CITY OF NEWBURGH GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT

Newburgh, New York
Site Number 336089

October 2016

ADDENDUM No. 2

TO CONTRACT NOS. D010308, D010309, D010310, D010326

NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

Prepared by:

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ADDENDUM No. 2
OCTOBER 2016 CONTRACT DOCUMENTS
CITY OF NEWBURGH GAC TREATMENT SYSTEM
AT WASHINGTON LAKE FILTRATION PLANT
NEWBURGH, NEW YORK
CONTRACT NOS. D010308, D010309, D010310, D010326

TO ALL HOLDERS OF THE CONTRACT DOCUMENTS:

Your attention is directed to the following changes and additions to the October 2016 Contract Documents for the City of Newburgh GAC Treatment System at Washington Lake Filtration Plant. This addendum has been prepared in accordance with the provisions of the Contract Documents.

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PART A. Pre-Bid Meeting Attendance Sheet

Sign-in sheets are attached on following pages:

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Attendance Sheet
TUESDAY, NOVEMBER 1, 2016
GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT
General Construction Contract No. D010308
HVAC Construction Contract No. D010309
Electrical Construction Contract No. D010310
Plumbing Construction Contract No. D010326
Site No. 336089

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PART B. GAC Contactor Equipment Purchase for the Washington Lake Filtration Plant Contract

Contract No. OP10261 can be found and downloaded at the following ftp link:

http://www.dec.ny.gov/chemical/59233.html

PART C. Questions and Answers

1. *Question: Is the WBE goal correct for this bid? Division VII, Appendix B states 30% for this fast-tracked project (or almost a third of our bid).*

   Response: Yes the 30% goal is correct and will remain the goal for the project.

2. *Question: Are there any Buy America or American Iron and Steel requirements for this contract? If so, please include specific language.*

   Response: No, there are no requirements for Buy American or American Iron and Steel.

3. *Question: Please specify which Kamlock model is to be used (40 05 05-14).*

   Response: Provide Kamlock quick disconnects by Dover Corp.

4. *Question: Are piping materials to be domestic or is imported acceptable?*

   Response: There are no Buy American requirements for the project. Materials must meet specifications.

5. *Question: Article V of Appendix B references compliance with Federal requirements if Federal funds are used on the project. Is any part of this project being financed with Federal funds?*

   Response: No Federal funds are being used.

6. *Question: Section IX Supplementary Conditions of the Specifications states, "Revise Work hours to be 6 days per week, excluding Sunday. Work hours shall not commence prior to 6 AM each day for a maximum of 16 hours per day." Is this statement making it mandatory that the contractor work Saturdays?*

   Response: Work on Saturdays is not mandatory, but available to meet schedule.

7. *Question: Specification section 46 61 22 part 1.1 A.3 states" a copy of Contract no. OP10261 is provide for reference in the Limited Site Use Data. In review of the documentation provided in the limited site data, a copy of the Contract does not appear to be included. Please provide for contractor review prior to bid.*

   Response: Please refer to the link provided in Part B above.

8. *Question: Specification Section 01 35 23 Safety Requirements/1.4/A/1 states that "CONTRACTOR's safety representative shall be at the Site full-time when work is in*

progress". Can the Safety Representative be the Project Superintendent?

Response: A full-time safety representative shall be provided for the General Contract. For the HVAC, Plumbing and Electrical Contracts, the safety representative may be the project superintendent or other qualified person and the safety representative duties must not be superseded by other duties.

9. *Question: Does contract DO10308 pay for utility consumption fees?*

   Response: Yes, except as otherwise clarified.

10. *Question: This project requires numerous subcontractors to complete this project plus it has an MBE/WBE utilization plan. With this in mind we are respectfully requesting that the minimum subcontracting of this project of no more than 40% be waived.*

    Response: Bid as specified..

11. *Question: Specification Section 01 51 36 Temporary Water states that the GC shall provide temporary water for entire project. It also states the possibility of obtaining written permission from the City to use water from hydrant(s) and/or the permanent water system. For bidding purposes, will the City be allowing us to utilize their permanent system, and/or hydrants for temporary water supply? If so, does it need to be metered?*

    Response: Water may be used from hydrants as coordinated with the City. Water use will be metered.

12. *Question: Spec Section 01 51 26 Temporary Lighting states that the GC is responsible for all Temporary Lighting on the project and all fees. Specifically, 'Security Lighting,' it states to provide security lighting within 50' of all parts of the project during hours of darkness, w/ photocell control. Does this mean we are to set up a grid of lights on a 50' grid and have them running every night for the duration of the project?*

    Response: Bid as specified.

13. *Question: Specification Section 01 51 13 Temporary Electricity states that the GC pays for all Electricity used for this project, including cost of electricity for start-up and testing. It also states to 'Provide and maintain temporary electric service so that electricity can be obtained at all locations within the Project's work areas using extension cord of not more than 100 feet.' We as a GC do not see how this is possible to install and maintain on the complete site. Please elaborate further as to the intent of this section, and how it may be accomplished.*

    Response: Bid as specified.

14. *Question: Is a P&ID piping diagram available for the GAC system?*

    Response: The Instrumentation Drawings incorporate GAC system piping. Successful bidders will also be provided with approved GAC shop drawings.

15. *Question: GC all power for trailers? Other primes?*

    Response: The GC will provide all temporary power to all field trailers for all primes.

16. *Question: Is this schedule of milestone achievable?*

    Response: Bid as Specified.

17. *Question: Allowance for testing?*

    Response: No allowance for testing will be provided. Contractor responsible for specified testing costs.

18. *Question: Instrumentation package? Which Contract? GC?*

    Response: Instrumentation is in the General Contract D010308.

19. *Question: Please explain "non-biddable". Are these correct? If not please confirm how I obtain them.*

    Response: Refer to the Advertisement and Notice to Bidders for instructions on how to obtain bid documents. Do not rely on documents obtained from any other source.

20. *Question: Please see attached pdf, I need to confirm that access from the attached web address for bidding documents is correct.*

    Response: Refer to the Advertisement and Notice to Bidders for instructions on how to obtain bid documents. Do not rely on documents obtained from any other source.

21. *Question: Verify NYS 2016 Building Code is being used (based primarily on IBC 2015) – Effective Date was 10/3/16. Previous NYS Code was 2010 – Drawing A-02 states 2015 which I assume is an error.*

    Response: NYS 2016 Building Code is applicable.

22. *Question: Building Classification - Risk Category III? Should it be classified as Risk Category IV – Essential Facility. Importance Factor for Seismic Design Data is 1.5 which would indicate Essential Facility Classification?*

    Response: Note G-6 item 2 on sheet S-01 has been revised to the following "Seismic Importance factor, IE = 1.25", indicating Building Classification – Risk Category III.

23. *Question: Roof Mounted Service Walkways: Is there a layout or quantity? (note, this was raised at the pre-bid and the answer was that roof walkways are not required – confirm)*

    Response: Roof walkways are not required.

24. *Question: Roof Penetrations: Are there any curbs required? I can only pick up one 4" sanitary vent on the MEP drawings. Can that be verified?*

Response: The referenced vent is the only penetration in the roof.

25. *Question: If there is no roof top equipment do we need to provide service walkways?*

    Response: Refer to Response No. 23.

