INVITATION TO BID

23-0045-UT

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INSTRUCTIONS TO BIDDERS

1. COPIES OF BIDDING DOCUMENTS

1.1. Bid Documents, any attachments and addenda are available for download at: https://procurement.opengov.com/portal/myclearwater/projects/175712.Bidding Documents may include, but are not limited to, plans, specifications, bond forms, contract form, affidavits, bid/proposal form, and addendums.

1.2. Complete sets of Bidding Documents must be used in preparing bids. Neither the City nor the Engineer shall be liable for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents, by Bidders, sub-bidders, or others.

2. QUALIFICATION OF BIDDERS

2. 1 Each prospective Bidder must pre-qualify to demonstrate, to the complete satisfaction of the City of Clearwater, that the Bidder has the necessary facilities, equipment, ability, financial resources and experience to perform the work in a satisfactory manner. An application package for pre-qualification may be obtained by contacting the City of Clearwater, Engineering Division by phone at (727) 562-4750. Pre-qualification requirement information is also available on the City of Clearwater Website at address:

www.myclearwater.com/government/city-departments/engineering/construction-management.

Contractors wanting to pre-qualify to bid on a project as a General Contractor must do so two weeks (ten workdays) prior to the bid opening date. Bidders currently pre-qualified by the City do not have to make reapplication. It is the Contractor's responsibility to confirm pre-qualification status before a Bid Opening.

The Contractor shall include copies of their current license/registration with the State of Florida and Pinellas County (if applicable) with their bid response.

3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1.It is the responsibility of each Bidder, before submitting a Bid, to (a) examine the Contract Documents thoroughly; (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress, performance or furnishing of the work; (c) consider and abide by all applicable

Procurement Division
PO Box 4748 33758-4748
Clearwater FL
727-562-4630

federal, state and local laws, ordinances, rules and regulations; and (d) study and carefully correlate Bidder's observations with the Contract Documents, and notify Engineer in writing of all conflicts, errors or discrepancies in the Contract Documents.

3.2.For the purposes of bidding or construction, bidder may rely upon the accuracy of the technical data contained in reports of explorations and tests of subsurface conditions at the site which have been utilized by the Engineer in the preparation of the Contract Documents, but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof. Drawings relating to physical conditions of existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site and which have been utilized by the Engineer in preparation of the Contract Documents, may be relied upon by Bidder for accuracy of the technical data contained in such drawings but not upon the completeness thereof for the purposes of bidding or construction.

3.3.Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site are based upon information and data furnished to the City and Engineer by owners of such Underground Facilities or others, and the City does not assume responsibility for the accuracy or completeness thereof unless expressly provided in the Contract Documents.

3.4.Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities, other physical conditions, possible conditions, and possible changes in the Contract Documents due to differing conditions appear in the General Conditions.

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

3.6. On request in advance, City will provide each Bidder access to the site to conduct such explorations and tests at Bidder's own expense as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former condition upon completion of such explorations and tests.

3.7. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the City unless otherwise provided in the Contract Documents.

3.8. The submission of a Bid will constitute an unequivocal representation by the Bidder that the Bidder has complied with every requirement of these Instructions to Bidders and that, without exception, the Bid is premised upon performing and furnishing the Work required by the Contract Documents by such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions of performance and furnishing of the work.

4. INTERPRETATIONS AND ADDENDA

4.1. All questions as to the meaning or intent of the Contract Documents are to be directed in writing to the Engineer. Interpretations or clarifications considered necessary by the Engineer in response to such

questions will be issued by Addenda, via OpenGov. Questions received after the time frame specified on the pre-bid meeting agenda, prior to the date for opening of Bids, may not be answered. Only information provided by formal written Addenda will be binding. Oral and other interpretations of clarifications will be without legal effect.

4.2. Addenda may also be issued to modify the Bidding Documents as deemed advisable by the City or Engineer.

5. BID SECURITY OR BID BOND

5.1. Each Bid must be accompanied by Bid Security made payable to the City of Clearwater in an amount equal to ten percent (10%) of the Bidder's maximum Bid price and in the form of a certified or cashier's check or a Proposal/Bid Bond (on form provided in Section V) issued by a surety meeting the requirements of the General Conditions.

5.2. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Payment and Performance bonds, whereupon the Bid Security will be returned. If the Successful Bidder fails to execute, deliver the Agreement and furnish the required Bonds within ten (10) days after the award of contract by the City Council, the City may annul the bid and the Bid Security of the Bidder will be forfeited. The Bid Security of any Bidder whom the City believes to have a reasonable chance of receiving the award may be retained by the City until the successful execution of the agreement with the successful Bidder or for a period up to ninety (90) days following bid opening. Security of other Bidders will be returned approximately fourteen (14) days after the Bid Opening.

5.3. The Bid Bond shall be issued in the favor of the City of Clearwater by a surety company qualified to do business in, and having a registered agent in, the State of Florida.

6. CONTRACT TIME

6.1. The number of consecutive calendar days within which the work is to be completed is set forth in the Technical Specifications.

7. LIQUIDATED DAMAGES

7.1. Provisions for liquidated damages are set forth in the Contract Agreement, Section V.

8. SUBSTITUTE MATERIAL AND EQUIPMENT

8.1. The contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or equal" item may be furnished or used, application for its acceptance will not be considered by the Engineer until after the effective date of the Contract Agreement. The procedure for submittal of any such application is described in the General Conditions and as supplemented in the Technical Specifications.

9. SUBCONTRACTORS

9.1. If requested by the City or Engineer, the Successful Bidder, and any other Bidder so requested, shall, within seven (7) days after the date of the request, submit to the Engineer an experience statement with pertinent information as to similar projects and other evidence of qualification for each Subcontractor, supplier, person and organization to be used by the Contractor in the completion of the Work. The amount of subcontract work shall not exceed fifty percent (50%) of the Work except as may

be specifically approved by the Engineer. If the Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, supplier, other person or organization, he may, before recommending award of the Contract to the City Council, request the Successful Bidder to submit an acceptable substitute without an increase in Contract Price or Contract Time. If the Successful Bidder declines to make any such substitution, the City may award the contract to the next lowest and most responsive Bidder that proposes to use acceptable Subcontractors, Suppliers, and other persons and organizations. Declining to make requested substitutions will not constitute grounds for sacrificing the Bid Security to the City of any Bidder. Any Subcontractor, supplier, other person or organization listed by the Contractor and to whom the Engineer does not make written objection prior to the recommendation of award to the City Council will be deemed acceptable to the City subject to revocation of such acceptance after the Effective Date of the Contract Agreement as provided in the General Conditions.

9.2. No Contractor shall be required to employ any Subcontractor, supplier, person, or organization against whom he has reasonable objection.

10. BID/PROPOSAL FORM

10.1. The Bid/Proposal Form is included with the Contract Documents and shall be printed in ink or typewritten. All blanks on the Bid/Proposal Forms must be completed. Unit Prices shall be to no more than two decimal points in dollars and cents. The Bidder must state in the Bid/Proposal Form in words and numerals without delineation's, alterations or erasures, the price for which they will perform the work as required by the Contract Documents. Bidders are required to bid on all items in the Bid/Proposal form. The lump sum for each section or item shall be for furnishing all equipment, materials, and labor for completing the section or item as per the plans and contract specifications. Should it be found that quantities or amounts shown on the plans or in the proposal, for any part of the work, are exceeded or should they be found to be less after the actual construction of the work, the amount bid for each section or item will be increased or decreased in direct proportion to the unit prices bid for the listed individual items.

10.2. Bids by corporations shall be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed. The corporate address and state of incorporation shall be shown below the Signature. If requested, the person signing a Bid for a corporation or partnership shall produce evidence satisfactory to the City of the person's authority to bind the corporation or partnership.

10.3. Bids by partnerships shall be executed in the partnership name and signed by a general partner, whose title shall appear under the signature and the official address of the partnership shall be shown below the signature.

10.4. All names shall be typed or printed below the signature.

11. SUBMISSION OF BIDS

11.1. It is recommended that bids are submitted electronically through the City's e-Procurement Portal located at https://procurement.opengov.com/portal/myclearwater. By way of the e-Procurement Portal, responses will be locked and digitally encrypted until the submission deadline passes.

Sealed Bids not submitted electronically shall be submitted at or before the time and at the place indicated in the Advertisement for Bids and shall be submitted in a sealed envelope with the project name and number on the bottom left-hand corner. If forwarded by mail, the Bid shall be enclosed in another envelope with the notation "Bid Enclosed" on the face thereof and addressed to the City of Clearwater,

attention Purchasing Manager. Bids will be received at the office indicated in the Advertisement until the time and date specified. Bids in any other form will not be accepted.

E-mail or fax submissions will not be accepted.

No responsibility will attach to the City of Clearwater, its employees or agents for premature opening of a bid that is not properly addressed and identified.

11.2. If submitting a hard copy, the sealed bid envelope shall contain, but not be limited to, the Proposal/Bid Bond and corresponding Power of Attorney, Affidavit, Non-Collusion Affidavit, Proposal (pages one and two), Addendum Sheet, Bidder's Proposal, Scrutinized Companies and Business Operations with Cuba and Syria Certification Form, and E-Verify form.

12. MODIFICATION AND WITHDRAWAL OF BIDS

12.1. For bids submitted electronically, vendors may use the "Unsubmit Response" button located on the Response Details page of their submission. Responses may be resubmitted once they have been edited or modified as needed.

For mailed in or hand delivered bids, written requests to modify or withdraw the bid received by the City prior to the scheduled opening time will be accepted and will be corrected after opening. Written requests must be addressed and labeled in the same manner as the bid and marked as a MODIFICATION or WITHDRAWAL of the bid.

No oral requests will be allowed.

Requests for withdrawal after the bid opening will only be granted upon proof of undue hardship and may result in the forfeiture of any bid security. Any withdrawal after the bid opening shall be allowed solely at the City's discretion.

13. REJECTION OF BIDS

13.1. To the extent permitted by applicable State and Federal laws and regulations, the City reserves the right to reject any, and all Bids, and to waive any, and all informalities. Grounds for the rejection of a bid include but are not limited to a material omission, unauthorized alteration of form, unauthorized alternate bids, incomplete or unbalanced unit prices, or irregularities of any kind. Also, the City reserves the right to reject any Bid if the City believes that it would not be in the best interest of the public to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the City. The City reserves the right to decide which bid is deemed to be the lowest and best in the interest of the public.

14. DISQUALIFICATION OF BIDDER

14.1. Any or all bids will be rejected if there is any reason for believing that collusion exists among the bidders, the participants in such collusion will not be considered in future proposals for the same work. Each bidder shall execute the Non-Collusion Affidavit contained in the Contract Documents.

15. OPENING OF BIDS

15.1. Bids will be opened and read publicly at the location and time stated in the Advertisement for Bids. Bidders are invited to be present at the opening of bids.

16. LICENSES, PERMITS, ROYALTY FEES AND TAXES

16.1. The Contractor shall secure all licenses and permits (and shall pay all permit fees) except as specifically stated otherwise in the Technical Specifications. The Contractor shall comply with all Federal and State Laws, County and Municipal Ordinances and regulations, which in any manner effect the prosecution of the work. City of Clearwater building permit fees and impact fees will be waived except as specifically stated otherwise in the Technical Specifications.

16.2. The Contractor shall assume all liability for the payment of royalty fees due to the use of any construction or operation process, which is protected by patent rights except as specifically stated otherwise in the Technical Specifications. The amount of royalty fee, if any, shall be stated by the Contractor.

16.3. The Contractor shall pay all applicable sales, consumer, use, and other taxes required by law. The Contractor is responsible for reviewing the pertinent State Statutes involving the sales tax and sales tax exemptions and complying with all requirements.

16.4. The City of Clearwater is exempt from state sales tax on materials purchased by the City and incorporated into the WORK. The City of Clearwater reserves the right to implement the Owner Direct Purchase (ODP) Option, as may be indicated in the Scope of Work Description in Section IV – Technical Specifications and as defined in Section III – General Conditions.

17. IDENTICAL TIE BIDS/VENDOR DRUG FREE WORKPLACE

17.1. In accordance with the requirements of Section 287.087 Florida Statutes regarding a Vendor Drug Free Workplace, in the event of identical tie bids, preference shall be given to bidders with drug-free workplace programs. Whenever two or more bids which are equal with respect to price, quality, and service are received by the City for the procurement of commodities or contractual services, a bid received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie bids will be followed if none or all of the tied bidders have a drug-free workplace program. In order to have a drug-free workplace program, a contractor shall supply the City with a certificate containing the following six statements and the accompanying certification statement:

(1)Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

(2) Inform employees as to the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

(3) Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).

(4) In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of chapter 893, or of any controlled substance law, of the United States, or of any state, for a violation occurring in the workplace no later than five (5) days after such conviction.

(5) Impose a sanction on or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.

(6) Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

I certify that this firm does/does not (select only one) fully comply with the above requirements.

18. AWARD OF CONTRACT

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

18.2. In evaluating the Bids, the City will consider the qualifications of the Bidders, whether the Bids comply or not with the prescribed requirements, unit prices, and other data as may be requested in the Bid/Proposal form. The City may consider the qualifications and experience of Subcontractors, suppliers and other persons and organizations proposed by the Contractor for the Work. The City may conduct such investigations as the City deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons, and organizations to perform and furnish the Work in accordance with the Contract Documents to the City's satisfaction within the prescribed time.

18.3. If the Contract is to be awarded, it will be awarded to the lowest responsible, responsive Bidder whose evaluation by the City indicates to the City that the award will be in the best interest of the City.

18.4. Award of contract will be made for that combination of base bid and alternate bid items in the best interest of the City, however, unless otherwise specified all work awarded will be awarded to only one Contractor.

18.5. The successful bidder/contractor will be required to comply with Section 119.0701, Florida Statutes, specifically to:

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

B. Provide the public with access to public records on the same terms and conditions that the City of Clearwater would provide the records and at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law;

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

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

19. BID PROTEST

19.1. RIGHT TO PROTEST:

Pursuant to Section 2.562(3), Clearwater Code of Ordinances, a bidder who submitted a response to a competitive solicitation and was not selected may appeal the decision through

the bid protest procedures, a copy of which shall be available in the Procurement Division. A protesting bidder must include a fee of one percent of the amount of the bid or proposed contract to offset the City's additional expenses related to the protest. This fee shall not exceed $5,000.00 nor be less than $50.00. Full refund will be provided should the protest be upheld. No partial refunds will be made.

20. TRENCH SAFETY ACT

20.1. The Bidder shall comply with the provisions of the City of Clearwater's Ordinance related to trench digging (Ordinance No. 7918-08) along with the Florida Trench Safety Act (Sections 553.60-553.64, Florida Statutes) and the provisions of the Occupational Safety and Health Administration's (OSHA) excavation safety standards, 29 C.F.R.s 1926.650 Subparagraph P, or current revisions of these laws.

21. CONSTRUCTION SITE EROSION AND SEDIMENT CONTROL MANAGEMENT MEASURES

21.1. The Bidder shall comply with the provisions of the Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) stormwater permit and implement stormwater pollution prevention plans (SWPPP's) or stormwater management programs (both using best management practices (BMPs) that effectively reduce or prevent the discharge of pollutants into receiving waters.

A. The control of construction-related sediment loadings is critical to maintaining water quality. The implementation of proper erosion and sediment control practices during the construction stage can significantly reduce sediment loadings to surface waters.

B. Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

NPDES Management Measures available at City of Clearwater Engineering Environmental Division and EPA websites to help address construction-related Best Management Practices.

GENERAL CONDITIONS

Section III - General Conditions can be found on the City's website at:
https://www.myclearwater.com/Business-Development/Doing-Business-with-the-City/Engineering-Construction-Bid-Information/Contract-Specifications

TECHNICAL SPECIFICATIONS

3.1 SCOPE OF WORK

Project Name: NE WRF Sand Filters Rehab

Project Number: 23-0045-UT

Scope of Work:

The project scope includes addressing issues at the Northeast Water Reclamation Facility (NE WRF), located at 3290 SR 580, Safety Harbor, FL 34695. The work involves rehabilitating twelve (12) sand filters, replacing valves and actuators, addressing structural concerns, and removing and replacing the

30” x 42” sluice gate. The project's goal is to enhance the filtration process, ensuring optimal water quality and extending the longevity of the filtration system. No permits are required.

3.2 Section IV - Technical Specifications

Section IV - Technical Specifications can be found on the City's website at: https://www.myclearwater.com/Business-Development/Doing-Business-with-the-City/Engineering-Construction-Bid-Information/Contract-Specifications

3.3 Section V - Contract Documents

Section V - Contract Documents can be found on the City's website at: https://www.myclearwater.com/Business-Development/Doing-Business-with-the-City/Engineering-Construction-Bid-Information/Contract-Specifications

SUPPLEMENTAL TECHNICAL SPECIFICATIONS - Section IVA

4.1 SECTION 01005: PROJECT REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. 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. The summary of the work is presented in Section 01010: Summary of Project.

2. Work Included:

a. The Contractor shall furnish all labor, superintendence, materials, plant power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion of the Work. The Contractor shall obtain and pay for all necessary local building and other regulatory permits. The Contractor 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.

b. The cost of incidental work described in these Project Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the Work and shall be included in the prices for the various Contract Items. No additional payment will be made therefore.

c. 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 workmanship, materials, and equipment, prior approval of the Engineer notwithstanding.

3. Public Utility Installations and Structures:

a. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, vaults, manholes, and all other appurtenances and facilities pertaining thereto whether owned or controlled by the Owner, other governmental bodies, or privately owned by individuals, firms, or corporations, 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 shall be deemed included hereunder.

b. 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.

c. 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 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 shall be repaired by the Contractor, at his expense. No separate payment shall be made for such protection or repairs to public utility installations or structures.

d. Public utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings 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.

e. Where public utility installations of structures owned or controlled by the Owner or other governmental body are encountered during the course of the Work, and are not indicated on the Drawings 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 in the Agreement.

f. The Contractor shall, at all times in performance of the Work, employ acceptable 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.

g. The Contractor shall give written notice to Owner and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least 48-hours in advance of breaking ground in any area or on any unit of the Work.

h. 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 owners of such utilities.

i. Contractor will need to coordinate with Evoqua well in advance of construction, and in advance of necessary inspections, to ensure a representative is available.

1.02 DRAWINGS AND PROJECT MANUAL

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

B. Supplementary Drawings:

1. 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 the Contractor will be furnished one (1) complete set of Construction Drawings (24 inches by 36 inches) and one (1) reproducible copy of the Project Manual.

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

C. Contractor to Check Drawings and Data:

1. The Contractor shall verify all dimensions, quantities, and details shown on the Drawings, 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.

2. 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 or the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

D. Specifications: The Technical Specifications consist of three (3) parts: General, Products, and Execution. The General part of a Specification contains General Requirements which govern the Work. The Products and Execution parts modify and supplement the General Requirements by detailed requirements for the Work and shall always govern whenever there appears to be a conflict.

E. Intent:

1. All Work called for in the Specifications applicable to this Contract, but not shown on the Drawings 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 Drawings 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.

2. 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, the interpretation of these Specifications shall be made upon that basis.

1.03 MATERIALS AND EQUIPMENT

A. Manufacturer:

1. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request and at the Engineer's option, 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.

2. Any two (2) 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.

B. Delivery:

1. The Contractor shall deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the Work so as to complete the Work within the allotted time.

2. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

3. The Contractor shall be fully responsible for all tarrifs associated with materials, equipments, and their delivery.

C. Tools and Accessories:

1. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind, or size of equipment, one (1) 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.

2. Spare parts shall be furnished as specified herein and as recommended by the manufacturer necessary for the operation of the equipment, not including materials required for routine maintenance.

3. 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 rate data.

D. Service of Manufacturer's Engineer:

1. 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.

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

1.04 INSPECTION AND TESTING

A. General:

1. 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 (5) 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.

2. 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 Documents, the Contractor will be notified thereof, and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the Work and replace it with acceptable material, without cost to the Owner.

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

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

B. Costs:

1. All inspection and testing of materials furnished under this Contract will be provided by the Contractor, unless otherwise expressly specified.

2. 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.

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

C. Certificate of Manufacture:

1. Contractor shall furnish to Engineer authoritative evidence in the form of a certificate of manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Contract Documents.
2. 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.

D. Shop Tests:

1. 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.

2. Five (5) 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 and/or independent laboratory, shall be submitted to the Engineer for approval.

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

E. Start-up Tests:

1. As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make start-up tests of equipment.

2. If the start-up tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to demonstration tests, make all changes, adjustments, and replacements required. The furnishing Contractor shall assist in the start-up tests as applicable.

F. Demonstration Tests:

1. Prior to Contractor's request for a Substantial Completion inspection, all equipment and piping installed under this Contract shall be subjected to demonstration tests as specified or required to prove compliance with the Contract Documents.

2. The Contractor shall furnish labor, fuel, energy, water, and all other materials, equipment, and instruments necessary for all demonstration tests, at no additional cost to the Owner. Contractor shall assist in the demonstration tests as applicable.

1.05 LINES AND GRADES

A. Grade:

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

2. Adjustments of grades shown on Drawings may be necessary to conform to actual field conditions or to maintain cover under proposed future grades. Such adjustments shall be considered part of the job conditions and no extra compensation will be allowed for such changes, except where specifically otherwise noted in the Drawings or

Specifications. Such adjustments must be approved by the Engineer prior to being made.

B. Surveys:

1. The Contractor shall furnish and maintain, at his own expense, stakes and other such materials.

2. 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.

3. 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 by the Engineer.

C. Safeguarding Marks:

1. The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, bear the cost of re-establishing 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.

2. The Contractor shall safeguard all existing and known property corners, monuments, and marks adjacent to but not related to the Work and shall bear the cost of re-establishing them if disturbed or destroyed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.2 SECTION 01010: SUMMARY OF PROJECT

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. This Contract is for the Northeast WRF Sand Filter Rehabilitation project as shown on the Drawings and specified herein. The Work consists of furnishing all labor, equipment, and materials for the repair of the structure consisting of, but not limited to, the following:

A. Removal, hauling, and disposal of all filter media and debris.

B. Cleaning of all filter cells.

C. Repair of concrete walls and floor as recommended by the Engineer.

D. Rehabilitate filter components as recommended by the Filter Equipment Manufacturer (Evoqua).

E. Replace air supply piping and diffusers as shown on the drawings and specified herein.

F. Replace various valves, actuators, and related components and pneumatic tubing as shown on the drawings and specified herein.

G. Remove and replace the 30” x 42” Sluice Gate located at the opening of the Equalization Pump Station Wet well.

1.02 CONTRACTOR’S USE OF PREMISES

A. The Contractor shall assume full responsibility for the protection and safekeeping of products and materials at the job site. If additional storage or work areas are required, they shall be obtained by the Contractor at no additional cost to the Owner. Payment will only be made for that portion of the work, which is fully installed including all materials, labor, and equipment.

1.03 PROJECT SEQUENCE

A. Refer to Section IV - Scope of Work for sequencing requirements.

END OF SECTION

4.3 SECTION 01041: PROJECT COORDINATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish personnel and equipment that will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress that will ensure the completion of the work within the Contract Time. If at any time, such personnel appear to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress.

1.02 TECHNICAL SPECIFICATION CONFLICTS

A. Where conflicts exist between the City of Clearwater Technical Specifications and the Tetra Tech Supplemental Technical Specifications and/or Contract Drawings, the more stringent requirements shall apply.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PIPE LOCATIONS

A. All pipes shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

3.02 OPEN EXCAVATIONS

A. Contractor shall adequately safeguard all open excavations by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by workmen. All open excavations shall comply with applicable OSHA Standards.

3.03 TEST PITS

A. Test pits for the purpose of locating underground pipelines or structures in advance of the construction shall be excavated and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the Engineer. The costs for such test pits shall be borne by the Contractor.

3.04 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

3.05 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from damage in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions damaged shall be reconstructed by the Contractor at no additional expense to the Owner.

B. Protect all structures in a suitable manner to prevent damage. Should any part of a structure become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor at his own expense and to the satisfaction of the Engineer. If, in the final inspection of the work, any defects, faults or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the Contract.

C. Further, the Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

3.06 MAINTENANCE OF TRAFFIC

A. Unless permission to close a street is received in writing from the proper authority (County, City, FDOT, etc.), all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.

B. Detours around construction will be subject to the approval of the Owner and the Engineer. Where detours are permitted, the Contractor shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the Contractor shall expedite construction operations and periods when traffic is being detoured will be strictly controlled by the Owner. All maintenance of traffic plans required for construction shall be approved by the local governmental entity having jurisdiction.

C. The Contractor shall take precautions to prevent injury to the public due to open excavation. Night watchmen may be required where special hazards exist, or police protection provided for traffic while

work is in progress. The Contractor shall be fully responsible for damage or injuries whether police protection has been provided.

3.07 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside the site, except by written permission of the appropriate owners. Contractor shall provide Owner a copy of such written permission prior to entering private land.

B. The Contractor shall ensure that all individuals are signed-in and signed-out of the site using the City log located on the first floor of the Maintenance Building each day. List all individual names and do not sign-in or sign-out as a group.

3.08 COOPERATION WITHIN THIS CONTRACT

A. The Contractor shall, prior to interrupting a utility service (water, sewer, etc.) for the purpose of making cut-ins to the existing lines or for any other purposes, contact the Owner and make arrangements for the interruption, which will be satisfactory to the Owner.

3.09 COOPERATION WITH OTHER CONTRACTS

A. This Contract may require a portion of the work to be connected to work done under other contract(s). It will be necessary for the Contractor to plan his work and cooperate with other contractors insofar as possible to prevent any interference and delay.

