the maximum conductor temperature to less than 75 degrees C, except where specifically stated otherwise. Table 310-16 of the NEC shall be the guide in determining 600-volt conductor sizes. The minimum size of conductor for power and lighting wiring shall be No. 12 AWG.

W-76.13 600-Volt Power and Control Cable - Insulation

Low voltage circuits shall be wired with 600-volt insulated conductors, sized as shown, or as required by the actual load to be served, whichever is larger.

Insulation for 600-volt copper conductors shall be cross-linked polyethylene compound, U.L. Inc. listed, NEC Type XHHW-2, with surface print cable identification; as manufactured by Okonite, American, Southwire or equal.

W-76.14 600-Volt Instrumentation Cables - Insulation

Shielded two-conductor No. 16 AWG cables for instrumentation shall be properly stranded 600-volt insulated copper wire twisted cables as shown. 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.

W-76.15 600-Volt Wire and Cable - Installation

The 600-volt wires and cables pulled into ducts and conduit shall be installed without the use of lubricants, except where such use is necessary and approved by the cable manufacturers and the Engineer. Wires and cables shall be carefully handled to avoid twists and kinks in the conductors or damage to the insulation. All trapped conduit and duct lines shall be swabbed to remove any accumulated moisture or debris before wires or cables are pulled in.

Cable reels shall be stored on concrete or other hard surface, or shall be lagged with 2 x 4 wood laggings providing 100 percent coverage.

No splicing will be permitted, except in junction boxes.

Lug bolting at terminals, devices, or bus bars shall be made up with a flat washer, a Belleville washer, and a locknut.

Lines of nylon or polypropylene, propelled by carbon dioxide or compressed air, shall be used to snake or pull wire and cable into conduits. Flat steel tapes or steel cables shall not be used.

W-76.16 600-Volt Wire and Cable - Splices and Terminations

Splices between copper conductors, Size No. 10 AWG and smaller, shall be made up with compression type butt connections. Splices between copper conductors, Size No. 8 AWG and larger, shall be made up with U.L. Inc. listed compression type tube connectors. Lug bolting at devices or bus bars shall be made up with a flat washer, a Belleville washer, and a locknut.

Splices and pigtail connections for lighting and receptacle wiring inside the buildings, No. 10 AWG and smaller, shall be made with a pre-insulated spring connectors, or equal.

Splices and lug terminations in 600-volt insulated cables shall be carefully taped and covered, using materials recommended by the cable manufacturer, to provide watertight insulation equal to that of the conductors.

Splices shall not be made within manholes unless specifically approved by the Engineer.

W-76.17 600-Volt Wire and Cable - Tests

The 600-volt insulated cables shall be factory tested prior to shipment in accordance with IPCEA standards for the insulation specified.

The following 600-volt wires and cable shall be tested after installation but before final connections are made up:

1. All feeders from motor control centers to motors 30 horsepower and larger.
2. All feeders from variable speed drive units.
3. All feeders from motor control centers to lighting panels and dry-type transformers.

For the above listed cables, a test voltage of 1,500 volts ac shall be applied for a period of 1 minute between all conductors in the same conduit, and between each conductor and ground.

All tests shall be made at the Contractor's expense, and certification of the tests shall be submitted to the Engineer. If any failures occur during the tests, the Contractor shall replace the cable.

W-76.18 Identification of Circuits

All wires and cables shall be banded with an identifying number and color code at each end termination and at each splice point in junction boxes. The identifying number of each wire shall be determined at the point of circuit origin, and shall continue unchanged to the point of circuit termination. In each conduit system, the wire identifying numbers shall include the conduit designation with a numeral suffix. The numeral suffix shall start with No. 1 and continue as required.

Where conduits enter motor control centers, switchgear terminal cabinets, and the like, the identification tag shall be fastened to the wire bundle near the conduit termination. The tag shall be held by an adjustable, self-locking nylon "Ty-Rap" as manufactured by Thomas and Betts Co., or equal. The identifying tag shall be of aluminum, brass, rigid fiber, and shall be engraved, stamped, or painted with the scheduled conduit number.

The wire identifying numbers and color code shall be applied as PVC slip-on sleeves, properly fitted to the wire diameter. The sleeves shall be as manufactured by Brady Co., Thomas and Betts Co., or equal. Wires shall be color coded in conformance with the requirements of applicable codes.

W-76.19 Wire and Cable Connections to Equipment

Electrical connections shall be made to all equipment in strict accordance with the manufacturer's approved wiring diagrams, the Plans, or as approved by the Engineer. The Contractor shall be responsible for the accuracy of his work, and shall repair any damage and replace any damaged equipment resulting from erroneous connections.

W-76.20 Painting

Conduit and boxes shall be painted in accordance with the Workmanship and Materials section headed "Painting."

Where aluminum surfaces such as boxes, conduit, or structural supports come in contact with incompatible metals, lime, mortar, concrete, or other masonry materials, the contact areas shall be given one field coat of Koppers Metal Passivator No. 40 and one coat of Koppers Bitumastic Super Service Black or two coats of asphalt varnish conforming to Fed. Spec. TT-V-51.

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SECTION 15010

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Basic Requirements: Requirements of the Contract Forms, Conditions of the Contract, Specifications, Drawings, and Addenda and Contract Modifications (the Contract Documents), apply to the requirements of each Section of Division 15xxx.
- B. Conflicts: Nothing contained in this Section shall be construed to conflict in any way with other provisions or requirements of the Contract documents. The intent is that this Section will take precedence. Where differences arise, the Engineer shall decide which directions or instructions take precedence.

1.02 SUMMARY

- A. General: Unless an item is specifically mentioned as being provided by others, the requirements of Division 15 Contract Documents shall be completed. The systems, equipment, devices and accessories shall be installed, finished, tested and adjusted for continuous and proper operation. Any apparatus, material or device not shown on the Drawings but mentioned in these Specifications, or vice versa, or any incidental accessories necessary to make the project complete and operational in all respects, shall be furnished, delivered and installed without additional expense to the City. Include all materials, equipment, supervision, operation, methods and labor for the fabrication, installation, start-up and tests necessary for complete and properly functioning systems.

1.03 APPLICABLE STANDARDS

- A. Code Compliance: Unless otherwise indicated, comply with all rules, regulations, standards, codes, ordinances and laws of local, state and federal governments and the amendments and interpretation of such rules, regulations, standards, codes, ordinances and laws of local, state and federal governments by the authorities having lawful jurisdiction.
- B. ADA: Comply with the requirements of the Americans with Disabilities Act (ADA).
- C. Comply: With the National Fire Protection Association (NFPA) Standards and other Codes and Standards as adopted by the Local Authority having Jurisdiction.
- D. Florida Building Code 2010: Conform in strict compliance to the Florida Building Code (FBC), 2010 Edition and the amendments which are enforced by the local authority having jurisdiction.

- 1. Florida Building Code – Mechanical 2010 Edition

E. NATIONAL FIRE PROTECTION (NFPA) Standards

1. NFPA-70, National Electrical Code, 2008 Revision
2. NFPA-90A, Standard for the Installation of Air Conditioning and Ventilation Systems, 2009 Revision
3. NFPA-101A, Guide to Alternative Approaches to Life Safety, 2009 Revision

F. Notification: Comply with all of the requirements of the Federal "Right-To-Know" Regulations and the Florida "Right-To-Know" Law and provide notification to all parties concerned as to the use of toxic substances.

1.04 DRAWINGS AND SPECIFICATIONS

- A. Intent: The intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable mechanical systems complete in every respect.
- B. Equipment Placement: The drawings are diagrammatic, intended to show general arrangement, capacity and location of various components, equipment and devices. Each location shall be determined by reference to the general building plans and by actual measurements in the building as built. Reasonable changes in locations ordered by the Engineer prior to the performance of the affected Work shall be provided at no additional cost to the City.
- C. Drawing Scale: Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets, transitions and fittings may not be shown but shall be provided at no additional cost.
- D. Conflict: In the event of a conflict, the Engineer will render an interpretation in accordance with the General Conditions.

1.05 DEFINITIONS

- A. Provide/Install: The word "provide" shall mean furnish, install, connect, test, complete, and leave ready for operation. The word "install" where used in conjunction with equipment furnished by the City or under another contract shall mean mount, connect, complete, and leave ready for operation.
- B. Concealed: The surface of insulated or non-insulated piping, ductwork or equipment is concealed from view when standing inside a finished room, such as inside a chase or above a ceiling.
- C. Exposed: The surface of insulated or non-insulated piping, ductwork or equipment is seen from inside a finished room, such as inside an equipment or air handling unit room.

- D. Protected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building but protected from direct exposure to rain by an overhang, eave, in an unconditioned parking garage or building crawl space.
- E. Unprotected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building and exposed to rain.
- F. Abbreviations: Abbreviations, where not defined in the Contract Documents, shall be interpreted to mean the normal construction industry terminology, as determined by the Engineer. Plural words shall be interpreted as singular and singular words shall be interpreted as plural where applicable for context of the Contract Documents.

1.06 MANUFACTURER'S CHECKOUT

- A. Start-up and Checkout: At completion of installation and prior to performance verification, a factory-trained representative of the manufacturer shall provide start-up and checkout service. After the performance verification the manufacturer's representative shall examine performance information and check the equipment in operation, and sign "Check-Out Memo" for the record. Submit a copy of Memo on each item of equipment where indicated in individual sections of these specifications for inclusion in each Technical Information Brochure. The "Check-Out Memo" shall be included with the performance verification data. Do not request "Instruction in Operation Conference" or request final inspection until Memos have been submitted and found acceptable.

1.07 INSTRUCTION TO CITY

- A. General: Instructions to the City shall be by competent representatives of the manufacturers involved, with time allowed for complete coverage of all operating procedures. Provide classroom instruction and field training in the design, operation and maintenance of the equipment and troubleshooting procedures. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar provisions of the systems. On the date of substantial completion, turn over the prime responsibility for operation of the mechanical equipment and systems to the City's operating personnel.
- B. Training Period: All training shall comply with SP-81 Services of Manufacturers Representatives. Unless otherwise indicated training periods shall encompass the following number of hours of classroom and hands-on instructions with a maximum period of 4 hours per day for either. Mixing classroom instructions and hands on training in the same day is preferable.
 - 1. Training periods:
 - a. 4 hours Classroom
 - b. 8 hours hands on training

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Specified Products: Manufacturer's names and product model numbers indicated on the drawings and in these specifications establish the type, style, quality, performance, and sound rating of the desired product. Listing of other manufacturers indicates that their equivalent products would be acceptable if they meet the specification requirements, the specific use and installation shown on the drawings, including space and clearance requirements, and the energy consumption and efficiency of the specified product. The listing of additional manufacturers in no way indicates that the manufacturer can provide an acceptable product.
- B. Space Requirements: All manufactured products furnished on this project must have the required space and service areas indicated in the manufacturer's printed literature or shown on their shop drawing. When the manufacturer does not indicate the space required for servicing the equipment, the space shown on the drawings or as required by the Engineer must be provided.

2.02 MATERIAL AND EQUIPMENT

- A. General: Material and equipment used shall be produced by manufacturers regularly engaged in the production of similar items, and with a history of satisfactory use as judged by the Engineer.
- B. Specified Equipment: Equipment shall be the capacity and types indicated or shall be equivalent in the opinion of the Engineer. Material and equipment furnished and installed shall be new, recently manufactured, of standard first grade quality and designed for the specific purpose. Equipment and material furnished shall be the manufacturer's standard item of production unless specified or required to be modified to suit job conditions. Sizes, material, finish, dimensions and the capacities for the specified application shall be published in catalogs for national distribution. Ratings and capacities shall be certified by a recognized rating bureau. Products shall be complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
- C. Compatibility: Material and equipment of one and the same kind, type or classification and used for identical or similar purposes shall be made by the same manufacturer. Where more than one choice is available, select the options which are compatible with other products already selected. Compatibility is a basic general requirement of product selection.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. General: The installation of materials and equipment shall be done in a neat, workmanlike and timely manner by an adequate number of craftsmen knowledgeable of the requirements of the Contract Documents. They shall be skilled in the methods and craftsmanship needed to produce a first-quality installation. Personnel who install materials and equipment shall be qualified by training and experience to perform their assigned tasks. All materials and equipment shall be installed per the manufacturer's written requirements.

- B. **Acceptable Workmanship:** Acceptable workmanship is characterized by first-quality appearance and function which conforms to applicable standards of building system construction and exhibits a degree of quality and proficiency which is judged by the Engineer as equivalent or better than that ordinarily produced by qualified industry tradesmen.
- C. **Performance:** Personnel shall not be used in the performance of the installation of material and equipment who, in the opinion of the Engineer, are deemed to be careless or unqualified to perform the assigned tasks. Material and equipment installations not in compliance with the Contract Documents, or installed with substandard workmanship in the opinion of the Engineer, shall be removed and reinstalled by qualified craftsmen at no change in the contract price.