26. *Question: Are you looking for engineered backfill where old tank comes out?*

    Response: Unless otherwise noted on the drawings, select backfill shall be used below all new foundations per specification 31 23 05. For areas that do not support foundations, provide a combination of select backfill and general fill as indicated in the Typical Concrete Wall Backfill Detail on S-14.

27. *Question: Sheet E-20 illustrates a detail for a Typical Handhole(Electric). The Plan View outside dimensions do not seem to be correct. They would result in a structure with a 1'-8" x 1'-8" inside dimension. Is that the intent of the detail?*

    Response: The detail illustrates a handhole with outside dimensions of 4'0" x 4'0" and wall thicknesses of 6". Therefore, the inside dimensions are 3'0" x 3'0". There is an 8" wide area around the bottom of the handhole that is flat before the bottom slopes toward the sump.

28. *Question: Sheet I-03 shows a Pressure Reducing Valve Vault to the right of the Low Service Meter Vault. There does not appear to be a detail for that structure provided in the plans.*

    Response: The PRV vault will be constructed under the Contact Tank contract and will exist when this contract commences.

29. *Question: Please clarify the NEMA 7 enclosure on drawing I-06, compared to specifications for enclosure on 40 60 05-19. They are conflicting and need to be clarified; also, can enclosure be down sized?*

    Response: Drawing I-06 has been revised, NEMA 7 enclosure is not required and NEMA 4X shall be acceptable. Exact panel sizes are to be determined. Panel details with all required equipment, adequate spacing and meeting all the required standards (UL) shall be submitted by CONTRACTOR during shop drawing review for ENGINEER approval.

30. *Question: OIT, horn and strobe specified for NEMA 7 does not meet this rating. Please clarify.*

    Response: Refer to Response No. 29.

31. *Question: OIT specified says minimum is 19" and max size of panel view plus 7 is 15" max size. Please clarify.*

    Response: Bid Panel View Plus 7 Performance as specified.

32. *Question: What are the existing PLC's and Ethernet Switch's?*

    Response: There is no existing PLC or Ethernet Switch(s). Existing Instrumentation & Controls Console is an actual console consisting of physical indicators and recorders in the Head House Building.

33. *Question: Is the GAC Control Panel provided with the GAC system?*

    Response: GAC Control Panel shall be provided by the General CONTRACTOR as specified in section 40 60 05 paragraph 1.1-A.3 and contract drawings.

34. *Question: Please clarify the amount of fiber Cable needed as there are no drawings listed.*

    Response: Quantity should be scaled from Contract Drawings.

35. *Question: Roof Assembly: Is a metal deck or liner panel required? Or is the PEMB insulation facing exposed?*

    Response: A metal deck or liner panel is not required. The vapor retarder facing is exposed.

36. *Question: If exposed insulation (not recommended) what type of facing is required?*

    Response: Bid as specified.

37. *Question: Please confirm motor type for the high lift and GAC feed pumps, Open Drip Proof or Totally Enclosed Fan Cooled?*

    Response: Provide Totally Enclosed Fan Cooled motors.

38. *Question: Is a "XYPEX" type additive required for the Backwash and Stormwater Tanks?*

    Response: Crystalline admixtures are not required for the Backwash and Stormwater Tanks.

39. *Question: After the elevated slab is poured on the Stormwater and Backwash Tanks, is the work within the tanks considered to be a confined space?*

    Response: It is the CONTRACTOR'S responsibility to determine when confined space scenarios exist.

40. *Question: What areas of the GAC Building receives the dry shake hardener? Is it required for the Stormwater and Backwash tanks also?*

    Response: The GAC floor slab at elevation 273 and the electrical room floor slab at elevation 285 require a dry shake hardener. The stormwater and backwash tank roof slabs also require a dry shake hardener.

41. *Question: Please supply the sign-in sheet for the pre-bid.*

    Response: The Pre-Bid sign-in sheet has been included as Part A of this addendum.

42. *Question: There are no piers/foundations shown for the exterior stairs and leading up to the electrical room. How are these stairs and landings to be supported?*

    Response: Bid as specified. The typical concrete foundation for stairs is shown on drawing S-15.

43. *Question: At the pre-bid walkthrough, it was stated that there would be possibly around 3,000 CY of fill left over from the other Concrete Tank contract. Should the GC plan on having access to this fill, and if so, how much should we count on, and how much of it is usable as backfill? Where is the material stored?*

    Response: Further testing of this material has determined that it will not be suitable for use as backfill. Bidders shall provide necessary imported backfill.

44. *Question: For bidding purposes is the "New Chain Link Fence to Match Existing" on C-03 to be eight feet tall with black vinyl coating?*

    Response: Provide eight-foot-high chain link fence with barbed wire and black vinyl coated fencing fabric, posts and appurtenances.

45. *Question: For bidding purposes please provide a size, spacing, quantity, and species of the new and replacement trees on C-05.*

    Response: Assume new and replacement trees to be American Arborvitae with an initial size of 4 to 6-feet high and planted at a spacing of 10 feet on center.

46. *Question: Please clarify the 21'-4" min and the two 16'-0" dimension at the Low Service Meter Vault section on C-17.*

    Response: Refer to Part D of this addendum - Changes to Contract Documents.

47. *Question: Is the new asphalt top course at the milled areas to have a 1" thickness.*

    Response: Provide a 1 inch minimum top course, however if milling depth and transition requires a thicker course then this layer and resulting required thickness to achieve the transition shall be comprised of top course material.

48. *Question: Calgon is providing the GAC Equipment, we are installing it. Who is providing the GAC Media? Who will be installing it?*

    Response: DEC will be procuring GAC media under a separate contract. As noted in the GAC Contactor Installation specification, the General Contractor will assist the GAC media vendor with installation of GAC media as specified.

49. *Question: Please provide the scope of supply for the Calgon Vessels.*

Response: Refer to Part B of this addendum.

50. *Question: Can you please clarify Calgon's scope of supply for the GAC system (Instruments there to provide).*

    Response: Calgon shall only provide pressure differential switches.

51. *Question: Confirm we install what is assumed to be owner supplied pre-assembled valve station skids being provided as part of the owner supplied GAC equipment package. We assume these to be preassembled skids. Are they?*

    Response: CONTRACTOR shall install owner-supplied GAC vessels and pre-assembled valve manifolds.

52. *Questions: If they are shipping as loose components, please forward info on what the owner (Calgon) is supplying as it pertains to these valve stations so we can price appropriately.*

    Response: Refer to Response No. 51

53. *Questions: Install what is assumed to be owner supplied interconnection piping at top of the GAC tanks. If (Calgon) owner has provided any details on this piping please send it our way.*

    Response: Bid as specified.

54. *Question: Note 3 on drawing M-06 says fittings to be true-union. Please verify if this note was to mean valves shall be true union as we are uncertain true union fittings are available.*

    Response: Note 3 shall be interpreted as the use of true-union valves.

55. *Question: Please provide clarification on the limits of the valve assembly that is part of the owner supplied GAC system and how they are supposed to be supported.*

    Response: Bid as specified.

56. *Question: Please clarify the scope of work needed to install the sample lines on the GAC tanks. Are these components shipping loose, preassembled on tanks, or how?*

    Response: Bid as specified.