END OF SECTION

4.4 SECTION 01070: ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 STANDARDS AND ABBREVIATIONS

A. Referenced Standards: Any reference to published specifications or standards of any organization or association shall comply with the requirements of the specification or standard which is current on the date of Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.

In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

B. Abbreviations:

AA Aluminum Association

AAA American Arbitration Association

AABC Associated Air Balance Council

AAMA Architectural Aluminum Manufacturers Association

AASHO The American Association of State Highway Officials

ABA American Bar Association

ABMA American Boiler Manufacturers Association

ABPA Acoustical and Board Products Association

ACI American Concrete Institute

ACPA American Concrete Pipe Association

AEIC Association of Edison Illuminating Companies

AFBMA Anti-Friction Bearing Manufacturers Association

AGA American Gas Association

AGC Associated General Contractors of America

AGMA American Gear Manufacturers Association

AHA American Hardboard Association

AI The Asphalt Institute

AIA American Institute of Architects

AIA American Insurance Association

AIEE American Institute of Electrical Engineers (Now IEEE)

AIMA Acoustical and Insulating Materials Association

AISC American Institute of Steel Construction

AISI American Iron and Steel Institute

AITC American Institute of Timber Construction

AMCA Air Moving and Condition Association

ANSI American National Standard Institute

APA American Plywood Association

API American Petroleum Institute

APWA American Public Works Association

AREA American Railway Engineering Association

ARI American Refrigeration Institute

ASA American Standards Association (Now ANSI)

ASAHC American Society of Architectural Hardware Consultants

ASCE American Society of Civil Engineers

ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers

ASME American Society of Mechanical Engineers

ASSCBC American Standard Safety Code for Building Construction

ASSHTO American Association of State Highway Transportation Officials

ASTM American Society for Testing and Materials

AWG American Wire Gauge

AWI Architectural Woodwork Institute

AWPA American Wood Preservers Association

AWPB American Wood Preservers Bureau

AWPI American Wood Preservers Institute

AWS American Welding Society

AWWA American Water Works Association

BHMA Builders Hardware Manufacturers Association

BIA Brick Institute of America (formerly SCPI)

CDA Copper Development Association

CFS Cubic Feet Per Second

CMAA Crane Manufacturers Association of America

CRSI Concrete Reinforcing Steel Institute

CS Commercial Standard

DHI Door and Hardware Institute

DIPRA Ductile Iron Pipe Research Association

DOT Spec Standard Specification for Road and Bridge Construction Florida Department of Transportation, 1982

E/A Engineer and/or Architect

EDA Economic Development Association

EEI Edison Electric Institute

EPA Environmental Protection Agency

FCI Fluid Control Institute

FDEP Florida Department of Environmental Protection

FDOT Florida Department of Transportation

Fed Spec Federal Specification

FGS Florida Geological Survey

FPS Feet Per Second

FS Federal Standards

GPM Gallons Per Minute

GSP Galvanized Steel Pipe

HMI Hoist Manufacturers Institute

HP Horsepower

HSBII Hartford Steam Boiler Inspection and Insurance Co.

ID Inside Diameter

IEEE Institute of Electrical and Electronic Engineers

IFI Industrial Fasteners Institute

IPCEA Insulated Power Cable Engineers Association

IPS Iron Pipe Size

MGD Million Gallons Per Day

MHI Materials Handling Institute

MMA Monorail Manufacturers Association

NaOCl Sodium Hypochlorite

NBFU National Board of Fire Underwriters

NBHA National Builders' Hardware Association

NBS National Bureau of Standards

NCSA National Crushed Stone Association

NCSPA National Corrugated Steel Pipe Association

ND Nominal Diameter

NEC National Electrical Code

NECA National Electrical Contractors' Association

NEMA National Electrical Manufacturers' Association

NFPA National Fire Protection Association

NLA National Lime Association

NPC National Plumbing Code

NPT National Pipe Threads

NSC National Safety Council

NSF National Sanitation Foundation

OD Outside Diameter

OSHA U.S. Department of Labor, Occupational Safety and Health Act

PCA Portland Cement Association

PCI Prestressed Concrete Institute

PS United States Products Standards

PSI Pounds per Square Inch

PSIA Pounds per Square Inch Absolute

PSIG Pounds per Square Inch Gauge

RAS Return Activated Sludge

RPM Revolutions Per Minute

SAE Society of Automotive Engineers

SDI Steel Decks Institute

SJI Steel Joists Institute

SWFWMD Southwest Florida Water Management District

SMACNA Sheet Metal and Air Conditioning Contractors' National Association

SSI Scaffolding and Shoring Institute

SSPC Steel Structures Painting Council

SSPC Structural Steel Painting Council

SST Stainless Steel

STA Station (100 feet)

TDH Total Dynamic Head

TH Total Head

UBC Uniform Building Code

UL Underwriter's Laboratories, Inc.

USASI or United States of America Standards Institute

USGS United States Geological Survey

WAS Waste Activated Sludge

C. Additional abbreviations and symbols are shown on the Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.5 SECTION 01091: REFERENCE SPECIFICATIONS

PART 1 - GENERAL

1.01 GENERAL

A. Applicable Publications. Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of or omission from said standards or requirements.

B. Assignment of Specialists. In certain instances, specification test requires (or implies) that specific Work is to be assigned to specialist or expert entities who must be engaged for the performance of the Work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work. They are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of Work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of other requirements of the specifications, all Work specified herein shall conform to or exceed the requirements of such documents are not in conflict with the requirements of these specifications not the applicable codes.

B. References herein to "Building Code" shall mean the Florida Building Code (FBC). The latest edition of the code as approved and used by the local agency as of the date of award as adopted by the agency having jurisdiction shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.

D. Applicable Standard Specifications. The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.6 SECTION 01100: SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 PUBLIC NUISANCE

A. The Contractor shall not create a public nuisance including, but not limited to, encroachment on adjacent lands, flooding of adjacent lands, or excessive noise.

B. Sound levels measured by the Engineer shall not exceed 50 dBA from 7 P.M. to 7 A.M. or 60 dBA 7 A.M. to 7 P.M. This sound level shall be measured at the exterior of the nearest exterior wall of the nearest residence. Levels at the equipment shall not exceed 85 dBA at any time. Sound levels in excess of these values are sufficient cause to have the Work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or Owner for excessive noise shall

not relieve the Contractor of the other portions of this Specification including, but not limited to, completion dates and bid amounts.

C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

1.02 PIPE LOCATIONS AND EXISTING UTILITIES

A. Pipe Locations. All pipes shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

B. Utility Conflicts. Contractor must identify all locations where there is the possibility of conflicts with existing utilities. Contractor will promptly notify the Owner and Engineer in writing in accordance with these documents. Contractor acknowledges that resolving utility conflicts, can sometimes require permitting. The Owner will grant additional days to the Contractor to cover the length of unanticipated delay in writing. However, under no circumstances will the Contractor be eligible for remobilization costs.

1.03 LANDSCAPING RESTORATION

A. Contractor shall be responsible for replacing all landscaping disturbed during construction with landscaping of equal or better quality, quantity, material, and size. The extent of existing landscaping is not shown on drawing and shall be the responsibility of Contractor and field inspected prior to bidding.

1.04 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by workmen.

1.05 TEST PITS

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the Engineer. The costs for such test pits shall be borne by the Contractor.

1.06 JURISDICTIONAL DISPUTES

A. It shall be the responsibility of the Contractor to pay all costs that may be required to perform any of the Work shown on the Drawings or specified herein in order to avoid any work stoppages due to jurisdictional disputes. The basis for subletting Work in question, if any, shall conform to precedent agreements and

decisions on record with the Building and Construction Trades Department, AFL-CIO, dated June, 1973, including any amendments thereto.

1.07 INCLEMENT WEATHER

A. In the event of inclement weather, or whenever the Engineer directs; the Contractor shall, and shall cause subcontractors to protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any portion of work or materials have been damaged or injured by reason of failure on the part of the Contractor or any subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of the Contractor.

1.08 COORDINATION OF WORK

A. The Contractor shall cooperate fully so as to eliminate or minimize the creation of conflicts. Adjustments from time to time may be required in the Contractor's work location and/or schedule provided a reasonable notice is given by the Owner or Engineer.

1.09 USE OF PUBLIC/PRIVATE STREETS

A. The use of public/private streets and roads shall be such as to provide a minimum of an inconvenience to the public and to other traffic. Any earth or other excavated materials spilled from trucks shall be removed by the Contractor and the streets and roads cleaned to the satisfaction of the Owner.

B. Access to properties along the Project must always be maintained throughout the duration of the Project as shown in the Drawings.

1.10 TRAFFIC

A. All safety precautions shall be taken and all traffic controls be furnished satisfactorily to the City, FDOT, and/or other government agencies having jurisdiction, where partial or complete obstruction of highways, roadways, streets, drives or sidewalks is required in the performance of the Work.

1.11 CHEMICALS

A. All chemicals used during project construction, or furnished for project operations, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of the State Department of Health, Florida Department of Environmental Protection and if required, also the EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with the manufacturer's instructions or recommended use procedures.

1.12 SAFETY AND HEALTH REGULATIONS

A. The Contractor shall comply with the Department of Labor Safety & Health Regulations for construction promulgated under the Occupational Safety & Health Act of 1970, (PL 91-596) and under Section 107 of the Contract Work Hours & Safety Standards Act (PL 91-54).

B. All equipment furnished and installed under this Contract shall comply to Part 1910, Occupational Safety & Health Standards & Amendments thereto.

C. The Contractor shall comply with the Florida Trench Safety Act (90-96, Florida Law).

1.13 STATE AND FEDERAL PERMITS

A. Construction in Florida Department of Transportation rights-of-way, wetlands and navigable water bodies will be governed by applicable State and Federal permits. All conditions set forth on the permits shall be a part of the Contract and they shall be attached by addendum.

1.14 INSPECTION

A. The authorized representatives and agents of the Environmental Protection Agency and Controlling State and Local Pollution Control Agencies shall be permitted to inspect all work, material, payrolls, personnel records, invoices of materials and any other relevant data and records. The Owner and Engineer shall be permitted access to any work area for the inspection of work and materials. The Owner may, at the Contractor's expense, order the uncovering or removal of any finished work if circumstances indicate faulty work or materials were used in the original installation. The Owner and Engineer shall also be permitted to inspect material invoices, payrolls or any other relevant data or records as may be necessary or required to satisfy the requirements of the Contract.

1.15 ENVIRONMENTAL PROTECTION

A. General:

1. Contractor shall comply with all Federal, State and Local laws and regulations controlling pollution of the environment. He shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, bitumens, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter. In the event of conflict between such laws and regulations and the requirements of the Specifications, the more restrictive requirements shall apply. Environmental protection requirements specified in other Sections shall be considered as supplementing the requirements of this Section.

2. Failure of the Contractor to fulfill any of the requirements of this Section may result in the Owner ordering the stopping of construction operations.

3. Failure on the part of the Contractor to perform the necessary measures to control erosion, siltation, and pollution will result in the Owner notifying the Contractor to take such measures. In the event that the Contractor fails to perform such measures within 24 hours after receipt of such notice, the Owner may stop the Work as provided above, or may proceed to have such measures performed by others. The cost of such work performed by others plus related fees by the Engineer will be deducted from monies due the Contractor on his Contract.

4. All erosion and pollution control features installed by the Contractor shall be acceptably maintained by the Contractor during the time that construction work is being done.

5. Repair or replace damaged or inoperative erosion and pollution control devices as directed by the Engineer or the Owner's Representative.

6. Where there is a high potential for erosion and possible water pollution, the Contractor shall not expose, by his construction methods or procedures, an area of erosive land at any one time larger than the minimum amount required for the proper and efficient construction operation. If the exposure of any incomplete work corresponding to the exposure period required for erosion is anticipated, temporary protective measures shall be taken to prevent the erosion or collapse of land in that immediate construction area.

B. Erosion and Pollution Control Schedule: At or prior to the preconstruction conference, the Contractor shall submit to the Owner for his information, three (3) copies of his erosion and pollution control work schedule. This schedule shall show the time relationship between phases of the Work which must be coordinated to reduce erosion and pollution and shall describe construction practices and temporary control measures which will be used to minimize erosion and pollution. The schedule shall also show the Contractor's proposed method of erosion control on haul roads and borrow and material pits, and his plan for disposal of waste materials or other sources of pollution. Maps or other documents may also be required to show the proposed final surface gradient of proposed borrow pits, soil type base course pits, and waste areas. No work shall be started until the erosion and pollution control schedules and methods of operations have been submitted to the Owner for his information.

C. Air Pollution Controls:

1. Contractor shall control dust caused by his operations in the construction of the Project, including but not specifically limited to the following:

a. Clearing, grubbing, and stripping.

b. Excavation and placement of embankment.

c. Cement and aggregate handling.

d. Limerock stabilization.

e. Use of haul roads.

f. Sandblasting or grinding.

2. Contractor shall control air pollution from the following causes in constructing the project:

a. Volatiles escaping from asphalt and cutback materials.

b. Use of herbicides or fertilizers.

3. Control of dust and other air pollutants by the Contractor shall include:

a. Exposing the minimum area of land.

b. Applying temporary mulch with or without seeding.

c. Use of water sprinkler trucks.

d. Use of covered haul trucks.

e. Use of stabilizing agents in solution.

f. Use dust palliatives and penetration asphalt on temporary roads.

g. Use of wood chips in traffic and work areas.

h. Use of vacuum-equipped sandblasting systems.

i. Use of plastic sheet coverings.

j. Restricting the application rate of herbicides to recommended dosage. Materials shall be covered and protected from the elements. Application equipment and empty containers shall not be rinsed and discharged so as to pollute a stream, river, lake, pond, water impoundment, or the ground water.

k. Relay of operations until climate or wind conditions dissipate or inhibit the potential pollutants.

D. Open Burning of Combustible Wastes: No open burning of combustible waste materials or vegetation shall be permitted. All waste materials shall be removed from the site or within public rights-of-way and disposed in a legal manner.

E. Permanent and Temporary Water Pollution Control (Soil Erosion):

1. Sufficient precautions shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than allowed by the State or controlling agency. Such measures may consist of construction of berms, dikes, dams, drains and sediment basins, or use of fiber mats, woven plastic filter cloths, gravel, mulches, quick growing grasses, sod, bituminous spray and other erosion control devices or methods approved by the State or controlling agency.

2. The Contractor shall promptly clear all waterways and drainage patterns of false work, piling, debris, or other obstructions placed during construction work and not a part of the finished work.

3. The Contractor shall remove and dispose of silt accumulations as directed by the Engineer or the Owner's Representative.

4. If new and additional erosion control structures are to be installed, under this project, to prevent possible future erosion as a result of work under this contract, they shall be constructed concurrently with the other work, as early as possible, and as conditions permit.

F. Noise Control: The Contractor shall provide adequate protection against objectionable noise levels caused by the operation of construction equipment in order to comply with all current City ordinances and these Specifications. Sound levels shall be measured at the exterior of the nearest exterior wall of the nearest residence or building. Levels at construction equipment shall not exceed 85 dBA at any time. Sound levels in excess of allowable values are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or Owner for excessive noise shall not relieve the Contractor of the other portions of this Specification including, but not limited to completion dates and bid amounts.

1.16 SITE CLEANUP AND RESTORATION

A. The Contractor shall keep the working area free at all times of tools, materials, and equipment not essential to the progress of the Work. Debris, waste materials, and rubbish shall be properly disposed of and not allowed to accumulate. If the Contractor should fail to do this, the Owner will make the necessary arrangements to affect the cleanup by others and will back charge the cost to the Contractor. If such action becomes necessary on the part of and in the opinion of the Owner, the Owner will not be responsible for the inadvertent removal of material which the Contractor would not have disposed of had he effected the required cleanup.

B. Where material or debris has washed or flowed into or been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as result of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the Work, and the ditches, channels, drains etc., kept in a clean and neat condition.

C. On or before the completion of the Work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations, in a neat and satisfactory condition.

D. The Contractor shall restore the entire project site to its original or better condition, except for any area(s) designated for alteration by the Contract Documents. The Contractor shall restore or replace; when and as directed, any public or private property damaged by his work, equipment, or employees to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration.

E. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors and on completion of the Work shall deliver it undamaged and in fresh and new appearing condition.

1.17 LAWS AND REGULATIONS

A. It shall be the responsibility of the Contractor to give all notices and comply with all the laws, rules, regulations, ordinances, etc., that may be applicable at the time the Work is started on the project. Should the Contractor discover the Drawings or Specifications are contradictory to, or in variance with the above, he shall notify the Engineer immediately, in writing, in order that any required changes or modifications can be made. It is not the Contractor's responsibility to make certain that the Drawings or Specifications are in non-compliance with any of the above; however, should he be aware of any existing discrepancy, or have reason to believe such may exist and performs work without proper notice to the Engineer, the Contractor shall be responsible for any cost involved in making the necessary alterations or corrections.

1.18 CONTRACTOR'S USE OF PREMISES

A. All project construction work will be accomplished on the Owner's property, public/private rights-of-way/easements or within temporary construction easements and the Contractor shall confine his activity to those designated areas. The Contractor shall not enter upon private property for any reason without securing prior permission from the property owner. Such permission, including any stipulations, shall be in writing and a copy shall be delivered to the Engineer prior to the Contractor's entry or occupation of the subject property. This requirement will be rigidly enforced, particularly with regard to the utilization of vacant areas adjacent to the work site for the storage of materials or parking equipment.

B. The Contractor shall perform his work in such manner that he will not damage adjacent public or private property. Any damage to existing physical structures or utility services shall be repaired or restored promptly at no expense to the Owner.

C. The Contractor shall avoid damage to and preserve all existing vegetation (grass, shrubs, trees, etc.) on or near the work area which do not, within reason, interfere with construction. The Contractor will be responsible for and required to replace or restore all such vegetation damaged or destroyed at no cost to the Owner. The Contractor will also be responsible for any unauthorized cutting or damage to trees, shrubs, etc., and also damage caused by careless operation of equipment, storage of materials and rutting or tracking of grass by equipment.

D. The Contractor shall conduct access, hauling, filling, and storage operations as specified herein and as shown on the Contract Drawings.

1. On-site borrow areas are designated as follows: Suitable material, as approved by Engineer, from excavations for project structures. Any additional borrow material required shall be provided by the Contractor from off-site.

2. On-site spoil areas will become property of the Contractor and are to be disposed off-site.

E. Construct all fill areas so runoff will not flood improved areas.

F. All connections to existing piping systems shall be made as shown or indicated on the Drawings after consultation, cooperation, and coordination with the Owner. Some such connections may have to be made during off-peak hours (late night or early morning hours). The Contractor shall give a minimum of 72 hours' notice to the Owner when tie-ins with the existing plant utilities are required.

1.19 HAZARDOUS LOCATIONS

A. The Contractor shall be responsible for identification of hazardous locations, appropriate construction methods, and all other safety issues.

1.20 ADDITIONAL PROVISIONS

A. The Contractor shall provide at his own cost all necessary temporary facilities for access to, and for protection of, all existing structures. The Contractor is responsible for all damage to existing structures, equipment, and facilities caused by his construction operations, and must repair all such damage when and as ordered by the Engineer.

B. All coatings and materials that come in contact with reclaimed water shall comply with ANSI-NSF Standard 61. The manufacturer shall provide documentation to demonstrate certification and compliance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.7 SECTION 01200: PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall cooperate and coordinate with the Engineer to schedule and administer the preconstruction meeting, periodic progress meetings, and specifically called meetings throughout the progress of the Work. The Contractor shall:

a. Prepare agenda for meetings.

b. Make physical arrangements for meetings.

c. Preside at Progress meetings.

d. Take and distribute meeting minutes.

2. Representatives of Contractor, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

3. The Owner shall attend meetings to ascertain that the Work is expedited consistent with Contract Documents and construction schedules.

4. The Contractor shall record the preconstruction meeting and each progress meeting in its entirety, and shall provide the Engineer with a copy of such recording, having good quality and clarity, and a typed transcript of the minutes of each meeting. A copy of the minutes of each progress meeting shall be available five business days after the meeting.

B. Related Requirements Described Elsewhere:

1. Construction Progress Schedules: Section 01310.

2. Shop Drawings, Working Drawings, and Samples: Section 01340.

3. Project Record Documents: Section 01720.

1.02 PRECONSTRUCTION MEETING

A. Engineer will schedule a preconstruction meeting no later than twenty (20) days after date of Notice to Proceed. The meeting shall be scheduled at the convenience of all parties.

B. Location: A local site, convenient for all parties, designated by the Owner.

C. Attendance:

1. Owner's representative.

2. Engineer and his professional consultants.

3. Resident project representative.

4. Contractor and his superintendent.

5. Major subcontractors.

6. Representatives of major suppliers and manufacturers as appropriate.

7. Governmental representatives as appropriate.

8. Others as requested by the Contractor, Owner, and Engineer.

D. The Engineer shall preside at the preconstruction meeting. The Contractor shall provide for keeping minutes and distribution of minutes to the Owner,

Engineer and others. The purpose of the preconstruction meeting is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established.

E. Contractor shall provide a preliminary construction schedule to demonstrate complete fulfillment of contract requirements utilizing critical path method at the Pre-Construction Meeting.

F. The suggested agenda for the preconstruction meeting would include the following:

1. Distribution and discussion of:

   a. List of major subcontractors and suppliers.

   b. Projected schedules.

   c. Schedule of Values.

2. Critical work sequencing: Relationships and coordination with other contracts and/or work.

3. Major equipment deliveries and priorities.

4. Project coordination: Designation and responsible personnel.

5. Procedures and processing of:

   a. Field decisions.

   b. Proposal requests.

   c. Request for Information.

   d. Submittals.

   d. Change Orders.

   f. Applications for Payment.

6. Submittal of Shop Drawings, project data and samples.

7. Adequacy of distribution of Contract Documents.

8. Procedures for maintaining Record Documents

9. Use of premises:

   a. Office, work, and storage areas.

   b. Owner's requirements.

   c. Access and traffic control.

10. Construction facilities, controls, and construction aids.

11. Temporary utilities.

12. Safety and first aid procedures.

13. Check of required Bond and Insurance certifications.

14. Completion time for contract and liquidated damages.

15. Request for extension of Contract Time.

16. Procedures for periodic monthly (or whatever interval is deemed appropriate or necessary, however, a minimum of monthly meetings will be required) progress meetings, for all involved.

17. Security procedures.

18. Procedures for making partial payments.

19. Guarantees on completed work.

20. Equipment to be used.

21. Project layout and staking of work.

22. Project inspection.

23. Labor requirements.

24. Laboratory testing of material requirements.

25. Provisions for material stored (well casing only) on site and monthly inventory of materials stored.

26. Requirements of other organizations such as utilities, railroads, highway departments, building departments.

27. Rights-of-way and easements.

28. Housekeeping procedures.

29. Liquidated damages.

30. Posting of signs and installation of Project Sign.

31. Pay request submittal dates.

32. Equal opportunity requirements.

1.03 PROGRESS MEETINGS

A. The Engineer shall schedule regular periodic meetings. The progress meetings will be held as needed and at other times as required by the progress of the Work. The first meeting shall be held within thirty (30) days after the preconstruction meeting.

B. Hold called meetings as required by progress of the Work.

C. Location of the meetings: Owner's Offices.

D. Attendance:

1. Engineer and his professional Subconsultants as needed.

2. Resident Project Representative.

3. Contractor and his Superintendent.

4. Owner's representatives.

5. Subcontractors (active on the site, as appropriate to the agenda).

6. Others as appropriate to the agenda (suppliers, manufacturers, other subcontractors, etc.).

E. The Contractor shall preside at the meetings and provide for keeping minutes and distribution of the minutes to the Owner, Engineer, and others. The purpose of the meetings will be to review the progress of the Work. Contractor shall provide updated progress construction schedule at each progress meeting.

F. The suggested agenda for the progress meetings will include but not be limited to the following:

1. Review approval of minutes of previous meeting.

2. Review of Work progress since previous meeting and Work scheduled (3-week look ahead schedule).

3. Field observations, problems, conflicts.

4. Problems which impede construction schedule.

5. Review of off-site fabrication, delivery schedules.

6. Corrective measures and procedures to regain projected schedule.

7. Status of approved Construction Schedule and revisions to the Construction Schedule as appropriate.

8. Progress schedule during succeeding work period.

9. Coordination of schedules.

10. Review status of submittals and submittal schedule, expedite as required.

11. Maintenance of quality standards.

12. Pending changes and substitutions.

13. Shop drawing problems.

14. Review proposed changes for:

a. Effect on Construction Schedule and on completion date.

b. Effect on other contracts of the Project.

15. Critical/long lead items.

16. Other business.

G. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items, and be prepared to discuss pertinent topics and provide specific information including but not limited to:

1. Status of all submittals and what specifically is being done to expedite them.

2. Status of all activities behind schedule and what specifically will be done to regain the schedule.

3. Status of all material deliveries, latest contact with equipment manufacturer, and specific actions taken to expedite materials.

4. Status of open deficiencies and what is being done to correct the same.

H. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340: Shop Drawings, Working Drawings, and Samples.

PART 2- PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.8 SECTION 01310: CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Promptly after award of the Contract, prepare and submit to the Engineer estimated construction progress schedules demonstrating complete fulfillment of all Contract requirements utilizing a Critical Path Method (hereinafter referred to as CPM) in planning, coordinating, and performing the Work under this Contract (including all activities of subcontractors, equipment vendors, and suppliers). The principles and definition of CPM terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976, but the provisions of this Specification shall govern the planning, coordinating, and performance of the Work.