CLEANING AND PROTECTION

- D. **Coordination of Cleaning:** Protection of existing facilities and personnel during cleaning of ductwork is mandatory. Some special areas are “clean rooms” and need extra care.
- E. **Equipment Protection:** Protect fan motors, switches, equipment, fixtures, and other items from dirt, rubbish and foreign matter. Do not operate air-handling equipment if the building is not clean or if dust can enter the coils or the fan housings.
- F. **Equipment Cleaning:** Thoroughly clean equipment and entire piping systems internally upon completion of installation and immediately prior to final acceptance. Open dirt pockets and strainers, blow down each piping system and clean strainer screens of accumulated debris. Remove accumulated dirt, scale, oil and foreign substances. Thoroughly wipe clean internal surfaces of ductwork and air handling units prior to request for substantial completion.
- G. **Building Cleanup:** Remove debris, rubbish, leftover materials, tools and equipment from work areas and site. Clean tunnels and closed off spaces of packing boxes, wood frame members and other waste materials used in the installation. Final acceptance shall not be approved until site is cleaned.
- H. **Fixture Cleanup:** Remove temporary labels, stickers, etc., from fixtures and equipment. Do not remove permanent nameplates, equipment model numbers, ratings, etc.
- I. **Protection of Finished Installation:** Where installation is required in areas previously finished by other trades, protect the area from marring, soiling or other damage.

3.02 CORRECTION OF WORK

- A. **General:** At no additional cost to the City, rectify discrepancies between the actual installation and contract documents when in the opinion of the Test and Balance Agency (T&B Agency) or the Engineer the discrepancies will affect system balance and performance.
- B. **Drive Changes:** Include the cost of all pulley, belt, and drive changes, as well as balancing dampers, valves and fittings, and access panels to achieve proper system balance recommended by the T&B Agency.

3.03 COORDINATION AND ASSISTANCE

- A. General: Provide all labor, equipment, tools and material required to operate the equipment and systems necessary for the testing and balancing of the systems and for the adjustment, calibration or repair of all electric or pneumatic automated control devices and components. These services shall be available on each working day during the period of final testing and balancing.
- B. Drawings and Specifications: Provide to the T&B Agency a complete set of project record drawings and specifications and an approved copy of all HVAC shop drawings and equipment submittals. The T&B Agency shall be informed of all changes made to the system during construction, including applicable change orders.
- C. Coordination: Coordinate the work of all trades and equipment suppliers to complete the modifications recommended by the T&B Agency and accepted by the Engineer. Cut or drill holes for the insertion of air measuring devices as directed for test purposes; repair to as-new condition, inserting plastic caps or covers to prevent air leakage. Repair or replace insulation and re-establish the integrity of the vapor retardant.

3.04 PREPARATIONS FOR PERFORMANCE VERIFICATION

- A. Verification: Prior to commencement of the balancing by the T&B Agency, the Contractor shall verify in writing:
 - 1. That linkages between dampers and their actuators are secure, non-overloading and non-binding.
 - 2. That strainers have been removed, cleaned and replaced, and that temporary construction strainers have been removed.
 - 3. That air vents at coils and high points of the piping systems have been inspected and installed and operating freely.
 - 4. That automatic valves, hand valves, and balancing valves have been placed in a fixed open position for full flow through all devices.
 - 5. That linkages between valves and their actuators are secure, non-overloading and non-binding.
 - 6. That pressures for hydronic reducing valves have been set.
 - 7. That operating temperatures have been set for chillers, regulating valves, etc.
 - 8. That pumps are operating at the correct rotation and specified horsepower.

9. That piping has been pressure tested and accepted and piping systems have been cleaned, flushed, sterilized and refilled with chemicals and prescribed treated water and vented.
10. That operating temperatures have been set for boilers, regulating valves, etc.
11. That the operating safeties (thermal overloads, firestat/freezestats, smoke detectors, relief valves, etc.), are installed and fully functional.
12. That equipment has been lubricated and can be operated without damage.
13. That the systems are operational and complete.
14. That no latent residual work remains to be completed.

3.05 PROTECTION OF MATERIALS AND EQUIPMENT

- A. Replacement of Damaged Stored Material and Equipment: Any material and equipment that has been wet or otherwise damaged prior to installation, in the opinion of the Engineer, shall be replaced with new material regardless of the condition of the material and equipment at the time of installation.
- B. Repair of Damaged Installed Material and Equipment: After installation correct or repair dents, scratches and other visible blemishes. At the direction of Engineer replace or repair to "as new" condition equipment which has been damaged during construction.
- C. During construction, all piping and ductwork system openings shall be capped with at least two layers of polyethylene film, fastened tightly in place with banding material or foil tape until connection of the continuation of such piping or ductwork is occurring.

3.06 ASBESTOS AND HAZARDOUS MATERIALS

- A. General: Should asbestos or other hazardous material be encountered during execution of the work, or should the presence of asbestos or other hazardous material be suspected, immediately notify the Engineer and suspend work in the affected area. The City will initiate a study to determine if asbestos or other hazardous materials are present and will determine what action will be taken. Removal of asbestos or other hazardous materials will be done under a separate contract.

3.07 COORDINATION OF SERVICES

- A. General: Coordinate interruption of existing services in writing at least 1 week in advance with the City. Shutdown time and duration of services interruption shall be decided by the City. Provide shutoff valves at points of interconnection to minimize downtime. Procedures incidental to the outage shall be prepared in advance to minimize downtime.
- B. Fire Safety in Existing facilities: Do not decrease the fire rating of walls, partitions, ceilings, floors, doors or combinations thereof in adjacent areas or means of egress. Do not interrupt fire sprinkling or life safety systems without prior coordination with the

Engineer. Inform all necessary parties (Fire Department, City insurance carrier, etc.) in advance, prior to and immediately after shutdown, disconnection or isolation of any portion of life safety or fire sprinkler system.

- C. Protection of Facilities: Portions of the building may be operational during construction. Maintain operation of the equipment and systems whenever the installation interfaces with existing equipment or systems. Provide protection for the building, its contents and occupants wherever installation under the contract is performed. As necessary, move, store, and protect furniture, office fixtures and carpets. Provide acoustical isolation of the work area with temporary doors, partitions, etc., to allow normal work functions. Provide exhaust fans, temporary dust barrier partitions and any containment measures required to prevent dirt, dust or fumes from reaching adjacent occupied spaces as required by the City or Engineer. Access to the building, including exit stairs, doors and passageways, and loading dock and other delivery areas shall be kept open and continuously accessible to the occupants. Workmen shall be confined to those areas directly involved in the project installation, and only during time periods indicated and approved by the City.

3.08 LAYOUT OF EXISTING EQUIPMENT

- A. General: Existing equipment, piping, ductwork, etc., as indicated on the drawings have, for the most part, been provided to the Engineer through existing drawings. The layouts shown may not be from as-built drawings and may be from partial copies of original design documents not produced by the Engineer. The Engineer is not responsible for the accuracy nor completeness of the existing installation and all layouts are shown for reference only. It is to be understood that unforeseen conditions probably exist and that existing and new work may not be field located exactly as shown on the drawings. Verify existing conditions in the field and notify the Engineer of any deviations required to install the work as shown. Coordinate new work with existing equipment, including removing, relocating, rerouting, extending with new materials, and reinstall existing piping, ductwork, conduits, wiring, tubing, supports and other equipment. The Engineer shall make the final decision on all deviations or modifications required by the existing conditions.

3.09 OWNERSHIP OF REMOVED EQUIPMENT

- A. General: Construction materials and items of mechanical and electrical equipment which are removed and not reused shall be removed from the job-site unless indicated as to be retained for the City. Include rigging, removal and hauling cost, as well as any salvage value, in the contract.

3.10 CLEAN-UP

- A. General: Debris and rubbish shall not be disposed into the City's containers.

END OF SECTION

SECTION 15030

ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Basic Requirements: Provisions of Section 15010, BASIC MECHANICAL REQUIREMENTS are part of this Section.

1.02 SUMMARY

- A. General: Provide electric motors and related electric material and equipment required for all mechanical work.

1.03 RELATION TO OTHER WORK

- A. Related Sections: Other Sections of Division 15 which relate to the requirements of this Section may include but are not limited to the following:

- 1. 15050, BASIC MECHANICAL MATERIALS AND METHODS
- 2. 15950, BUILDING CONTROL SYSTEM
- 3. 15990, PERFORMANCE VERIFICATION

- B. Related Divisions: Other Divisions of these specifications which relate to the requirements of this Section may include but are not limited to the following:

- 1. Division 1, ALTERNATES
- 2. Division 16, ELECTRICAL

1.04 SUBMITTAL

- A. General: Refer to paragraph entitled "SUBMITTAL" in Section 15010. Include the following material and performance data:

- 1. Manufacturer Literature:
 - a. Dimensional outline drawing showing the operating weights of the equipment with all connection locations and requirements.
- 2. Installation Instructions:
 - a. Manufacturer's printed installation instructions including copies shipped with the equipment.
- 3. Maintenance Instructions:
 - a. Manufacturer's printed maintenance instructions for equipment covered in this Section.

1.05 APPLICABLE STANDARDS

- A. General: All equipment, material, accessories, methods of construction and reinforcement, finish quality, workmanship and installation shall be in compliance with the paragraph entitled "Code Compliance" in Section 15010.
- B. Comply: With the National Fire Protection Association (NFPA) Standards and other Codes and Standards as adopted by the Local Authority having Jurisdiction.
 - 1. NFPA: NFPA-70, National Electrical Code, 2008 Revision.
 - 2. NEMA: National Electric Manufacturer's Association Standard MG-2.

PART 2 - PRODUCTS

2.01 NONE

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Material and Equipment: Install material and equipment in accordance with details shown on the drawings, submittal drawings and manufacturer's instructions.

3.02 WIRING

- A. Power: All power wiring shall be installed according to the requirements of Division 16, ELECTRICAL.
- B. Interlock: Unless otherwise noted, all interlock wiring, such as remote line voltage thermostats, fan speed controllers, etc. shall be installed by the supplier of that equipment. Interlock wiring shall be installed according to the requirements of Division 16, ELECTRICAL.
- C. Control: All control wiring exposed in mechanical equipment rooms, fan rooms, return air plenums, etc. shall be in conduit. Low voltage control wiring may be installed without conduit in return air plenums provided the cable is plenum rated and the installation is acceptable to the authority having jurisdiction.

END OF SECTION

SECTION 15050

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Basic Requirements: Provisions of Section 15010, BASIC MECHANICAL REQUIREMENTS, are part of this Section.

1.02 SUMMARY

- A. General: Materials listed herein are general mechanical materials to be used for Division 15 sections of the specifications unless noted otherwise.

1.03 ADDITIONAL REQUIREMENTS

- A. Related Sections: This section relates to the requirements of all sections in Division 15.

1.04 APPLICABLE STANDARDS

- A. General: All equipment, material, accessories, methods of construction and reinforcement, finish quality, workmanship and installation shall comply with the paragraph entitled "Code Compliance" in Section 15010.
- B. Comply: With the National Fire Protection Association (NFPA) Standards and other Codes and Standards as adopted by the Local Authority having Jurisdiction.
- C. ANSI: Color coding for piping systems shall comply with The American National Standards Institute, ANSI A13.1-1981, "Scheme for the Identification of Piping Systems".
- D. NFPA: NFPA 704, Standard System for the Identification of the Fire Hazards of Materials for Emergency Response, 2001 Revision.

1.05 SUBMITTAL

- A. General: Include the following data for all submittals:
 - 1. Manufacturers Literature:
 - 2. Installation Instructions
 - 3. Operating Instructions

PART 2 - PRODUCTS

2.01 GENERAL

- A. Acceptance: Materials and equipment shall be products which will meet with the acceptance to the authority having jurisdiction. Where acceptance is contingent upon having the products examined, tested and certified by Underwriters Laboratories or other recognized testing laboratory, the product shall be so examined, tested and certified.
- B. Material: Refer to the paragraph entitled "MATERIAL AND EQUIPMENT" in Section 15010.

2.02 PAINTING AND MARKING

- A. Prohibited Material: The use of red lead or any lead-based component in primer or paint is prohibited.