57. *Question: Is each Prime Contractor responsible for a Builder's Risk policy to cover their own work?*

    Response: Each Prime Contractor shall provide coverage for their respective work.

58. *Question: Is the value of the equipment being provided by NYS to be included in the*

policy? If so, what is the value of said equipment?

Response: The cost of the equipment being supplied by NYS is to be included in the Contractor's Builders Risk Insurance policy. The dollar amount of the tanks and ancillary equipment is $2,250,000. Refer to Addendum #1.

59. *Question: Will the bid date be extended?*

Response: The bid period will not be extended.

60. *Question: Project sequencing concerns.*
    a. It appears the GAC tanks and interior process piping needs to be installed before the structural support steel and eventual roof go on. Yet the structural steel supports some of the elevated large bore process piping needed to bring a system on line to meet their milestones.
    b. New building - how does one install the new GAC system and bring it on line per their milestones?
    c. Both carbon fill systems would need to be completed prior to startup of the first series of GAC system as currently designed. How can this be accomplished?
    d. How do we address the multiple fillings of the GAC into the tanks? Has owner bought this as part of their package?
    e. Milestone schedule requires phased startup of the various GAC treated water systems. How are we to accomplish this with an apparent incomplete structure?
    f. Are the damages cumulative? E.g. If you some reason there is a failure to meet the 1st milestone, it is likely you are behind to meet the next then the next.

    Response: Bid as specified.

61. *Question: Metal Building Systems – The section shows straight columns, can tapered columns be used?*

    Response: Bid as specified.

62. *Question: It appears there is a mandate that all site personnel have OSHA 40 training. Is the HAZWOPER? Is this mandatory for everyone on site?*

    Response: OSHA standard 29 CFR Part 1910.120 HAZWOPER training is not required for this project.

63. *Question: Are the valve stations located between GAC Units "Skid Mounted" therefore not requiring any further structural Support?*

    Response: Yes.

64. *Question: If the stations are not skid mounted, please provide us with more detail as to what field assembly is required.*

    Response: Refer to Response No. 63.

65. *Question: Is the Overhead Inner-connection piping over the GAC Units being supplied by Calgon? If so, in how many pieces is each being supplied?*

    Response: Bid as specified.

66. *Question: Drawing M-05 indicated 5 lines, two of which are spares. C-08 shows 4 lines, one spare. Please confirm either.*

    Response: Clarification was provided in Addendum No. 1.

67. *Question: Note 3 on Drawing M-06 says fittings to be true-union. Please verify if this note was to mean valves shall be true union.*

    Response: Refer to Response No. 54.

68. *Question: Please clarify the scope of work needed to install the sample lines on the GAC tanks. Are these components shipped "loose" or preassembled on tanks?*

    Response: Bid as specified.

69. *Question: Regarding seismic requirements, the pipe supports shown on Sheet S-07 are completely sized and detailed, therefore we assume that seismic requirements have been accounted for there, please confirm.*

    Response: Bid as specified.

70. *Question: Given the existence of "multiple prime contracts" on this job, who is responsible for overall coordination of the layout drawing?*

    Response: Refer to coordination requirements as specified in Section 01 31 16, Multiple Contract Coordination.

71. *Question: Is the bid date going to hold or is an extension going to be granted?*

    Response: Refer to Response No. 59.

72. *Question: For the pre-engineered building, Elevations 1/A-09 and Sections 1&2/A-10 show steel rafter beams approx. 2 feet on center. Has the structural system already been designed and are the loads/member sizes available for the bidders?*

    Response: The pre-engineered building will be designed by a metal building manufacturer. The structural system has not yet been designed, so member sizes are not available. Assumed column base reactions are provided on Sheet S-02.

73. *Question: Is it the intent for the bidders to provide a predetermined amount of additional live load capacity within the steel frame beyond what is shown on the drawings?*

    Response: The steel frame shall be designed as indicated in the contract documents. Contractor shall provide the designer with all piping, monorail, mechanical, and electrical

loads to be included in the design.

74. *Question: Please provide the loads for the piping shown on M-01 and M-02, particularly between column lines "E" and "F".*

    Response: Bid as specified.

75. *Question: For the Segmental Retaining Wall System will larger scale block systems such as Redi-Block or Stone Strong be acceptable?*

    Response: Bid as specified.

76. *Question: Is the grade below the elevated exterior concrete landing at the GAC building to be paved? Ref. S-02, 5/S-06, C-06 and A-07.*

    Response: Yes, Provide pavement under the landing and stair system.

77. *Question: Please more fully identify the Painting scope of work. The specification lists a bunch of applications, but there is confusion as to the actual extent of the painting.*

    Response: Bid as specified.

78. *Question: Can wing curb be substituted for machined asphalt curb?*

    Response: Bid as specified.

79. *Question: The pavement restoration detail just states top and binder, is the thickness the same as the pavement detail.*

    Response: Yes..

80. *Question: The plans call for milling and states sufficient for grades but there is no detail for milling, what is the material for top course type #6 or type #7?*

    Response: Milled areas shall have the same top course as specified for new paving.

81. *Question: Contract drawing C-05 shows a Segmental Retaining Wall System. The contract plans do not provide the required elevations of this wall. Please provide an elevation view/profile of the new retaining wall.*

    Response: Segmental wall top elevation shall at a minimum meet the adjacent pavement elevation. Height may extend above pavement as necessary to achieve standard block coursing. Wall burial depth (footing) shall be as required by delegated design requirements.

82. *Question: Please provide the drawings for the current Contact Tank contract.*

    Response: Relevant elements of the Contact Tank design have been provided.

83. *Question: The Notice to Proceed of this contract is dependent upon the timely award of this contract, as well as the completion of the current Contact Tank contract. If either of those items is delayed, and construction cannot be started in a timely manner, the construction duration for the Contract Milestones would be reduced. In order to have uniformity in all bid proposals, it would be beneficial for all bidding contractors to assume the same NTP date, thus having the same number of days to reach Milestones A thru E. If there are any delays as indicated above, then there is a baseline in place for a recovery schedule.*

    Response: For purposes of the bid use a Notice to Proceed date of January 31, 2017.

84. *Question: Contract Specification 03 20 00 Concrete Reinforcing specifies several types of reinforcing steel material (black, epoxy, galvanized). The contract plans do not call out the type of reinforcing to be used. Please clarify type of reinforcing steel to be used on this project.*

    Response: Bid as specified. Reinforcing shall be ASTM A615 see note C-2 on S-01.

85. *Question: Contract Specification 01 51 13 indicates that the "General Contractor shall provide temporary electrical service during the Project." Please confirm if this correct.*

    Response: This is correct.

86. *Question: Contract Specification 01 51 26 indicates that the "General Contractor shall provide temporary lighting for the Project." Please confirm if this correct.*

    Response: This is correct.

87. *Question: Sheet I-03 shows a Pressure Reducing Valve Vault to the right of the Low Service Meter Vault. There does not appear to be a detail for that structure provided in the plans. Please provide a detail.*

    Response: The PRV vault will be constructed under the Contact Tank contract and will exist when this contract commences.