2. Submit revised progress schedules on a monthly basis. No partial payments shall be approved until there is an updated construction progress schedule on hand.

B. Related Requirements Described Elsewhere:

1. Conditions of the Contract.

2. Summary of Project: Section 01010.

3. Project Meetings: Section 01200.

4. Shop Drawings, Working Drawings, and Samples: Section 01340.

5. Schedule of Values: Section 01370.

1.02 QUALIFICATIONS

A. A statement of computerized CPM capability shall be submitted and shall verify that either Contractor's organization has in-house capability to use the CPM technique or that Contractor will employ a CPM consultant who is so qualified.

1.03 FORM OF SCHEDULES

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide a separate horizontal bar for each trade or operation within each structure or item.

2. Horizontal time scale:

a. Show starting and completion dates for each activity in terms of the number of days after Notice to Proceed. All completion dates shown shall be within the period specified for contract completion.

b. Identify the first work day of each month.

3. Scale and Spacing: Sufficient to allow space for notations and future revisions.

4. Maximum Sheet Size: 24 inches by 36 inches.

B. Format of Listings: The chronological order of the start of each item of work for each structure.

C. Identification of Listings: By major specification section numbers as applicable and by structure.

D. Construction Progress Schedules shall be computer generated using software equal to Primavera Project Planner for Windows by the following:

A. Primavera Systems, Inc.

B. Bala Cynwyd, P.A.

C. Microsoft Project

D. Equal as approved by the City PM and EOR

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity and by structure.

2. Show the dates for the beginning and completion of each major element of construction in no more than a two (2) week increment scale.

3. Show projected percentage of completion for each item, as of the first day of each month.

4. Show projected dollar cash flow requirements for each month of construction and for each activity as indicated by the approved Schedule of Values.

B. Submittals for construction progress schedules shall be in accordance with Section 01340: Shop Drawings, Work Drawings, and Samples. Indicate on the schedule the following:

1. The dates for Contractor's submittals.

2. The dates submittals will be required for Owner-furnished products, if applicable.

3. The dates approved submittals will be required from the Engineer.

C. A typewritten list of all long lead items (equipment, materials, etc.).

D. Failure to include any element of work required for the performance of this Contract shall not excuse the Contractor from completing all work required within any applicable completion date.

E. Scheduling Constraints: The work within Owner's property must be completed within the maximum number of days start to finish, as indicated in the Contract. Additionally, work must proceed on a continuous basis, without stoppages, except for nights and weekends. There shall be no lapses between phases of construction.

1.05 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.

2. Activities modified since previous submission.

3. Revised projections of progress and completion.

4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.

2. Corrective action recommended, and its effect.

3. The effect of changes on schedules of other prime contractors.

D. If the Work falls behind the critical path schedule by two (2) weeks or more, the Contractor shall prepare a recovery schedule.

1.06 SUBMISSIONS

A. Submittal Requirements.

1. Logic network and/or time-phased bar chart, computer generated.

2. Narrative description of the logic and reasoning of the schedule.

B. Time of Submittals: Within ten (10) working days after Notice to Proceed, Contractor shall submit a network diagram describing the activities to be accomplished in the project and their dependency relationships, (predecessor/successor) as well as a tabulated schedule as herein defined. The total length of time indicated on the initial CPM schedule shall equal the exact number of days as defined in the Contract. The schedule produced and submitted shall also indicate calendar dates, including project starting and completion dates, based on the Contract Commencement and completion dates indicated in the Notice to Proceed. The Engineer will complete the review of the complete schedule within fifteen (15) working days after receipt. During the review process,

the Engineer may meet with a representative of Contractor to review the proposed plan and schedule to discuss any clarifications that may be necessary.

C. Within ten (10) working days after the conclusion of the Engineer's review period, Contractor shall revise the network diagram as required and resubmit the network diagram and a tabulated schedule produced therefrom. The revised network diagram and tabulated schedule shall be reviewed and accepted or rejected by the Engineer within fifteen (15) working days after receipt. The network diagram and tabulated schedule, when accepted by the Engineer, shall constitute the project work schedule unless a revised schedule is required due to substantial changes in the Work, a change in Contract Time or a recovery schedule is required and requested.

D. Acceptance. The finalized schedule will be acceptable to the Engineer when, in the opinion of the Engineer, it demonstrates an orderly progression of the Work to completion in accordance with the Contract Documents. Such acceptance will neither impose on the Engineer responsibility for the progress or scheduling of the Work nor relieve Contractor from full responsibility therefore. The finalized schedule of shop drawing submittals will be acceptable to the Engineer when, in the opinion of the Engineer, it demonstrates a workable arrangement for processing the submittals in accordance with the requirements. The finalized Schedule of Values (lump sum price breakdown), as applicable, will be acceptable to the Engineer as to form and content when, in the opinion of the Engineer, it demonstrates a substantial basis for equitably distributing the Contract Price. When the network diagram and tabulated schedule have been accepted, the Contractor shall submit to the Engineer six (6) copies of the time-scaled network diagram, six (6) copies of a computerized tabulated schedule in which the activities have been sequenced by numbers, six (6) copies of a computerized tabulated schedule in which the activities have been sequenced by early starting date, and six (6) copies of a computerized, tabulated schedule in which activities have been sequenced by total float, and six (6) copies sorted by predecessor/successor.

E. Revised Work Schedules. Contractor, if requested by the Engineer, shall provide a revised work schedule if, at any time, the Engineer considers the completion date to be in jeopardy because of "activities behind schedule." The revised work schedule shall include a new diagram and tabulated schedule conforming to the requirements of Paragraph 1.09 herein, designed to show how Contractor intends to accomplish the Work to meet the completion date. The form and method employed by Contractor shall be the same as for the original work schedule. No payment will be made if activities fall more than two (2) weeks behind schedule and a revised work schedule is not furnished.

F. Schedule Revisions. The Engineer may require Contractor to modify any portions of the work schedule that become infeasible because of "activities behind schedule" or for any other valid reason. An activity that cannot be completed by its original latest completion date shall be deemed to be behind schedule. No change may be made to the sequence, duration, or relationships of any activity without approval of the Engineer.

1.07 DISTRIBUTION

A. Distribute copies of the reviewed schedules to:

1. Engineer.

2. Jobsite file.

3. Subcontractors.

4. Other concerned parties.

5. Owner (two copies).

B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

1.08 CHANGE ORDERS

A. Upon approval of a change order, the approved changes shall be reflected in the next scheduled revision or update submittal of the construction progress schedule by the Contractor.

1.09 CPM STANDARDS

A. CPM, as required by this Section, shall be interpreted to be generally as outlined in the Associated General Contractor's (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976.

B. Work schedules shall include a graphic network and computerized, tabulated schedules as described below. To be acceptable the schedule must demonstrate the following:

1. A logical succession of work from start to finish.

2. Definition of each activity. Activities shall be identified by major specification section numbers, as applicable, and by major structure.

3. A logical flow of work crews/equipment (crews are to be defined by manpower category and man-hours; equipment by type and hours).

4. Show all work activities and interfaces including submittals as well as major material and equipment deliveries.

C. Networks.

1. The CPM network, or diagram, shall be in the form of a time-scaled diagram of the customary activity-on-type and may be divided into a number of separate pages with suitable notation relating the interface points among the pages. Notation on each activity line shall include a brief work description and a duration, as described in Paragraph 1.09, D. herein.

2. All construction activities and procurement shall be indicted in a time-scaled format, and a calendar shall be shown on all sheets along the entire sheet length. Each activity arrow shall be plotted so the beginning and completion dates of said activity can be determined graphically by comparison with the calendar scale. All activities shall be shown using the symbols that clearly distinguish between critical path activities, non-critical path activities, and float for each non-critical activity. All non-critical path activities shall show estimated performances time and float time in scaled form.

D. The duration indicated for each activity shall be in calendar days and shall represent the single best time considering the scope of the work and resources planned for the activity including time for inclement weather. Except for certain non-labor activities, such as curing concrete or delivering materials, activity durations shall not exceed fourteen (14) days nor be less than one (1) day unless otherwise accepted by the Engineer.

E. Tabulated Schedules. The initial schedule shall include the following minimum data for each activity.

1. Activity Beginning and Ending Numbers (i-j numbers) (single activity numbers may be used).

2. Duration.

3. Activity Description.

4. Early Start Date (Calendar Dated).

5. Late Start Date (Calendar Dated).

6. Early Finish Date (Calendar Dated).

7. Late Finish Date (Calendar Dated).

8. Identified Critical Path.

9. Total Float (Note: No activity may show more than 20 days float).

10. Cost of Activity.

11. Equipment Hours, by type; Man-Power Hours, by crew or trade.

F. Project Information. Each tabulation shall be prefaced with the following summary data.

1. Project Name.

2. Contractor.

3. Type of Tabulation (Initial or Updated).

4. Project Duration.

5. Project Scheduled Completion Date.

6. Effective or Starting Date of the Schedule.

7. New Project Completion Date and Project Status (if an updated or revised schedule).

8. Actual Start Date and Actual Finish Date (for all updated schedules.)

1.10 SCHEDULE MONITORING

A. At not less than monthly intervals or when specifically requested by Engineer, Contractor shall submit to the Engineer a computer printout of an updated schedule for those activities that remain to be completed. Typically, the updated schedule will be submitted with the application for payment as specified below.

B. The updated schedule shall be submitted in the form, sequence, and number of copies requested for the initial schedule.

1.11 PROGRESS MEETINGS

For the monthly progress meeting, Contractor shall submit a revised CPM schedule and a three-week look-ahead schedule, showing all activities completed, in progress, uncompleted, or scheduled to be worked during the weeks. The three weeks include the current week plus the next two weeks. All activities shall be from the approved CPM and must be as shown on the CPM unless behind or ahead of schedule. One copy of the revised CPM schedule shall be submitted with each copy of that month's application for payment, six (6) copies minimum.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.9 SECTION 01340: SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall submit to the Engineer for review and approval, such Shop Drawings, Test Reports, and Product Data on materials and equipment (hereinafter in this Section called Data), and material samples (hereinafter in this Section called Samples) as are required for the proper control of work, including but not limited to those Shop Drawings, Data, and Samples for materials and equipment specified elsewhere in the Specifications and in the Drawings.

2. Within fourteen (14) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Contract Documents. This procedure is required in order to expedite final review of Shop Drawings.

3. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the Engineer. This log should include the following items:

a. Submittal description and number assigned.

b. Date to Engineer.

c. Date returned to Contractor (from Engineer).

d. Status of submittal (Approved, Approved as Noted, Amend and Resubmit, and Rejected).

e. Date of resubmittal and return (as applicable).

f. Date material release (for fabrication).

g. Projected date of fabrication.

h. Projected date of delivery to site.

i. Status of O&M manuals submittal.

j. Specification Section.

k. Drawings sheet number.

B. Related Requirements Described Elsewhere:

A. General Requirements: Division 1

B. Construction Progress Schedules: Section 01310

C. Shop Drawings, Working Drawings, and Samples: Section 01340

4. Material and Equipment: Section 01600

5. Project Record Documents: Section 01720

1.02 CONTRACTOR'S RESPONSIBILITY

A. It is the responsibility of the Contractor to check all drawings, data and samples prepared before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear the Contractor's stamp showing

that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the Engineer. The City of Clearwater does not pay the contractor for shop drawing review.

B. Determine and verify:

1. Field measurements.

2. Field construction criteria

3. Catalog numbers and similar data.

4. Conformance with Specifications.

C. The Contractor shall furnish the Engineer a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning and ending of manufacture, testing, and installation of materials, supplies, and equipment. This schedule shall indicate those that are critical to the progress schedule.

D. The Contractor shall not begin any of the work covered by a Shop Drawing, Data, or a Sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the Engineer, with approval.

E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the Engineer receives them.

F. All submittals shall be accompanied with a transmittal letter prepared in duplicate containing the following information:

1. Date.

2. Project Title and Number.

3. Contractor's name and address.

4. The number of each Shop Drawings, Project Data, and Sample submitted.

5. Notification of Deviations from Contract Documents.

a. The Contractor shall indicate in **bold type** at the top of the cover sheet of submittal of shop drawing if there is a deviation from the Drawings, Specifications, or referenced specifications or codes.

b. The Contractor shall also list any deviations from the Drawings, Specifications, or referenced specifications or codes and identify in green ink prominently on the applicable Shop Drawings.

6. Submittal Log Number conforming to Specification Section Number.

G. The Contractor shall submit five (5) copies of descriptive or product data information and Shop Drawings to the Engineer plus the number of copies which the Contractor requires returned.

H. The Contractor shall be responsible for and bear all costs of damages which may result from the ordering of any material or from proceeding with any part of Work prior to the completion of the review by the Engineer of the necessary Shop Drawings.

I. The Contractor shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the materials/equipment he proposes to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of the Drawings and Specifications.

J. The Contractor shall not use Shop Drawings as a means of proposing alternate items to demonstrate compliance with the Drawings and Specifications.

K. Each submittal will bear a stamp indicating that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal. The Contractor stamp shall be similar to the sample given below.

(OWNER'S NAME)
(PROJECT NAME)
(PROJECT NUMBER)

SHOP DRAWING NO.:_____

SPECIFICATION SECTION:_____
DRAWING NO._____

WITH RESPECT TO THIS SHOP DRAWING OR SAMPLE, I HAVE DETERMINED AND VERIFIED ALL QUANTITIES, DIMENSIONS, SPECIFIED PERFORMANCE CRITERIA, INSTALLATION REQUIREMENTS, MATERIALS, CATALOG NUMBERS, AND SIMILAR DATA WITH RESPECT THERETO AND REVIEWED OR COORDINATED THIS SHOP DRAWING OR SAMPLE WITH OTHER SHOP DRAWINGS AND SAMPLES AND WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS.

_____ NO VARIATION FROM CONTRACT DOCUMENTS

_____ VARIATION FROM CONTRACT DOCUMENTS AS SHOWN

(CONTRACTOR'S NAME)
(CONTRACTOR'S ADDRESS)

BY:_____
AUTHORIZED SIGNATURE
DATE:_____

L.. Drawings and schedules shall be checked and coordinated with the work of all trades and sub-contractors involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.

1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The Engineer's review of Shop Drawings, Data, and Samples as submitted by the Contractor will be to determine if the items(s) generally conforms to the information in the Contract Documents and is compatible with the design concept. The Engineer's review and exceptions, if any, will not constitute an approval of dimensions, connections, quantities, and details of the material, equipment, device, or item shown.

B. The review of drawings and schedules will be general, and shall not be construed:

1. As permitting any departure from the Contract Documents.

2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.

3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

C. If the drawings or schedules as submitted describe variations and show a departure from the Contract Documents which the Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or contract time, the Engineer may return the reviewed drawings without noting an exception.

D. "Approved As Noted" - Contractor shall incorporate Engineer's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the Engineer acknowledging the comments and their incorporation into the Shop Drawing.

E. "Amend And Resubmit" - Contractor shall resubmit the Shop Drawing to the Engineer. The resubmittal shall incorporate the Engineer's comments highlighted on the Shop Drawing.

F. "Rejected" - Contractor shall correct, revise and resubmit Shop Drawing for review by Engineer.

G. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.

H. If the Contractor considers any correction indicated on the drawings to constitute a change to the Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.

I. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items for:

1. Systems.

2. Processes.

3. As indicated in specific Specifications Sections.

All drawings, schematics, manufacturer's product data, certifications, and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

K. Only the Engineer shall utilize the color "red" in marking Shop Drawing submittals.

L. Shop drawing and submittal data shall be reviewed by the Engineer for each original submittal and first resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor and the Contractor shall reimburse the Owner for services rendered by the Engineer as specified in the Supplementary Conditions.

1.04 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawing" shall be considered to mean Contractor's plans for materials and equipment which become an integral part of the Project. Shop Drawings shall be complete and detailed and shall consist of fabrication, erection, setting and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Catalogs cuts, catalogs, pamphlets, descriptive literature, and performance and test data shall be considered only as supportive information to required Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.

B. Manufacturer's catalog sheets, brochures, diagrams, illustrations, and other standard descriptive data shall be clearly marked to identify pertinent materials, products, or models. Delete information which is not applicable to the Work by striking or cross-hatching.

C. Each Shop Drawing shall be submitted with an 8-1/2" by 11" cover sheet which shall include a title block for the submittal. Each Shop Drawing cover sheet shall have a blank area 3-1/2 inches high by 4-1/2 inches wide, located adjacent to the title block. The title block/cover sheet shall display the following:

1. Project Title and Number.

2. Name of project building or structure.

3. Number and title of the Shop Drawing.

4. Date of Shop Drawing or revision.

5. Name of Contractor and subcontractor submitting drawing.

6. Supplier/manufacturer.

7. Separate detailer when pertinent.

8. Specification title and Section number.

9. Applicable Drawing number.

D. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog data sheets, catalog cuts, performance curves, diagrams, verification of conformance with applicable standards or codes, materials of construction, and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish, and all other pertinent Data.

E. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, and address, and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.

F. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such drawings have been reviewed.

G. All manufacturers or equipment suppliers who propose to furnish equipment or products shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five (5) installations where identical equipment has been installed and has been in operation for a period of at least two (2) years unless specified otherwise in the Specification Section applicable.

1.05 WORKING DRAWINGS

A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework for underpinning, and for such other work as may be required for construction but does not become an integral part of the Project.

B. Copies of working drawings as noted in paragraph 1.05 A. above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for the Work.

C. Working Drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida, and shall convey, or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks to new or existing work are assumed by the Contractor; the Owner and Engineer shall have no responsibility therefor.

1.06 SAMPLES

A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved by the Engineer.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the product, with integrally related parts and attachment devices.

2. Full range of color, texture, and pattern.

3. A minimum of two (2) samples of each item shall be submitted.

C. Each sample shall have a label indicating:

1. Name of Project.

2. Name of Contractor and subcontractor.

3. Material or equipment represented.

4. Place of origin.

5. Name of producer/supplier and brand (if any).

6. Location in Project.

7. Submittal and specification numbers.

(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

D. The Contractor shall prepare a transmittal letter and a description sheet for each shipment of samples. The description sheet shall contain the information required in Paragraphs 1.06B and C above. He shall enclose a copy of the letter and description sheet with the shipment and send a copy of the letter and description sheet to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

E. Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the Work. Approved Samples of the hardware in good condition will be marked for identification and may be used in the Work. Materials and equipment incorporated in the Work shall match the approved Samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.10 SECTION 01370: SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Submit to the Engineer a Schedule of Values allocated to the various lump sum portions of the Work, at the Pre-Construction Conference.

2. Upon request of the Engineer support the values with data which will substantiate their correctness. The data shall include, but not be limited to quantity of materials, all sub-elements of the activity, and their units of measure. The City of Clearwater does not pay the contractor for shop drawing review.

3. The Schedule of Values shall establish the actual value for each activity of the Work to be completed taken from the Critical Path Method (CPM) Construction Schedule, and shall be used as the basis for the Contractor's Applications for Payment.

B. Related Requirements Described Elsewhere:

1. Conditions of the Construction Contract.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on 8-1/2 inch x 11 inch white paper. Contractor's standard forms and computer printouts may be considered for approval by the Engineer upon Contractor's request. Identify schedule with:

1. Title of project and location.

2. Owner and purchase order number.

3. Engineer and project number.

4. Name and address of Contractor.

5. Contract designation.

6. Date of submission.

B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing item prices for progress payments during construction.

C. Identify each line item with the number and the title of the respective section of the Specifications.

D. For each major item of the Work, list sub-values of major products or operations under the major item.

E. For the various portions of the Work:

1. The amount for each item shall reflect a total installed cost including a directly proportional amount of the Contractor's overhead and profit. Payment will only be made for that portion of the work, which is fully installed including all materials, labor and equipment.

F. Round off figures to nearest dollar amount.

G. The sum of the costs of all items listed in the schedule shall equal the total Contract Price.

H. For each item which has an installed value of more than $15,000, provide a breakdown of costs to list major products or operations under each item.

1.03 SUBSCHEDULE OF UNIT MATERIAL VALUES

A. The unit values for the materials shall be broken down into:

1. Cost of the material, delivered and unloaded at the site, with taxes paid.

2. Copies of paid invoices for component material shall be included with the payment request in which the material first appears.

B. Materials of standard use such as conduit, wire, small-diameter pipe, steel, etc., shall not be accepted for payment.

C. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

1.04 REVIEW AND RESUBMITTAL

A. After review by Engineer, revise and resubmit Schedule of Values and Schedule of Unit Material Values as required.

B. Resubmit revised schedules in same manner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.11 SECTION 01505: MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 DEFINITION AND SCOPE

A. Mobilization shall include the obtaining of all permits, insurance, and bonds; moving onto the site of all equipment; and furnishing and erecting temporary construction facilities; all as required for the proper performance and completion of the Work. Mobilization shall include, but not be limited to, the following principal items.

1. Move onto the site all Contractor's plant and equipment required for first month operations.

2. Install temporary construction power, wiring, and lighting facilities, as required.

3. Establish fire protection plan and safety program.

4. Secure construction water supply.

5. Provide on-site sanitary facilities and potable water facilities as required by agencies having jurisdiction.

6. Arrange for and erect Contractor's work and storage yard and employee's parking facilities.

7. Submit all required insurance certificates and bonds.

8. Obtain all required permits.

9. Post all OSHA, EPA, Department of Labor, and all other required notices.

10. Submit a detailed construction schedule acceptable to the Engineer as specified.

11. Submit a schedule of values of the Work. Mobilization and Demobilization shall not be more than 5.0% of the bid amount.

12. Submit a schedule of submittals.

13. Install project sign.

1.02 DEMOBILIZATION

A. Demobilization is the timely and proper removal of all Contractor owned material, equipment or plant, from the job site and the proper restoration or completion of work necessary to bring the site into full compliance with the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.12 SECTION 01600: MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Material and equipment incorporated into the Work:

1. Manufactured and fabricated products:

a. Design, fabricate and assemble in accord with the best engineering and shop practices.

b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.

c. Two (2) or more items of the same kind shall be identical, by the same manufacturer.

d. Products shall be suitable for service conditions.

e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

2. Do not use material or equipment for any purpose other than that for which it is designed or specified.

1.02 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

A. Contractor will need to coordinate with Evoqua well in advance of construction, and in advance of necessary inspections, to ensure a representative is available.

B. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including five copies of the Engineer.

1. Maintain one (1) set of complete instructions at the job site during installation and until completion.

C. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.

2. Do not proceed with work without clear instructions.

D. Perform work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.03 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accordance with progress schedules, coordinate to avoid conflict with work and conditions at the site. City employees will not accept deliveries, sign receipts for materials, inspect deliveries, assist in unloading or participate in any activities related to the Contractor receiving materials or equipment. Deliveries shall be scheduled during normal working hours and a representative of the Contractor must be present to receive all shipments.

1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.04 STORAGE AND PROTECTION

A. The Contractor shall furnish a covered, weather-protected storage structure providing a clean, dry, noncorrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this Project. Storage of equipment shall be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including connection of heaters, placing of storage lubricants in equipment, etc. Corroded, damaged or deteriorated equipment and parts shall be replaced before acceptance of the project.

B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

1. Store products subject to damage by the elements in weather-tight enclosures.

2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

3. Store fabricated products above the ground, on blocking or skids, prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.

4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

C. All materials and equipment to be incorporated in the work shall be handled and stored by the Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.

D. Cement, sand and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural and miscellaneous steel, and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete beams shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking and spalling to a minimum.

E. All materials, which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the work, and the Contractor shall receive no compensation for the damaged material or its removal.

F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.

G. Protection After Installation: Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove covering when no longer needed.

H. The Contractor shall be responsible for all material, equipment and supplies sold and delivered to the Owner under this Contract until final inspection of the work and acceptance thereof by the Owner. In the event any such material, equipment and supplies are lost, stolen, damaged or destroyed prior to final inspection and acceptance, the Contractor shall replace same without additional cost to the Owner.

I. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven (7) days after written notice to do so has been given, the Owner retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering and any other costs associated with making the necessary corrections.

1.05 STORAGE AND HANDLING OF EQUIPMENT ON SITE

A. Because of the long period allowed for construction, special attention shall be given to the storage and handling of equipment on site. As a minimum, the procedure outlined below shall be followed:

1. Materials shall not be shipped until approved by the Engineer. The intent of this requirement is to avoid unnecessary delivery of unapproved materials and to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall major equipment or finish products be delivered to the site more than one month prior to installation without written authorization from the Engineer. Materials shipped to the site, or temporarily stored off-site in approved locations, shall be stored in accordance with Paragraph 1.04, herein.

2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the Engineer, until such time as the equipment is to be installed.

3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.

4. Manufacturer's storage instructions shall be carefully studied by the Contractor and reviewed with the Engineer by him. These instructions shall be carefully followed and a written record of this kept by the Contractor.

5. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half the load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.

6. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. Mechanical equipment to be used in the work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed and lubricated prior to testing and startup, at no extra cost to the Owner.

7. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

8. Payment will only be made for that portion of the work, which is fully installed including all materials, labor and equipment.

1.06 SPARE PARTS

A. Spare parts for certain equipment provided under Divisions 11: Equipment; 13: Special Construction; 15: Mechanical; and 16: Electrical have been specified in the pertinent sections of the Specifications. The Contractor shall collect and store all spare parts so required in an area to be designated by the Engineer. In addition, the Contractor shall furnish to the Engineer an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

1.07 GREASE, OIL AND FUEL

A. All grease, oil and fuel required for testing of equipment shall be furnished with the respective equipment. The Owner shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of equipment supplied.