2.03 IDENTIFICATION OF EQUIPMENT

- A. Manufacturer:
 - 1. Refer to paragraph entitled "MANUFACTURERS" in Section 15010. Model numbers or product type listed for one or more manufacturers are given to provide an example of the item required.
- B. Valve Tags: Each tag shall designate appropriate service and valve number. Secure attach with meter seals, 4-ply 0.018 copper smooth wire, brass "S" hooks, or brass jack chain to allow easy reading. All valve tags used on a project shall be the same type and manufacturer.
 - 1. Manufacturer: Provide either of the following types:
 - a. Brass Type: Minimum 19 gauge polished brass; 1-1/2 inch min. diameter. Seton, Style 250-BL.
- C. Equipment Labels: Provide either of the following types:
 - 1. Stainless Steel Type: Engraved, flexible, 0.020 inch thick stainless steel. Sized 3/4 inch x 2-1/2 inch, 1 inch x 3 inch, 1-1/2 inch x 4 inch or 3 inch x 6 inch as necessary to identify item.

PART 3 - EXECUTION

3.01 IDENTIFICATION OF PIPING AND EQUIPMENT

- A. General: Apply after completion of insulation, painting and cleaning work so that final identification is not disfigured.

1. Coordinate with composition and operating temperatures of surface for permanent adhesion of markers and labels to surface.
 2. Locate marking and banding to facilitate ease of visual tracking. (For example, mark and band parallel runs of pipe which are side-by-side at the same general place.) Labels on vertical piping shall be 7 foot above the floor.
 3. Pipes less than 3/4 inch diameter may be identified with tags similar to those specified for valves.
 4. Adhere or affix all identification items permanently except where removal may be necessary for maintenance or service. Where labels or arrows are used, overlap the label ends 2 inches with matching color bands completely encircling the pipe.
 5. Apply labels on the bottom lower quarters of overhead pipe. Pipe within 24 inches of a wall does not require a label on the quarter facing the wall.
- B. Valve Tags: Valve tags shall be installed on the following items:
1. All control valves (except those valves associated with direct control of flow to air handling apparatus whereby the valve may be identified by reference to the item of equipment it serves).
- C. Valve Tag List: Prior to substantial completion, provide a complete list of all valves having tags. Provide two laminated copies of the valve list to the owner. Indicate the following:
1. Valve size.
 2. Valve location.
 3. Valve type.
 4. Service application.
 5. Valve manufacturer and model number.
 6. Pressure class and allowable working pressure.
 7. Safety warnings.
 8. Sequencing information.
 9. Seasonal operating position (normally open/normally closed).
- D. Labels: Provide labels of proper size on mechanical system equipment including but not limited to, pumps, chillers, tanks, major piping components such as air separators, air handling equipment, fans, control panels, terminal units, flow stations, reheat coils and similar items. Provide labels on access panels indicating the item accessible through the panel. Equipment labels shall be mechanically fastened with machine screws or rivets; adhesive securing is not acceptable.
- E. Identification: Coordinate colors and finishes with pipe identification markers.

END OF SECTION 15050

SECTION 15950

BUILDING CONTROL SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Basic Requirements: Provisions of Section 15010, BASIC MECHANICAL REQUIREMENTS and Section 15030, ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT, are a part of this Section. Any conflicts that may arise between this document and SP-72, SP-72 shall take precedence.

1.02 RELATED SECTIONS

- A. Other Sections of Division 15 which relate to the requirements of this Section may include but are not limited to the following:
 - 1. 15050, BASIC MECHANICAL MATERIALS AND METHODS
 - 2. 15030, ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT
 - 3. 15990, PERFORMANCE VERIFICATION

- B. Related Divisions: Other Divisions of these specifications which relate to the requirements of this Section may include but are not limited to the following:

- 1. Division 16, ELECTRICAL

1.03 DESCRIPTION

- A. General: The Building Control System (BCS) shall consist of a high speed, peer-to-peer network of Direct Digital Control (DDC) controllers and networked operator workstations. The operator workstation shall be a personal computer (PC) with a color monitor, mouse, keyboard, and printer. The PC will allow the user to interface with the network via dynamic color graphics. Each mechanical system, building floor plan, and control device will be depicted by point and click graphics. A modem will be provided for remote access to the network and for paging the operators when an alarm occurs.
- B. The system will directly control each piece of mechanical equipment as indicated in the point list, schematic drawings, and sequence of operations.
- C. The system shall be capable being expanded for future expansion to include monitoring of card access, fire alarm, lighting, and integrated systems.

1.04 APPROVED CONTROL SYSTEM CONTRACTORS AND MANUFACTURERS

- A. The following are the approved Control System Contractors and Manufacturers for this project. Each system must be installed and serviced by a local Factory Authorized Office:

1. The controls shall be by KMC with options as shown, specified, and required. The City of Tampa has officially standardized on this brand and no alternates will be considered. The Standardization Certificate of conditions and Circumstances is included herein.
- B. The Contractor shall use only products from the corresponding manufacturer and product line listed.
- C. The above list of manufacturers applies to operator workstation software, controller software, the custom application programming language, Building Controllers, Custom Application Controllers, and Application Specific Controllers. All other products specified herein (e.g. sensors, valves, dampers, and actuators) need not be manufactured by the above manufacturers.

1.05 QUALITY ASSURANCE

- A. The installer shall have an established working relationship with the Control System Manufacturer of not less than three years.
- B. Workmanship Quality: Install a complete control system, with competent mechanics and electricians regularly employed for controls installation. Supervise installation of control valves, control dampers and thermometer wells to be installed in pipes and ducts by other sections.
- C. Tests and Inspections: Provide tests and a point by point inspection and verification prior to substantial completion to prove to the satisfaction of the Owner and Engineer that the controls and the HVAC systems perform as specified.
- D. The installer shall have an office within 50 miles of the project site.
- E. All products used in this installation shall be new, currently under manufacture, and shall be applied in similar installations for a minimum of 2 years. This installation shall not be used as a test site for any new products unless explicitly approved by the Engineer in writing. Spare parts shall be available for a minimum of 5 years after completion of this contract.

1.06 CODES AND STANDARDS

- A. General: All equipment, material, accessories, methods of construction and reinforcement, finish quality, workmanship and installation shall be in compliance with the paragraph entitled "Code Compliance" in Section 15010.
- B. All work, materials, and equipment shall comply with the rules and regulations of all codes and ordinances of the local, state, and federal authorities. Such codes, when more restrictive, shall take precedence over these plans and specifications.

1.07 SYSTEM PERFORMANCE

A. Performance Standards: The system as a minimum, shall conform to the following:

1. Graphic Display: The system shall display a graphic with all current data within 10 seconds.
2. Graphic Refresh: The system shall update a graphic with dynamic points with all current data within 8 seconds.
3. Object Command: The maximum time between the command of a binary point by the operator and the reaction by the device shall be less than 2 seconds. Analog objects should start to adjust within 2 seconds.
4. Object Scan: All changes of state and change of analog values will be transmitted over the high speed network such that any data used or displayed at a controller or workstation will have been current within the previous 60 seconds.
5. Alarm Response Time: The maximum time from when an object goes into alarm to when it is annunciated at the workstation shall not exceed 30 seconds.
6. Program Execution Frequency: Applications shall be capable of running as often as once every 5 seconds. The Contractor shall be responsible for selecting execution times consistent with the mechanical process under control.
7. Performance: Programmable Controllers shall be able to execute DDC PID control loops at a selectable frequency of at least once per second. The controller shall scan and update the process value and output generated by this calculation at the same frequency.
8. Multiple Alarm Annunciation: All workstations on the network must receive alarms within 5 seconds of each other.
9. Reporting Accuracy: The system shall report all values with an end-to-end accuracy as listed or better than those listed in Table 1.
10. Stability of Control: Control Loops shall maintain measured variables at setpoint within the tolerances listed in Table 2.

TABLE 1: Reporting Accuracy

Measured Variable	Reported Accuracy
Space Temperature	±0.5°C [±1°F]
Ducted Air	±0.5°C [±1°F]
Outside Air	±0.5°C [±2°F]
Dew Point	±1.5°C [±3°F]
Water Temperature	±0.5°C [±1°F]
Delta-T	±0.15°C [±0.25°F]

Relative Humidity	±3% RH
Water Flow	±5% of Full Scale
Airflow (Terminal)	±10% of Full Scale (See Note1)
Airflow (Measuring stations)	±5% of Full Scale
Air Pressure (Ducts)	±25 Pa [±0.1" W.G.]
Air Pressure (Space)	±3 Pa [±0.01" W.G.]
Water Pressure	±2% of Full Scale (See Note2)
Electrical	5% of Full reading (See Note 3) (A,V,W, Power Factor)
Carbon Monoxide (CO)	±5% of reading (See Note 3)
Carbon Dioxide (CO2)	±50 ppm

Note 1: 10%-100% of scale

Note 2: For both absolute and differential pressure

Note 3: Not including utility-supplied meters

TABLE 2: Control Stability and Accuracy

Controlled Variable	Control Accuracy	Range of Medium
Air Pressure	±50 Pa [±0.2" w.g.] ±3 Pa [±0.01" w.g.]	0-1.5 kPa [0-6" w.g.] -25 to 25 Pa [-0.1 to 0.1" w.g.]
Airflow	±100 CFM	
Temperature	±0.5°C [±1.0°F]	
Humidity	±3% RH	
Fluid Pressure	±10 kPa [±1.5psi] ±250 kPa[±1.0" w.g.]	0-1 kPa [1-150 psi] 0-12.5 kPa [0-50" w.g.]

1.08 SUBMITTALS

- A. Procedures: Provide Technical Information Brochures and Shop Drawings in accordance with Section 15010.
- B. Contractor shall provide shop drawings and manufacturers' standard specification data sheets on all hardware and software provided for this project. No work may begin on any segment of this project until submittals have been reviewed by the Engineer/Owner for conformity with the design intent. All drawings shall be done on AutoCAD Release 14 or higher and provided on compact disc (CD), and on a minimum of 11 x 17" drawings.
- C. When manufacturer's cutsheets apply to a product series rather than a specific product, the data specifically applicable to this project shall be highlighted or clearly indicated by other means.

D. Each submitted piece of literature and drawing shall clearly reference the specification and/or drawing that the submittal is to cover. General catalogs shall not be accepted as cut sheets to fulfill submittal requirements. Submittals shall include as a minimum:

1. DDC Hardware:

- a. A complete bill of materials of equipment shall be used on each drawing indicating quantity, manufacturer, model number, and other relevant technical data.
- b. Manufacturer's description and technical data, such as performance curves, product specification sheets, and installation/maintenance instructions for the items listed below, and other relevant items not listed below:
 - (1) Direct Digital Controllers
 - (2) Transducers/Transmitters
 - (3) Sensors (including accuracy data)
 - (4) Actuators
 - (5) Valves
 - (6) Relays/Switches
 - (7) Control Panels
 - (8) Power Supply
 - (9) Batteries
 - (10) Operator Interface Equipment
 - (11) Wiring
- c. Wiring diagrams and layouts for each control panel, indicating all termination numbers.
- d. Schematic diagrams for all field sensors and controllers. Provide floor plans of all sensor locations and control hardware.

2. Central System Hardware and Software:

- a. A complete bill of materials of equipment shall be used on each drawing indicating quantity, manufacturer, model number, and other relevant technical data.
- b. Manufacturer's description and technical data, such as performance curves, product specification sheets, and installation/maintenance instructions for the items listed below, and other relevant items not listed below:
 - (1) Central Processing Unit
 - (2) Monitors
 - (3) Printers
 - (4) Keyboard
 - (5) Power Supply
 - (6) Battery Backup
 - (7) Interface Equipment Between CPU and Control Panels
 - (8) Operating System Software

- (9) Operator Interface Software
 - (10) Color Graphic Software
 - (11) Third-party Software
- c. Schematic diagrams for all control, communication and power wiring. Provide a schematic drawing of the central system installation. Label all cables and ports with computer manufacturer's model numbers and function. Show all interface wiring to the control system.
 - d. Riser diagrams of wiring between central control unit and all control panels.
 - e. A list of the color graphic screens to be provided. For each screen, provide a conceptual layout of pictures and data, and show or explain which other screens can be directly accessed.
3. Controlled Systems:
- a. A schematic diagram of each controlled system. The schematics shall have all control points labeled and with point names shown or listed. The schematics shall graphically show all control elements in the system.
 - b. An instrumentation list for each controlled system. Each element of the controlled system shall be listed in table format. The table shall show element name, type of device, manufacturer, model number, and product data sheet number.
 - c. Each system schematic shall include a complete sequence of operation, where possible. If sequence of operation is not on same sheet, it shall reference the schematic diagram of the controlled system.
 - d. A point list for each system controller including both inputs and outputs (I/O), point number, the controlled device associated with the I/O point, and the location of the I/O device.
4. Quantities of items submitted shall be reviewed, but are the responsibility of the Contractor.
5. A description of the proposed process along with all report formats and checklists to be used in Part 3: "Control System Demonstration and Acceptance."
6. A BACnet Protocol Implementation Conformance Statement (PICS) for each type of BACnet controller and BACnet operator interface included in the submittal.
- E. Project Record Documents: Upon substantial completion of the installation, submit three copies of record (as-builts) documents. The documents shall be submitted for approval prior to final completion and shall include:
- 1. Project Record Drawings: These shall be as-built versions of the submittal shop drawings. One set of magnetic media including CAD, DWG, or DXF drawing files also shall be provided.