88. *Question: Sheet E-20 illustrates a detail for a Typical Handhole (Electric). The Plan View outside dimensions do not seem to be correct. They would result in a structure with a 1'-8"x 1'-8" inside dimension. Is that the intent of the detail?*

    Response: Refer to Response No. 27.

89. *Question: At the Pre-bid Site walk-thru it was indicated that an off-site location was available for excavation and stockpiling requirements. This Project site will generate fairly large quantities of excavation, some of which will be required during backfilling of new structures. Can you provide the location of this?*

    Response: Refer to Supplemental Staging Area as shown on Sheet G-02.

90. *Question: At the Pre-Bid meeting it was indicated that each individual Contractor for*

Electrical, Plumbing and HVAC were responsible for their own Civil components of work under their respective Contracts. Under 01 12 13, Summary of Work, Item 1.3 Construction Contracts, This Project, it only calls out responsible Divisions (and a few Sections within a Division) of the Specification for each Contractor without specifics as to each Contractors responsibility. In fact, in that same Section, it states that Division 22, Plumbing is included in the General Contract. Concrete and Excavation Sections are not called out under the Plumbing and Electrical Contracts. This is a very important Section to make clear in order to avoid individual Contractors from assuming responsibility of or to another. Please spend some time with this to clarify. It will certainly pay dividends in the future.

Response: Bid as specified. Refer to 01 12 13, Summary of Work and statement "General Construction – Contract No. D010308 Consists of all Work shown, indicated, and required to complete the Project, except that specifically assigned to other prime contractors."

91. *Question: At the Pre-Bid meeting it was stated that some residual sediments likely exist in the bottom of the Underground Water Storage Tank scheduled to be demolished. What are bidders to assume with regard to the volume and more importantly, the characterization of these built-up sediments with regard to any special handling and disposal?*

    Response: Refer to Part D of this addendum.

92. *Question: The Pre-Bid Meeting Sign-In sheet was not included in Addendum 1 as indicated. Please issue.*

    Response: Refer to Part A of this addendum.

93. *Question: Item 15.a in Addendum 1 reads: "Special Damages could be substantial if the City of Newburgh is forced to continue purchasing water from the New York City or if New York City needs to delay planning improvements to the Catskill Aqueduct." It is imperative to provide what the exact damages would be if this was to occur. Our bonding company needs to know what these charges will be. Please provide this information.*

    Response: Bid as specified.

94. *Question: Is the existing Underground Water Storage Tank presently filled? If so, will it be full at the time of this Contract?*

    Answer: The existing clear well is currently filled and in use. It will be drained prior to the start of this Contract.

95. *Question: Milestone E: States that it must be approved by the NYSDOH on or before September 15, 2017. Under the Permit section 01 41 24-2, 1.4 B coordinating with the NYSDOH and The OCHD, the Engineer and the City of Newburgh is responsible for this coordination. How long is needed for the NYSDOH and OCDOH process? Per section 01 79 13-6 C Testing schedule must be submitted 28 days before testing may commence. Per the required testing schedule, you need 14 days to test the system, Milestone E is tied*

to very large penalties if the date is not ascertained.

Response: Bid as specified.

96. *Question: Contractor-Is the performance Testing Manager: Section 01 79 13-2 A1-a5 requires a valid water treatment plant operator's license issued by the authority having jurisdiction? Who's Jurisdiction? If you look at section A1-b under experience it does not require a treatment plant operator's license?*

Response: No operator's license is required. GC shall provide qualified personnel to operate equipment as necessary.

97. *Question: The Exposed Piping Schedule on 40 05 05-14 calls out Victaulic joints for systems CO & CF. The stainless steel spec section on 40 05 23 only calls out fabricated SS pipe. Please provide spec section on Victaulic joints. If Victaulic is wanted, are the grooves to be roll grooved or cut grooved?*

Response: Cut grooved joints shall be allowed for CO and CF systems.

98. *Question: The Plan view of the HSW pipe shows an 8" 90-degree elbow just after the 0+25 marking. The profile on page C-11 calls out the elbow to be an 8" 45-degree elbow. Please clarify.*

Response: Refer to Part D of this addendum.

99. *Question: Section VIII, Article 4.2.1 states Contractor has to submit true copies of all endorsements and a certificate of insurance. For a project this of this size, a certificate of insurance should suffice. Contractor requests that all endorsements are not required for this project.*

Response: Bid as specified.

100. Question: Section VIII, Article 4.2.2 states "Contractor shall not permit any Subcontractor, Supplier or other person or organization to perform Work unless the following insurance requirements at a minimum have been complied with by such Subcontractor, Supplier or other person or organization and proof of the issuance of all policies of insurance has been delivered to Contractor". We ask that the Contractor can require subcontractors to provide insurance policies and coverages per Contractor's usual business practices.

Response: Bid as specified.

101. Question: Please confirm that all Subcontractors don't need to provide an Owners and Contractors Protective Liability policy listed in 4.2.2.4.

Response: Refer to Addendum No. 1.

102. Question: We ask that Article 4.2.3 is updated to the following "Insurance shall be issued by carriers licensed or authorized to do business in New York State", as many

insurers are authorized but not licensed to do business in individual states.

Response: Refer to Addendum No. 1.

103. Question: Article 4.2.5 states "All insurance policies shall require notice to Department 30 days prior to expiration, termination, or suspension of such policy, directed to the attention of Department". Please confirm its acceptable to have only 10 days notice for non-payment of premium, as this is standard in the insurance industry.

Response: Refer to Addendum No. 1.

104. Question: Article 4.3.3 limits the Builders Risk deductible to $100. We ask that the deductible restriction is removed from the specifications as this is an extremely low deductible and probably commercially unavailable in the insurance market.

Response: Bid as specified.

105. Question: On Drawing S-07, the base plates of the supports are called out as 5/8" thick in the elevation views, however in the detail for the base plate it is called out to be 3/8", please indicate which is correct.

Response: Base plate thickness - 5/8".

106. Question: Please provide a specification section for pre-cast concrete.

Response: Refer to Part D of the addendum for the specifications section.

107. Question: The pipe marking spec on page 40 05 05-4 says to see section 10 14 00 for pipe identification markings and arrows however, this section doesn't have any of this information. Please clarify.

Response: Refer to Part D of this addendum.

108. Question: Please clarify the material and joints for the 3" air relief piping coming off of the 24" TW pipe.

Response: The piping shall be 3-inch Schedule 80 PVC piping that is solvent weld except as needed to connect to the automatic valve. Manual valve shall be true-union type.

109. Question: Can the Contractors Safety Representative also be the Site Superintendent? General Conditions indicate that the Site Safety Rep can be the Contractors Site Superintendent but the Safety Requirement spec is unclear.

Answer: Refer to Response No. 8.

110. Question: What rate will Contractor have to pay for use of City's water during startup, testing and general construction use.

Response: $6.13 per 1,000 gallons at the time of publication of this addendum.

111. *Question: Detail 2 on I-09 calls for SS304 Tubing, but the back plate is to be SS316, is this correct or should the entire unit be one type of Stainless Steel? If one type, which type is preferred?*

Response: Bid as specified.