B. The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be any longer than three (3) weeks of operation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.13 SECTION 01650: START-UP AND DEMONSTRATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Demonstrate to Owner and Engineer that the Work functions as a complete and operable system under normal and emergency operating conditions.

B. Requirements

A. Contractor shall provide all materials, personnel, equipment and expendables as needed and as specified to perform the required start-up and demonstration tests.

B. Equipment testing and facility start-up is requisite to satisfactory completion of the contract and, therefore, shall be completed within the required contract time for substantial completion.

C. Related Work Described Elsewhere:

1. Construction Progress Schedules: Section 01310.

2. Equipment: Division 11.

PART 2 - PRODUCTS

2.01 START-UP PLAN

A. Submit for approval by the Engineer a detailed start-up plan outlining the schedule and sequence of all tests and start-up activities, including submittal of check-out forms. Start-up and commissioning may not begin until the plan is approved by the Engineer.

PART 3 - EXECUTION

3.01 COMPONENT TEST AND CHECK-OUT

A. Start-up Certification: Prior to system start-up, successfully complete all the testing required of the individual components of the Work. Electronically submit check-out forms for each set of two (2) filters, signed by the Contractor or the subcontractor. These forms shall be completed and submitted before submitting requests for initiating any final inspections.

B. Demonstrate to the Engineer and the Owner's representative, that all temporary jumpers and/or bypasses have been removed and that all of the components are operating under their own controls as designated.

C. Coordinate start-up activities with the Owner's operating personnel at the site and with the Engineer prior to commencing system start-up.

3.02 START-UP

A. Each filter shall be started up and placed on line as soon as the mechanical rehabilitation work associated with the specific filter cell has been completed, and the cell has been cleared and is ready for service.

B. Confirm that all equipment is properly energized.

C. Observe the component operation and make adjustments as necessary to optimize the performance of the Work.

D. In each filter cell, level sensors shall be tested by filling the filter cell with water. Contractor shall confirm the following:

A. Level sensor on/off elevations are installed at the setpoint elevations recommended by the filter equipment manufacturer (Evoqua).

B. Level sensors are wired in the normally open (NO) position.

C. Upper switch activates Backwash routine.

D. Lower switch activates Air Mix/Pulse Mix routine

E. The Chem Clean System shall be tested as recommended and approved by the filter equipment manufacturer to be cleared for service.

F. Filter Influent and Backwash Trough valves shall be tested as recommended and approved by the valve manufacturer to be cleared for service.

H. Coordinate with Owner for any adjustments desired or operational problems requiring debugging.

H. Make adjustments as necessary.

3.03 START-UP DEMONSTRATION AND TESTING (PER SET OF TWO (2) FILTERS)

A. After all Work components have been constructed, field tested, and started up in accordance with the individual Specifications and manufacturer requirements, and after all Check-Out Forms have been completed and submitted, perform the Start-Up Demonstration and Testing.

B. The demonstration period shall be held upon completion of all systems at a starting date to be agreed upon in writing by the Owner or Engineer.

C. The Start-Up Demonstration Testing will be as instructed by the Filter Equipment Manufacturer.

D. Repairs and additional tests shall be made by the Contractor at no additional cost to the Owner.

E. Acceptability of the Work's performance will be based on the Filter Equipment Manufacturers criteria which shall be identified and agreed upon prior to commencement of Work. The intent of the start-up demonstration and testing is for the Contractor to demonstrate to the Owner and the Engineer that the Work will function as a complete and operable system under normal, as well as emergency operating conditions, and is ready for final acceptance.

F. Electronically submit to the Engineer a Certificate of Completed Demonstration Form, for each item of equipment or system in the Work, signed by the Contractor, Subcontractor, Engineer, and the Owner. Samples of the Check Out Form and Certificate of Completed Demonstration Form are provided at the end of this Section.

CHECK OUT FORM

[] OWNER City of Clearwater No. Copies ____ CHECK-OUT
[] ENGINEER: Tetra Tech No. Copies ____ MEMO NO. _____
[] ARCHITECT: _____ No. Copies ____
[] CONTRACTOR: _____ No. Copies ____
[] FIELD: _____ No. Copies ____
[] OTHER: _____ No. Copies ____

PROJECT DATA CONTRACT DATA

NAME: _____ NUMBER: _____

LOCATION: _____ DATE: _____

OWNER: _____ DRAWING NO: _____

OTHER: _____ SPECIFICATION SECTION: _____

Name of equipment checked:

Name of manufacturer of equipment:

1. The equipment furnished by us has been checked on the job by us. We have reviewed, where applicable, the performance verification information submitted to us by the Contractor.

2. The equipment is properly installed, except for items noted below.*

3. The equipment is operating satisfactorily, except for items noted below.*

Checked By:

_____ _____

Name of Manufacturer's Rep. Name of General Contractor

_____ _____

Address and Phone # of Rep. Authorized Sig./Title/Date

_____ _____

Sig./Title/Pers. Making Chk. Name of Subcontractor

_____ _____

Date Checked Authorized Sig./Title/Date

Manufacturer's Representative Notations: Exceptions noted at time of check were:

_____

_____

_____

_____

Manufacturer's Representative to note adequacy of related equipment that directly affects operation, performance or function of equipment checked. (No comment presented herein will indicate adequacy of related systems or equipment):

_____

_____

_____

_____

CERTIFICATE OF COMPLETED DEMONSTRATION FORM

[] OWNER City of Clearwater No. Copies ____ CERTIFICATE
[] ENGINEER: Tetra Tech No. Copies ____ OF COMPLETED
[] ARCHITECT: _____ No. Copies ____ DEMONSTRATION
[] CONTRACTOR: _____ No. Copies ____ MEMO NO. _____
[] FIELD: _____ No. Copies ____
[] OTHER: _____ No. Copies ____

_____

PROJECT DATA

NAME: _____
LOCATION: _____
OWNER: _____
OTHER: _____

CONTRACT DATA

NUMBER: _____
DATE: _____
DRAWING NO: _____
SPECIFICATION SECTION: _____

_____

NOTE TO CONTRACTOR:

Submit five (5) copies of all information listed below for checking at least one (1) week before scheduled demonstration of the Work. After all information has been approved by the Engineer, give the Owner a Demonstration of Completed Systems as specified and have the Owner sign five (5) copies of this form. After this has been done, a written request for a final inspection of the system shall be made.

MEMORANDUM:

This memo is for the information of all concerned that the Owner has been given a Demonstration of Completed Systems on the work covered under this Specification Section. This conference

consisted of the system operation, a tour on which all major items of equipment were explained and demonstrated, and the following items were given to the Owner:

(a) Owner's copy of Operation and Maintenance Manual for equipment or systems specified under this Section containing approved submittal sheets on all items, including the following:

(1) Maintenance information published by manufacturer on equipment items.

(2) Printed warranties by manufacturers of equipment items.

(3) Performance verification information as recorded by the Contractor.

(4) Check-Out Memo on equipment by manufacturer's representative.

(5) Written operating instructions on any specialized items.

(6) Explanation of guarantees and warranties on the system.

(b) Prints showing actual "As-Built" conditions.

(c) A demonstration of the system in operation and of the maintenance procedures which will be required.

_____
(Name of General Contractor)

By: _____
(Authorized Signature, Title and Date

_____
(Name of Subcontractor)

By: _____
(Authorized Signature, Title and Date

Operation and Maintenance Manuals, Instruction Prints, Demonstration and Instruction in Operation Received:

_____ _____
(Name of Owner)

By:

_____ (Authorized
Signature/Title/Date

END OF SECTION

4.14 SECTION 01700: CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

B. Related Requirements Described Elsewhere:

1. Contract Closeout: Section 01700.
2. Project Housekeeping/Cleaning: Section 01710.
3. Project Record Documents: Section 01720.
4. Warranties and Bonds: Section 01740.

1.02 SUBSTANTIAL COMPLETION

A. The Work will not be substantially complete, and Contractor may not request substantial completion inspection unless the following submittals and work is completed:

A. Project Record Documents are complete and have been submitted and reviewed to the requirements of Section 01720.

B. All start-up and demonstration testing completed, and Certificates of Completed Demonstration submitted to the requirements of Section 01650.

3. All areas to be used and occupied are safe, operable in automatic and complete.

4. All building occupancy certificates have been issued by the appropriate building permitting agency.

5. All painting, finishes, fencing, cleanup, final grading, grassing, planting, sidewalk construction, and paving shall have been completed and are ready for inspection.

6. All deficiencies noted on inspection reports or nonconformances are corrected or the correction plan approved.

B. When the conditions of Paragraph 1.02 A. are met the Contractor shall submit to the Engineer:

1. A written notice that he considers the Work, or portion thereof, is substantially complete, and request an inspection.

2. A punchlist of items to be corrected. (Uncompleted work which is not related to the safe, effective, efficient use of the Project may be allowed on the punchlist with the Engineer's approval.)

C. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.

D. Should the Engineer determine that the Work is not substantially complete:

1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefor.

2. Contractor shall remedy the deficiencies in the Work and send another written notice of substantial completion to the Engineer.

3. The Engineer will within reasonable time, reinspect the Work. The Contractor will be liable for reinspection fees as described in Paragraph 1.04, herein.

E. When the Engineer finds that the Work is substantially complete, he will:

1. Schedule a walk-through of the facility to include the Owner. Engineer shall determine the completeness of the punchlist and readiness of the facility for occupancy by the Owner.

2. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with the tentative punchlist of items to be completed or corrected before final inspection.

3. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected. Any incomplete work allowed on a punchlist must be reinspected upon completion and any deficiencies found will be added to the punchlist.

1.03 FINAL PROJECT INSPECTION

A. Prior to Contractor's request for a final project inspection the following submittals and work must be complete:

1. Project Record Documents must be approved.

2. All spare parts and maintenance materials must be suitably delivered to the Owner per the requirements of the Technical Sections of the Specifications.

3. Contractor to submit evidence of compliance with requirements of governing authorities.

B. After satisfying the requirements of Paragraph 1.03 A. and when Contractor considers the Work complete, he shall submit written certification that:

1. Contract Document requirements have been met.

2. Work has been inspected for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.

5. All punchlist items have been corrected or completed and the Work is ready for final inspection.

C. The Engineer will, within reasonable time, make an inspection to verify the status of completion after receipt of such certification.

D. Should the Engineer consider that the Work is incomplete or defective:

1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send another written certification to the Engineer that the Work is complete.

3. The Engineer will, within a reasonable amount of time, reinspect the Work and the Contractor shall be liable for reinspection fees as described in Paragraph 1.04, herein.

E. When the Engineer finds that the Work is acceptable under the Contract Documents, the Contractor may make closeout submittals.

1.04 REINSPECTION FEES

A. Should the Engineer perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:

1. Contractor will compensate the Owner for such additional services.

2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS

A. Warranties and Bonds: To requirements of Section 01740.

B. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.

C. Certificate of Insurance for Products and Completed Operations.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Engineer.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum.

2. Additions and deductions resulting from:

a. Previous change orders or written amendments.

b. Allowances.

c. Unit prices.

d. Deductions for uncorrected work.

e. Penalties and bonuses.

f. Deductions for liquidated damages.

g. Deductions for reinspection payments.

h. Other adjustments.

3. Total Contract Sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

1.07 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Agreement between City and Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.15 SECTION 01710: PROJECT HOUSEKEEPING/CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Execute cleaning, during progress of the Work and at completion of the Work.

1.02 DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

A. Execute daily cleaning to keep the Work, the site and adja-cent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations or personal activities.

B. Provide on-site containers for the collection of waste materials, debris and rubbish.

C. Remove waste materials, debris and rubbish from the site periodically, or as directed by the Owner, and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

A. The Contractor shall employ construction techniques that minimize the production and distribution of dust.

B. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.

C. Schedule operations so that dust and other contaminants re-sulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Remove grease, mastic, adhesives, dust, dirt, stains, fin-gerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas, to verify that the entire Work is clean.

END OF SECTION

4.16 SECTION 01720: PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Maintain at the site for the Owner one (l) record copy of:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications of the Contract.

5. Engineer's Field Orders or written instructions.

6. Approved Shop Drawings, Working Drawings and Samples.

7. Field test records.

8. Construction photographs.

B. Related Requirements Described Elsewhere:

1. Shop Drawings, Working Drawings and Samples: Sec-tion 01340.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.

2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format with section numbers as provided herein.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construc-tion purposes.

D. Make documents and samples available at all times for in-spection by the Engineer or the Owner.

E. As a prerequisite for monthly Progress payments, the Con-tractor is to exhibit the currently updated "Record Docu-ments" for review by the Engineer and Owner. Payment may be withheld if record documents are not satisfactorily maintained.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by the Engineer.

1.04 RECORDING

A. Label each document "PROJECT RECORD" with a rubber stamp having one (1) inch high letters.

B. Record information concurrently with construction progress.

1. Do not conceal any work until required information is recorded.

C. Drawings: Legibly and clearly mark, to scale, each drawing to record actual construction:

1. Depths of various elements of foundation in relation to finish first floor datum.

2. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.

3. Location of internal utilities and appurtenances con-cealed in the construction, referenced to visible and accessible features of the structure.

4. Field changes of dimension and detail.

5. Changes made by Field Order or by Change Order.

6. Details not on original Contract Drawings.

7. Equipment and piping relocations.

8. Major architectural and structural changes including relocation of doors, windows, etc.

9. Architectural schedule changes according to Contrac-tor's records and shop drawings.

D. Specifications and Addenda: Legibly mark each section to record:

1. Manufacturer, trade name, catalog number of Supplier of each product and item of equipment actually installed.

2. Changes made by Field Order or by Change Order.

E. Shop Drawings (after final review and approval): Provide six (6) sets of record shop drawings, for each process equip-ment, piping, electrical system and instrumentation system (see Section 01340).

1.05 SUBMITTAL

A. At Contract closeout, deliver Record Documents to the Engi-neer for the Owner.

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date.

2. Project title and number.

3. Contractor's name and address.

4. Title and number of each Record Document.

5. Signature of Contractor or his authorized representa-tive.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED

END OF SECTION

4.17 SECTION 01740: WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Described Elsewhere:

1. Contract Closeout: Section 01700.

1.02 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two (2) each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product of work item.

2. Firm, with name of principal, address and telephone number.

3. Scope.

4. Date of beginning of warranty, bond or service and maintenance contract.

5. Duration of warranty, bond or service maintenance contract.

6. Provide information for Owner's personnel:

a. Proper procedure in case of failure.

b. Instances which might affect the validity or warranty or bond.

7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 inches by 11 inches, punch sheets for standard three (3) ring binder.

a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

a. Title of Project.

b. Name of Contractor.

C. Binders: Commercial quality, three (3) D-ring type binders with durable and cleanable white plastic covers and maximum D-ring width of two (2) inches. Binders shall be presentation type with clear vinyl covers on front, back, and spine. Binders shall include two sheet lifters and two horizontal inside pockets.

1.04 WARRANTY SUBMITTALS REQUIREMENTS

A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year, unless otherwise specified, commencing at the time of final acceptance by the Owner.

B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment. Electrical and which has at least a 1 hp motor or which lists for more than $1,000. The Engineer reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be "major" in the Contractor's one-year warranty period even though certificates of warranty may not be required.

C. In the event that the equipment manufacturer or supplier is unwilling to provide a one (1) year warranty commencing at the start of the Correction Period, the Contractor shall obtain from the manufacturer a two (2) year warranty commencing at the time of equipment delivery to the job site. This two (2) year warranty from the manufacturer shall not relieve the Contractor of the one (1) year warranty, starting at the time of Owner's acceptance of the equipment.

D. The Owner shall incur no labor or equipment cost during the guarantee period.

E. Guarantee shall cover all necessary labor, equipment, materials, and replacement parts resulting from faulty or inadequate equipment design, improper assembly or erection, defective workmanship and materials, leakage, breakage or

other failure of all equipment and components furnished by the manufacturer or the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

4.18 SECTION 03180: CONCRETE COATING SYSTEM

A. - GENERAL

- SCOPE OF WORK

1. Furnish and install all labor, materials, equipment and incidentals required to supply and install the concrete coating system on the sand filter structure as indicated on the Drawings.

- WARRANTY

1. The specialty coatings (both materials and application) shall be warranted for a period of three (3) years after the acceptance of the project by the Department. A sample copy of the warranty shall be provided with the submittals. A fully executed warranty shall be submitted prior to placing each coated structure back in service.

2. The Contractor shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during the warranty period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without any additional cost to the Owner.

- SUBMITTALS

1. Submit for review, in accordance with Section 01340, complete detailed shop drawings for all materials fur-nished under this Section.

2. A rehabilitation plan detailing the methods, materials and procedures proposed for the rehabilitation of the facilities shall be prepared by the Contractor.

3. The manufacturer of the coating system shall furnish an affidavit attesting to the successful use of its material as a coating for concrete structures for a minimum period of 5 years in wastewater conditions recognized as corrosive or otherwise detrimental to concrete.

- QUALITY ASSURANCE

1. The coatings system manufacturer shall provide a representative to visit the jobsite at intervals during surface preparation and coating application as may be required for product application quality assurance, and to determine compliance with supplier's instructions and these Specifications, and as may be necessary to resolve field problems attributable to, or associated with, the manufacturer's products furnished under this Contract.

2. The following minimum site visits shall be provided for inspections by the coating system manufacturer's representative:

    a. Prior to surface preparation, inspection of all concrete surfaces specified in this section to be coated. At this time, the manufacturer's representative shall review and recommend the surface preparation and repair procedures with the applicator.

    b. Inspection of all prepared surfaces prior to repair activities. At this time, the manufacturer's representative shall approve the surface preparation for repair coating application.

    c. Inspection of all areas of exposed reinforcing steel after application of the bonding agent and prior to application of repair coating.

    d. Post-repair inspection prior to application of the coating system. At this time, the manufacturer's representative shall approve the re-surfaced surfaces for final coating application.

    e. The manufacturer shall visit the site during the coating application to ensure that the application process is proceeding in accordance with its recommendations.

    f. A post installation inspection shall be provided by the manufacturer's representative prior to issuance of a guarantee for the work specified herein.

    g. The manufacturer's factory representative shall submit all inspection reports to the Engineer within five days of each site visit documenting its observations and certifying the suitability of the applicator's work for the coating application.

3. The coating system applicator shall have a minimum of five years' practical experience in applying the approved coating system. Prior to application of any coating, Contractor shall furnish the Engineer with a detailed list of previous jobs and references substantiating the requirement. Records of such jobs showing project name, owner's name and contact information, engineer's name and contact

information, date of completion, and results of subsequent inspections and tests shall be submitted as verification of performance. The coating system manufacturer shall submit a letter stating that the proposed applicator is qualified to apply the coatings specified herein and that all components proposed for use in the project are acceptable and will not adversely affect the finish coating system or its warranty.

4. It is the responsibility of the Contractor to inspect and provide substrate surfaces that are prepared in accordance with these Specifications and the printed directions and recommendations of the Manufacturer's representative.

5. Report in writing to Engineer, with copy to manufacturer, of deficiencies that could impair work. Surfaces must be approved by the coating system manufacturer and the installing contractor prior to application of coating.

B. - PRODUCTS

- COATING SYSTEMS

1. The coating system shall be one of the systems as described in the drawings and outlined below or approved equal. The cementitious surfacer products along with primers and other products used to prepare the surface shown below shall be coordinated with the site-specific requirements of the Manufacturer.

    a. Sherwin Williams

        i. Cementitious surfacer shall be Dura-Plate

        ii. Apply (1) or more coatings of Dura-Plate 2300 at a maximum thickness of 1/8 in. DFT or as required to build back up to original thickness.

        iii. Acceptable topcoat to be (3) coatings of Macropoxy 5500 with a minimum thickness of 10 Mils DFT each coat.

        iv. Do not use in conjunction with Vinyl Ester and Polyester coatings or lining systems.

    b. Tnemec

        i. Cementitious Surfacer shall be Series 217 or 218 and shall be applied at a thickness as required to bring the existing structure up to original thickness.

        ii. Apply (1) or more coatings of Series N69 on surfaces at a recommended DFT of 5-10 mils each coat.

iii. Apply (2) coatings of Series G435 topcoat on surfaces at a recommended DFT of 30-40 mils in (1) to (2) coats

c. Approved Equal

C. - EXECUTION

- GENERAL

A.

B.

C.

1. Surface preparation shall be performed in accordance with Manufacturer's requirements and at a minimum shall remove all deteriorated materials, dirt, oil, grease, and all other bond inhibiting materials from the surface by dry mechanical means, i.e. -sandblasting, grinding, etc, as approved by the Engineer.

2. Where existing reinforcement is exposed the reinforcement shall be cleaned of all rust and coated with a corrosion inhibitor as recommended by the coating Manufacturer.

3. Installation, curing and testing shall be performed in accordance with the Manufacturer's specifications and requirements.

4. In all cases where coating work must be performed in a non-flow condition the Contractor shall be responsible for coordinating and facilitating all flow diversion and bypass pumping during the coating operation.

5. New Portland cement concrete structures shall have been cured for a minimum of 28 days prior to commencing coating installation. Should earlier coating be required, coating product manufacturer shall recommend specifications including appropriate cure assessment testing and use of specialty primers and sealers.

- REPAIRS AND SURFACE PREPARATION

1. Excessive debris, sediment, root intrusion or other foreign materials which may impact the effectiveness of the surface preparation process shall be removed prior to the commencement thereof.

2. Offset structural components, lids, covers, frames, etc. shall be repaired, replaced, or reset prior to the commencement of surface preparation.

3. External soil/fill voids shall be remediated and/or stabilized by replacement or injection of stabilizing grout as determined appropriate by the engineer.

4. Oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants which may affect the performance and adhesion of the coating to the substrate shall be removed in accordance with SSPC-SP 1 – Solvent Cleaning.

5. Choice of surface preparation method(s) should be per the coating manufacturer's recommendation which shall be based upon the condition of the structure and concrete or masonry surface, potential contaminants present, access to perform work, and the required cleanliness and profile of the prepared surface to receive the repair and/or coating product(s).

6. Surface preparation method shall be abrasive blasting.

    a. SSPC SP-13/NACE No. 6 Surface Preparation of Concrete,

    b. ASTM D-4258 Standard Practice for Surface Cleaning Concrete for Coating and ASTM-D-4259 Standard Practice for Abrading Concrete,

    c. ICRI Technical Guideline No. 03732 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

    d. NACE/SSPC Standards for the surface preparation of steel.

7. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound, clean, and neutralized surface suitable for the specified coating product(s).

    a. Resulting surface profile of the prepared concrete substrate shall be (as described in ICRI Technical Guideline No. 03732):

        i. For application of cementitious materials; at least a CSP2

        ii. For application of coating products: at least a CSP2.

b. Concrete and/or mortar damaged by corrosion, chemical attack or other means of degradation shall be removed so that sound substrate remains,

   i. In conditions where severe chemical/microbiological attack has occurred the prepared substrate shall exhibit a pH of 8-12. Additional cleaning and/or contaminated substrate removal may be required to achieve the specified pH level.

c. Steel surfaces to be coated shall be abrasive blast cleaned.

   ii. Blast air shall be free of oil and water.

   iii. Abrasive shall be as required to produce the specified level of cleanliness and profile in an efficient and uniform manner. Abrasive shall not be recycled.

   iv. Abrasive blasting shall not be performed when the air or steel temperature is below 40 deg F, when the relative humidity exceeds 80%, or when the steel is less than 5 deg F warmer than the dew point. The Contractor will provide dehumidification, and/or temperature control as necessary to meet these conditions.

   v. Blast cleaning shall be in accordance with SSPC-SP 5, White Metal Blast Cleaning for immersion service of the coated areas. Blast cleaning for other surfaces shall be in accordance with SSPC-SP 10, Near White Blast Cleaning. Anchor profile shall be 2.5-5.0 mils and relative to the coating thickness specified.

   vi. Alternatively, surfaces to be recoated may be cleaned according to SSPC-SP 12/NACE No. 5 Surface Preparation and Cleaning of Metals by Water jetting prior to Recoating.

8. At the time of the recoating, the amount of flash rust shall be no greater than “No Flash Rust” as defined in SSPC-SP 12.
9. Prior to the application of the coating product repairs shall be completed to ensure the following:

   i. All inflow and infiltration shall be eliminated by use of appropriate repair material(s), such as hydraulic cements and/or chemical grouts.

   j. All repairs to joints, pipe seals, steps, mechanical penetrations, benches, inverts, pipes or other appurtenances to be coated shall be completed and repaired surfaces prepared according to this section.

vii. Benches or other horizontal surfaces shall have adequate slope (1" rise per lineal foot minimum) to minimize the retention of debris following surcharge.

viii. Inverts or flow channels shall be smooth without lips, rough edges or other features which may cause debris to collect; contoured to minimize turbulent flow; and be sloped to promote adequate flow from the inlet(s) to the outlet pipe.

ix. All joints, pipe seals, steps or other penetrations shall be sealed against inflow, infiltration and exfiltration and be adequately filled, smoothed and contoured to promote monolithic coating application.

10. Areas where reinforcing steel has been exposed shall be repaired in accordance with the Project Engineer's recommendations or at the minimum all exposed steel shall be prepared prior to coating with the coating product specified or other approved primer as specified by the coating product manufacturer.

B.