2. Testing and Commissioning Reports and Checklists: Completed versions of all reports and checklists, along with all trend logs, used to meet the requirements of Part 3: "Control System Demonstration and Acceptance."
3. Operation and Maintenance (O&M) Manual: This manual shall include as-built versions of the submittal product data. In addition to the information required for submittals, the O&M manuals shall include:
 - a. Names, addresses, and 24 hour telephone numbers of service representatives for each system as well as Office numbers.
 - b. Operators Manual with procedures for operating the control systems, including logging on/off, alarm handling, producing point reports, trending data, overriding computer control, and changing setpoints and other variables.
 - c. One set of Programming Manuals with a description of the programming language (including syntax), statement descriptions (including algorithms and calculations used), point database creation and modification, program creation and modification, and use of the editor.
 - d. Engineering, Installation, and Maintenance Manuals that explain how to design and install new points, panels, and other hardware; preventive maintenance and calibration procedures; how to debug hardware problems; and how to repair or replace hardware.
 - e. A listing and documentation of all custom software created using the programming language, including the set points, tuning parameters, and object database. One set of magnetic/optical media containing files of the software and database also shall be provided.
 - f. One set of magnetic/optical media containing files of all color graphic screens created for this project.
 - g. A list of recommended spare parts with part numbers, suppliers, and phone numbers.
 - h. Complete original issue documentation, installation, and maintenance information for all third-party hardware provided, including computer equipment and sensors.
 - i. Complete original issue diskettes for all software provided, including operating systems, programming language, operator workstation software, and graphics software.
 - j. Licenses, guarantee, and warranty documents for all equipment and systems.

- k. Recommended preventive maintenance procedures for all system components including a schedule of tasks (inspection, cleaning, calibration, etc.), time between tasks, and task descriptions.
- l. Training Manuals: The Contractor shall provide as course outline and training manual for all training classes at least six weeks prior to the first class. The Engineer may modify any or all of the training course outline and training materials to meet the needs of the Owner. Review and approval by the Engineer shall be completed at least three weeks prior to the first class. Training shall consist of two eight-hour periods of instruction, scheduled at the convenience of the Owner.

1.09 WARRANTY

- A. In addition to the requirements Section 15010, the control system herein specified, including all DDC hardware and software components, shall be free from defects in workmanship and material under normal use and service for a period of no less than twelve months commencing at the time of final acceptance of the facility by the Owner.
 - 1. After completion of the installation, adjust all sensors, thermostats, control valves, motors and other equipment. Any of the equipment provided in this Section proved to be defective shall be replaced or repaired at no additional cost.
 - 2. All work shall have a single warranty date, even when the Owner has received beneficial use due to an early system startup. If the work specified is split into multiple contracts or a multi-phase contract, then each contract or phase shall have a separate warranty start date and period.
 - 3. At the end of the final startup, testing and commissioning phase, if equipment and systems are operating satisfactorily to the Engineer, the Engineer shall sign certificates certifying that the control system's operation has been tested and accepted in accordance with the terms of this specification. The date of the acceptance shall be the start date of the warranty.
 - 4. Operator workstation software, project-specific software, graphic software, database software, and firmware updates which resolve known software deficiencies as identified by the Contractor shall be provided at no charge during the warranty period. Any upgrades or functional enhancements associated with the above mentioned items also can be provided during the warranty period for an additional charge to the Owner by purchasing an in-warranty service agreement from the Contractor. Written authorization by the Owner must, however, be granted prior to the installation of any of the above mentioned items.
 - 5. Exception: The Contractor shall not be required to warrant reused devices, except for those which have been rebuilt and/or repaired. The Contractor shall warrant all installation labor and materials, however, and shall demonstrate that all reused devices are in operable condition at the time of Engineer's acceptance.

1.10 OWNERSHIP OF PROPRIETARY MATERIAL

- A. All project-developed software and documentation shall become the property of the Owner. These include, but are not limited to:
 - 1. Project graphic images
 - 2. Record drawings
 - 3. Project database
 - 4. Project-specific application programming code
 - 5. All documentation

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All products used in this project installation shall be new, currently under manufacture, and shall be applied in similar installations for a minimum of two years. This installation shall not be used as a test site for any products unless explicitly approved by the Owner's Representative in writing. Spare parts shall be available for a minimum of five years after completion of this project.

2.02 COMMUNICATION

- A. All control products provided for this project shall comprise a BACnet internetwork. Communication involving control components (i.e., all types of controllers and operator interfaces) shall conform to ASHRAE Standard 135-1995, BACnet.
- B. Each BACnet device shall operate on the BACnet Data Link/Physical layer Protocol specified for that device as defined in this section.
- C. All controllers shall have a communication port for connections with the operator interfaces using the BACnet Data Link/Physical layer Protocol.
- D. The Contractor shall provide all communication media, connectors, repeaters, hubs, and routers necessary for the internetwork.
- E. A device on the internetwork shall be provided with a 56K modem that will allow for remote operator interface using the BACnet PTP Data Link/Physical layer Protocol. Remote operator interface via this modem shall allow for communication with any and all controllers on this network as described below.
- F. Communication services over the internetwork shall result in operator interface and value passing that is transparent to the internetwork architecture as follows:
 - 1. Connection of an operator interface device to any one controller on the internetwork will allow the operator to interface with all other controllers as if the interface were directly connected to the other controllers. Data, status information, reports, system software, custom programs, etc., for all controllers shall be available for viewing and editing from any one controller on the internetwork.
 - 2. All database values (e.g., objects, software variables, custom program variables) of any one controller shall be readable by any other controller on the internetwork.

This value passing shall be automatically performed by a controller when a reference to an object name not located in that controller is entered into the controller's database. An operator/installer shall not be required to set up any communication services to perform internetwork value passing.

- G. The time clocks in all controllers shall be automatically synchronized daily via the internetwork. An operator change to the time clock in any controller shall automatically broadcast to all controllers on the internetwork.
- H. The internetwork shall have the following minimum capacity for future expansion:
 - 1. Each Building Controller shall have routing capacity for 50 controllers.
 - 2. The Building Controller network shall have routing capacity for 50 Building Controllers.
 - 3. The system shall have an overall capacity for 12,500 Building Controller, Custom Application Controller, and Application Specific Controller input/output objects.

2.03 OPERATOR INTERFACE (Omitted)

2.04 CONTROLLER SOFTWARE

- A. Furnish the following applications software for building and energy management. All software applications shall reside and operate in the system controllers. Editing of applications shall occur at the operator workstation.
- B. System Security:
 - 1. User access shall be secured using individual security passwords and user names.
 - 2. Passwords shall restrict the user to the objects, applications, and system functions as assigned by the system manager.
 - 3. User Log On/Log Off attempts shall be recorded and archived.
 - 4. The system shall protect itself from unauthorized use by automatically logging off following the last keystroke. The delay time shall be user-definable.
- C. Scheduling: Provide the capability to schedule each object or group of objects in the system. Each schedule shall consist of the following:
 - 1. Weekly Schedule: Provide separate schedules for each day of the week. Each of these schedules should include the capability for start, stop, optimal start, optimal stop, and night economizer. Each schedule may consist of up to 10 events. When a group of objects are scheduled together, provide the capability to adjust the start and stop times for each member.
 - 2. Exception Schedules: Provide the ability for the operator to designate any day of the year as an exception schedule. Exception schedules may be defined up to a

year in advance. Once an exception schedule is executed, it will be discarded and replaced by the standard schedule for that day of the week.

3. Holiday Schedules: Provide the capability for the operator to define up to 99 special or holiday schedules. These schedules may be placed on the scheduling calendar and will be repeated each year. The operator shall be able to define the length of each holiday period.
- D. System Coordination: Provide a standard application for the proper coordination of equipment. This application shall provide the operator with a method of grouping together equipment based on function and location. This group may then be used for scheduling and other applications.
- E. Binary Alarms: Each binary object shall be set to alarm based on the operator-specified state. Provide the capability to automatically and manually disable alarming.
- F. Analog Alarms: Each analog object shall have both high and low alarm limits. Alarming must be able to be automatically and manually disabled.
- G. Alarm Reporting: The operator shall be able to determine the action to be taken in the event of an alarm. Alarms shall be routed to the appropriate workstations based on time and other conditions. An alarm shall be able to start programs, print, be logged in the event log, generate custom messages, and display graphics.
- H. Remote Communication: The system shall have the ability to dial out in the event of an alarm using Point-to-Point (PTP) protocol.
- I. Maintenance Management: The system shall monitor equipment status and generate maintenance messages based upon user-designated run-time, starts, and/or calendar date limits.
- J. Sequencing: Provide application software to properly sequence the start and stop of chillers, and pumps to minimize energy usage in the facility.
- K. PID Control: A PID (proportional-integral-derivative) algorithm with direct or reverse action and anti-windup shall be supplied. The algorithm shall calculate a time-varying analog value that is used to position an output or stage a series of outputs. The controlled variable, set point, and PID gains shall be user-selectable.
- L. Staggered Start: This application shall prevent all controlled equipment from simultaneously restarting after a power outage. The order in which equipment (or groups of equipment) is started, along with the time delay between starts, shall be user-selectable.
- M. Energy Calculations: Provide software to allow instantaneous power (e.g., kW) or flow rates (e.g., L/s [GPM]) to be accumulated and converted to energy usage data. Provide an algorithm that calculates a sliding-window kW demand value.
- N. Anti-Short Cycling: All binary output objects shall be protected from short cycling. This feature shall allow minimum on-time and off-time to be selected.

- O. On/Off Control with Differential: Provide an algorithm that allows a binary output to be cycled based on a controlled variable and set point. The algorithm shall be direct-acting or reverse-acting, and incorporate an adjustable differential.

2.05 BUILDING CONTROLLERS

- A. General: Provide an adequate number of Building Controllers to achieve the performance specified in the Part 1 Article on "System Performance". Each of these panels shall meet the following requirements.
 - 1. The Building Automation System shall be comprised of one or more independent, standalone, microprocessor-based Building Controllers to manage the global strategies described in the System Software section.
 - 2. The Building Controller shall have sufficient memory to support its operating system, database, and programming requirements.
 - 3. Data shall be shared between networked Building Controllers.
 - 4. The operating system of the Building Controller shall manage the input and output communication signals to allow distributed controllers to share real and virtual object information, and allow central monitoring and alarms.
 - 5. Controllers that perform scheduling shall have a real-time clock.
 - 6. The Building Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall:
 - a. Assume a predetermined failure mode.
 - b. Generate an alarm notification.
- B. Communication:
 - 1. The Building Controller shall communicate with other BACnet objects on the internetwork using the Read (Execute and Initiate) and Write (Execute and Initiate) Property services as defined in Clauses 15.5 and 15.8, respectively, of ASHRAE Standard 135-95. Each Building Controller shall reside on a BACnet network using the ISO 8802-3 (Ethernet) Data Link/Physical layer protocol. Each Building Controller also shall perform BACnet routing if connected to a network of Custom Application and Application Specific Controllers.
 - 2. The controller shall provide a service communication port using BACnet Data Link/Physical layer protocol for connection to a hand-held workstation.
- C. Environment: Controller hardware shall be suitable for the anticipated ambient conditions.

1. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at -40°C to 65°C [-40°F to 150°F].
 2. Controllers used in conditioned space shall be mounted in dust-proof enclosures, and shall be rated for operation at 0°C to 50°C [32°F to 120°F].
- D. Keypad: A local keypad and display shall be provided for each controller. The keypad shall be provided for interrogating and editing data. An optional system security password shall be available to prevent unauthorized use of the keypad and display. If the manufacturer does not provide this keypad and display, provide a portable operator terminal.
- E. Serviceability: Provide diagnostic LED's for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips--or to a termination card connected by a ribbon cable.
- F. Memory: The Building Controller shall maintain all BIOS and programming information in the event of a power loss for at least 72 hours.
- G. Immunity to power and noise: Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 1 m [3 ft].

2.06 CUSTOM APPLICATION CONTROLLERS

- A. General: Provide an adequate number of Custom Application Controllers to achieve the performance specified in the Part 1 Article on "System Performance". Each of these panels shall meet the following requirements.
1. Custom Application Controllers shall be provided for Roof Top Units, Mechanical Equipment Rooms, Boiler Plant, Chiller Plant and other applications as shown.
 2. The Custom application Controller shall have sufficient memory to support its operating system, database, and programming requirements.
 3. Data shall be shared between networked Custom Application Controllers.
 4. The operating system of the Controller shall manage the input and output communication signals to allow distributed controllers to share real and virtual object information, and allow central monitoring and alarms.
 5. Controllers that perform scheduling shall have a real-time clock.
 6. The Custom Application Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall:
 - a. Assume a predetermined failure mode.

b. Generate an alarm notification.