112. *Question: Spec Section 40 05 96, seems to make reference to needing to do a seismic design on the pipe supports, however, the tables at the end of the spec section do not have them listed. Also, specs 40 05 07 & 40 05 96, do not reference one another in each ones corresponding spec. Please clarify if a seismic design needs to be done on the pipe supports?*

Response: Seismic design of pipe supports is not required.

113. *Question: Provide spec section for GAC Contactor supply contract (46 61 21).*

Response: Refer to Part B of this addendum.

114. *Question: What is the material of the Pipe supports shown on S-07 supposed to be?*

Response: Steel. Refer to Section 05 50 13, Part 2.1 and 2.2.M

115. *Question: On drawing C-18, there is a detail called "Fabricated Weir & Orifice", the detail is not to scale and provides no dimensions other than the top of weir elevation. Please indicate excepted plan view dimensions of the weir.*

Response: Refer to Part D of this addendum.

116. *Question: Section VI, Agreement, Part. 6.5 makes clear that Contractor will be charged $5,000 per day in Liquidated Damages for every day that there is delay in the achievement of a contract milestone. Section VI, Agreement, Part. 6.6 appears to reserve the Owner's right to recover actual damages in addition to Liquidated Damages for delay. Please confirm that Owner intends that Contractor to price the risk of both Liquidated Damages for delay as well as Owner actual damages for delay.*

Response: Correct Assumption. Bid both as specified.

PART D. Changes to Contract Documents

The following changes are to be made to the Contract Documents:

1. **Section I, Advertisement and Notice to Bidders** – Revise second to last sentence I the first paragraph to read "…until the time of 1:00 P.M. prevailing local time (EST) and on the date of November 30, 2016. The bids will be publicly opened and read aloud at the above time and date."

2. **Section V, Article 1(a) - General Construction Contract D010308** – Replace Bid Form with the revised Bid Form as attached.

3. **Section VI – Agreement** – This article and requirements thereof have been replaced in their entirety for each contract. See the attached agreements.

4. **Section XII – Measurement for Payment – General Construction Contract D010308** – Replace with the revised Measurement for Payment Section as attached.

5. **Section XI – Specification 03 41 33 – Designed Pre-Cast Concrete Vaults**, Add new specification section as attached.

6. **Section XI 0 Specification 10 14 00 – Signage**, Add new paragraph as follows:

"2.7 PIPELINE IDENTIFICATION SIGNS

A. Pipeline Identification Signs:
   1. Lettering of Titles:
      a. Letter size shall be as indicated in the following table:

LETTER SIZE TABLE

Outside Diameter of Pipe or Covering*	Size of Legend Letters
3/4-inches to 1-1/4 inches	1/2-inches
1-1/2-inches to 1-7/8--inches	3/4-inches
2-inches to 5-7/8-inches	1-1/4-inches
6-inches to 9-7/8-inches	2-1/2-inches
10-inches and Over	3-1/2-inches

*Outside diameter shall include pipe diameter plus insulation and jacketing.

      b. Text and symbols shall be Standard Helvetica Medium, all upper case. Signs shall include text with separate arrow signs indicating direction of flow and be located as specified in Part 3 of this Section.
   2. Sign Materials: Provide the following:

a. Signs shall be coiled construction, 0.006-inch, polyester with ultraviolet light-resistant, sealed, subsurface color graphics, recommended by the manufacturer for both indoor and outdoor use and for service temperature range from -40 degrees F to 248 degrees F.
b. Provide manufacturer's full selection of standard and custom sizes, colors and graphics. Where manufacturer has established minimum order quantities for custom units provide minimum order quantities at no additional cost to OWNER.
c. Where large pipe diameters preclude overlap of pipeline sign material, provide Type 304, 1/4-inch wide stainless steel banding straps; two per sign, lengths as required by circumference of pipe or covering. Provide manufacturer's recommended banding tools for stainless steel banding.

3. Legend for Pipeline Identification Signs: Pipeline identification signs shall have the following text or abbreviations in the color combinations designated to identify the pipeline service.

SCHEDULE OF
PIPELINE IDENTIFICATION SIGNS

PIPELINE LEGEND	LETTERING COLOR	BACKGROUND COLOR
WATER		
Air Conditioning Water	White	Green
Backwash Water	Black	Green
Bearing Cooling Water	White	Green
Chilled Water Return	White	Green
Chilled Water Supply	White	Green
Circulating Water	White	Green
City Water	White	Green
Clarified Water	White	Green
Cold Water	White	Green
Condenser Water	White	Green
Cooling Water	White	Green
Dangerously Hot Water	White	Charcoal
Deionized Water	White	Green
Dilution Water	White	Green
Distilled Water	White	Green
Domestic Hot Water	Black	Yellow
Drinking Water	White	Green
Effluent Water	White	Green
Engine Jacket Water	White	Green
Engine Cooling Water	White	Green
Filtered Water	White	Green
Finished Water	White	Green
Fire Water	White	Red
Flushing Water	White	Green
High Pressure Water	Black	Yellow
Hot Water Return	Black	Yellow
Hot Water Supply	Black	Yellow

Hydraulic Control Water	White	Green
Ice Water	White	Green
Make-Up Water	White	Green
Non-Potable Water	White	Green
Plant Water	Black	Green
Potable Water	Black	Green
Pump Flushing Water	Black	Green
Raw Water	Black	Green
River Water	Black	Green
Seal Water	Black	Green
Settled Water	Black	Green
Sludge Heating Water	Black	Yellow
Sprinkler Water	Red	White
Standpipe Water	Red	White
Treated Water	Black	Green
Unsafe Water	Black	Yellow
Waste Water	Black	Green
Well Water	Black	Green

STEAM

Exhaust Steam	Black	Yellow
High Pressure Steam	Black	Yellow
Low Pressure Steam	Black	Yellow
Medium Pressure Steam	Black	Yellow

AIR AND GAS

Argon	Black	Yellow
Acetylene	Black	Yellow
Ammonia	Black	Yellow
Blower Air	White	Blue
Butane	Black	Yellow
Carbon Dioxide	White	Blue
Chlorine Gas	White	Blue
Compressed Air	Black	Yellow
City Gas	White	Blue
Defoamant	White	Blue
Engine Air	White	Blue
Exhaust Silencer Blowoff	White	Brown
Freon	White	Blue
Fuel Gas	Black	Yellow
Furnace Stack Gas	Black	Yellow
Helium	White	Blue
High Pressure Air	Black	Yellow
High Pressure Gas	Black	Orange

Hydrogen	White	Blue
Inert Gas	White	Blue
Instrument Air	White	Blue
Intake Air	White	Blue
Low Pressure Air	White	Blue
Low Pressure Gas	Black	Yellow
Mixed Gas	Black	Yellow
Natural Gas	Black	Yellow
Nitrogen	White	Blue
Oxygen	White	Blue
Ozone	White	Blue
Propane Gas	Black	Yellow
Service Air	White	Blue
Soot Blower Air	White	Blue
Sludge Gas, H.P.	Black	Yellow
Sludge Gas, L.P.	Black	Yellow
Starting Air	White	Blue
Waste Gas	Black	Yellow