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- FIELD QUALITY CONTROL AND TESTING

11. The CONTRACTOR shall give the ENGINEER a minimum of 3 days advance notice of the start of any field surface preparation work or coating application work, and a minimum of 7 days advance notice of the start of any surface preparation work.

12. The CONTRACTOR shall furnish, until final acceptance of such coatings, inspection devices in good working condition for the detection of holidays and measurement of dry-film thicknesses of protective coatings. Dry-film thickness gages shall be made available for the ENGINEER'S use at all times while coating is being done, until final acceptance of such coatings. The CONTRACTOR shall furnish the services of a trained operator of the holiday detection devices until the final acceptance of such coatings.

13. Coating system thickness shall be inspected to ensure compliance with the specifications herein.

    a. During application a wet film thickness gauge, meeting ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness of Organic Coatings

by Notched Gages, shall be used. Measurements shall be taken, documented, and attested to by Contractor for submission to Owner.

b. After the coating product(s) have cured in accordance with manufacturer recommendations, coating system thickness may be measured according to SSPC-PA 9 - Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages.

14. High voltage holiday detection for coating systems installed in corrosive environments, when it can be safely and effectively employed, shall be performed to ensure monolithic protection of the substrate. After the coating product(s) have cured in accordance with manufacturer recommendations, all surfaces shall be inspected for holidays in accordance with NACE RPO 188-99 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates or ASTM D4787 Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates. All detected holidays shall be marked and repaired according to the coating product(s) manufacturer's recommendations.

    a. Test voltage shall be a minimum of 100 volts per mil of coating system thickness.

    b. Detection of a known or induced holiday in the coating product shall be confirmed to ensure proper operation of the test unit.

    c. All areas repaired shall be retested following cure of the repair material(s).

    d. In instances where high voltage holiday detection is not feasible a close visual inspection shall be conducted and all possible holidays shall be marked and repaired as described above.

    e. Documentation of areas tested, equipment employed, results, and repairs made shall be submitted to the Owner/Engineer by Contractor.

15. Visual inspection shall be made by the Engineer. Any deficiencies in the finished coating affecting the performance of the coating system or the operational functionality of the structure shall be marked and repaired according to the recommendations of the coating product(s) manufacturer.

16. Inspection by the ENGINEER, or the waiver of inspection of any particular portion of the WORK, shall not relieve the CONTRACTOR of its responsibility to perform the work in accordance with these Specifications.

17. Prior to demobilization from the site, the Contractor shall remove all construction debris, stabilize any spill areas and wash roadway areas affected by the work.

18. Inspection by the Owner shall be scheduled after the work is complete, and again within the warranty period.

END OF SECTION

4.19 SECTION 11287: HYDRAULIC GATES

PART 1 - GENERAL

- REFERENCES

A. The following is a list of standards which may be referenced in this Section:

A. American Water Works Associations (AWWA): C563 Standard for Fabricated Composite Slide Gates.

B. ASTM International (ASTM):

1. A193/A193M, Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.

2. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and General Applications.

3. A276, Standard Specification for Stainless Steel Bars and Shapes.

4. D635-81 Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

5. D648-82 Test Method for Deflection Temperature of Plastics Under Flexural Load.

C. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).

- DEFINITIONS

A. Slenderness Ratio: The ratio of the maximum unsupported stem length to the stem cross-section radius of gyration.

B. Self-Contained: The arrangement of gate operator, supported by gate frame, such that operating thrust loads are not applied external to the assembly.

- SCOPE OF WORK

The work to be performed under this Section shall include furnishing all labor, materials, tools and equipment necessary to install and test all hydraulic gates, consisting of, but not limited to frames, discs, seals, stems, operators, floor stands, stem guides, anchorage, electric operators, and all other appurtenances, in place and complete, as manufactured by Ashbrook-Simon-Hartley, Plasti-Fab, or an approved equal.

- SUBMITTALS:

A. Action Submittals:

1. Shop Drawings:

a. Make, model, and weight of each equipment assembly.

b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.

c. Detailed structural and mechanical drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and locations of connections to other work, and weights of associated equipment associated therewith.

d. Gate operator and stem calculations for each gate and service condition.

e. Gate opening and closing thrust forces that will be transmitted to the support structure with operator at extreme positions and load.

B. Informational Submittals:

1. Manufacturer's Certificate of Compliance.

2. Special shipping, storage and protection, and handling instructions.

3. Manufacturer's written/printed installation instructions.

4. Routine maintenance requirements prior to plant startup.

5. Manufacturer's Certificate of Proper Installation.

6. Operation and Maintenance Data.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

All equipment shall be delivered in suitable packaging, cases, or crates and stored or placed in the appropriate manner. Each package shall have an identifying mark and a

complete list showing contents. Payment will only be made for that portion of the work, which is fully installed including all materials, labor, and equipment.

1.06 WARRANTY AND GUARANTEE

The manufacturer shall guarantee the gates, when installed and operated as recommended by the manufacturer with a documented maintenance program, trouble-free operation for a period of ten (10) years. If the Owner or Engineer is not completely satisfied with the performance of the product, the manufacturer shall remedy the problem at no cost or refund the materials and installation cost upon the return of the equipment. The manufacturer shall guarantee the following:

A. Leakage shall be no more than that allowed by the AWWA C563 Standard during the guarantee period.

B. Disc shall be free of sticking or binding as judged by the Engineer (move freely via operator provided) with no exercising required. Gate operators are to be warranted by the operator manufacturer.

1.07 OTHER GATE REQUIREMENTS

A. Any seal that needs replacement in less than ten (10) years shall not be acceptable. No part of the seal shall protrude into the clear opening.

B. All gates shall be supplied by the same manufacturer who shall be fully experienced, reputable and qualified in the manufacturing of the equipment furnished and who has been building said equipment for a minimum period of ten (10) years.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

Gates shall be designed for the seating and unseating heads as listed in the Hydraulic Gate Schedule and shall conform to AWWA C563. Conformance to AWWA C563 applies to discs and frames with a safety factor of five (5) with regard to tensile, compressive and shear strength. Leakage shall not exceed 0.1 gallon per minute per foot of gate periphery under both seating and unseating head conditions. Calculations shall be submitted to show conformance. Materials of construction shall be suitable for the environment in which the gates shall be installed and operated.

2.02 GATE CONSTRUCTION

A. Rising stem type, with assembly styles as listed in the Hydraulic Gate Schedule and designated as follows:

1. Style A: Upward opening type for wall surface mounting on the concrete structures.

2. Style B: Upward opening type for mounting in channels with concrete embedded frame and invert.

3. Style C: Downward opening weir gate type with P-type invert seal for wall surface mounting on the concrete structures.

B. Guide Frames:

1. Guide frames shall be Type 316L stainless steel and shall have a slot suitable for mating with the disc. Plastic coated steel or externally reinforced disc shall not be acceptable.

2. Guide frames shall be wall mounted as shown on the Drawings against a 1” grout base.

3. Where guides are extended above the operating floor, they shall be sufficiently strong so that no further reinforcements are required.

4. The head rail shall be affixed so as to allow the gate to be removed from the guide without disassembly.

5. The head rail shall have a maximum deflection of 1/4” when subjected to a horizontal force of four times the 40-pound maximum handwheel effort.

6. Where the guide frame extends above a concrete wall, the top anchor bolt shall be not more than 6” below the top of the wall

7. The sealing arrangement for the reinforced composite sluice gates shall comprise of sealing faces and side guides constructed of ultra high molecular weight polyolefin having an extremely low coefficient of friction and a backing constructed of highly resilient expanded neoprene.

8. Join vertical guide frames and invert with factory welded comers.

9. Size guided slot to provide a minimum disc engagement of 1 inch on each side.

10. No thimbles or flanges are allowed.

C. Disc:

1. Construct disc from a reinforced rigid composite plastic material.

2. Discs shall be of solid rigid composite plastic material or they shall be reinforced units that feature a totally encapsulated reinforcing structure. Sandwich-type disc construction is not acceptable.

3. Each disc shall be molded individually to the exact dimensions specified.

4. Outer surface of the disc shall be nontoxic and stabilized against UV light.

5. Surface shall be free of exposed reinforcing fibers.

D. Seals: The sealing arrangement shall comprise of sealing faces and side guides constructed of UHMW polyolefin having an extremely low coefficient of friction and a backing constructed of highly resilient expanded neoprene. Guides and seating of the gate shall be easily adjustable (min. 5/8-inch). All moving contact surfaces shall be compatible to each other by minimizing sticking/jamming and making the operation smooth.

E. Operator Support Head Rail (Yoke):

1. For self-contained gate operators, attached to the vertical extensions of the guide frames.

2. Constructed from at least two (2) Type 316L stainless steel angles, or two (2) other suitable shapes, and bolted in place to provide a rigid assembly.

3. Maximum Deflection: Not to exceed 1/4 inch under full operator applied loading.

F. Stems:

1. l-1/4 inch minimum diameter, ASTM A276, Type 316 stainless steel.

2. Stems shall have ACME threads. Extend threaded portion of stem 2 inches above operator when gate is in CLOSED position.

3. Ratio of the unsupported stem length to the radius of gyration, both in inches, shall not exceed 200.

4. Stems to withstand in compression, without damage, the thrust equal to at least 2-1/2 times the rated output of the hoisting mechanism, with a 40-pound effort applied to the handwheel.

5. Stems shall be furnished with adjustable stem guides spaced as necessary to maintain a slenderness ratio L/R of less than 200.

6. Provide adjustable stop collar for the CLOSED position.

7. Stem shall be fixed to the disc by a threaded and keyed assembly into a lifting nut attached to the disc in a lifting bracket.

8. Gates having a width greater than twice the height shall have dual stems. For downward opening weir type gates, locate stems near outside edges of gate.

G. Stem Covers:

1. Transparent plastic, vented pipe stem cover and cap.

2. Provide with OPEN/CLOSED designators with l-inch graduations on clear mylar pressure sensitive, adhesive tape, suitable for outdoor application.

2.03 FASTENERS

All fasteners shall be of Type 316 stainless steel. All anchor bolts, assembly bolts, screws, nuts, etc. shall be of ample section to safely withstand the forces created by operation of the gate while subjected to the heads specified.

2.04 GATE OPERATORS

A. General:

1. Components: Withstand a minimum of 250 percent of design torque or thrust at extreme operator positions without damage.

2. Mount at walkway level, 36 inches above floor, unless otherwise indicated.

3. Gear train and gate stem sections shall produce a self-locking drive train.

4. Lift Nuts: Internally threaded with cut or cold-rolled Acme threads corresponding to stem threading.

5. Roller Bearings: Ball-thrust or tapered above and below lift nut to support both opening and closing thrusts.

a. Grease lubrication fittings for bearings.

b. Input pinions with needle or ball bearings.

6. Lubrication: Furnish rising stem gates with an insert lubricator flange in lift, with grease fitting for greasing stem threads below stem nut.

B. Type 1: Manual: Yoke with Handwheel and Benchstand:

1. Provide as indicated in the Hydraulic Gate Schedule.

2. Weatherproof housings, mounted on floor stand or head rail, as shown on the Drawings.

3. Solid Bronze Lift Nut: Integrally threaded with Acme threads.

4. Ball Thrust or Tapered Roller Bearings:

a. Locate above and below operating nut flange to support opening and closing thrusts.

b. Include grease lubrication fittings and input pinions.

5. Manual Effort: Not to exceed 40 pounds of force.

6. Furnish fracture-resistant clear butyrate plastic stem covers complete with indicator markings to indicate gate position. Stem covers shall not discolor or become opaque for a minimum of five (5) years after installation. The top of the stem cover shall be closed. The bottom end of the stem cover shall be mounted in a housing or adapter plate for easy field mounting.

7. Handwheel to be perpendicular in orientation to the gate (horizontal).

C. Type 2, Floor Stand with Electric Operator:

1. Provide as indicated in the Hydraulic Gate Schedule and as shown on the Drawings.

2. Use single or tandem steel or cast iron pedestals as shown on the Drawings or as required for proper operation.

3. Floor stand shall include solid bronze operating nut.

4. Ball Thrust or Tapered Roller Bearings:

a. Locate above and below operating nut to support opening and closing thrusts.

b. Include grease lubrication fittings and input pinions.

5. Manual Effort: Not to exceed 40 pounds of force on bypass crank on electric operator. Provide appropriate gearing to meet maximum effort limitation. Design gearing, shafting, and stem to withstand force resulting from 200 pound effort on bypass crank.

6. Furnish fracture-resistant clear butyrate plastic stem covers complete with indicator markings to indicate gate position. Stem covers shall not discolor or become opaque for a minimum of 5 years after installation. The top of the stem cover shall be closed. The bottom end of the stem cover shall be mounted in a housing or adapter plate for easy field mounting.

7. Provide horizontal shafting between tandem floor stands. Shafting material shall match stem material. Provide clear cover on horizontal shafting.

8. Provide corrosion resistant factory finish suitable for outdoor service or shop prime and apply finish coating in field per Section 09 90 00, Painting and Coating.

D. Identification Tagging Requirements:

1. For each gate operator, provide 1-1/2-inch minimum diameter heavy brass tag, bearing the gate tag number shown in the schedule.

2. Attach the tags to the operator by soldered split key rings to that ring and tag cannot be removed. Use block type numbers and letters with 1/4-inch minimum high numbers and letters stamped on and filled with black enamel.

2.05 ELECTRIC GATE ACTUATORS

A. Electric motor actuators shall be AUMA SA/SQ (SAR/SQR for modulating) Series, Rotork IQ/IQT Series (IQM for modulating service), or Limitorque MX/QX Series. Actuators on the project shall be of one manufacturer.

B. Motors shall be 480 volt, 3 phase and specifically designed for high torque, low inertia duty. Motors for on/off, open/close actuators shall be designed and rated for 15-minute duty or 60 starts per hour at 104°F (40°C). Motors and starters for modulating actuators shall be designed for 30-minute duty or 1,200 starts per hour at 104°F (40°C). Output capacity shall be sufficient to open or close the gate against the maximum differential head when the voltage is 10% above or below normal at the specified service conditions. Motors shall have Class F insulation. Provide motor with torque output (at duty rating). Provide an electrical and

mechanical disconnection of the motor without draining the lubricant from the actuator gearcase.

C. The rated output torque of the motor actuator shall be at least 1.5 times the maximum torque required to open or close the gate at any position including seating and unseating conditions when subjected to the most severe operating condition including any mechanical friction and/or other restrictive conditions that are inherent in the gate assembly. Do not include hammer-blow effect in sizing the actuator to comply with this torque requirement. Coordinate with the gate manufacturer to assure that the motor actuator stall torque output does not exceed the torque limits of the gate operating stem or shaft. Maximum torque shall include seating or unseating torque, bearing torque, dynamic torque, and hydrostatic torque. Assume that the differential head across the gate is equal to the rating of the gate.

D. Unless specified elsewhere in the drawings or specifications, furnish actuators for open/ close service with communication via 4-20 mA signals for position control and for position feedback.

E. The actuator shall have the following inputs and outputs:

1. Analog Input- Position Control

2. Analog Output – Position feedback

3. Digital Output – Fault

4. Digital Output – In remote

F. Design the actuator to move gates from fully closed to fully open. The actuator shall be sized to guarantee gate closure at the specified differential head. The safety margin of motor power available for seating and unseating the gate shall be sufficient to ensure torque switch trip at maximum gate torque with the supply voltage 10% below nominal.

G. Each electric actuator shall contain a reversing starter, three overloads (one in each ungrounded leg) or thermistor embedded in windings, 480VAC/120VAC/24VDC control power transformer, local-off-remote selector switch, open-stop-close push buttons or selector switch, open and closed indicator lights, and single phasing protection. Provide starters in actuators for open/close operation and (solid-state) modulating operation. The actuator shall include a device to ensure motor runs with the correct rotation for the required direction of gate travel with either phase sequence of the 3-phase power supply connected to it.

H. The actuator shall be capable of functioning in an ambient temperature ranging from minus 22°F (-30°C) to 158°F (70°C) and in direct sunlight.

I. Design actuator housings, supports, and connections to the gate with a minimum safety factor of five based on the ultimate strength or three based on the yield strength of the material used.

J. The actuator gearing shall be in an oil or grease filled gearcase suitable for operation at any angle. Worm gears shall be alloy bronze. Worm shall be hardened steel alloy. Design gears for 24-hour continuous service with an AGMA rating of 1.50. If intermediate gearboxes are used on gates, supporting structures to support the weight of the actuator on the gate stem shall be provided.

K. Provide a NEMA 6 enclosure for the actuator. An inner watertight and dustproof 'O' ring seal between the terminal compartment and the internal electrical elements of the actuator shall be provided to protect the motor and all other internal electrical elements of the actuator from intrusion of moisture and dust when the terminal cover is removed on site for cabling. All external fasteners shall be of 316 stainless steel.

L. Position switches shall be integrally geared to the actuator and shall be adjustable and capable of actuation at any point between fully opened and fully closed. The position switches shall operate while the actuator is either in manual or in motor operation. Provide motor actuators with position switches capable of being separately used to provide remote indication of end of travel in each direction and to stop motion at the end of travel in each direction.

M. Provide two individually adjustable torque switches to protect the gate and motor against overload in the opening and closing directions. To prevent hammering, the torque switch shall not reclose until the gate is made to travel in the opposite direction.

N. The actuators shall have a manually operated handwheel, which shall not rotate during electrical operation. In the event electrical power is interrupted, handwheel operation shall be activated by a hand lever attached to the mechanism. While the gate is being operated manually, the motor shall not rotate. Upon restoration of electrical power, the handwheel shall automatically disengage. Design the handwheel diameter such that hand operation will not damage the gate. For safety purposes, it shall be possible to disengage the electric drive with the declutch lever. The disengagement and any subsequent reengagement shall not cause any damage to the gate or operator, even with the motor running.

O. Provide minimum 10-watt space heater mounted in the actuator housing to prevent condensation and maintain the temperature in the actuator housing 5 degrees above the ambient temperature in the structure. Heater shall be on at all times.

P. Integral to the actuator shall be local controls for Open, Close, and Stop, and a local/remote selector switch, padlockable in any one of the following three positions:

a. Local Control Only

b. Off (No Electrical Operation)

c. Remote Control plus Local Stop Only.

Q. All the necessary wiring, indication relays and terminals shall be provided in the actuator to accommodate the remote mounted push button control functions. Provide terminal connections for external remote controls fed from an internal 120-volt AC supply. Provide dry contact for remote indication of the actuator mode of control. The contact shall be closed when local off-remote selector switch is in the remote position and the internal control power exists. Provide actuator controls in a NEMA 4X enclosure.

R. Internal wiring shall be tropical grade insulated stranded cable of appropriate size for the control and three-phase power. Each wire shall be clearly identified at each end. All wiring supplied as part of the actuator to be contained within the main enclosure for physical and environmental protection. External conduit connections between components are not acceptable. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal. The terminal compartment of the actuator shall be provided with a minimum of three threaded cable entries.

PART 3 – EXECUTION

- INSTALLATION

A. Install products in accordance with the manufacturer's written instructions.

B. Field mount operators after installing gates.

C. Frames and guides shall be installed in a true vertical plane with 90-degree corners.

D. Accurately place Type 316 stainless steel anchor bolts using templates furnished by the manufacturer.

E. Lubricate stems before operating.

3.02 FIELD QUALITY CONTROL

A. Functional Tests: Conduct on each gate.

B. Performance Test:

1. Conduct on each slide gate.

2. Maximum gate leakage shall be as defined in the Performance Requirements of this Specification, herein.

3. Perform under actual or approved simulated operating conditions.

4. Test for a continuous 3-hour period without malfunction.

D. If gates, operators, and appurtenances do not meet specified requirements, corrective measures shall be taken by the Contractor, or the equipment shall be removed and replaced with equipment that satisfies the conditions specified.

3.03 START-UP AND INSTRUCTION

A. Furnish services of manufacturer's technical representative to inspect the completed installation, correct or supervise correction of any defects or malfunctions, and instruct operating personnel in proper operating and maintenance procedures as described in this Section.

3.04 HYDRAULIC GATE SCHEDULE

HYDRAULIC GATE SCHEDULE					
Number	**Assembly Style**	**Number of Units**	**Wall Opening Size**	**Design Operating Head (ft) Seating/Unseating Condition**	**Operator Type/ Control Style**
SG-1	Style A	1	30” Wide X 42” High	15/15	Type 1

Notes:

A. Pedestal operators with wall brackets and appropriate intermediate shaft supports are acceptable. Mounting hardware and appurtenance shall be of Type 316 stainless steel.

END OF SECTION

4.20 SECTION 11366: SAND FILTERS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

A. The Contractor shall furnish all labor, materials, equipment and incidentals required to disassemble, inspect, rehabilitate, re-assemble, and field test complete and ready for operation twelve (12) existing rapid sand filters as shown on the Drawings and specified herein.

B. These Specifications are intended to give a general description of the work required, but do not cover all details. It is, however, intended to cover the furnishing, shop testing, delivery, complete installation, and field testing of all materials, equipment and all appurtenances for the rehabilitation of the existing filter system as shown on the Drawings or herein specified, whether specifically mentioned in these Specifications or not.

C. The Work involves rehabilitating the filters. See Section IV, Paragraph 1.0 “Scope of Work” for construction phasing and other project restrictions.

1.02 DESCRIPTION OF SYSTEMS

A. The existing filters are Model KK 12 x 30 (12) Hydro Clear Rapid Sand Filters as originally manufactured by Zimpro/Passavant, Inc. Eight (8) of these filters were installed and became operational on or about 1983 and were designed to handle a flow of 12 MGD. The remainder of the filters were constructed in 1988 increasing the filter capacity to 18 MGD. The company is presently owned and manufactured by Evoqua. All filters were previously rehabilitated in 2004.

B. The filters share a common influent channel and utilize conventional downflow technology for forward flow and upflow for backwash flow. Filtered water is collected in a common clearwell that also serves as the source for backwash water (washwater). Spent backwash water (waste washwater) is collected in a common mudwell and returned to the treatment plant.

C. The filters are controlled automatically by an existing PLC or manually by plant operators. The automatic backwash system uses butterfly valves to control flow. Similar valves are also used for a low pressure air scour of the filter surface. All automatic valves in the filter control system are pneumatically-actuated using high pressure air.

D. The primary components of the filtration complex include:

1. Twelve (12) 12’x30’ filter cells.

2. One (1) high pressure air system with a working pressure of 150 psi.

3. One (1) low pressure air system with a working pressure of 3 psi.

4. Backwash water pumping systems with vertical centrifugal pumps, check valves, and butterfly throttling valves.

5. Mudwell pumping system with submersible pumps, check valves, isolation valves and air release valves.

6. Six (6) local filter control consoles.

7. One (1) main filter control panel and water level switches and sensors.

8. One (1) motor control center (MCC).

E. Each rapid sand filter consists of an atmospherically vented underdrain system supported on a concrete structure with the following primary components:

1. Six (6) carbon steel gullet covers.

2. Six (6) carbon steel underdrain frame assemblies, grouted in place.

3. Eighteen (18) PVC underdrain core assemblies.

4. Six (6) stainless steel wire mesh blankets.

5. Eighteen (18) squares of 1-inch thick fiberglass grating.

6. Twenty four (24) 2” x 1-½” x ¼” perimeter hold down angle iron pieces.

7. Thirty six (36) structural I-beam hold down pieces.

8. One (1) carbon steel distribution/trough assembly with splash plates and weirs.

9. One (1) inlet box with weir assembly.

10. Ten (10)-inches of quartz filter media.

F. Refer to Section IV of the Contract Documents and Specifications for a description of the Work required as part of the Filter Rehabilitation project. The Filter Equipment Manufacturer (Evoqua) shall inspect and recommend the filter equipment and components that shall be replaced or rehabilitated as shown on the Drawings. Replacement items shall be purchased by the Contractor and manufactured by the filter equipment manufacturer: Evoqua. The filter equipment manufacturer shall inspect the filter equipment and components and approve the filters have been rehabilitated before the filters may be returned to service.

1.03 SUBMITTALS

A. Copies of all materials required to establish compliance with the specifications shall be submitted in accordance with the provisions of the Contract Documents. Submittals shall include at least the following:

1. Certified shop and erection drawings showing all important details of construction, dimensions and anchor bolt locations.

2. Descriptive literature, bulletins and/or catalogs of the equipment.

3. A complete, total bill of materials for all equipment with the O&M manual.

4. A list of the manufacturer's recommended spare parts with the manufacturer's current price for each item.

B. Filter media submittal(s) shall include the following information as a minimum:

1. Supplier's Name

2. Gradation of Each Media Type

3. Date of Sampling/Lot Number

4. Samples of Each Media Type

5. Representative Sample Analysis, (i.e. effective size, uniformity coefficient, specific gravity, acid solubility)

6. Material Quantities

7. Estimated Shipping Schedule

8. Media Loading Procedure

9. All testing shall conform to the requirements of the latest edition of AWWA B100.

1.04 WARRANTY

A. The Contractor shall provide a twelve (12) month warranty commencing from the time the filters are approved for service. The guarantee shall indicate that the equipment furnished is suitable for the purpose intended and free from defects of design, material and workmanship. In the event the equipment fails to perform as specified, the Contractor shall promptly repair or replace the defective equipment without any cost to the Owner (including handling and shipment costs).

1.05 STORAGE AND HANDLING

A. All equipment shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. The Contractor shall replace, at no charge to Owner, all materials and ancillary equipment damaged during storage and delivery, including filter media.

C. The Contractor shall be responsible for removing the filter media off-site as soon as it is removed from the individual filter cells. Stockpiling of the existing media on the treatment plant site shall not be permitted. The Contractor shall be responsible for any ground or groundwater contamination, or other claims, caused by his failure to promptly remove and dispose of the existing filter media.