B. Communication:

1. The Custom Application Controller shall communicate with other BACnet objects on the internetwork using the Read (Execute and Initiate) and Write (Execute and Initiate) Property services as defined in Clauses 15.5 and 15.8, respectively, of ASHRAE Standard 135-95. Each Custom Application Controller shall reside on a BACnet network using the MS/TP Data Link/Physical layer protocol.
2. The controller shall provide a service communication port using BACnet Data Link/Physical layer protocol for connection to a hand-held workstation.

C. Environment: Controller hardware shall be suitable for the anticipated ambient conditions.

1. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at -40°C to 65°C [-40°F to 150°F].
2. Controllers used in conditioned space shall be mounted in dust-proof enclosures, and shall be rated for operation at 0°C to 50°C [32°F to 120°F].

D. Keypad: A local keypad and display shall be provided. The keypad shall be provided for interrogating and editing data. An optional system security password shall be available to prevent unauthorized use of the keypad and display.

E. Serviceability: Provide diagnostic LED's for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips--or to a termination card connected by a ribbon cable.

F. Memory: The Custom Application Controller shall maintain all BIOS and programming information in the event of a power loss for at least 72 hours.

G. Immunity to power and noise: Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 1m [3 ft].

2.07 APPLICATION SPECIFIC CONTROLLERS

A. General: Application Specific Controllers (ASC's) are microprocessor-based DDC controllers which through hardware or firmware design are dedicated to control a specific piece of equipment. They are not fully user-programmable, but are customized for operation within the confines of the equipment they are designed to serve.

1. Each ASC shall be capable of standalone operation and shall continue to provide control functions without being connected to the network.

2. Each ASC will contain sufficient I/O capacity to control the target system.
3. The use of ASC's shall be limited to terminal equipment such as VAV's, FTU's, FCU's, and D/X systems.

B. Communication:

1. Application Specific Controllers shall communicate with other BACnet objects on the internetwork using the Read (Execute) Property service as defined in Clause 15.5 of ASHRAE Standard 135-95. The controller shall reside on a BACnet network using the MS/TP Data Link/Physical layer protocol. Each network of controllers shall be connected to one Building Controller.
2. Each controller shall have a BACnet Data Link/Physical layer compatible connection for a laptop computer or a portable operator's tool. This connection shall be extended to a space temperature sensor port where shown.

C. Environment: Controller hardware shall be suitable for the anticipated ambient conditions.

1. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at -40°C to 65°C [-40°F to 150°F].
2. Controllers used in conditioned space shall be mounted in dust-proof enclosures, and shall be rated for operation at 0°C to 50°C [32°F to 120°F].

D. Serviceability: Provide diagnostic LED's for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips--or to a termination card connected by a ribbon cable.

E. Memory: The Application Specific Controller shall use non-volatile memory and maintain all BIOS and programming information in the event of a power loss.

F. Immunity to power and noise: Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 1m [3 ft].

G. Transformer: Power supply for the ASC must be rated at minimum of 125% of ASC power consumption, and shall be fused or current limiting type.

2.08 INPUT/OUTPUT INTERFACE

A. Hardwired inputs and outputs may tie into the system through Building, Custom Application, or Application Specific Controllers.

B. All input points and output points shall be protected such that shorting of the point to itself--to another point, or to ground--will cause no damage to the controller. All input

and output points shall be protected from voltage up to 24 V of any duration, such that contact with this voltage will cause no damage to the controller. Inputs and outputs shall be arranged on interchangeable modules or circuit boards to allow the replacement of a damaged module or board without replacing the entire controller.

- C. Binary inputs shall allow the monitoring of On/Off signals from remote devices. The binary inputs shall provide a wetting current of at least 12 mA to be compatible with commonly available control devices, and shall be protected against the effects of contact bounce and noise. Binary inputs shall sense "dry contact" closure without external power (other than that provided by the controller) being applied.
- D. Pulse accumulation input objects: This type of object shall conform to all the requirements of binary input objects, and also accept up to 10 pulses per second for pulse accumulation.
- E. Analog inputs shall allow the monitoring of low-voltage (0 to 10 VDC), current (4 to 20 mA), or resistance signals (thermistor, RTD). Analog inputs shall be compatible with--and field-configurable to--commonly available sensing devices.
- F. Binary outputs shall provide for On/Off operation, or a pulsed low-voltage signal for pulse width modulation control. Binary outputs on Building and Custom Application Controllers shall have three-position (On/Off/Auto) override switches and status lights. Outputs shall be selectable for either normally open or normally closed operation.
- G. Analog outputs shall provide a modulating signal for the control of end devices. Outputs shall provide either a 0 to 10 VDC or a 4 to 20 mA signal as required to provide proper control of the output device. Analog outputs on Building or Custom Application Controllers shall have status lights and a two-position (AUTO/MANUAL) switch and manually adjustable potentiometer for manual override. Analog outputs shall not exhibit a drift of greater than 0.4% of range per year.
- H. Tri-State Outputs: Tri-state outputs (two coordinated binary outputs) for control of three-point floating type electronic actuators without feedback shall not be permitted. Provide proportional control only.
- I. Input/Output points shall be universal type, i.e., controller input or output may be designated (in software) as either a binary or analog type point with appropriate properties. Application Specific Controllers are exempted from this requirement.
- J. System Object Capacity: The system size shall be expandable to at least twice the number of input/output objects required for this project. Additional controllers (along with associated devices and wiring) shall be all that is necessary to achieve this capacity requirement. The operator interfaces installed for this project shall not require any hardware additions or software revisions in order to expand the system.

2.09 POWER SUPPLIES AND LINE FILTERING

- A. Control transformers shall be UL Listed. Furnish Class 2 current-limiting type, or furnish over-current protection in both primary and secondary circuits for Class 2 service per NEC requirements. Limit connected loads to 80% of rated capacity.

1. DC power supply output shall match output current and voltage requirements. Unit shall be full-wave rectifier type with output ripple of 5.0 mV maximum peak-to-peak. Regulation shall be 1.0% line and load combined, with 100 microsecond response time for 50% load changes. Unit shall have built-in over-voltage and over-current protection, and shall be able to withstand a 150% current overload for at least 3 seconds without trip-out or failure.
 - a. Unit shall operate between 0°C and 50°C [32°F and 120°F]. EM/RF shall meet FCC Class B and VDE 0871 for Class B, and MIL-STD 810C for shock and vibration.
 - b. Line voltage units shall be UL Recognized and CSE Approved.

B. Power Line Filtering:

1. Provide transient voltage and surge suppression for all workstations and controllers either internally or as an external component. Surge protection shall have the following at a minimum:
 - a. Dielectric strength of 1,000 volts minimum
 - b. Response time of 10 nanoseconds or less
 - c. Transverse mode noise attenuation of 65 dB or greater
 - d. Common mode noise attenuation of 150 dB or better at 40 Hz to 100 Hz.

2.10 AUXILIARY CONTROL DEVICES

A. Motorized control dampers, unless otherwise specified elsewhere, shall be as follows:

1. Control dampers shall be parallel or opposed blade type as below or as scheduled on drawings.
 - a. Outdoor and/or return air mixing dampers and face and bypass (F&BP) dampers shall be parallel blade, arranged to direct air-streams toward each other.
 - b. Other modulating dampers shall be opposed blade type.
 - c. Two-position shutoff dampers may be parallel or opposed blade type with blade and side seals.
2. Damper frames shall be 13 gauge galvanized steel channel or 1/8" extruded aluminum with reinforced corner bracing.
3. Damper blades shall not exceed 20 cm [8"] in width or 125 cm [48"] in length. Blades are to be suitable for medium velocity performance (10 m/s [2,000 fpm]). Blades shall be not less than 16 gauge.
4. Damper shaft bearings shall be as recommended by manufacturer for application. Oilite or better.

5. All blade edges and top and bottom of the frame shall be provided with replaceable butyl rubber or neoprene seals. Side seals shall be spring-loaded stainless steel. The blade seals shall provide for a maximum leakage rate of 50 L/s-m² [10 cfm per sq. ft.] at 1000 Pa [4" w.c.] differential pressure. Provide air foil blades suitable for a wide-open face velocity of 7.5 m/s [1,500 fpm].
6. Individual damper sections shall not be larger than 125 cm x 150 cm [48;" x 60"]. Provide a minimum of one damper actuator per section.
7. Modulating dampers shall provide a linear flow characteristic where possible.
8. Dampers shall have exposed linkages.

B. Electric damper/valve actuators:

1. The actuator shall have electronic overload or digital rotation sensing circuitry to prevent damage to the actuator throughout the rotation of the actuator.
2. Where shown, for power-failure/safety applications, an internal mechanical, spring-return mechanism shall be built into the actuator housing.
3. All rotary spring-return actuators shall be capable of both clockwise or counter-clockwise spring-return operation. Linear actuators shall spring-return to the retracted position.
4. Proportional actuators shall accept a 0 to 10 VDC or 0 to 20 MA control signal and provide a 2 to 10 VDC or 4 to 20 mA operating range.
5. All 24 VAC/VDC actuators shall operate on Class 2 wiring and shall not require more than 10 VA for AC or more than 8 W for DC applications. Actuators operating on 120 VAC or 230 VAC shall not require more than 11 VA.
6. All non-spring-return actuators shall have an external manual gear release to allow manual positioning of the damper when the actuator is not powered. Spring-return actuators with more than 7 N-m [60 in-lb] torque capacity shall have a manual crank for this purpose.
7. All modulating actuators shall have an external, built-in switch to allow the reversing of direction of rotation.
8. Actuators shall be provided with a raceway fitting and a minimum 1m electrical cable and shall be pre-wired to eliminate the necessary of opening the actuator housing to make electrical connections.
9. Actuators shall be UL Standard 873 Listed and CSA Class 4813 02 Certified as meeting correct safety requirements and recognized industry standards.
10. Actuators shall be designed for a minimum of 60,000 full-stroke cycles at the actuator's rated torque.

C. Control Valves:

1. Control valves shall be two-way or three-way type for two-position or modulating service as shown.
2. Close-off (differential) Pressure Rating: Valve actuator and trim shall be furnished to provide the following minimum close-off pressure ratings:
 - a. Water Valves:
 - (1) Two-way: 150% of total system (pump) head.
 - (2) Three-way: 300% of pressure differential between ports A and B at design flow or 100% of total system (pump) head.
3. Water Valves:
 - a. Body and trim style and materials shall be per manufacturer's recommendations for design conditions and service shown, with equal percentage ports for modulating service.
 - b. Sizing Criteria:
 - (1) Two-position service: Line size.
 - (2) Two-way modulating service: Pressure drop shall be equal to twice the pressure drop through heat exchanger (load), 50% of the pressure difference between supply and return mains, or 5 psi, whichever is greater.
 - (3) Three-way modulating service: Pressure drop equal to twice the pressure drop through the coil exchanger (load), 35 kPa [5 psi] maximum.
 - (4) Valves 1/2" through 2" shall be bronze body or cast brass ANSI Class 250, spring-loaded, Teflon packing, quick opening for two-position service. Two-way valves to have replaceable composition disc, or stainless steel ball.
 - (5) 2-1/2" valves and larger shall be cast iron ANSI Class 125 with guided plug and Teflon packing.

D. Binary Temperature Devices:

1. Low-voltage space thermostat shall be 24 V, bimetal-operated, mercury-switch type, with either adjustable or fixed anticipation heater, concealed setpoint adjustment, 13°C to 30°C [55°F to 85°F] setpoint range, 1°C [2°F] maximum differential, and vented ABS plastic cover.

2. Line-voltage space thermostat shall be bi-metal-actuated, open contact or bellows-actuated, enclosed, snap-switch type, or equivalent solid-state type, with heat anticipator, UL listed for electrical rating, concealed setpoint adjustment, 13°C to 30°C [55°F to 85°F] setpoint range, 1°C [2°F] maximum differential, and vented ABS plastic cover.
3. Low-limit thermostats: Low-limit thermostats shall be vapor pressure type with an element 6 m [20 ft] minimum length. Element shall respond to the lowest temperature sensed by any 30 cm [1 ft] section. The low-limit thermostat shall be manual reset only.

E. Temperature sensors:

1. Temperature sensors for liquid sensing shall be Resistance Temperature Device (RTD). The RTD shall be encapsulated in epoxy, series 300 stainless steel, or a copper sheath. The RTD's shall be provided in either probe mounting, averaging element, or for mounting in a separable well for liquid sensing applications.
2. Temperature sensors for air sensing may be RTD or thermistor type.
3. Duct sensors shall be rigid or averaging as shown. Provide averaging sensors within air handling units. Averaging sensors shall have a minimum length of 1 foot per 2 square feet of face area.
4. Immersion sensors shall be provided with a separable stainless steel well. Pressure rating of well is to be consistent with the system pressure in which it is to be installed.
5. Space sensors shall be equipped with set point adjustment, override switch, display, and/or communication port as shown.
6. Provide matched temperature sensors for differential temperature, BTU, etc. measurement.