FUELS AND LUBRICANTS

Blower Lube	White	Blue
Diesel Fuel Oil	Black	Yellow
Engine Lube	White	Blue
Fuel Oil	Black	Yellow
Fuel Oil Fill	Black	Yellow
Gasoline	White	Blue
Grease	Black	Green
High Pressure Lube Oil	Black	Yellow
Hydraulic Fluid	Black	Yellow
Kerosene	Black	Yellow
Lube Oil	Black	Yellow
Lube Oil Fill	Black	Yellow
Vacuum	White	Blue
Waste Oil	Black	Yellow

CHEMICALS

Acetone	Black	Yellow
Acid	Black	Yellow
Alum	Black	Yellow
Ammonia	Black	Yellow
Carbon	Black	Green
Carbon Slurry	Black	Green
Caustic	Black	Yellow
Caustic Soda	Black	Yellow
Chlorine Liquified	Black	Yellow
Chlorine Solution	Black	Yellow
Ferric Chloride	Black	Yellow

Fluoride	Black	Yellow
Hydrogen Peroxide	Black	Yellow
Lime	Black	Yellow
Lime Slurry	Black	Green
Liquid Polymer “A“	Black	Yellow
Liquid Polymer “B“	Black	Yellow
Polymer Feed	Black	Yellow
Polyelectrolyte Solution	Black	Green
Potassium Permanganate	Black	Yellow
Sulfur Dioxide	Black	Yellow
Sodium Hypochlorite	Black	Yellow

PROCESS

Ash Conveying Air	Black	Yellow
Ash Water	Black	Yellow
Centrate	Black	Green
Clarifier Drains	Black	Green
Combined Sludge	Black	Green
Concentration Tank Drains	Black	Green
Concentration Tank Overflow	Black	Green
Digester Tank Overflow	Black	Green
Digested Sludge	Black	Green
Digester Tank Drains	Black	Green
Disinfectant	Black	Green
Excess Activated Sludge	Black	Green
Filtrate	Black	Green
Floor Drains	Black	Green
Fly Ash	Black	Yellow
Gravity Thickener Overflow	Black	Green
Grit	Black	Green
Mixed Liquor	Black	Green
Mixed Sludge	Black	Green
Modified Sludge	Black	Green
Primary Sludge	Black	Green
Raw Sludge	Black	Green
Recirculated Digester Sludge	Black	Green
Return Activated Sludge	Black	Green
Scavanger Waste	Black	Green
Scrubber Drains	Black	Yellow
Scum	Black	Green
Secondary Sludge	Black	Green
Settling Tank Drains	Black	Green
Sewage	Black	Green
Sewage Sampling Line	Black	Green
Skimmings	Black	Green
Sludge	Black	Green
Soda Ash	Black	Yellow
Storage Tank Drains	Black	Green

Storage Tank Overflow	Black	Green
Storm Drains	Black	Green
Sump Drains	Black	Green
Supernatant	Black	Green
Thermal Conditioning		
Thickener Overflow	Black	Green
Thickener Effluent Line	Black	Green
Thickened Sludge	Black	Green
Thickener Tank Drains	Black	Green
Thickener Tank Vent	Black	Green
Waste Activated Sludge	Black	Green
Wet Ash	Black	Yellow
Waste Backwash	Black	Green

VENTS

Concentration Tank Vent	Black	Green
Digester Tank Vent	Black	Green
High and Low Temperature	Black	Yellow
Thickener Tank Vent	Black	Green

B. Products and Manufacturers: Provide one of the following:
   1. Custom B-689 High Performance Pipe Markers by Brady USA, Incorporated Signmark Division.
   2. Custom Ultra-Mark® High Performance Pipe Markers by Seton Identification Products, A Tricor Direct Company
   3. Or equal."

7. **Section XI – Specification 26 29 23 - Low Voltage Variable Frequency Drives**, Replace section in its entirety with the attached.

8. **Section XI – Specification 40 60 05 – Instrumentation and Control**, Replace section in its entirety with the attached.

9. **Section XI – Specification 40 60 05A – Process Control System Input/Output List**, Replace section in its entirety with the attached.

10. **Section XI – Specification 40 60 05B – Data Sheets for Primary Sensors and Field Instruments**, Replace section in its entirety with the attached.

11. **Drawing I-09**, Revise per the attached Drawing I-09.

12. **Drawing I-09, Chemical Monitoring Schematic**, Add new notes #4 and #5 to read as follows:

    "4. Pressure Reducing Valve (PRV) for main sample line shall reduce inlet pressure of between 60-90 PSIG to 20 PSIG outlet pressure and maintain an approximate flow rate of 5 GPM. Pressure Reducing Valve (PRV) for turbidity sample line shall also reduce inlet pressure to 20 PSIG and maintain a flow rate of approximately 1 GPM.

5. Pressure Reducing Valve (PRV) materials shall meet specification section 40 05 53 – Process Valves. Provide CLA-VAL, or equal."

13. **Drawing C-11, HSW Profile I**, Revise label at station 0+25 +/- from 45 degree elbow to 90 degree elbow.

14. **Drawing C-17, Low Service Meter Vault Section View**, Revise dimension 21'-4" Min to read 6" Min. and dimension 16'-0" Min. to read 4" Min.

15. **Drawing C-28, Fabricated Weir and Orifice**, Add dimension of weir plate plan to make the weir plate 18 inches high by 30-inches wide.

16. **Drawing S-01, Note G06, Item 2**, Revise note to read "Seismic Importance factor, IE = 1.25".

17. **Drawing S-07, Pipe Support Detail (PS1) Detail**, Revise "3/8" Base Plate" note to read "5/8" Base Plate".

18. **Drawing A-01**, Add new notes #12 and #13 under the General Architectural Notes as follows:

    "12. Provide a metal liner panel as specified in specification section 13 34 19 on the interior side of all the wall girts.
    13. Provide field painting of all exposed primary and secondary steel not otherwise covered by the metal liner panel noted above."

19. **Drawing M-03**, Add new note #9 to read as follows:

    "9. Provide 1 inch tap and corporation stop and 1 inch schedule 90 PVC piping from Treated Water Line just prior to existing the GAC building to the Chemical Monitoring System."

20. **Drawing E-08**, Revise per the attached Drawing E-08.

21. **Drawing E-15**, Revise per the attached Drawing E-15.

This ADDENDUM No 2, becomes part of the Contract Documents.

Daniel J. Loewenstein, P.E., BCEE

Dated: November 10, 2016

SECTION V

ARTICLE 1(a) - Contract Bid Form and Acknowledgment for:

GAC Treatment System at Washington Lake Filtration Plant

General Construction

Contract Number: D010308, NYS Site Number: 336089

To The New York State Department of Environmental Conservation

The Bidder hereby declares that either personally or through authorized representative(s), Bidder has carefully examined all Bidding Documents and has personally or through authorized representative(s) inspected the actual location of the work, together with the local sources of supply; and understands all terms and conditions of Bidding Documents. Bidder further understands that in signing this Bid, the right to plead any misunderstanding regarding the same is waived.

Pursuant to and in compliance with the Bidding Documents, the Bidder hereby offers to furnish all labor, materials, supplies, equipment and other facilities and things necessary or proper for, or incidental to the construction and completion of this Contract, as required by and in strict compliance with the applicable provisions of all Contract Documents, for the following unit and/or lump sum prices.