D. Contractor shall be responsible for hauling and disposal of filter media and debris removed from each filter cell. Hauling and disposal of spent filter media and debris shall be in strict accordance with state, local, and federal regulations.

E. Payment will only be made for that portion of the work, which is fully installed including all materials, labor, and equipment.

PART 2 – PRODUCTS

2.01 GENERAL

A. The material covered by these Specifications is intended to be standard equipment of proven ability and as manufactured by the original equipment manufacturer. The equipment furnished shall be designed, constructed and installed in accordance with best practice and methods and shall operate satisfactorily when installed as shown on the Drawings.

B. Filter system equipment and components shall be as manufactured by Evoqua.

2.02 PERFORMANCE AND DESIGN REQUIREMENTS

A. General Requirements

1. The filters shall consist of 10-inches of silica sand quartz media supported by an underdrain system comprised of fiberglass grating, stainless steel wire mesh, PVC cores, and a steel frame system. Filter assembly drawings are provided in the Contract Drawings. The Contractor shall replace only the equipment and components which are recommended to be replaced by the filter equipment manufacturer.

B. Performance Requirements

1. Each filter cell shall meet the Performance Requirements specified in Section 3.10.

C. Design Criteria: The filter system shall be rehabilitated to perform satisfactorily when operated under the following conditions:

1. Downflow of filtered water up to 4.0 gpm/sf.

2. Air-Mix air flow rate 900 cfm @ 3.0 psi.

3. Upflow of backwash water at a rate of 12 gpm/sf.

4 Quartz single grade filter media with 0.45 mm ±0.05 mm effective size and a uniformity coefficient of 1.7.

D. All specialty hardware, such as special anchorage, grout retaining strips, closures, gaskets, etc., as required for rehabilitation, shall be furnished and shall be the products of a single manufacturer/supplier.

2.03 FILTER MEDIA

A. New media shall be furnished and installed in each filter cell to a uniform nominal depth of 10-inches.

B. The media shall be a single grade quartz sand, durable, clean siliceous particles, free of all mica, and shall be in strict accordance with AWWA B100 with properties as listed below:

Media Depth	10-inches uniform

Sand per Filter	300 cubic feet minimum
Effective Size	0.45 mm ±0.05 mm
Uniformity Coefficient	1.7
Average Specific Gravity	2.6

C. Sufficient media shall be provided for a ½-inch skimming allowance.

D. The majority of the filter media shall be packaged in semi-bulk containers with lifting sleeves and a bottom discharge spout containing a maximum of 4,000 pounds per container.

E. The makeup portion of the media shall be furnished in sealed bags suitable for manual loading.

F. All new media shall be stored under roof or otherwise kept dry and covered until loaded into the filter cells.

2.04 UNDERDRAIN COMPONENTS

A. The Contractor shall completely remove all media using a vac truck and shop vac and subsequently pressure wash the media support screens to remove debris. Following complete removal of the existing media and cleaning operations, a representative of the filter manufacture will inspect the underdrain components which generally include:

A. Wire mesh support screens

B. PVC underdrain core and fiberglass grating

C. Loose steel items such as long and short angles and I-beams

D. Clip angles and embedded bolts.

B. The filter manufacture will furnish replacement components as deemed necessary for installation by the Contractor. All components shall be installed in accordance with the filter manufacturer's recommendations.

2.05 CELL DISTRIBUTION/BACKWASH TROUGH ASSEMBLY

A. The carbon steel distribution/backwash trough assembly in each filter cell including adjustable weirs, trough supports, and removable splash trays shall inspected by the filter equipment manufacturer (Evoqua). Anticipated repairs include:

A. Replace all backwash support trough brackets that secure the troughs to the walls.

B. Cut off securing tabs on the backwash trough support stands and weld a replacement tab in-place , and subsequently secure the assembly with Type 316 stainless steel bolts and hardware.

B. All of the weirs shall be adjusted and set level with a surveyor's level to the elevation shown in the Contract Drawings. All weir hardware shall be replaced during adjustment of the weirs.

C. Contractor shall verify dimensions of all equipment prior to release of materials.

2.06 HARDWARE, GASKETS, AND CONSUMABLES

A. All hardware replaced shall be stainless steel, including bolts, nuts, washers, clips, all thread, all thread couplings, anchors, and set screws installed to connect and anchor the various assemblies described herein. All hardware replaced inside the filter cell shall be Type 316 stainless steel except as otherwise specified herein.

B. Where wire mesh screens are replaced, a new 3-inch x 3/16-inch closed cellular neoprene gasket shall be installed below the screen. All miscellaneous hardware, gaskets, and consumables shall be installed in accordance with the manufacturer's recommended procedures.

2.07 MAIN FILTER PLC CONTROLLER

A. The Contractor shall coordinate with the Filter Equipment Manufacturer (Evoqua) to input the recommended chem clean setpoints into the existing PLC program.

2.08 LEVEL SENSORS

A. New level switches shall be provided and installed in every filter cell as listed below:

   A. Low level sensor

   B. High level sensor

B. The level switches shall be Seimens MAC 3 Liquid Level Switch or approved equal and shall be the products of a single manufacturer.

E. Splices in the float level switch chords shall not be permitted. All level switches shall be supplied with sufficient chord length such that no chord splicing is required and the free ends of the chord shall attach directly to a terminal strip.

F. All level switches shall be mounted in their original locations using new stainless steel hardware and set to the elevation recommended by the filter equipment manufacturer.

2.09 SURFACE AIR SYSTEM

A. The 3" galvanized steel backwash air mains shall be replaced in each filter. The existing galvanized steel pipe droplegs shall be reused.

B. Each filter includes twenty-four (24) surface air mix diffusers and clamps. Diffusers shall be replaced. The new diffusers shall be ¾" diameter Schedule 80 PVC with UV inhibitors and threaded end caps. The diffuser orientation, locations, and sizes are provided in the Contract Drawings.

C. Pipe supports shall be Type 316 stainless steel off-set pipe clamps by B-Line or Type 316 stainless steel Unistrut depending upon the configuration. Support spacing shall not exceed five feet and support shall be provided at all bends and tees.

2.10 VALVES AND ACTUATORS

A. Several valves and actuators shall be furnished and installed as shown on the Drawings and specified herein. Additionally, the high pressure tubing for all actuators shall be replaced. Furnishing the equipment and appurtenances shall be the responsibility of the filter manufacturer. The Contractor shall be responsible for installation. Refer to Section 15050 for butterfly valve and actuator specifications as well as requirements for appurtenances.

PART 3 – EXECUTION

3.01 FILTER CELL CLEANING

A. Contractor shall completely remove all filter media and debris from the interior of the filter cells and expose all six (6) underdrain assemblies in each filter. Contractor shall be responsible for hauling and disposal of filter media and debris removed from each filter cell.

B. After all filter media and debris has been removed from the interior of the filter cells and all six (6) underdrain assemblies from each filter have been exposed, the filter walls and equipment shall be completely pressure washed, including brush blasting loose coating from concrete walls, and made suitable for a visual evaluation but left in place for evaluation by Evoqua and the Engineer on a per cell basis.

C. Pressure washer shall be capable of cleaning walls and screens to a condition that facilitates inspection. The operating pressure shall be established in the field. Spent wash water and other byproducts of the cleaning process shall be removed from the filter cells by the Contractor. It is not acceptable to drain filter cells into the process through the valves. Contractor shall protect underdrain equipment from coating material removed from wall surface as a result of pressure washing.

3.02 INITIAL FILTER INSPECTIONS

A. The Contractor shall furnish the services of the manufacturer's field service technician, who has complete knowledge of proper operation and maintenance of the equipment to inspect the existing equipment to provide recommendations for repair and/or replacement of equipment as required for satisfactory operation.

B. Initial inspections shall be scheduled at least two (2) days in advance with the Owner.

3.03 FILTER CELL EQUIPMENT REMOVAL

A. The Contractor shall carefully disassemble and remove existing filter components, hardware, and consumables inside the filter cells as recommended by the filter equipment manufacturer (Evoqua).

3.04 CLEANING AND PROTECTION DURING INSTALLATION, TESTING, AND STARTUP

A. The Contractor shall take all precautions recommended by the equipment manufacturer or as specified herein to ensure that the filter underdrain system and any piping connected thereto is completely clean and free of any debris, dirt, or other foreign materials that could clog the underdrain system or interfere with flow. All loose debris and dirt within the filter cell shall be removed by brooming and vacuuming. As installation progresses, partially completed portions of the work shall be protected with heavy plastic sheet material or other suitable material

to maintain the cleanliness of the underdrain system. Such protection shall be maintained until the media is installed.

B. Any time the underdrain is to be used as a work surface, the underdrain shall be overlaid with ½ inch minimum plywood sheeting, to distribute the load of workers, yard buckets, wheel barrows, ladders, scaffolds, etc., to prevent damage to the underdrain.

- FILTER ASSEMBLY

A. The Contractor shall assemble the filter components in strict accordance with the filter manufacturer's written instructions and recommendations and the manufacturer's installation drawings; the oral and written directions provided by the manufacturer's technical representative who shall be supervising and observing the work; and any additional requirements specified herein.

B. All stainless steel hardware, fasteners, and anchors shall be assembled with anti-seize compound specifically formulated for use with stainless steel in similar conditions and applications, and approved by the Engineer.

3.06 MEDIA INSTALLATION

A. The filter underdrain system in each filter cell shall be thoroughly cleaned and visually inspected by the equipment supplier to verify that orifices are not clogged with debris.

B. The filter equipment manufacturer shall furnish a written certification to the Engineer that the equipment has been installed in strict accordance with the equipment manufacturer's recommendations. Media shall not be installed until after this certification has been furnished to the Engineer.

C. The Contractor shall place a level line on the wall of the filter designating the top elevation of the media.

D. The media shall be carefully placed in a manner approved by the equipment supplier so as not to disturb the underdrain system.

E. The media shall be installed level and the bed shall be backwashed a minimum of three (3) times to remove fines. The media shall be re-leveled by scraping as required to obtain the correct elevation.

F. The Contractor shall measure the depth of the media after it has been backwashed and skimmed as recommended by the filter equipment manufacturer.

3.07 FINAL INSPECTION

A. The Contractor shall furnish the services of the manufacturer's field service technician, who has complete knowledge of proper operation and maintenance of the equipment, as required to inspect the installed equipment, supervise the initial test runs and provide instruction to the plant personnel.

B. Final inspections shall be scheduled at least five (5) days in advance with the Owner and shall take place prior to start-up and acceptance by the Owner.

C. Prior to initial start-up of each filter, the manufacturer's representative shall provide written certification to the Owner that the equipment has been installed, tested in accordance with the Manufacturer's approved method, and testing requirements specified herein and shall certify that the equipment is ready for permanent operation.

END OF SECTION

4.21 SECTION 15000: MECHANICAL - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. All equipment furnished and installed under this contract shall conform to the general stipulations set forth in this Section except as otherwise specified in other Sections.

2. Contractor shall coordinate all details of equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alternations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

B. Contract Drawings and Specifications: The Contract Drawings and Specifications shall be considered as complementary, one to the other, so that materials and work indicated, called for, or implied by the one and not by the other shall be supplied and installed as though specifically called for by both. The Contract Drawings are to be considered diagrammatic, not necessarily showing in detail or to scale all of the equipment or minor items. In the event of discrepancies between the Contract Drawings and Specifications, or between either of these and any regulations or ordinances governing work of these Specifications, the bidder shall notify the Engineer in ample time to permit revisions.

1.02 QUALITY ASSURANCE

A. Materials and Equipment: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and undamaged when installed or otherwise incorporated in the Work. No such material or equipment shall be used by the Contractor for any purpose other than that intended or specified, unless such use is specifically authorized in writing by the Owner. No material shall be delivered to the site without prior acceptance of drawings and data by the Engineer.

B. Equivalent Materials and Equipment:

1. Whenever a material or article is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, the specific item mentioned shall be understood as establishing the type, function, and quality desired. Other manufacturers' products will be accepted provided sufficient information is submitted to allow the Engineer

to determine that the products proposed are equivalent to those named. Such items shall be submitted for review in accordance with Section 01340: Shop Drawings and Submittals.

2. Requests for review of equivalency will not be accepted from anyone except the Contractor and such requests will not be considered until after the contract has been awarded.

C. Governing Standards: Equipment and appurtenances shall be designed in conformity with ANSI, ASME, ASTM, IEEE, NEMA, OSHA, AGMA, and other generally accepted applicable standards. They 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 operations. All bearings and moving parts shall be adequately protected against wear by bushings or other acceptable means. Provisions shall be made for adequate lubrication with readily accessible means.

D. Tolerances: Machinery parts shall conform to the dimensions indicated on the Drawings within allowable tolerances. Protruding members such as joints, corners, and gear covers shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be rounded or chamfered.

E. Clearances: Ample clearances shall be provided for inspection and adjustment. All equipment shall fit the allotted space and shall leave reasonable access room for servicing and repairs. Greater space and room required by substituted equipment shall be provided by the Contractor and at his expense.

F. Testing:

1. When the equipment is specified to be factory tested, the results of the tests shall be submitted to the Engineer and approval of the test results shall be obtained before shipment of the equipment.

2. When an item of equipment, including controls and instrumentation, has been completely erected, the Contractor shall notify the Engineer, who will designate a time to make such tests as required, and operate the item to the satisfaction of the Engineer. All testing shall be done in the presence of the Engineer. "Completely erected" shall mean that the installation is erected, all necessary adjustments have been made, all required utility connections have been made, required lubricants and hydraulic fluid have been added and the unit has been cleaned and painted.

H. Failure of Test:

1. Defects: Any defects in the equipment, or deviations from the guarantees or requirements of the Specifications, 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 correct any defects or deviations, or if the replaced equipment when tested shall fail again to meet the guarantees or specified requirements, the Owner, notwithstanding his having made partial payment for work and

materials, may reject that equipment and order the Contractor to remove it from the premises at the Contractor's expense.

2. Rejection of Equipment: In case the Owner rejects a particular item of equipment, then the Contractor hereby agrees to repay to the Owner all sums of money paid to him to deliver to the Contractor a bill of sale of all his rights, title, and interest in and to the rejected equipment provided, however that the equipment shall not be removed from the premises until the Owner obtains from other sources other equipment to take the place of that rejected. The bill of sale shall not abrogate the Owner's right to recover damages for delays, losses or other conditions arising out of the basic Contract. The Owner hereby agrees to obtain the alternate equipment within a reasonable time and the Contractor agrees that the Owner may use the original equipment furnished by him without rental or other charge until the other equipment is obtained.

I. Responsibility During Tests: 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 Owner formally takes over the operation thereof.

J. Acceptance of Materials:

1. Only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor shall be subject to the inspection and acceptance of the Owner. No material shall be delivered to the work without prior submittal approval of the Engineer.

2. The Contractor shall submit to the Engineer data relating to materials and equipment he proposes to furnish for the work. Such data shall have in sufficient detail to enable the Engineer to identify particular product and to form an opinion as to its conformity to the Specifications.

3. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during the progress of the work, the Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the Specifications. Such sample shall be furnished, stored, packed, and shipped as directed at the Contractor's expense. Except as otherwise noted, the Owner will make arrangements for and pay for tests.

4. The Contractor shall submit data and samples sufficiently early to permit consideration and acceptance before materials are necessary for incorporation in the work.

K. Safety Requirements:

1. In addition to the components shown and specified, all machinery and equipment shall be safeguarded in accordance with the safety features required by the current codes and regulations of ANSI, OSHA, and local industrial codes.

2. The Contractor shall provide for each V-belt drive or rotating shaft a protective guard which shall be securely bolted to the floor or apparatus. The guard shall completely enclose drives and pulleys and be constructed to comply with all safety requirements.

1.03 SUBMITTALS (SEE SECTION 01340: SHOP DRAWINGS AND SUBMITTALS)

1.04 MAINTENANCE MATERIALS

A. All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The Owner shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of equipment supplied.

B. The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be any longer than three weeks of operation.

PART 2 - PRODUCTS

2.01 FABRICATION AND MANUFACTURE

A. Workmanship and Materials:

1. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage or other failure. Materials shall be suitable for service conditions.

2. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and gages so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.

3. Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4 inch thick.

B. Lubrication:

1. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants.

2. Lubricants of the type recommended by the equipment manufacturer shall be furnished by the Contractor in sufficient quantity to fill all lubricant reservoirs and to replace all consumption during testing,

startup, and operation for the entire warranty period prior to acceptance of equipment by Owner. Unless otherwise specified or permitted, the use of synthetic lubricants will not be acceptable.

3. Lubrication facilities shall be convenient and accessible. Lubrication fittings shall be the zerk type for each piece of equipment. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal in-stalled position.

C. Safety Guards: All belt or chain drives, fan blades, couplings, and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gage or heavier galvanized or aluminum-clad sheet steel or 1/2 inch mesh galvanized expanded metal. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.

D. Equipment Foundation Supports:

1. All foundations, platforms and hangers required for the proper installation of equipment shall be furnished and installed by the Contractor.

2. Unless otherwise indicated or specified, all equipment shall be installed on reinforced concrete bases at least 6 inches high and shall conform to requirements set forth in Division 3. Cast iron or welded steel baseplates shall be provided for pumps, compressors, and other equipment. Each unit and its drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components and adequate grout holes. Baseplates for pumps shall have a means for collecting leakage and a threaded drain connection. Baseplates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with 1 inch minimum grout. All open equipment bases shall be filled with nonshrink grout sloped to drain to the perimeter of the base.

3. The Contractor shall furnish, install and protect all necessary guides, bearing plates, anchor and attachment bolts, and all other appurtenances required for the installation of equipment. These shall be of ample size and strength for the purpose intended.

4. All anchor bolts, anchor bolt templates, and location drawings required for the installation of the equipment, support columns, and for all other equipment or machinery included under this Contract shall be furnished by the Contractor. All mechanical equipment shall be anchored using hook anchor bolts, cast-in-place, unless specifically called for otherwise on the Drawings. Anchor bolts, sleeves, and inserts shall be set in place in forms and cast in the concrete by the Contractor. It shall be the responsibility of the Contractor to obtain such anchor bolts, templates, and approved location drawings in proper time to avoid delay, and it shall be his further responsibility to check and approve the location and setting of the anchor bolts, sleeves, and inserts prior to the casting of the

concrete. Parts of anchors or metal work that are not built into masonry and concrete shall be coated with approved paint. Anchor bolts for column base plates and other structural elements shall be of galvanized steel unless indicated otherwise; anchor bolts for drives, motors, fans, blowers, and other mechanical equipment shall be of Type 304 stainless steel or high-strength bronze. Anchor bolts shall be of ample size and shall be provided with hexagonal nuts of the same quality of metal as the bolts. All threads shall be clean cut and of U.S. Standard sizes.

5. Expansion bolts shall have malleable iron and lead composition elements of the required number of units and sizes. Expansion bolts, if called for on the Drawings, shall be furnished and installed by the Contractor. No other use of expansion bolts will be allowed without prior approval of the Engineer.

6. Unless specified otherwise, stud, tap, and machine bolts shall be of the best quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used. All threads shall be clean cut and shall conform to ANSI B1.1-latest for "Unified and American Screw Threads for Screws, Bolts, Nuts, and Other Threaded Parts."

7. Bolts, anchor bolts, nuts, and washers not specified to be stainless steel shall be zinc-coated by the hot-dip process, after being threaded, in conformity with the ASTM Standard Specification for "Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip," Designation A123-latest, or the ASTM Standard Specification for "Zinc Coating (Hot-Dip) on Iron and Steel Hardware," Designation A153-latest, as is appropriate.

8. Anchor bolts and expansion bolts shall be set accurately. Anchor bolts which are set before the concrete has been placed shall be carefully held in suitable templates of approved design provided under this Contract. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4" x 4" x 3/8" or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both.

9. Structural steel supports and miscellaneous steel required for supporting and/or hanging equipment and piping furnished under this Division shall be provided and installed by Contractor.

10. All foundations, anchor pads, piers, thrust blocks, inertia blocks and structural steel supports shall be built to template and reinforced as required for loads imposed on them.

11. The Contractor shall assume all responsibility for sizes, locations and design of all foundations, anchor pads, pier, thrust blocks, inertia blocks, curbs and structural steel supports.

E. Shop Painting:

1. All steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. The paint system to be applied will be as identified by the associated pipe system coating as identified in the Pipe

Schedule as presented in the drawings. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished smooth, thoroughly cleaned, and filled as necessary to provide a smooth uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with a high-grade oil-resistant enamel suitable for coating in the field with an alkyd enamel. Coatings shall be suitable for the environment where the equipment is installed.

2. Surfaces to be painted after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service, and then shop painted with one or more coats of the specified primer. Unless otherwise specified, the shop primer for steel and iron surfaces shall be Koppers "No. 10 Inhibitive Primer", or equal.

3. Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust-preventive compound, Houghton "Rust Veto 344", Rust-Oleum "R-9", or equal.

F. Nameplates: Contractor shall provide equipment identification nameplates for each item of equipment. Nameplates shall be 1/8 inch Type 304 stainless steel and shall be permanently fastened. Plates shall be fastened using round head metallic drive screws, or where metallic drive screws are impractical, with stainless steel pop rivets. Metallic drive screws shall be brass or stainless steel, Type V and No. 8 by 3/8 inch long. Names and/or equipment designations shall be engraved on the plates and the engraving painted with a primer and black paint system compatible with stainless steel. Contractor shall submit a list of proposed names and designations for review prior to fabrication of nameplates. At a minimum, each nameplate shall include equipment manufacturer's name, year of manufacture, serial number and principal rating data.

G. Noise Attenuation and Control:

1. Unless otherwise specified, the maximum permissible noise level for a complete installed piece of equipment located within or outside a structure shall not exceed 85 dB at 3 feet. A complete piece of equipment includes the driver and driven equipment, plus any intermediate couplings, gears, and auxiliaries. All equipment provided herein that is specified to be factory and field tested shall be tested as specified herein for noise generation at the equipment manufacturer's expense.

2. Maximum permissible noise (sound pressure) levels shall be in decibels as read on the "A" weighting scale of a standard sound level meter (dB); all measurements shall be made in relation to a reference pressure of 0.0002 microbar. Measurements of emitted noise levels shall be made on a sound level meter meeting at least the Type 2 requirements set forth in ANSI S1.4, Specification for Sound Level Meters. The sound level meter shall be set on the "A" scale and to slow response. Unless otherwise specified for a particular piece of equipment, the point of measurement of sound level shall be made at the specified distance from any major surface along the entire perimeter and at midheight of the piece of equipment, or at the specified distance from an outer major surface encompassing the sound source including inlets or outlets.

H. Fire Hazard Rating:

1. All piping, duct work, and equipment insulation, fastener, and jacketing materials shall have a fire hazard rating not to exceed 25 for flame spread, 50 for fuel contributed, and 50 for smoke developed. Rating shall be determined by ASTM Designation E84, "Surface Burning Characteristics of Building Materials". Corresponding ratings determined by Underwriters' Laboratories, Inc., UL-723, "Test Method for Fire Hazard Classification of Building Materials", will also be acceptable.

2. Flameproofing treatments will not be acceptable.

2.02 ACCESSORIES

A. Special Tools and Accessories: Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

B. Fasteners: All nuts, bolts, anchors and other fastening devices shall be a minimum of Type 304 stainless steel.

PART 3 - EXECUTION

3.01 INSTALLATION AND OPERATION

A. Installation: Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary for proper results. When so specified, or when employees of Contractor or his subcontractors are not qualified, such personnel shall be field representatives of the manufacturer of the equipment or materials being installed.

1. The Contractor shall have on site sufficient proper construction equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character. To minimize field erection problems, mechanical units shall be factory assembled when practical.

2. Equipment shall be erected in a neat and workmanlike manner on the foundations and supports at the locations and elevations shown on the Drawings, unless otherwise directed by the Engineer during installation.

3. All equipment shall be installed in such a manner as to provide access for routine maintenance including lubrication.

4. For equipment such as pumping units, which require field alignment and connections, the Contractor shall provide the services of the equipment manufacturer's qualified mechanic, millwright, machinist, or authorized representative, to align the pump and motor prior to making piping connections or anchoring the pump base.

5. Equipment of a portable nature which requires no installation shall be delivered to a location designated by the Owner.

B. Tolerances: Precision gauges and levels shall be used in setting all equipment. All piping and equipment shall be perfectly aligned, horizontally and vertically. Tolerances for piping and equipment installation shall be 1/2 inch to 30 ft. horizontal and vertically. All valves and operators shall be installed in the position shown on the Drawings or as directed by the Engineer, if not shown.

C. Alignment and Level: The equipment shall be brought to proper level by shims (1/4 inch maximum). After the machine has been leveled and aligned, the nuts on the anchor bolts shall be tightened to bind the machine firmly into place against the wedges or shims. Grouting shall be as described below.

D. Grouting: The grout shall be tamped into position with a board, steel bar, or other tool. Tamping should not be so hard as to raise or otherwise displace the plate.

E. Contact of Dissimilar Metals: Where the contact of dissimilar metal may cause electrolysis and where aluminum will contact concrete, mortar, or plaster, the contact surface of the metals shall be separated using not less than one coat of zinc chromate primer and one heavy coat of aluminum pigmented asphalt paint on each surface.