F. Humidity sensors:

1. Sensors shall have a sensing range of 0% to 100 with an accuracy of plus or minus 3 percent NIST traceable.
2. Duct sensors shall be provided with a sampling chamber.
3. Outdoor air humidity sensors shall have a sensing range of 0% to 100% RH. They shall be suitable for ambient conditions of -40°C to 75°C [-40°F to 170°F].
4. Humidity sensor's drift shall not exceed 1% of full scale per year.

G. Flow switches:

1. Flow-proving switches shall be either paddle or differential pressure type, as shown.

2. Paddle type switches (water service only) shall be UL Listed, water-tight, SPDT snap-acting with pilot duty rating (125 VA minimum). Adjustable sensitivity with NEMA 4X enclosure unless otherwise specified. McDonnell & Miller No. FS8-W.
3. Differential pressure type switches (air or water service) shall be UL Listed, SPDT snap-acting, pilot duty rated (125 VA minimum), NEMA 1 enclosure, with scale range and differential suitable for intended application, or as specified.

H. Relays:

1. Control Relays: Control relay contacts shall be rated for the application, with a minimum of two sets of Form C contacts, enclosed in a dustproof enclosure. Relays shall have silver alloy contact material. Relay operation shall be in 20 milliseconds or less, with release time of 10 milliseconds or less. Relays shall be equipped with coil transient suppression (limiting transients to non-damaging levels). All control relays shall be of the plug in style with a separate base. All wiring shall be terminated to the base and not the relay itself.
2. Time delay relays shall be UL Listed solid-state plug-in type with adjustable time delay. Delay shall be adjustable $\pm 200\%$ (minimum) from set point shown on plans. Contact rating, configuration, and coil voltage suitable for application. Provide NEMA 1 enclosure when not installed in local control panel.

I. Override timers:

1. Override timers shall be spring-wound line voltage UL Listed, contact rating and configuration as required by application. Provide 0-to-6-hour calibrated dial unless otherwise specified; suitable for flush mounting on control panel face, located on local control panels or where shown.

J. Current transmitters:

1. AC current transmitters shall be self-powered combination split-core current transformer type with built-in rectifier and high-gain servo amplifier with 4 to 20 mA two-wire output. Unit ranges shall be 10 A, 20 A, 50 A, 100 A, 150 A, and 200 A full scale, internal zero and span adjustment, and $\pm 1\%$ full scale accuracy at 500 ohm maximum burden.
2. Transmitter shall meet or exceed ANSI/ISA S50.1 requirements and shall be UL/CSA Recognized.
3. Unit shall be split-core type for clamp-on installation on existing wiring.

K. Current transformers:

1. AC current transformers shall be UL/CSA Recognized and completely encased (except for terminals) in approved plastic material.

2. Transformers shall be available in various current ratios and shall be selected for $\pm 1\%$ accuracy at 5 A full scale output.
3. Transformers shall be fixed-core or split-core type for installation on new or existing wiring, respectively.

L. Voltage transmitters:

1. AC voltage transmitters shall be self-powered single loop (two-wire) type, 4 to 20 mA output with zero and span adjustment.
2. Ranges shall include 100 to 130 VAC, 200 to 250 VAC, 250 to 330 VAC, and 400 to 600 VAC full-scale, adjustable, with $\pm 1\%$ full-scale accuracy with 500 ohm maximum burden.
3. Transmitters shall be UL/CSA Recognized at 600 VAC rating and meet or exceed ANSI/ISA S50.1 requirements.

M. Voltage transformers:

1. AC voltage transformers shall be UL/CSA Recognized, 600 VAC rated, complete with built-in fuse protection.
2. Transformers shall be suitable for ambient temperatures of 4 to 55°C [40 to 130°F] and shall provide $\pm 0.5\%$ accuracy at 24 VAC and a 5 VA load.
3. Windings (except for terminals) shall be completely enclosed with metal or plastic material.

N. Current switches:

1. Current-operated switches shall be self-powered, solid state with adjustable trip current. The switches shall be selected to match the current of the application and output requirements of the BCS system.

O. Pressure Transducers:

1. Transducers shall have a linear output signal. Zero and span shall be field adjustable.
2. Transducer sensing elements shall withstand continuous operating conditions of positive or negative pressure 50 percent greater than calibrated span without damage.
3. Water pressure transducers shall have stainless steel diaphragm construction, proof pressure of 150-psi minimum. Transducer shall be complete with 4 to 20 mA output, required mounting brackets, and block and bleed valves.
4. Water differential pressure transducers shall have stainless steel diaphragm construction, proof pressure of 150-psi minimum. Over range limit (differential

pressure) and maximum static pressure shall be 300 psi. Transducer shall be complete with 4 to 20 mA output, required mounting brackets, and five-valve manifold.

- P. Pressure Switches: Pressure switches shall have a repetitive accuracy of plus or minus one percent of their operating range and shall withstand up to 150 percent of rated pressure. Sensors shall be diaphragm or bourdon tube. Switch operation shall have a snap-acting form C contact rated for the application. Switch contacts shall be self wiping contacts of platinum alloy, silver alloy, or gold plated, and shall have an adjustable differential setting.

2.11 WIRING AND RACEWAYS

- A. General: Provide copper wiring, plenum cable, and raceways as specified in the applicable sections of Division 1600, and installed per electrical standards.

2.12 FIBER OPTIC CABLE SYSTEM

- A. Optical Cable: Optical cables shall be duplex 900-mm tight-buffer construction designed for Intra-building environments. The sheath shall be UL listed OFNP in accordance with NEC article 770. The optical Fiber shall meet the requirements of FDDI, ANSI X3T9.5 PMD for 62.5/125mm.
- B. Connectors: All optical fibers shall be field terminated with ST type connectors. Connectors shall have ceramic ferrules and metal bayonet latching bodies.

2.13 TRANSIENT PROTECTION

- A. Transient Protection Devices: Transient protection devices shall be provided as required for communications trunks to protect the DDC system circuitry from induced voltage transients and other dangerous voltages to non-damage levels.

2.14 SURGE SUPPRESSION

- A. Surge Suppression Equipment: Provide surge suppression devices and equipment to protect all electronic equipment by line voltage from induced voltage transients from natural disturbances. The surge suppression devices shall use metal oxide varistor (MOV) technology and solid state voltage clamping to limit line-to-ground and line-to-line voltages. Surge suppression equipment shall be in compliance with the requirements of Division 16000.

PART 3 - EXECUTION

3.01 GENERAL

- A. Coordination: Coordinate the work of this section with the work of all applicable sections of Divisions 15 and 16, and all other applicable Divisions.

- B. Installation: Install all materials and products furnished in this section in a workmanlike manner with skilled mechanics and electricians regularly employed in the installation of DDC commercial automatic temperature control systems.

3.02 ELECTRIC WIRING

- A. General: Provide all electrical work required as integral part of the BCS system. Install a complete wiring system including wire, plenum rated cable, conduit and other electrical equipment as required for a complete operating system.
- B. Material: Provide all conduit, wire, junction boxes and other electrical equipment as required for a complete operating control system.
- C. Compliance: All electrical materials and equipment shall comply with the requirements of Section 16000, Electrical.
- D. Any cables run exposed in return air plenums shall be smoke and fire rated for the application. Cables shall not be run in walls without conduit.
- E. Cables shall be properly identified and tagged as to the control point. Use permanent non-smearable markers on permanent strap-on type cable labels.
- F. No splices will be allowed except at control panels and controllers.
- G. No two wires of the same color shall be run in one conduit unless wires of the same color are properly tagged at both ends and any splice points. Do not change colors at splice points.
- H. All control and instrument wiring shall be properly secured to building structure - not to ductwork, hangers, supports, etc. Use of peel-off pre-adhesived type of hangers are not acceptable.
- I. The control system shall be protected against the occurrence of electrical noise on the building power systems and such that the DDC system performance will not be degraded by the incidence of electrical noise, both spurious and harmonics, being present on the building power systems where such electrical noise may be reasonably expected in the operating building environment.
- J. All equipment provided shall continue to operate normally when hand-held radio transmitters are keyed and operated in their immediate vicinity.
- K. Electrical control and power wiring required for the BCS equipment, damper and valve actuators, terminal box controllers, and control panels not specifically identified in Division 16000 as electrical work or shown on the electrical drawings, is work of this section.
- L. If additional circuits need to be designated for this equipment, the BCS contractor shall be responsible for including the cost to add these circuits.

- M. Conceal all wiring except in mechanical rooms and areas where conduit and piping are exposed.
- N. Cables shall be properly identified and tagged as to the control point. Use permanent non-smearable markers on permanent strap-on type cable labels.
- O. Provide over-current protection for all control and interlock wiring as specified in NFPA (70.1971) Art. 240-5 (a). Exception #4 and Art. 430-72, Exception.
- P. Testing: Provide testing as required to show that the control system is operating as specified.

3.04 CALIBRATION AND ADJUSTMENT

- A. Checkout: Provide calibration and adjustment of the entire control system set points and sensitivities after the installation is complete. Place the control system in final operating condition subject to Owner approval.
- B. Testing: Provide testing as required to show that the control system is operating as specified.

3.05 IDENTIFICATION OF HARDWARE AND WIRING

- A. All wiring and cabling, including that within factory-fabricated panels, shall be labeled at each end within 5 cm (2") of termination with the DDC address or termination number.
- B. All pneumatic tubing shall be labeled at each end within 5 cm (2") of termination with a descriptive identifier.
- C. Permanently label or code each point of field terminal strips to show the instrument or item served.
- D. Identify control panels with minimum 1 cm (1/2") letters on laminated plastic nameplates.
- E. Identify all other control components with permanent labels. All plug-in components shall be labeled such that removal of the component does not remove the label.
- F. Identify room sensors relating to terminal box or valves with nameplates.
- G. Manufacturers' nameplates and UL or CSA labels to be visible and legible after equipment is installed.
- H. Identifiers shall match record documents.

3.06 CONTROLLERS

- A. Provide a separate controller for each AHU or other HVAC system. A DDC controller may control more than one system provided that all points associated with the system are assigned to the same DDC controller. Points used for control loop reset such as outside air or space temperature are exempt from this requirement.

3.07 PROGRAMMING

- A. Provide sufficient internal memory for the specified sequences of operation and trend logging. There shall be a minimum of 25% of available memory free for future use.
- B. Point Naming: System point names shall be modular in design, allowing easy operator interface without the use of a written point index. Use the following naming convention:
 - 1. AA, BBB, CC, DD, E where:
 - a. AA is used to designate the location of the point within the building such as mechanical room, wing, or level, or the building itself in a multi-building environment.
 - b. BBB is used to designate the mechanical system with which the point is associated (e.g., A01, HTG, CLG, LTG).
 - c. CC represents the equipment or material referenced (e.g., SF for supply fan, RW for return water, EA for exhaust air, ZN for zone).
 - d. D or DD may be used for clarification or for identification if more than one of CC exists (e.g., SF10, ZNB).
 - e. E represents the action or state of equipment or medium (e.g., T for temperature, H for humidity, C for control, S for status, D for damper control, I for current).
- C. Software Programming:
 - 1. Provide programming for the system and adhere to the sequences of operation provided. The Contractor also shall provide all other system programming necessary for the operation of the system, but not specified in this document. Imbed into the control program sufficient comment statements to clearly describe each section of the program. The comment statements shall reflect the language used in the sequences of operation. Use the appropriate technique based on the following programming types:
 - a. Text-based:
 - (1) Must provide actions for all possible situations
 - (2) Must be modular and structured
 - (3) Must be commented
 - b. Graphic-based:
 - (1) Must provide actions for all possible situations
 - (2) Must be documented

c. Parameter-based:

- (1) Must provide actions for all possible situations
- (2) Must be documented

D. Operator Interface:

1. Standard Graphics: Provide graphics for all mechanical systems and floor plans of the building. This includes each chilled water system, hot water system, chiller, boiler, air handler, and all terminal equipment. Point information on the graphic displays shall dynamically update. Show on each graphic all input and output points for the system. Also show relevant calculated points such as set points.
2. Show terminal equipment information on a "graphic" summary table. Provide dynamic information for each point shown.
3. The Contractor shall provide all the labor necessary to install, initialize, start up, and troubleshoot all operator interface software and their functions as described in this section. This includes any operating system software, the operator interface database, and any third-party software installation and integration required for successful operation of the operator interface.