The undersigned shall meet the required submittal time periods listed in Article 5 - Required Bid Submittals of the Bidding Information and Requirements, Section III.

The undersigned hereby designates the following office as the office to which such Notice of Intent to Award and Notice of Award may be mailed, telegraphed or delivered:

Attn:-_____
Company_____
Address 1_____
Address 2_____
City, State, Zip Code+4_____
Fax Number ( )_____ - _____

E-mail Address_____

Bid

New York State Department of Environmental Conservation

Project Number: D010308, NYS Site Number: 336089

Payment Item Number	*Description*	*Unit*	*Estimated Quantity*	*Unit Price*		*Total Amount ($)*
				Words	*Figures*	
Lump Sum Items						
LS-1	GAC Treatment System Construction	Lump Sum	1			
Unit Price Items						
UP-1	Bedrock Excavation and Disposal	Cubic Yards	1,000			
UP-2	Select Granular Fill Backfill	Cubic Yards	5,000			
UP-3	Sediment Removal and Disposal	Cubic Yards	50			

GRAND TOTAL OF BID _____ $_____

Words Figures

The undersigned acknowledges the receipt of the following Addenda and agrees to be bound by all Addenda whether or not listed herein.

Addendum Number	*Date of Addendum*
_____	_____
_____	_____
_____	_____
_____	_____

Accompanying this proposal is bid security in the amount of $_____; said security is in the form of $_____ certified check or checks, and $_____ Bid Bond which shall become the property of the **Department** if this proposal shall be accepted by **Department**, and the undersigned shall fail to execute and return the contract in a timely manner or fail to comply with the requirements of the Bidding Documents.

_____

Corporate Seal
(If no seal, write "No Seal" and sign)

Legal Name of Person, Partnership or Corporation

By _____

Print Name

_____

Signature

Date _____

Please Complete Information Requested Below:

The P.O. address of the bidder is: _____

Federal Identification Number is: _____

If a Corporation

Name	*Address*
_____, President	_____
_____, Secretary	_____
_____, Treasurer	_____

If a Partnership

Name	*Address*
_____, President	_____
_____, Secretary	_____
_____, Treasurer	_____

(ACKNOWLEDGMENT)

State of _____)
s.s.:
County of _____)

On the _____day of _____in the year _____, before me, the undersigned notary public, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose names(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public

Bidder's/Proposer's Certification (Page 1 of 2)

Non-Collusive Bidding and Nondiscrimination in Employment in Northern Ireland
MacBride Fair Employment Principles

BY SUBMISSION OF THIS BID AND BY SIGNING HEREUNDER THE BIDDER/PROPOSER, AND EACH PERSON SIGNING ON BEHALF OF SUCH PARTY CERTIFIES, AND IN THE CASE OF A JOINT BID/PROPOSAL, EACH PARTY THERETO CERTIFIES AS TO ITS OWN ORGANIZATION, UNDER PENALTY OF PERJURY, THAT TO THE BEST OF HIS/HER KNOWLEDGE AND BELIEF:

Article 1(b) - Non Collusion, State Finance Law §139-d

1) The prices in this Bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor;

2) Unless otherwise required by law, the prices which have been quoted in this Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other Bidder or to any competitor; and

3) No attempt has been made or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a Bid for the purpose of restricting competition.

Article 1(c) - MacBride Fair Employment Principles, State Finance Law §165(5)

1) it or any individual or legal entity in which the Bidder/Proposer holds a 10% or greater ownership interest, or any individual or legal entity that holds a 10% or greater ownership in the Bidder/Proposer, either: (answer yes or no to one or both of the following, as applicable).

2) Has business operations in Northern Ireland:

Yes ☐ or No ☐ (check answer) If yes, complete #3

3) Shall take lawful steps in good faith to conduct any business operations that it has in Northern Ireland in accordance with the MacBride Fair Employment Principles relating to non-discrimination in employment and freedom of workplace opportunity, regarding such operations in Northern Ireland and shall permit independent monitoring of its compliance with such Principles. (Check Answer):

Yes ☐ or No ☐ (check answer)

NOTE: All references to "bid" "bidder" shall be deemed to include "proposer" "proposal"

_____ _____
Date **Print Name and Title**

_____
Signature

Bidder's/Proposer's Certification (Page 2 of 2)

Offerer's Affirmation of Understanding of and Agreement Pursuant to State Ethics Law Provision and State Finance Law §139-j (3) and §139-j (6) (b)

BY SUBMISSION OF THIS BID AND BY SIGNING HEREUNDER THE BIDDER/PROPOSER, AND EACH PERSON SIGNING ON BEHALF OF SUCH PARTY CERTIFIES, AND IN THE CASE OF A JOINT BID/PROPOSAL, EACH PARTY THERETO CERTIFIES AS TO ITS OWN ORGANIZATION, UNDER PENALTY OF PERJURY, THAT TO THE BEST OF HIS/HER KNOWLEDGE AND BELIEF:

Article 1(d) - State Ethics Law Provision

By submittal of this bid, the undersigned hereby certifies, for and on behalf of the bidder, that he is familiar with the following provisions of the State Ethics Law provisions applicable to post employment restrictions affecting former state employees: POL §73(8)(a)(i) the two year ban, and §73(8)(a)(ii), the life time bar, and that submittal of this bid is not in violation of either provision, and that no violation will occur by entering into a contract or in performance of the contractual services, and further that the bidder recognizes that the Department may rely upon this certification.

Except as follows: (attach information if needed)

(Proposer is to make full disclosure of any circumstances which could affect its ability to perform in complete compliance with the cited laws. Any questions as to the applicability of these provisions should be addressed to the New York State Ethics Commission, 39 Columbia Street, Albany, NY 12207:telephone #1-800-87-ETHICS.)

Article 1(e) - Permissible Contacts During a Procurement and Prohibition of Inappropriate Lobbying Influence, State Finance Law §139-j and §139-k

Offerer affirms that it understands and agrees to comply with the procedures of the New York State Department of Environmental Conservation relative to permissible contacts as required by State Finance Law §139-j (3) and §139-j (6) (b).

Use of Best Available Retrofit Technology (BART) and Ultra Low Sulphur Diesel (ULSD) Pursuant to Environmental Conservation Law Section 19-0323

Article 1(f) - Use of Best Available Retrofit Technology (BART) and Ultra Low Sulphur Diesel (ULSD) Provision

The Contractor certifies and warrants that all heavy duty vehicles, as defined in New York State Environmental Law (ECL) section 19-0323, to be used under this Contract, will comply with the specifications and provisions of ECL section 19-0323 and any regulations promulgated pursuant thereto, which requires the use of Best Available Retrofit Technology (BART) and Ultra Low Sulphur Diesel (ULSD), unless specifically waived by the Department. Qualification for a waiver under this law will be the responsibility of the Contractor.

NOTE: All references to "bid" "bidder" shall be deemed to include "proposer" "proposal."

_____ _____

Date **Print Name and Title**

_____

Signature

ARTICLE 1(g) - Page to Attach

Bid Security

If Bid Security is a Bid Bond, use Bid Bond form and provide certified power of attorney.

ARTICLE 1(h) - Bid Bond

Know all men by these presents, that we, the undersigned, _____, as Principal, and _____, as Surety, are hereby held and firmly bound unto New York State Department of Environmental Conservation in the penal sum of _____ for the payment of which, will and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns. Signed this _____ day of _____, 20____.