F. Cutting and Patching: All cutting and patching necessary for the work shall be performed by the Contractor.

G. Operation: All equipment installed under this Contract, including that furnished by Owner or others under separate contract, shall be placed into successful operation according to the written instructions of the manufacturer or the instructions of the manufacturer's field representative. All required adjustments, tests, operation checks, and other startup activity shall be provided.

3.02 OBSERVATION OF PERFORMANCE TESTS

A. Where the specifications require observation of performance tests by the Engineer, such tests shall comply with the quality assurance paragraph in this section.

END OF SECTION

4.22 SECTION 15050: PIPING, FITTINGS, VALVES, AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The Work included in this Section consists of furnishing all labor, equipment, and materials and in performing all operations necessary for the construction, installation or restoration of all utility piping, valves, and appurtenances complete and ready for operation as shown on the Drawings and specified herein.

1.02 QUALITY ASSURANCE

A. Construction Requirements:

1. Install all pipe, fittings, valves, actuators. And appurtenance in accordance with the manufacturer's instructions.

2. Install all products so as not to scratch, dent, or damage any existing component. Pipe shall be installed in a way that prevents damaging existing pipe. If existing components are damaged due to construction, the Contractor shall be required to repair the pipe according to the Owner's requirements.

B. The entire product of any plant may be rejected when, in the opinion of the Engineer, the methods of manufacture fail to secure uniform results, or where the materials used are such as to produce inferior pipe or fittings.

1.03 SUBMITTALS

A. Shop Drawings:

1. In general, the following Shop Drawings shall be submitted to the Engineer for approval prior to construction:

    A. Mill test certificates or certified test reports on pipe and fittings.

    B. Expansion Joints

    C. Valve boxes.

    D. All valves and actuators.

    E. Couplings.

2. A separate Shop Drawing submittal will be required for each major item listed above and for each different type of an item within a major item. For example, separate submittals will be required for butterfly, ball, solenoid, and check, valves.

3. Submit to the Engineer within 30 days after execution of the contract a typewritten schedule of valves to be furnished. The valve schedule shall include valve tags organized by process with the valve manufacturer, tag shape, letter code and number, the valve size, type, use, supplier, and the date of delivery to the site.

B. Operation and Maintenance Manuals: Submit operation and maintenance manuals for applicable components requiring periodic maintenance and/or explanation of operation, at the discretion of the Engineer. Manuals shall be prepared in accordance with Toho specification requirements regarding Operating and Maintenance Data.

1.04 DELIVERY, STORAGE AND HANDLING

A. Pipe, fittings, valves, and accessories shall be handled in such manner as to ensure a sound undamaged condition during shipping, delivering, and installing.

B. Particular care shall be taken not to injure the pipe coating and linings.

C. Insides of valves and piping shall be kept free of dirt and debris.

D. Payment will only be made for that portion of the work, which is fully installed including all materials, labor, and equipment.

PART 2 – PRODUCTS

- SMALL DIAMETER PVC PIPE AND FITTINGS

A. Small PVC Pressure Piping: Unless otherwise specified, PVC pressure pipe smaller than 4 inches nominal diameter shall be Schedule 80 PVC in accordance with ASTM D1785. Schedule 80 pipe shall have either solvent welded or threaded joints. PVC pressure pipe for potable water service shall bear the approved seal of the National Sanitation Foundation (NSF). PVC pipe that is exposed to sunlight shall be manufactured with additives to provide resistance to ultraviolet deterioration or painted with a UV resistant paint.

A. Fittings: Socket type, solvent welded fittings for Schedule 80 PVC pipe shall be in conformance with ASTM D2467. Threaded type fittings for Schedule 80 PVC pipe shall be in conformance with ASTM D2464. All solvent welded or threaded joints shall be watertight.

B. Flanges: Flanges for Schedule 80 PVC pipe shall be rated for a 150-psi working pressure with ANSI B 16.1 dimensions and bolting pattern. Flanges shall be connected to PVC piping with either solvent welded or threaded joints in accordance with ASTM D2467 or ASTM 2464, respectively. Gaskets shall be neoprene, full faced type with a minimum thickness of 1/8-inch. Nuts and bolts shall be hexagonal with machine threads, manufactured of Type 316 stainless steel in accordance with ASTM A320, Class 2. Type 316 stainless steel flat washers, with lock washers, shall be used against PVC flanges. The nuts shall have a hardness that is lower than that of the bolts and washers by a difference of 50 Brinnell hardness to prevent galling during installation.

C. Solvent Cement: PVC solvent cement shall be in compliance with ASTM D2564 and in accordance with the pipe manufacturer's recommendations.

D. Thread Lubricant: Lubricant for Schedule 80 threaded joints shall be Teflon tape only.

- STAINLESS STEEL PIPE & FITTINGS

A. Pipe - Pipe smaller than 3 inches shall conform to ASTM A 312, Grade TP 304L. Pipe 3 inches and larger shall conform to ASTM A 312 or A778, Grade TP 304L.

A. Pipe sizes and wall thicknesses shall conform to ANSI B36.19 as follows:

Pipe Size	Wall Thickness
1 inch and smaller	Schedule 80S
1-1/4 inches through 2 inches	Schedule 40S
3 inches through 8 inches	Schedule 10S
Larger than 8 inches, through 30 inches	Schedule 10S

B. Fittings - Fittings 3 inches and smaller shall be threaded or socket welded, conforming to ANSI B16.11, 3,000-pound CWP. Material for threaded fittings shall conform to ASTM A 403, Class WP304 or ASTM A 182, Grade F304. Material for socket welded fittings shall conform to ASTM A 403, Class WP304L or ASTM A 182, Grade F304L.

A. Fittings shall be butt-welded or flanged, conforming to ASTM A403, Class WP or ASTM A774, same material and wall thickness as the pipe, conforming to ANSI B16.9. Elbows shall be long radius.

B. Fitting material shall be the same as the pipe.

2.03 BUTTERFLY VALVES (STANDARD SERVICE)

A. Butterfly valves for liquid service, 4 inches in size and larger, shall be Class 150-B in conformance with ANSI/AWWA C504, latest revision and designed for a minimum working pressure of 150 psi. Butterfly valves shall be of the tight closing rubber seat type. Valves shall be bubble tight with 150 psi on the upstream side of the valve and 0 psi on the downstream side and shall be satisfactory for applications involving valve operation after long periods of inactivity. Valve discs shall rotate 90 degrees from the fully open position to the fully closed position. Butterfly valves shall be in accordance with the City of Clearwater Utility Standards

B. Valve bodies shall be constructed of high-strength cast iron conforming to ASTM A126, Class B. Buried valves shall have integrally cast mechanical joint ends as specified for ductile iron pipe and above-ground valves shall have cast iron flanges. End flanges shall conform in dimensions and drilling to ANSI B16.1, Class 125. Two trunnions for shaft bearings shall be integral with each valve body. Valve body thickness shall be in strict accordance with ANSI/AWWA C504 latest revision for Class 150-B valves.

C. Valve seat ring shall be constructed of Type 304 stainless steel. Seating edges of the seat ring shall be smooth and polished. The seat ring shall be capable of compensating for changes in direction of flow to assure a bubble tight seal in either direction.

D. Valve discs shall be solid (no cores) for 24-inch and smaller valves and shall be either solid or hollow core for valves greater than 24-inch. Discs shall be constructed of ASTM A536, Grade 65-45-12 ductile iron. Valve disc shall be of the offset design to provide 360-degree uninterrupted seating.

E. Valve shafts may consist of a one-piece unit extending completely through the valve disc bearings and into the operating mechanism or may be of the "stub shaft" type, which comprises two separate shafts inserted into the valve disc hubs. If used, stub shafts shall extend a minimum of 1 1/2 shaft diameters into the valve disc hubs. Valve shafts shall be constructed of ASTM A276, Type 304 stainless steel or a stainless steel with greater overall corrosion and oxidation resistance. The minimum shaft diameter shall conform to ANSI/AWWA C504, latest revision for Class 150B valves. The valve disc shall be attached to the shaft by means of "O" ring sealed taper pins. The valve shaft seal shall consist of "O" rings in a bronze cartridge or self-adjusting nitrile Vee-type ring seals.

F. Valve seats shall be of a corrosion resistant synthetic rubber compound bonded to a high-grade stainless-steel retaining ring and secured to the valve disc by Type 304 stainless steel set screws or shall be molded in, vulcanized, and bonded to the body. Seats bonded to the body shall withstand a 75-pound pull tested in accordance with ASTM D429, Method B. The valve seat shall be adjustable and replaceable in the field without dismantling operator, disc, or shaft.

G. Valve shafts shall be fitted with sleeve-type bearings. Bearings shall be corrosion resistant and self-lubricating (Nylon or Teflon). Bearings shall be designed for a pressure not exceeding the published design load for the bearing material, or 1/5 of the compressive strength of the bearing or shaft material.

H. All butterfly valves shall open left or counterclockwise when viewed from the stem. Manual valve operators shall be of the worm gear or traveling nut type and shall be fully enclosed. All operators shall have adjustable mechanical stop limiting devices to prevent over travel of disc. Should an adjustment of the disc be required to maintain a bubble tight seal, this adjustment shall be made externally without removing the operator housing cover. The operator shall be designed such that all adjustments can be made under pressure and without the possibility of dirt getting into the operator lubricant. Any adjustments through the lower shaft will not be acceptable. Units furnished for buried service shall be fully gasketed and grease packed. Manual valves located above ground shall be equipped with handwheel or chainwheel operators and shall have a suitable indicator arrow to give valve position from fully open to fully closed. Each buried butterfly valve shall be furnished with a 2-inch square AWWA nut operator with valve box and cover. Operator components shall, at the extreme operator

positions, withstand without damage a pull of 200 lbs. for handwheel or chainwheel operators or an input torque of 300 ft.-lbs. for operating nuts.

I. Interior of valve body and valve disc except for valve seat and stainless-steel valve seat ring shall be coated with a fusion bonded or thermosetting epoxy coating in accordance with AWWA C550, latest revision. Coating shall be holiday-free, NSF approved, with a minimum thickness of 16 mils. Surfaces shall be clean, dry, and free from rust and grease before coating.

J. All exterior surfaces of butterfly valves shall be clean, dry, and free from rust and grease before coating. For buried service, the exterior ferrous parts of all valves shall be coated at the factory with epoxy in accordance with AWWA C550. For valves installed aboveground, the exterior ferrous parts of all valves shall be shop primed at the factory with one coat, minimum dry film thickness of 4 mils of a rust inhibitive, universal epoxy primer. Primer shall be suitable for finish paint specified. Following installation, aboveground valves shall be finish painted in accordance with two (2) coats of potable water epoxy manufactured by Tnemec or an approved equal.

K. Neck extensions and floorstands shall be provided on valves when called for on the drawings or in the specifications. Neck extensions shall be fabricated from steel and furnished with end connections suitable for the intended service. Shafting for the neck extensions shall be stainless steel and suitable sized for the application. Pedestals shall be of cast or ductile iron, or fabricated steel, and shall have appropriate end connections and shafting for the intended application. Shafting shall be stainless steel. Neck extensions and floorstands shall be furnished by the valve supplier. Following installation, neck extensions and floorstands shall be finish painted in accordance with two (2) coats of potable water epoxy manufactured by Tnemec or an approved equal.

L. Prior to shipment from the factory, hydrostatic and leakage tests shall be conducted for each butterfly valve. Hydrostatic and leakage tests shall be conducted in strict accordance with ANSI/AWWA C504, latest revision, and results shall be submitted to the Engineer.

2.04 BUTTERFLY VALVES (AIR SERVICE)

A. Valves shall be designed for service with compressed air and for a range of 10 inches Hg vacuum to 25 psig pressure and a temperature range of 40° to 300°F.

1. All butterfly valves shall be of the tight closing, PTFE seat type with PTFE seats that are securely fastened to the valve body. Valves shall be bubble-tight at rated pressures with flow in either direction, and shall be suitable for applications involving throttling service. Valve disc shall rotate 90° from the full open position to the tight shut position.

2. Valve shop drawings shall include Cv data for all valves proposed for the project.

3. Valve Body: Each valve body shall be a fully lugged style cast or ductile iron body.

4. Valve Disc: Disc shall utilize air-profile design. Disc material shall be Type 316 stainless steel.

5. Valve Shaft: Shaft shall be either one-piece through or stub shaft design. The shaft shall be Type 316 stainless steel.

6. Valve Seat: Elastomer seats shall be in the body. Seats shall be PTFE and suitable for a maximum operating temperature of 300°F.

7. Valve Bearings: All shaft bearings shall be of the self-lubricating, corrosion resistant, sleeve type, suitable for a maximum operating temperature of 300°F.

8. Valve Packing: All valves shall have adjustable or self-adjustable packing materials. Packing shall be suitable for the temperature of 300°F and service condition.

9. Valve Coating: All valves shall have a factory applied high build epoxy coating suitable for the intended service.

10. Valve Operators:

a. Manually actuated valves 4-inches in size and smaller shall be furnished with a lever operator that includes a locking mechanism for throttling capability. Properly sized gear operators shall be provided for manually actuated valves larger than 4 inches in size. Each gear operator shall include a handwheel and be designed so that the force on the handwheel needed to operate the valve does not exceed 80 pounds.

b. Valves to be equipped with a pnuematic actuator shall be provided with appropriate appurtenances for connection to the pneumatic valve operator as specified in in this section.

B. Butterfly valves for air service shall be Keystone Model 61L or an approved equal

- PNEUMATIC VALVE ACTUATORS

A. Manufacturer: Kinetrol

B. Pneumatic valve actuators shall be quarter-turn double acting rotary vane actuators specifically sized and designed for the intended applications. Sizing shall be based on a valve working pressure of 10 psi for all valves. It is anticipated that the compressed air system will maintain a pressure of 70 psi. The manufacturer shall field verify conditions during bidding.

C. Actuators for the butterfly valves shall be designed for open/close service or modulating service per the Valve Schedule. For modulating service an electropneumatic positioner shall be furnished to provide accurate control in response to a 4-20 mADC signal. Each actuator

shall also provide a 4-20 mADC signal to allow remote monitoring of the valve position. Other accessories shall include limit switches, visual position indicator, solenoid valve, and handwheel for manual valve operation.

2.06 SWING CHECK VALVES

A. Swing check valves 2-inch through 24-inch in size shall conform to AWWA C508, latest revision, and shall be designed for a minimum water working pressure of 150 psi. Check valves shall have cast iron body, swing type design, and ends shall be flanged, Class 125 in accordance with ANSI B16.1. When open, the valve shall have a straight way passage with a minimum flow area equal to the full pipe area. Swing check valves shall be completely bronze fitted with renewable bronze seat ring and a rubber faced disc. Valve hinge pin shall be stainless steel. Check valves shall be supplied with an outside lever and weight. The check valve bonnet shall be provided with a tapped boss with plug for future installation of a pressure gauge.

B. Swing check valves shall absolutely prevent the return of water back through the valve when the inlet pressure decreases below the downstream pressure. The check valve shall be constructed such that the disc and body seat ring may be easily removed and replaced without removing the valve from the line. Each valve shall be hydrostatically tested at the factory, at a test pressure of 300 psi.

C. Prior to shipment from the factory, the interior ferrous surfaces of the valve, except for finished, non-ferrous, or bearing surfaces, shall be coated with a fusion bonded or thermosetting epoxy coating in accordance with AWWA C550, latest revision. Coating shall be holiday-free, NSF approved, with a minimum thickness of 16 mils. Surfaces shall be clean, dry, and free from rust and grease before coating.

D. All exterior surfaces of swing check valves shall be clean, dry, and free from rust and grease before coating. Exterior ferrous parts of all valves shall be shop primed at the factory with one coat, minimum dry film thickness of 4 mils of a rust inhibitive, universal primer. Primer shall be suitable for finish paint specified. Following installation, valves shall be finish painted with two (2) coats of potable water epoxy as manufactured by Tnemec or an approved equal.

E. Valve Manufacturer: Non-cushioned swing check valves shall bein accordance with the City of Clearwater Utility Standards.

2.07 RESTRAINED COUPLINGS

A. Joint Restraint to prevent axial separation shall be incorporated into the design of the sleeve or coupling used to connect two plain pipe ends.

B. The restraint mechanism shall consist of a plurality of individually actuated gripping surfaces to maximize restraint capability. Torque limiting twist off nuts shall be used to insure proper actuating of the restraint devices. The restraint devices shall be coated using MEGABOND™.

C. Ductile Iron components shall be of a minimum of 65-45-12 ductile iron meeting the requirements of ASTM A536 of the latest revision and shall be tested in accordance with the stated standard.

D. The restrained joining system shall meet the applicable requirements of AWWA C219, ANSI/AWWA C111/A21.11, and ASTM D2000.

E. The restrained joining system shall be the EBAA Iron Series 3800 or approved equal.

2.08 RESTRAINED FLANGED ADAPTORS

A. Restrained flange adapters shall be used in lieu of threaded, or welded, flanged spool pieces. Flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C110/A21.10.

B. Restraint for the flange adapter shall consist of a plurality of individual actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of gripping wedges. The restraint devices shall be coated using MEGABOND™.

C. The flange adapter shall be capable of deflection during assembly, or permit lengths of pipe to be field cut, to allow a minimum of 0.6” gap between the end of the pipe and the mating flange without affecting the integrity of the seal.

D. The flange adapter shall have a safety factor of 2:1 minimum.

E. The flange adapter shall be the SERIES 2100 MEGAFLANGE adapter, as produced by EBAA Iron, Inc., or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION

A. All pipe, fittings, valves, and other material shall be subject to inspection and approval by the Engineer after delivery, and no broken, cracked, imperfectly coated, or otherwise damaged or unsatisfactory material shall be used. When a defect or crack is discovered, the injured portion shall not be installed. Cracked pipe shall have the defect cut off at least 12 inches from the break in the sound section of the barrel.

3.02 GENERAL INSTALLATION REQUIREMENTS

A. Pipe, fittings, valves, and accessories shall be installed as shown or indicated on the Drawings in accordance with the manufacturer’s recommendations. All connections to existing piping systems shall be made as shown or indicated on the

Drawings after consultation and cooperation with authorities of the Owner. Some such connections may have to be made during off-peak hours (late night or early morning).

3.03 INSTALLATION OF VALVES

A. Valves of the size and type shown on the Drawings shall be set plumb and installed at the locations indicated on the Drawings. Valves shall be installed in accordance with manufacturer's installation instructions and with the details shown on the Drawings.

B. Valves shall be installed such that they are supported properly in their respective positions, free from distortion and strain. Valves shall be installed such that their weight is not borne by pumps and equipment that are not designed to support the weight of the valve.

C. Valves shall be carefully inspected during installation; they shall be opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Check and adjust all valves for smooth operation.

D. Install valves with the operating stem in either horizontal or vertical position.

E. Allow sufficient clearance around the valve operator for proper operation.

F. Clean iron flanges by wire brushing before installing flanged valves. Clean carbon steel flange bolts and nuts by wire brushing, lubricate threads with oil or graphite, and tighten nuts uniformly and progressively. Clean threaded joints by wirebrushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves. Joints shall be watertight.

END OF SECTION

4.23 SECTION 16050: BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

A. SUMMARY

1. Section Includes: General administrative, procedural requirements, and installation methods for electrical installations specified in Division 16.

2. The Drawings are schematic and are not intended to show every detail of construction.

a. In general, conduits/raceways, transitions and offsets shown on Drawings indicate approximate locations in plan and elevation where the systems are intended to be run.

b. CONTRACTOR shall fully coordinate electrical Work with other trades to avoid interferences.

c. In the event of interferences, CONTRACTOR shall request clarification from ENGINEER in writing.

1. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Sections, apply to Work of this Section.

B. SUBMITTALS

1. Shop Drawings: Submit in accordance with requirements of Section 01340, Shop Drawings covering the items included under this Section of Work. Shop Drawing submittals shall include:

a. Submit product data covering the items included under this Section of Work.

2. Conforming to Construction Drawings: Submit a complete set of Drawings showing the locations of the piping, ductwork, etc., as actually installed. Such Drawings shall be submitted to ENGINEER in electronic format (PDF).

3. Operation and Maintenance Manuals: Submit operation and maintenance manuals for items included under this Section. Include following information for equipment items:

a. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.

b. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.

c. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.

d. Servicing instructions and lubrication charts and schedules.

C. RECORD DOCUMENTS

1. Prepare Record Documents in accordance with requirements in Section 01720. In addition, CONTRACTOR shall submit, prior to final payment, Drawings conforming to construction records of systems it has installed. Vendor drawings shall be sized as manufacturers' standard.

2. Provide updated panelboard schedules for any panelboard modified.

D. QUALITY ASSURANCE

1. National Electrical Code: Comply with NFPA 70, National Electrical Code.

2. UL Compliance and Labeling: Use products and components labeled by UL.

E. PERMITS, INSPECTIONS, AND LICENSES

1. CONTRACTOR shall procure all necessary permits and licenses, observe and abide by all applicable laws, codes, regulations, ordinances, and rules of the State, territory, or political subdivision thereof, wherein Work is done, or any other duly constituted public authority, and further agrees to hold OWNER harmless from liability or penalty which might be imposed by reason of an asserted violation of such laws, codes, regulations, ordinances, or other rules.

a. Upon completion of Work, CONTRACTOR shall secure certificates of inspection from the inspector having jurisdiction and shall submit 3 copies of the certificates to OWNER. CONTRACTOR shall pay the fees for the permits, inspections, licenses, and certifications when such fees are required.

F. DELIVERY, STORAGE, AND HANDLING

1. Deliver products to Project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification. Equipment shall be packaged to prevent damage during shipment, storage, and handling. Do not install damaged units; replace, and remove damaged units from Site.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

○ GENERAL ELECTRICAL INSTALLATION

1. Provide electrical materials and equipment enclosures appropriate for areas in which they are installed. An area designated by a name and elevation includes space bounded by floor, ceiling, and enclosing walls.

a. Exception: Provide manufacturer's standard construction for indoor or outdoor application where equipment is not manufactured to NEMA specifications (e.g., switchgear, transformers, high voltage capacitors, bus duct, and light fixtures; materials and equipment used in finished areas such as offices, laboratories, etc.).

2. Provide nonmetallic electrical materials and equipment enclosures in NEMA 4X areas; watertight NEMA 4 and equipment enclosures for outdoor applications and indoor applications below grade; explosion-proof NEC Class I, Division 1, Group D equipment for NEMA 7 areas; explosion-proof NEC Class II, Division 2, Group F equipment for NEMA 9 areas.

3. Provide chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.

4. Supporting devices and sleeves shall be set in poured-in-place concrete and other structural components as they are constructed.

5. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide maximum headroom possible. Locate light fixtures at approximately 8 feet above floor and where fixtures may be readily serviced.

6. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

7. Install systems, materials, and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by Drawings recognizing that portions of Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to ENGINEER.

8. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components where installed exposed in finished spaces.

9. As much as practical, connect equipment for ease of disconnecting with minimum of interference with other installations.

10. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

- RACEWAY INSTALLATION

1. Indoors, use the following wiring materials:

a. Connection to Vibrating Equipment, including transformers and hydraulic, pneumatic or electric solenoid or motor-operated equipment: Liquidtight flexible conduit.

b. Exposed Conduit: Schedule 80 PVC.

2. Minimum size conduit shall be 3/4 inch unless shown otherwise.

3. Instrument Signal Conduit Requirements: Shielded signal wires for 4-20 mA type instruments or thermocouple wires assigned to the same control panel may be run in the same conduit. Shielded instrument signal wires, thermocouple wires, and shielded 2-wire intercom wires may be run in the same conduit.

4. Install expansion fittings in all exposed rigid nonmetallic conduit runs of 20 feet or more.

5. Install expansion/deflection fittings where conduit passes a building expansion joint or where conduits are attached to two structures joined by a concrete expansion joint.

6. Exposed Raceways: Install parallel and perpendicular to nearby surfaces or structural members and follow the surface contours as much as practical. Make bends and offsets so the inside diameter is not effectively reduced. Keep the legs of a bend in the same plane and the straight legs of offsets parallel. Conduits shall slope away from loads to keep moisture from entering the load. Run parallel or banked raceways together. Make bends in parallel or banked runs from the same centerline so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel. This requires that there be a change in the plane of the run, such as from wall to ceiling and that the raceways be of the same size. In other cases, provide field bends for parallel raceways. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.

7. Space raceways, fittings, and boxes 0.25 inch from mounting surface in NEMA 4 and NEMA 7 areas. Spacers shall be one-piece construction of stainless steel, galvanized steel, PVC, ABS, or other noncorrosive material.

8. Sleeves: Install in concrete floor slabs except where conduit passes through a housekeeping pad. Install in exterior walls below grade.

9. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid metal conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this Contract, install screwdriver-operated threaded flush plugs with floor.

10. Flexible Connections: Use short length (maximum 6 feet for lighting fixtures; maximum 3 feet for all other equipment) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement, and all motors. Use liquidtight flexible conduit in wet locations and rated flexible connections for hazardous locations. Install separate ground conductor across flexible connections.

11. Join raceways with fittings designed and approved for the purpose and make joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.

12. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate metal conduit, use threaded rigid metal conduit fittings. For PVC externally coated rigid metal conduit, use only factory-coated fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduit.

13. Install raceway sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL listed sealing compound. For concealed raceways, install each fitting in a flush metal box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:

a. Where conduits enter or leave hazardous locations.

b. Where conduits enter or leave NEMA 4X areas.

c. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air-conditioned spaces.

d. Where required by the NEC.

1. Install electrical boxes in those locations which ensure ready accessibility to enclosed electrical wiring. Provide knockout closures to cap unused knockout holes where blanks have been removed.