3.09 TESTING, CALIBRATION, AND ACCEPTANCE

- A. After the inspection has been completed, systems shall be checked for continuity.
- B. After completion of the installation, control equipment shall be tested and adjusted in terms of design, function, systems balance, alarms, and performance, and shall otherwise be made ready for systems acceptance tests. Data showing set points and final adjustments of controls shall be provided.
- C. After air handling system acceptance and after the systems have operated in normal service for 2 weeks, the adjustment on instruments and devices shall be checked. Items found to be out of order shall be corrected. When air-handling systems are in specified operating condition and when all other pertinent specification requirements have been met, automatic temperature-control systems will be accepted.
- D. Equipment to check the calibration of instruments shall be provided by the Contractor. Instruments not in calibration shall be recalibrated or replaced.
- E. System Start-up and Check-out:
 1. The manufacturer shall provide a control technician for the start-up, checkout of all input and outputs, implement and check the software function and submit report on check-out of each system.
 2. Demonstrate to the Owner that all functions are operating as per final approved sequences.

F. System Acceptance & Trend Log Submittal:

1. Historical Trending:
 - a. Software shall provide historical trend information for operator-selected points. Operator shall be able to assign any system point, analog or binary, real or calculated, to trend group. Trend groups shall consist of single point or multiple point groups. Trended values shall be retained in system storage. Operator shall be able to request retrieval of trended values from storage and printing at time.
 - b. After completion of the installation, check-out and control loop tuning, trend logs, shall be enabled and upon completion submitted, as listed below, to demonstrate the satisfactory performance of the system and to serve as a database for the owner's future use.
 - c. The trend logs shall be organized in spreadsheet format and presented in both tabular and graphical form. A disc copy of each final accepted trend log set shall also be provided. Trend logs shall be as follows:
2. Control Stability Trend Logs:
 - a. Each digital or analog output to valves, dampers, adjustable frequency drives and other control devices shall be included.
 - b. Scan time shall be at five-second intervals for a duration of ten minutes.
 - c. Start of the sets shall be immediately after change from one mode to another, i.e., unoccupied to occupied, no economizer to economizer, off to on, etc. Only one log will be required for each output as long as it addresses all controlled elements.
3. System Operation Trend Logs:
 - a. Each measured value (temperature, pressure, amps, etc.), equipment status (on-off, percent speed or position, etc.), each mode (unoccupied, cool-down, occupied, etc.), each setpoint and each alarm shall be included.
 - b. Scan time shall be at one - minute intervals with a duration of 24 hours.
 - c. Sets shall be included for cooling only, cooling plus economizer and heating only. Where start up occurs at a defined season and both heating and cooling cannot be logged, then the system will be accepted subject to a final demonstration of the other season, when weather permits.
4. Load Profile Trend Log Sets:
 - a. The total AHU load in tons shall be calculated using airflow and temperature difference between supply and return air.

- b. Tonnage shall be calculated by averaging six instantaneous readings per hour taken at ten - minute intervals. Tonnage for each of the 24 hours shall be listed.
5. Energy Use Trend Log Sets:
- a. Energy use of each fan shall be calculated using measured amps and a look-up table provided by the motor manufacturer to convert to kW.
 - b. The sum of all HVAC power use shall be totaled and listed.
 - c. Outdoor air wet-bulb shall be listed.
 - d. Data shall be presented for each of the 24 hours each day.
 - e. Energy use shall be presented in bar graph form.
6. Life Safety Trend Logs:
- a. A separate set of trend logs shall be developed for each life safety/smoke control system/zone. These shall be in the "change of value" format when going from "normal operation" to "emergency operation" and shall show the condition of each input device, fan and damper. Where airflow is measured, as in an engineered smoke control system, the airflow in each possible smoke condition shall be included.
7. Custom Trend Log Sets:
- a. The operator shall have the ability to customize all trend logs by adjusting both sampling time and duration.
 - b. After the initial graph data is accepted, the printout shall be changed from a fixed interval to a change of value.

3.10 FINAL ON-SITE TESTING

- A. Provide Owner's Representative approved operation and acceptance testing of the complete system. The Owner's Representative will witness all tests.
- B. Field Test: When installation of the system is complete, calibrate equipment and verify transmission media operation before the system is placed on-line. All testing, calibrating, adjusting and final field tests shall be completed by the installer. Provide a detailed cross-check of each sensor with the system by making a comparison between the reading at the sensor and a standard traceable to the National Bureau of Standards. Provide a cross-check of each control point within the system by making a comparison between the control command and the field-controlled device. Verify that all systems are operable from local controls in the specified failure mode upon panel failure or loss of power. Submit the results of functional and diagnostic tests and calibrations to the Owner's Representative for final system acceptance.

C. Compliance Inspection Checklist: Submit in the form requested, the following items of information to the Owner's Representative for verification of compliance to the project specifications. Failure to comply with the specified information shall constitute non-performance of the contract. The contractor shall submit written justification for each item in the checklist that he is unable to comply with. The Owner's Representative will initial and date the checklist to signify contractor's compliance before acceptance of system.

1. Verify to Owner's Representative in letterform that supplier has in-place support facility. Letter shall show location of support facility, name and titles of technical staff, engineers, supervisors, fitters, electricians, managers and all other personnel responsible for the completion of the work on this project.

User_____Date_____A/E_____Date_____

2. Submit in data sheet form or official government approval from compliance to F.C.C. Regulation, Part 15, Section 15.

User_____Date_____A/E_____Date_____

3. Manually generate an alarm at a remote DDC Controller as selected by the Owner's Representative to demonstrate the capability of the workstation and alarm printer to receive alarms within 5 seconds.

User_____Date_____A/E_____Date_____

4. Disconnect an operator workstation in the central control room and manually generate an alarm at a remote DDC Controller to demonstrate the capability of the system printer to receive alarms when the workstation is disconnected from the system.

User_____Date_____A/E_____Date_____

5. Disconnect one DDC Controller from the network to demonstrate that a single device failure shall not disrupt or halt peer-to-peer communication. Panel to be disconnected shall be selected by the Owner's Representative.

User_____Date_____A/E_____Date_____

6. At a DDC Controller of the Owner's Representative choice, display on the portable operator's terminal:

- a. At least one temperature setpoint and at least one status condition, i.e., on or off for a system or piece of equipment attached to that panel as well as for points at another DDC Controller on the network.

- b. The diagnostic results as specified for a system or piece of equipment attached to that panel as well as for a system or piece of equipment attached to another DDC Controller.

- c. The ability to add a new point to the DDC Controller with the Portable Operators Terminal and have it automatically uploaded to the workstation to modify that panel's stored database.

User _____ Date _____ A/E _____ Date _____

- 7. At an FOI of the Owner's Representative choice, disconnect the LAN connection to demonstrate its lack of reliance on a DDC Controller to maintain full control functionality.

User _____ Date _____ A/E _____ Date _____

- 8. The contractor shall demonstrate the following all DDC Controllers that control Package Air Handlers and Chilled Water Pumping Stations.

- a. Program locally at least 4 points in each DDC Controller.
- b. Program locally at least 4 points in each ASC Controller serving the Air Handling Units and the Pumping Stations.
- c. Obtain a localized trend report at each DDC Controller as required by Items a. and b. above.
- d. Obtain a trend report for the points trended at each DDC Controller as required by item a. and b. above. The report shall be produced at the host workstation in the facility.
- e. Obtain a trend report for the points trended at each DDC Controller as required by Item a. and b. above. The report shall be produced at the main maintenance facility on the property.

User _____ Date _____ A/E _____ Date _____

- 9. The contractor demonstrates that each Smoke Control Zone operates properly, and that the activation of one subsequent zone operates automatically without operator intervention.

- a. Obtain a report for each smoke zone indicating the proper operation of each piece of equipment, and that the operation reverts from one Override control panel to the other as described.

3.11 OPERATOR TRAINING

- A. Provide a training course schedule, syllabus, and training materials 45 days prior to the start of training. Furnish a qualified instructor to conduct training courses for designated personnel in the maintenance and operation of the HVAC and DDC system. Orient training to the specific system being installed under this contract. Use operation and maintenance manual as the primary instructional aid in contractor provided activity

personnel training. Base training on the Operations and Maintenance manuals and a DDC training manual. Manuals shall be delivered for each trainee with two additional sets delivered for archiving at the project site. Training manuals shall include agenda, defined objectives and a detailed description of the subject matter for each lesson. Furnish audio-visual equipment (for training classes) and all other training materials and supplies. Training course shall include a minimum of (2) two, 8-hour sessions with an additional (1) one 8-hour follow up session to be scheduled 7 months after Owner turnover.

- B. All training and material shall include the following items, in addition to these items all of the items covered in SP-72 shall also be satisfied.
- C. The training course provided shall include but not be limited to:
 - 1. Theory of operation.
 - 2. Hardware architecture.
 - 3. Operation of the system.
 - 4. Operator commands.
 - 5. Control sequence programming.
 - 6. Data base entry.
 - 7. Reports and logs.
 - 8. Alarm reports.
 - 9. Troubleshooting and Diagnostics
 - 10. Repair instructions.
 - 11. Calibration procedures.
 - 12. Preventive maintenance.

3.12 CLEANING

- A. The Contractor shall clean up all debris resulting from its activities daily. The Contractor shall remove all cartons, containers, crates, etc., under its control as soon as their contents have been removed. Waste shall be collected and placed in a designated location.
- B. At the completion of work in any area, the Contractor shall clean all of its work, equipment, etc., keeping it free from dust, dirt, and debris, etc.

END OF SECTION

**STANDARDIZATION
CERTIFICATE OF CONDITIONS AND CIRCUMSTANCES**

The purpose of this form is to certify the conditions and circumstances to standardize on a particular manufacturer of equipment.

Item or Services Required:

HVAC Energy Management System/Building Automation System

Name of Manufacturer:

KMC/Automated Building Controls Systems, Inc.

Conditions and special circumstances for the standardization. Please be specific:

KMC energy management control systems have been installed in various City facilities to control, operate and monitor equipment and systems that historically require large quantities of non renewable energy resources. The equipment and systems controlled by energy management system include but are not limited to HVAC, boilers, pumps and lighting. KMC energy management systems are currently installed and in use at TMOB, T.P.D. Headquarters, OCH, T.F.R. Headquarters, CMOB, Solid Waste Administration, MLK Gym, Cyrus Green Community Center, Wayne Papy Community Center, Port Tampa Community Center, Fire Station 12, Seminole Gardens Center and Spring Hill Community Center. It is in the City's best interest to continue using KMC/Automated Building Controls, Inc at other facilities. The benefits include but are not limited to able to purchase equipment, material, installation, programming and commissioning at dealer level pricing, networking all facilities into a fully integrated seamless user environment which can not be accomplished if a 3rd party Energy Management System is used, prevent additional costs for 3rd party software licensing and maintenance requirements, provide more efficient progressive KMC factory training for City service personnel, KMC factory training at Automated Building Controls, Inc. local facilities located within 2 miles of Facility Management office, reduce duplication of parts required to support system, reduce City parts inventory utilizing local KMC authorized agents parts inventory.



Requesting Department Director's Signature

6/23/11

Date of Request

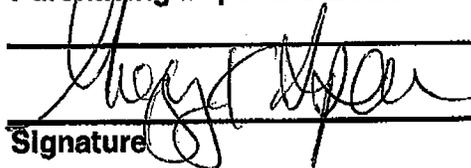
RQBS11500111

Ivette Rosario

Requisition Number

Buyer Name

Purchasing Department Action:



Signature

7-19-2011

Date

SECTION 15990

PERFORMANCE VERIFICATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Basic Requirements: Provisions of Section 15010, BASIC MECHANICAL REQUIREMENTS, and Section 15030, ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT, are a part of this Section.

1.02 SUMMARY

- A. Scope: Verify the performance of the systems of Division 15 by testing and balancing procedures described in this section.
- B. General: The existence of a test and balance agency (herein referred to as the T&B Agency) shall not relieve responsibility for the complete operation of the mechanical systems as indicated.
- C. Definition of Terms:
 - 1. "Contractor" shall refer to the General Contractor.
 - 2. "Owner" shall refer to City of Tampa or their designated representative.

1.03 ADDITIONAL REQUIREMENTS

- A. Related Sections: Other Sections of Division 15 which relate to the requirements of this Section may include but are not limited to the following:
 - 1. 15050, BASIC MECHANICAL MATERIALS AND METHODS
 - 2. 15950, BUILDING CONTROL SYSTEM
- B. Related Divisions: Other Divisions of these specifications which relate to the requirements of this Section may include but are not limited to the following:
 - 1. Division 1, ALTERNATE
 - 2. Division 16, ELECTRICAL

1.04 APPLICABLE STANDARDS

- A. General: All equipment, material, accessories, methods of construction and reinforcement, finish quality, workmanship and installation shall comply with the paragraph entitled "Code Compliance" in Section 15010.

1.05 TEST AND BALANCE AGENCY

- A. General: Performance verification shall be performed by an independent T&B Agency.

- B. Certification: The T&B Agency shall be a certified member of the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB).
- C. References: The T&B Agency shall have been in business continuously for the previous 3 years and shall specialize in and be limited to testing and balancing HVAC systems. The T&B Agency shall submit references of five previously successfully completed projects of similar size, type, scope, and complexity.
- D. Supervision: Field work shall be performed under the direct supervision of a full-time employee of the T&B Agency. The final test reports shall be certified and sealed by the supervisor and signed by the employees performing the work.
- E. Approval: The T&B Agency shall not be affiliated with the construction contractors, equipment manufacturers, sales vendors, or design engineering firms. The T&B Agency shall be acceptable to the Engineer and shall not be replaced without the written consent of the Engineer. The T&B Agency shall report to the Engineer in writing anytime the scheduled services cannot be performed as scheduled or as required.
- F. Reporting: The T&B Agency shall function as an authorized inspection agency responsible to the Engineer and the Owner, and shall list all items which are installed incorrectly, require correction or completion, or which have not been installed in accordance with the contract documents. Prior to beginning system balancing, submit to the Engineer for review written procedures to be followed for the testing and balancing work.

1.06 AGENCY APPROVAL

- A. Name and Qualifications: Submit the name and qualifications of the proposed T&B Agency to the Engineer for acceptance within thirty (30) days of Notice to Proceed. If the proposed agency is not submitted within the stated time the Engineer shall select the T&B Agency and deduct the cost of their services from the Contract Amount.

1.07 INSTRUMENTATION

- A. General: All test and balance equipment and instruments shall be furnished by the T&B Agency and shall have been calibrated to the tolerances required in balancing standards within six (6) months of use on this work. A list of equipment and instruments shall be submitted to the Engineer prior to commencing test and balancing operations and shall include manufacturer, serial number and certification of last calibration date and method of calibration including test references. Instruments without calibration adjustment capability shall be accompanied with manufacturer's certification of accuracy. Instruments shall have maximum field measuring accuracy, shall be applied as recommended by the manufacturer, and shall have minimum scale and maximum subdivisions with ranges for the values being measured.

1.08 WORK INCLUDED

- A. General: The T&B Agency shall provide all labor, supervision, professional services, tools, test equipment and instruments (except as otherwise indicated) to perform work of this section; including but not limited to:

1. Review the automatic temperature control and air terminal unit specifications for their effects on the testing and balancing procedures for the air and hydronic systems.
2. Where conditions may exist in the system design or construction which may adversely affect system performance, identify the conditions and submit recommended corrections in writing for consideration by the Engineer.
3. During construction, review shop drawings relevant to performance verification to confirm that the required piping, ductwork and equipment, and their respective specialties and accessories such as gauges, valves, dampers, access doors, etc., are properly selected, sized and located to permit proper and complete testing and balancing.
4. Perform a minimum of 80 hours of site inspections at a maximum of 8 hours per visit during construction and prior to the scheduled start of the test and balance work to become familiar with the project, equipment locations, and to verify compliance with documents. After each inspection submit a written report to the Engineer indicating the area covered and the results of the inspection.
5. Submit the Equipment Test and Systems Balance Report for review and acceptance.
6. Furnish specifications for properly-sized fixed sheaves and belts on fan systems after proper RPM has been established.
7. Test for sound and vibration levels.
8. Test and report pressure differentials between the sampling and return ports of all duct smoke detectors.

1.09 GUARANTY

- A. General: The T&B Agency shall include a warranty period of ninety (90) days after acceptance of test and balance work. During the warranty period, the Engineer may request a re-check or re-setting of any system component requiring testing and balancing. The T&B Agency shall provide technicians, instruments, and tools to assist the Engineer in conducting any test required. a guarantee, such as the AABC National Project Certification Performance Guarantee, shall also be provided.

PART 2 - PRODUCTS

2.01 REPORT

- A. Records: Recorded test data shall be at the final balanced condition for each system, and shall be arranged by system using the appropriate designation as established on the Contract Documents. 6 copies of the typewritten, signed, bound and indexed final report shall be submitted to the Engineer for review prior to request for substantial completion inspection. The substantial completion inspection shall not be scheduled until the final report has been received and is acceptable to the Engineer. Report format shall be similar to forms approved for use by SMACNA or AABC.

- B. Measurements: Where actual measurements recorded for the final balance show deviations of more than 10 percent from the design, the T&B Agency shall note same in the report and submit recommendations for corrective action to the Engineer.
- C. Deficiency: Where recorded data can be reasonably interpreted to be inaccurate, inconsistent or erroneous, the Engineer may request additional testing and balancing. The T&B Agency shall perform re-testing and re-balancing at no additional cost.
- D. Vibration: Where, in the opinion of the T&B Agency, there is excessive vibration, movement or noise from any piece of equipment, ductwork, pipes, etc., the T&B Agency shall note same in the report and submit recommendations for corrective action to the Engineer.
- E. Controls: The T&B Agency shall verify that each controller and the devices it controls, such as control valves, motorized dampers, VAV boxes, etc., operates in the exact sequence required.
- F. Test Data: Include the following data in the Systems Test and Balance Report for all items included in the project:
 - 1. Motors:
 - a. Manufacturer
 - b. Model and serial number
 - c. Rated amperage and voltage
 - d. Rated horsepower
 - e. Rated RPM
 - f. Measured amperage and voltage
 - g. Calculated brake-horsepower
 - h. Measured RPM
 - i. Sheave size, type and manufacturer
 - j. Bearing model numbers
 - 2. Fans:
 - a. Manufacturer
 - b. Model or Serial number, type of fan, number of blades, wheel diameter
 - c. Rated CFM, measured CFM
 - d. Rated RPM, measured RPM
 - e. Design inlet and outlet total and external static pressures
 - f. Actual inlet and outlet total and external static pressures
 - g. Pulley sizes, types and manufacturers
 - h. Belt size and quantity (V-belt drive only)
 - i. Bearing model numbers
 - j. Inlet vane position
 - k. Shaft diameter
 - 3. Pumps:
 - a. Manufacturer
 - b. Model or Serial number, impeller size
 - c. Rated RPM, measured RPM

- d. Rated head, measured head
- e. Measured discharge pressure
- f. Measured suction pressure
- g. Rated and measured GPM
- h. Bearing serial number

4. Air Handling Units and Fan Coil Units:

- a. Design and measured air flow and water flow rates
- b. Design and measured airside static pressure drops across each component, filter bank, each coil and across the entire unit.
- c. Design and measured water inlet and outlet temperatures for each coil, and waterside pressure drops
- d. Design and measured steam inlet pressure and consumption
- e. Design and measured airside cooling coil entering and leaving dry and wet bulb temperatures
- f. Design and measured airside heating coil entering and leaving dry bulb temperatures

G. Other Report Requirements: Where systems have equipment or components which are not covered by the above, the Final Test and Balance Report shall include the following design and measured data as applicable:

- 1. All duct inlet and outlet areas.
- 2. All applicable duct, pipe and coil sizes.
- 3. Outside, return, mixed and supply air conditions.
- 4. All fluid velocities, flow rates, temperatures and pressure differentials at appropriate locations.
- 5. All speeds.
- 6. All voltage and ampere ranges.

2.02 DIAGRAMS

A. General: Provide a schematic diagram (i.e., one-line) of duct systems tested. Indicate on the diagram the relative location of all air distribution devices, VAV boxes, heating/cooling coils, points of data measurements (i.e., pitot traverse, temperature, static pressure) fans, air handling units, and similar equipment included in the system which cause a pressure drop, such as filter banks, air flow monitors, sound attenuators, etc. Diagrams shall identify each component tested utilizing the conventions shown on the drawings (i.e., AHU-1 or SF-6) and correlate with the data sheets provided in the Test and Balance Report.

PART 3 - EXECUTION

3.01 GENERAL

- A. Load Conditions: All testing and balancing of systems shall be performed with maximum attainable load. Testing and balancing of all air handling systems shall be accomplished with ceiling tiles in place and enclosing partitions, windows and doors erected.
- B. Observation: Observe all equipment and exposed piping for noise, movement or vibrations under normal operating conditions and report unacceptable operation to the Engineer.
- C. Measuring Stations: Where measuring stations are installed, each is to be read and recorded in hydronic systems, permanent devices such as flow tubes with manometers, annular ring systems, venturi tubes with portable meters, etc. must be used for final measurements after they are completed and calibrated.
- D. Balancing/Test Results: Where flow, pressure or balancing meters are provided by the manufacturer of a specific device, (i.e. flow control valves), the T&B Agency shall verify meter operation and calibrate the device with the manufacturer's meter prior to turnover to the Owner.
- E. Adjusting: Testing and balancing is an iterative process and the T&B Agency may have to perform preliminary adjustments, readjustments and final adjustments as necessary to properly tune the systems. This is an integral part of the balancing procedure and must be anticipated; all adjustments, spot-checking required by the Engineer and other reverification shall be performed at no additional cost to the Owner.

3.02 AIR SYSTEMS

- A. General: The testing and balancing shall include, but is not limited to, the following requirements:
 - 1. Adjust fan speeds to deliver the required cfm and static pressure, and record rpm and full load amperes. Replace drives as required; increasing static pressure by dampering at the fan is not permitted.
 - 2. Traverse main supply ducts with pitot tube to verify design cfm. Artificially load air filters by partially blanking to produce the equipment or air pressure drops through dirty filters. Mark position of balancing devices.
 - 3. Verify the quantity of outside air and return air when the system is operating in the maximum cooling and full heating modes. Check all controls which regulate flow or pressure for calibration, verify damper positioning and modulation, and flowrate with minimum and maximum outside air.
 - 4. Test and adjust each diffuser, grille and register to within 10 percent of design requirements, and adjust to minimize drafts and noise in all areas.
 - 5. Observe all equipment and exposed ductwork for noise, movement or vibration under normal operating conditions and report to the Engineer.
- B. Diagrams: On the single-line diagram, indicate the measured flow rates and pressure drops across each component, such as coils, filters, air flow monitoring stations, sound attenuators, louvers, fans, etc. in order of physical arrangement.

- C. Air Distribution: Adjust air distribution devices to distribute design air quantities. Should the temperature in any area vary more than 2 degrees from the zone thermostat setpoint, notify Engineer and obtain approval to re-balance devices to air quantities other than those indicated so that air temperature in the entire zone will be as even as possible regardless of design air quantities. After obtaining approval, perform necessary re-balancing.

3.03 HYDRONIC PIPING SYSTEM

- A. General: Test and balance shall include, but is not limited to, the following requirements:
 1. Prior to testing and balancing of each system check all control valves, inlet valves, and flow meters for proper installation, calibration and accuracy.
 2. Measure and adjust pump flow capacity to proper quantity.
 3. Adjust flow through equipment such as chillers, boilers, heat exchangers, coils, and cooling towers.
 4. Balance system flows. After adjustments to coils are made, recheck pump setting and readjust if required. Set pressure drop through bypass to match pressure drop through coil or equipment.
 5. Coordinate equipment operation and output performance with the manufacturer's representative. Record inlet and outlet temperatures.
 6. Mark settings of adjustable balancing devices which provide the design flow requirement. Mark equipment settings, control damper positions, valve indicators, fan speed controls, control levers, and other balancing devices. Permanent markings shall be with an arrow indicator stamped or cut into the surface; a waterproof marker may be used on non-wear surfaces.
 7. Test and balance each hydronic system and record flow rate, pump inlet and outlet pressures and motor amperage for each pump for each increment of system flow rate provided by the pumping/piping configuration. Variable speed pumps shall operate as constant volume pumps at maximum speed for purposes of this record.

3.04 SYSTEM MEASUREMENT

- A. General: Measurements shall be taken to obtain accurate and consistent readings; i.e. sufficiently downstream from changes in direction, regions of turbulence, or flow convergence.
- B. Repeatability: Take sufficient readings which when averaged will result in a repeatability error not to exceed 5 percent. When measuring a single point, repeat readings until two consecutive identical values are obtained. Readings shall be taken with the eye at the level of the indicated value to prevent parallax. Insert pulsation dampeners to eliminate error involved in estimating the median of fluctuating readings.

- C. Report Availability: Two copies of the final report shall be submitted one is to be supplied to the engineer, while the other is to be supplied to the owner for review. The final report shall be typewritten and submitted to the Engineer prior to the final survey with sufficient time for review, comment, correction of report, additional testing as necessary, follow-up review, and acceptance signature by the Engineer. The Test and Balance Report shall include differential pressure testing of each duct smoke detector, verifying that each reading falls within the manufacturer's acceptable tolerance.

END OF SECTION