2. Fasten electrical boxes firmly and rigidly to substrates or structural surfaces to which attached, or solidly embed electrical boxes in concrete masonry.

3. Provide fire-retardant barriers in all pull and junction boxes containing circuits that are otherwise continuously separated in conduit. Securely fasten these barriers within box. Size barriers so that space between barrier and box wall does not exceed 0.125 inch anywhere around the perimeter of barrier.

4. Support exposed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.

5. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from building structure.

6. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box and tighten the chase nipples so no threads are exposed.

7. Complete installation of electrical raceways before starting installation of conductors within raceways and prevent foreign matter from entering raceways by using temporary closure protection. Cap spare conduit. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

8. Install pull wires in empty raceways: Use No. 14 AWG zinc-coated steel or monofilament plastic line having not less than 200-pound tensile strength. Leave not less than 12 inches of slack at each end of the pull wire.

- WIRE AND CABLE INSTALLATION

a. Use pulling means including fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Pull conductors simultaneously where more than

one is being installed in same raceway. Use UL listed pulling compound or lubricant where necessary.

b. Keep branch circuit conductor splices to minimum. Splice feeders only where indicated. Use a standard kit. No splices are allowed for instrument and telephone cables except at indicated splice points.

c. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced. Use splice and tap connectors which are compatible with conductor material and are UL listed as pressure type connectors.

d. Provide adequate length of conductors within electrical enclosures and train conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than No. 10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at terminal.

e. Terminate power conductors at equipment using pressure-type terminals specifically designed for type of terminations to be made. Terminate no more than 2 conductors No. 8 AWG and smaller within the same pressure-type terminal. These 2 conductors shall be no more than 4 wire gauge sizes apart. Terminate no more than 1 conductor larger than No. 8 AWG within any pressure-type terminal.

f. Seal wire and cable ends until ready to splice or terminate.

- CUTTING AND PATCHING

a. Perform cutting, fitting, and patching of electrical equipment and materials required to uncover Work to provide for installation of ill-timed Work, remove and replace Work that is either defective or does not conform to requirements of Drawings.

b. Cut, remove, and legally dispose of selected electrical equipment, components, and materials as indicated including, but not limited to, removal of electrical items indicated to be removed and items made obsolete by new Work. Protect structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed. Provide and maintain temporary partitions or dust barriers adequate to prevent spread of dust and dirt to adjacent areas.

c. Patch existing finished surfaces and building components using new materials matching existing materials.

- EQUIPMENT CHECKOUT AND TESTING

a. In addition to testing recommended by equipment or material supplier and called for in equipment or material specification, perform the following.

b. Check-out Procedures. In general, check-out procedures (as listed below) which are applicable for a particular item of equipment shall be performed:

a. Vacuum interior of cubicles and remove foreign material.

b. Wipe clean with a lint-free cloth insulators, bushings, bus supports, etc.

c. Check exposed bolted power connections for tightness.

d. Check operation of breakers, contactors, etc., and control and safety interlocks.

e. Check tightness of bolted structural connections.

f. Check leveling and alignment of enclosures.

g. Check operating parts and linkages for lubrication, freedom from binding, vibration, etc.

h. Check tightness and correctness of control connections at terminal blocks, relays, meters, switches, etc.

i. Clean auxiliary contacts and exposed relay contacts after vacuuming.

END OF SECTION

4.24 SECTION 16060: GROUNDING

PART 1 - GENERAL

1.01 SUMMARY

1. Section Includes: Electrical grounding and bonding Work as follows:
    a. Solidly grounded.
2. Applications of electrical grounding and bonding Work in this Section:
    a. Electrical power systems.
    b. Raceways.
    c. Equipment.

A. SUBMITTALS

1. Shop Drawings: Submit in accordance with Section 01340, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

a. Product Data: Submit manufacturer's data on grounding and bonding products and associated accessories.

B. QUALITY ASSURANCE

1. Codes and Standards:

a. UL Compliance: Comply with applicable requirements of UL Standards No. 467, "Electrical Grounding and Bonding Equipment," and No. 869, "Electrical Service Equipment," pertaining to grounding and bonding of systems, circuits, and equipment. In addition, comply with UL Standard 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide grounding and bonding products which are UL listed and labeled for their intended usage.

b. IEEE Compliance: Comply with applicable requirements and recommended installation practices of IEEE Standards 80, 81, 141, and 142 pertaining to grounding and bonding of systems, circuits, and equipment.

PART 2 - PRODUCTS

o GROUNDING AND BONDING

1. Materials and Components:

a. Except as otherwise indicated, provide electrical grounding and bonding systems indicated; with assembly of materials including, but not limited to, cables/wires, connectors, solderless lug terminals, grounding electrodes and plate electrodes, bonding jumper braid, surge arresters, and additional accessories needed for complete installation. Where more than one type component product meets indicated requirements, selection is Installer's option. Where materials or components are not indicated, provide products which comply with NEC, UL, and IEEE requirements and with established industry standards for those applications indicated.

b. Conductors: Electrical copper grounding conductors for grounding system connections that match power supply wiring materials and are sized according to NEC.

PART 3 - EXECUTION

A. INSTALLATION OF ELECTRICAL GROUNDING AND BONDING SYSTEMS

1. Connect grounding conductors to underground grounding electrodes using exothermic weld process or mechanical compression type connectors.

2. Connect together system neutral, service equipment enclosures, exposed noncurrent carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.

3. Terminate feeder and branch circuit insulated equipment grounding conductors with grounding lug, bus, or bushing.

4. Bond grounding cables to both ends of metal conduit or sleeves through which such cables pass.

5. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque-tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A to assure permanent and effective grounding.

6. Route grounding connections and conductors to ground and protective devices in shortest and straightest paths as possible while following building lines to minimize transient voltage rises. Protect exposed cables and straps where subject to mechanical damage.

END OF SECTION

4.25 SECTION 16070: SUPPORTING DEVICES

PART 1 – GENERAL

A. SUMMARY

1. Section Includes: Secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings.

B. SUBMITTALS

2. Shop Drawings: Submit in accordance with Section 01340, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

a. Product data for each type of product specified.

C. QUALITY ASSURANCE

3. Electrical components shall be listed and labeled by UL, ETL, CSA, or other approved, nationally recognized testing and listing agency that provides third-party certification follow-up services

PART 2 - PRODUCTS

A. MANUFACTURERS

1. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

a. Slotted Metal Angle and U-Channel Systems:

I. Allied Tube & Conduit.

II. American Electric.

III. B -Line Systems, Inc.

IV. Cinch Clamp Co., Inc.

V. GS Metals Corp.

VI. Haydon Corp.

VII. Kin-Line, Inc.

VIII. Unistrut Diversified Products.

b. Conduit Sealing Bushings:

I. Bridgeport Fittings, Inc.

II. Cooper Industries, Inc.

III. Elliott Electric Mfg. Corp.

IV. GS Metals Corp.

V. Killark Electric Mfg. Co.

VI. Madison Equipment Co.

VII. L.E. Mason Co.

VIII. O-Z/Gedney.

IX. Producto Electric Corp.

X. Raco, Inc.

XI. Red Seal Electric Corp.

XII. Spring City Electrical Mfg. Co.

XIII. Thomas & Betts Corp.

B. COATINGS

1. Coating: Supports, support hardware, and fasteners shall be protected by being 316 stainless steel finish, or inherent material characteristic.

C. MANUFACTURED SUPPORTING DEVICES

1. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps.

2. Fasteners. Types, materials, and construction features as follows:

a. Expansion Anchors: Stainless steelwedge or sleeve type.

b. Toggle Bolts: Stainless Steelspringhead type.

c. Hanger Rods: 0.375-inch diameter minimum Stainless steel.

1. Conduit Sealing Bushings: Factory fabricated, watertight conduit sealing bushing assemblies suitable for sealing around conduit or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.

2. Cable Supports for Vertical Conduit: Factory fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of stainless steel finish.

3. U-Channel Systems: 12 gauge or 0.105-inch-thick steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center in top surface. Provide fittings and accessories that mate and match with U-channel and are of same manufacturer.

D. FABRICATED SUPPORTING DEVICES

1. Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.

2. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

3. Pipe Sleeves: Provide a waterstop on pipe sleeves. Provide pipe sleeves of 2 standard sizes larger than conduit/pipe passing through it and of one of the following:

a. Sheet Metal: Fabricate from aluminum sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gauge metal for sleeve diameter noted:

I. 3-inch and smaller: 20-gauge.

II. 4-inch to 6-inch: 16-gauge.

III. Over 6-inch: 14-gauge.

b. Pipe: Fabricate from Schedule 40 aluminum pipe.

PART 3 - EXECUTION

NOT USED

END OF SECTION

4.26 SECTION 16075: ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

- SUMMARY

1. Section Includes: Identification of electrical materials, equipment, and installations. It includes requirements for electrical identification components including, but not limited to, the following:

a. Identification labeling for cables and conductors.

- SUBMITTALS

1. Shop Drawings: Submit in accordance with Section 01340, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

a. Product Data for each type of product specified

PART 2 - PRODUCTS

A. ELECTRICAL IDENTIFICATION PRODUCTS

NOTE TO SPECIFIER: DELETE NONAPPLICABLE PRODUCTS BELOW. CONSIDER DELETING RACEWAY AND CABLE IDENTIFICATION REQUIREMENTS FOR RENOVATION IN BUILDINGS WITHOUT CURRENT RACEWAY CABLE IDENTIFICATION SYSTEMS.

1. Colored Adhesive Marking Tape for Wires and Cables: Self-adhesive, vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width.

2. Pre-tensioned Flexible Wraparound Colored Plastic Sleeves for Cable Identification: Flexible acrylic bands sized to suit raceway diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the cable.

3. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with pre-printed numbers and letter.

4. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18 inch minimum width, 50-pound minimum tensile strength, and suitable for a temperature range from minus 50 to 350 degrees F. Provide ties in specified colors when used for color coding.

PART 3 - EXECUTION

A. INSTALLATION

1. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification Work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by Code.

2. Underground Electrical Line Identification: During trench backfilling for exterior nonconcrete encased underground power, signal, and communications lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where multiple lines installed in a common trench, do not exceed an overall width of 16 inches; install a single line marker.

3. Install line marker for underground wiring, both direct buried and in raceway.

4. Conductor Color Coding: Provide color coding for secondary service, feeder, and branch circuit conductors throughout the Project secondary electrical system following OWNER's method of phase identification or as follows:

1. Wiring Standards:

a. 480/277 Volt, 3-Phase Power:

i. Brown.

ii. Orange.

iii. Yellow.

iv. Grey Neutral.

b. Motor Leads, Control Cabinet/MCC:

i. Black, numbered L1-T1, etc.

c. Control Wiring:

i. Red Control circuit wiring that is de-energized when the main disconnect is opened.

ii. Yellow Control circuit wiring that remains energized when the main disconnect is opened.

iii. Blue DC.

iv. Green Ground.

2. Use conductors with color factory applied entire length of conductors except as follows:

a. The following field applied color coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.

i. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last 2 laps of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration.

ii. In lieu of pressure-sensitive tape, colored cable ties may be used for color identification. Apply 3 ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal spaced 3 inches apart. Apply with a special tool or pliers, tighten for snug fit, and cut off excess length.

3. Power Circuit Identification: Securely fasten identifying metal tags of aluminum wraparound marker bands to cables, feeders, and power circuits in vaults, pull boxes, junction boxes, manholes, and switchboard rooms with 1/4-inch steel letter and number stamps with legend to correspond with designations on Drawings. If metal tags are provided, attach them with approximately 55-pound test monofilament line or one-piece self-locking nylon cable ties.

4. Install wire/cable designation tape markers at termination points, splices, or junctions in each circuit. Circuit designations shall be as indicated on Drawings.

END OF SECTION

4.27 SECTION 16120: WIRES AND CABLES

PART 1 - GENERAL

A. SUMMARY

1. Section includes the following:

   a. Low-Voltage Wire and Cable.

   b. Instrument Cable.

B. SUBMITTALS

1. Shop Drawings: Submit in accordance with Section 01340, Shop Drawings covering the items included under this Section. Include Shop Drawings of wires, cables, connectors, splice kits, and termination assemblies.

2. Reports of field tests prepared as noted in Section 01720.

C. QUALITY ASSURANCE

1. UL Compliance: Provide components which are listed and labeled by UL. For cables intended for use in air handling space comply with applicable requirements of UL Standard 710, "Test Method for Fire and Smoke characteristics of cables used in Air Handling Spaces."

2. NEMA/ICEA Compliance: Provide components which comply with following standards:

   a. NEMA WC 70-1999/ICEA S-95-658-1999, Nonshielded Power Cables Rated 2,000 Volts or Less for the Distribution of Electrical Energy.

3. IEEE Compliance: Provide components which comply with the following standard.

   a. Standard 82, Test procedures for Impulse Voltage Tests on Insulated Conductors.

4. Labeling: Handwritten labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or typewritten onto adhesive labels. The font shall be at least 1/8 inch in height, block characters, and legible. The text shall be of a color contrasting with the label such that is may be easily read. If labeling tape is utilized, the font color shall contrast with the background. Patch panels shall exhibit workstation numbers or some type of location identifier, in sequential order, for all workstations or devices attached. Each Network cable segment shall be labeled at each end with its respective identifier.

PART 2 - PRODUCTS

A. MANUFACTURERS

1. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

a. Low-Voltage Wire and Cable:

i. American Insulated Wire Corp.

ii. General Cable.

iii. The Okonite Co.

iv. Southwire Co.

b. Connectors for Low-Voltage Wires and Cable Conductors:

i. AMP.

ii. O-Z/Gedney Co.

iii. Square D Company.

iv. 3M Company.

c. Instrument Cable:

i. Belden (Trade Nos. 1120A and 1118A).

B. LOW-VOLTAGE WIRES AND CABLES

1. Conductors: Provide stranded conductors conforming to ASTM Standards for concentric stranding, Class B. Construction of wire and cable shall be single conductor (1/c) unless multiconductor cable is shown by notation in form (x/c) where x indicates the number of separate insulated conductors per cable.

2. Conductor Material: Copper. Minimum size power wire shall be No. 12 AWG.

3. Insulation: Provide XHHW insulation for power conductors used in single- and 3-phase circuits with more than 120 volts to ground. Provide XHHW, or THWN/THHN insulation for power conductors used in single- and 3-phase circuits with 120 volts or less to ground

a. Provide THHN/THWN, or XHHW insulation for grounding conductors installed in raceways.

b. Provide THHN/THWN insulation for control conductors.

C. CONNECTORS FOR LOW-VOLTAGE WIRES AND CABLES

1. Provide UL listed factory fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types, and classes for applications and services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

D. INSTRUMENT CABLE

1. Instrument Cable: 600 volt minimum insulated shielded cable with two or more twisted No. 16 AWG stranded copper conductors; PVC, nylon, or polyethylene outer jacket; and 100 percent foil shielding.

PART 3 - EXECUTION

A. FIELD QUALITY CONTROL

1. Reports (non-LAN cable): Testing organization shall maintain a written record of observations and tests, report defective materials and workmanship, and retest corrected defective items. Testing organization shall submit written reports to ENGINEER.

END OF SECTION

4.28 SECTION 16130: RACEWAYS

PART 1 - GENERAL

A. SUMMARY

1. Section Includes: Raceways for electrical wiring. Types of raceways in this Section include the following:

    a. Liquidtight flexible conduit.

    b. Rigid nonmetallic conduit.

    c. Conduit bodies.

B. SUBMITTALS

2. Shop Drawings: Submit in accordance with Section 01340, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

    d. Product data for the following products:

        i. Conduit.

        ii. Conduit bodies.

C. QUALITY ASSURANCE

3. Codes and Standards:

e. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.

f. UL Compliance and Labeling: Comply with applicable requirements of UL standards pertaining to electrical raceway systems. Provide raceway products and components listed and labeled by UL, ETL, or CSA.

PART 2 - PRODUCTS

A. MANUFACTURERS

1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in Work include:

a. Conduit:

i. Allied Tube.

ii. Carlon.

iii. General Electric Co.

iv. Johns Manville.

v. Occidental Coatings.

vi. Orangeburg.

vii. Perma-Cote Industries.

viii. Republic Steel.

ix. Robroy Industries.

x. Steelduct Co.

xi. Triangle Conduit.

xii. Wheatland Tube.

xiii. Youngstown Sheet and Tube.

b. Liquidtight Conduit:

i. Anamet, Inc.

ii. Carlon.

iii. Electric-Flex.

iv. Thomas and Betts.

c. Conduit Bodies:

i. Adalet-PLM.

ii. American Electric.

iii. Appleton Electric Co.

iv. Carlon.

v. Crouse-Hinds Division, Cooper Industries, Inc.

vi. Delta Industrial Products.

vii. Killark Electric Mfg. Co.

viii. Kraloy Products Co.

ix. O-Z/Gedney Co.

x. Perma-Cote Industries.

xi. Robroy Industries.

xii. Spring City Electrical Mfg. Co.

B. NONMETALLIC CONDUIT AND DUCTS

1. Rigid Nonmetallic Conduit (RNC): NEMA TC 2 and UL 651, 80 PVC.

2. Liquidtight Flexible Nonmetallic Conduit and Fittings: UL 1660. Fittings shall be specifically approved for use with this raceway.

C. CONDUIT BODIES

1. Provide matching gasketed covers secured with corrosion-resistant screws. Use nonmetallic covers in NEMA 4X areas.

2. Conduit and Tubing: Use metallic conduit bodies as follows:

PART 3 - EXECUTION

NOT USED

END OF SECTION

PRICING SHEET

Please note the quantities listed on the Pricing Sheet are estimates and not all quantities may be used during construction.

NE WRF SAND FILTERS REHAB

23-0045-UT

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
I. GENERAL					
1	Mobilization and Demobilization	1	LS		
2	Indemnification	1	LS		
3	General Requirements	1	LS		
II. FILTER CLEANING					
4	Filter Media and Debris Removal, Hauling, Disposal	180	Ton		
5	Filter Cell Cleaning	10,000	SF		
III. FILTER INSPECTIONS					
6	Filter Inspections - Filter Equipment Manufacturer	13	EA		
IV. CONCRETE REPAIR					
7	Crack Repairs - Epoxy Injection	75	LF		
8	Concrete Surface Rehab - Level 1 Repair	900	SF		
9	Concrete Surface Rehab - Level 2 Repair	200	SF		
10	Concrete Surface Rehab - Level 3 Repair	150	SF		

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
11	Concrete Surface Rehab - Level 4 Repair	30	SF		
12	Spall Repair at Floor	5	SF		
13	Protective Coatings	9,000	SF		
V. FILTER REHABILITATION					
14	Furnish and Install I-Beam Hold Down Assemblies (Including Fasteners & Hardware)	12	EA		
15	Furnish and Install Hold Down Clip Angles (Including Fasteners & Hardware)	360	EA		
16	Furnish and Install Wire Mesh Screen	60	EA		
17	Furnish and Install 1/8"x1" Core Sealing Gasket (100' Roll)	10	EA		
18	Furnish and Install 3/16"x3" Closed Cell Neoprene Gasket (50' Roll)	48	EA		
19	Furnish and Install Long Loose Perimeter Angles	120	EA		
20	Furnish and Install Short Loose Perimeter Angles	120	EA		
21	Furnish and Install Hold Down I-Beam	360	EA		
22	Furnish and Install Level Sensors	24	EA		
23	Kit-Holddown	360	EA		
24	Backwash Trough Support Angle	12	EA		
25	Backwash Trough Support Tabs	96	EA		
26	Level Existing V-Notch Weir	144	EA		
27	Furnish and Install Filter Media	180	Ton		

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
VI. VALVES					
28	Replace Existing 20-Inch Backwash Effluent Trough Valve	12	EA		
29	Replace Existing 20-Inch Backwash Effluent Trough Actuator	12	EA		
30	Replace Existing 18-Inch Inlet Trough Valve	10	EA		
ITEM DESCRIPTION					
31	Replace Existing 18-Inch Inlet Trough Actuator	12	EA		
32	Replace Existing 18-Inch Backwash Inlet Valve	8	EA		
33	Replace Existing 18-Inch Backwash Inlet Actuator	12	EA		
34	Replace Existing 18-Inch Filtrate Valve	8	EA		
35	Replace Existing 18-Inch Filtrate Actuator	12	EA		
36	Replace Existing 16-Inch Effluent Pump Check Valve	2	EA		
37	Replace Poly Tubing for Pneumatic Actuators	3,000	LF		
38	Install 1/2" Push to Connect X 1/2" Straight Fitting for Connection to New Actuator	72	EA		
VII. AIR PIPING & DIFFUSERS					
39	Remove Existing 3-Inch GSP Low Pressure Air Manifold & Replace with 3-Inch Type 304 SST Pipe Manifold (30')	16	EA		

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
40	Furnish and Install PVC Diffusers	240	EA		
41	Furnish and Install 3-inch Air Manifold SST Supports	24	EA		
VIII. CHEM CLEAN SYSTEM					
42	Reprogram PLC for Proper Operation of Chemical Cleaning System	1	LS		
IX. GATE REMOVAL AND REPLACEMENT					
43	Sliding Gate Replacement, Actuator Replacement and Bypass	1	LS		
TOTAL					

CONTINGENCY

10% based on subtotal from lines 1-43 above.

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
44	Contingency (10%)	1	LS		
TOTAL					

SUBMITTAL REQUIREMENTS

1 Certified Business*

Are you a Certified Small Business or a Certified Minority, Woman or Disadvantaged Business Enterprise?

☐ Yes

☐ No

*Response required

When equals "Yes"

*Certified Business Type**

Pick one of the following

Select all that apply

☐ Certified Small Business

☐ Certified Minority, Woman, or Disadvantaged Business Enterprise

*Response required

When equals "Yes"

*Certifying Agency**

List the Agency that provided your certification.

*Response required

When equals "Yes"

*Certification Documentation**

Provide a copy of your certification

*Response required

2 Vendor Certification*

By submitting this response, the Vendor hereby certifies that:

A. It is under no legal prohibition on contracting with the City of Clearwater.

B. It has read, understands, and is in compliance with the specifications, terms and conditions stated herein, as well as its attachments, and any referenced documents.

C. It has no known, undisclosed conflicts of interest.

D. The prices offered were independently developed without consultation or collusion with any of the other vendors or potential vendors or any other anti-competitive practices.

E. No offer of gifts, payments or other consideration were made to any City employee, officer, elected official, or consultant who has or may have had a role in the procurement process for the commodities or services covered by this contract. The Vendor has not influenced or attempted to influence any City employee, officer, elected official, or consultant in connection with the award of this contract.

F. It understands the City may copy all parts of this response, including without limitation any documents or materials copyrighted by the Vendor, for internal use in evaluating respondent's offer, or in response to a public records request under Florida's public records law (F.S. Chapter 119) or other applicable law, subpoena, or other judicial process; provided that the City agrees not to change or delete any copyright or proprietary notices.

G. It hereby warrants to the City that the Vendor and its subcontractors will comply with, and are contractually obligated to comply with, all federal, state, and local laws, rules, regulations, and executive orders.

H. It certifies that Vendor is not presently debarred, suspended, proposed for debarment, declared ineligible, voluntarily excluded, or disqualified from participation in this matter from any federal, state, or local agency.

I. It will provide the commodities or services specified in compliance with all federal, state, and local laws, rules, regulations, and executive orders if awarded by the City.

J. It is current in all obligations due to the City.

K. It will accept all terms and conditions as set forth in this solicitation if awarded by the City.

L. The signatory is an officer or duly authorized representative of the Vendor with full power and authority to submit binding offers and enter into contracts for the commodities or services as specified herein.

☐ Please confirm

*Response required

3 E-Verify System Certificattion*

PER FLORIDA STATUTE 448.095, CONTRACTORS AND SUBCONTRACTORS MUST REGISTER WITH AND USE THE E-VERIFY SYSTEM TO VERIFY THE WORK AUTHORIZATION STATUS OF ALL NEWLY HIRED EMPLOYEES.

The affiant, by virtue of confirming below, certifies that:

A. The Contractor and its Subcontractors are aware of the requirements of Florida Statute 448.095.

B. The Contractor and its Subcontractors are registered with and using the E-Verify system to verify the work authorization status of newly hired employees.

C. The Contractor will not enter into a contract with any Subcontractor unless each party to the contract registers with and uses the E-Verify system.

D. The Subcontractor will provide the Contractor with an affidavit stating that the Subcontractor does not employ, contract with, or subcontract with unauthorized alien.

E. The Contractor must maintain a copy of such affidavit.

F. The City may terminate this Contract on the good faith belief that the Contractor or its Subcontractors knowingly violated Florida Statutes 448.09(1) or 448.095(2)(c).

G. If this Contract is terminated pursuant to Florida Statute 448.095(2)(c), the Contractor may not be awarded a public contract for at least 1 year after the date on which this Contract was terminated.

H. The Contractor is liable for any additional cost incurred by the City as a result of the termination of this Contract.

☐ Please confirm

*Response required

4 Scrutinized Company Certification*

Please download the below documents, complete, and upload.

- SCRUTINIZED_COMPANIES_AND_B...

*Response required

5 Compliance with Anti-Human Trafficking Laws*

Please download the below documents, complete, and upload.

- Compliance_with_787.06_form...

*Response required

6 Section V - Contract Documents*

Please download the below documents, complete, and upload.

- Section_V_-_Contract_Docume...

*Response required

7 W-9*

Upload your current W-9 form. (available at https://www.irs.gov/pub/irs-pdf/fw9.pdf)

*Response required