The condition of the above obligation is such that whereas the Principal has submitted to New York State Department of Environmental Conservation certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

_____
_____
_____

Now, Therefore

a) If said Bid shall be rejected, or in the alternate,

b) If said Bid shall be accepted and the principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid.

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bids; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

(Seal)

_____
Principal

_____
Surety

By _____

(ACKNOWLEDGMENT BY SURETY COMPANY)

State of _____)
County of _____) s.s.:

On this _____ day of _____, 20_____ before me personally came _____ to me known, who being by me duly sworn, did depose and say that he/she resides in _____, that he/she is the _____ ***(title)*** of the _____***(firm)***, the corporation described in and which executed the within instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the order of the Board of Directors of said corporation and the he/she signed his name thereto by like order; and that the liabilities of said company do not exceed its assets as ascertained in the manner provided by the laws of the State of New York.

(Seal)

_____
Notary Public

(**ACKNOWLEDGMENT)**

State of _____)
s.s.:
County of _____)

On the _____day of _____in the year _____, before me, the undersigned notary public, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose names(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public

ARTICLE 1(i) - Offerer Disclosure of Prior Non-Responsibility Determinations
(Page 1 of 2)

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

_____

Address:_____

_____

Name and Title of Person Submitting this Form:_____

_____

Contract Procurement Number: D010308

Date:_____

1. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years? (Please circle):

Yes ☐ No ☐

If yes, please answer the questions 2 - 4, if no, go to question 5:

2. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j? (Please circle):

Yes ☐ No ☐

3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity? (Please circle):

Yes ☐ No ☐

4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.

Governmental Entity: _____

Date of Finding of Non-responsibility: _____

Basis of Finding of Non-Responsibility: _____

_____
_____
_____
_____

(Add additional pages as necessary)

5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information? (Please circle):

Yes ☐ No ☐

6. If yes, please provide details below.

Governmental Entity: _____

Date of Termination or Withholding of Contract:_____

Basis of Termination or Withholding: _____

_____

_____

_____

_____

(Add additional pages as necessary)

Offerer Certification:

Offerer certifies that all information provided to the New York State Department of Environmental Conservation with respect to State Finance Law §139-k is complete, true and accurate.

By:_____ Date: _____
Signature

ARTICLE 2(a) - Corporate Resolution and Certification

"This Article 2(a) is not applicable"

ARTICLE 2(b) - Statement of Surety's Intent

To: ***New York State Department of Environmental Conservation***

We have reviewed the Bid of _____ (Contractor)

of _____ (Address)

for _____ (Project)

Contract Number: D010308

NYS Site Number: 336089

Bids for which will be received on _____ (insert Bid Opening Date) and wish to advise that should this Bid of Contractor be accepted and the Contract awarded to Contractor, it is our present intention to become surety on the Performance Bond and Labor and Material Payment Bond required by the Contract.

Any arrangement for the Bonds required by the Contract is a matter between Contractor and ourselves and we assume no liability to Department or third parties if for any reason we do not execute the requisite bonds.

We are duly licensed to do business in the State of New York.

Attest:

Corporate Seal
(If no seal, write "No Seal" and sign)

_____
Surety's Authorized Signature(s)

_____
Telephone Number for Bonding Company

_____
Telephone Number for Bonding Broker

Attach Power of Attorney

Article 2(c) - M/WBE-EEO Workplan and Utilization Plan

Contractor must submit a M/WBE Workplan after being announced the apparent low bidder in accordance with Section III, Article 5.b. Contractor must submit M/WBE-EEO Utilization Plan after being issued Notice of Intent to Award in accordance with Section III, Article 5.c. Quarterly reporting is required throughout the term of the contract.

Contractors are invited to file the required forms online or may choose to complete and submit paper forms. Instructions are available at: http://www.dec.ny.gov/about/48854.html

If submitting paper forms, The M/WBE-EEO Utilization Plan and/or quarterly reports shall be sent directly to:

NYS Department of Environmental Conservation
Division of Management and Budget Services
Minority and Women's Business Programs Unit, l0th Floor
625 Broadway
Albany, New York 12233-5028

Contractors opting to file electronic forms can obtain the appropriate forms from the website and certify to the Department, via a letter, within the timeframes designated in the Instructions to Bidders, that the forms have been completed and submitted. The Contractor will be able to supply any additional information requested by the Department, by updating the online forms and notifying the Department via letter, that it has been re-submitted.

M/WBE Directory on the Internet

Empire State Development has put the Minority and Women-Owned Business Directory on the Internet. The Internet address is www.empire.state.ny.us, just follow the links to the M/WBE Directory. Support will be available from 9:00 a.m. to 5:00 p.m., Monday through Friday, except for NYS holidays. If assistance is needed, call (518) 474-1979.

Article 2 (d) - Instructions for Completing the New York State Vendor Responsibility Questionnaire CCA-2

*Please Read Before Completing Questionnaire

Contractors must submit a Vendor Responsibility Questionnaire CCA-2 form after being announced the low bidder for any competitively bid contract of $10,000 or more, or when proposed for subcontract work valued at $10,000 or more. The Department may require additional information deemed necessary for its review.

Contractors are invited to file the required Vendor Responsibility Questionnaire online via the New York State VendRep System or may choose to complete and submit a paper questionnaire. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at http://www.osc.state.ny.us/vendrep/systeminit.htm or go directly to the VendRep System online at https://portal.osc.state.ny.us. For direct VendRep System user assistance, the Office of the State Comptroller's Help Desk may be reached at 866-370-4672 or 518-408-4672 or by email at helpdesk@osc.state.ny.us. Contractors opting to file a paper questionnaire can obtain the appropriate questionnaire from the VendRep website www.osc.state.ny.us/vendrep or contact the Office of the State Comptroller's Help Desk.

The enrollment process in the VendRep System can take several days. Contractors are encouraged to enroll prior to submitting bids to ensure meeting the timeframes for certification.

Contractors electing to file the Vendor Responsibility Questionnaire online shall certify to the Department, via a letter, within the timeframe designated in the Instructions to Bidders, that the questionnaire has been updated. The Contractor will be able to supply any additional information requested by the Department, by updating the online questionnaire and notifying the Department via letter, that it has been recertified.

Throughout the contract term, the Contractor is required to notify the Department in writing of any changes in Contractor's vendor responsibility disclosure related to the Contractor commencing bankruptcy proceedings; filings against the Contractor for relief under bankruptcy; Contractor making general assessment for benefit of creditors; a Court appointing a party to take charge of the Contractor's property; Contractor's inability to pay debts; or the Contractor being found in violation of laws and regulations of any public body having jurisdiction.

If the Contractor elects to file a paper copy directly with the Department, a completed original CCA-2 Form must be submitted within the timeframe designated in the Instructions to Bidders. Submit completed questionnaires marked "CONFIDENTIAL" to:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Benjamin Rung, Project Manager
625 BROADWAY12th FLOOR
ALBANY, NY 12233-7017
(518)402-9814

ARTICLE 3(a) - Instructions for Certificate of Insurance

Use this form to certify insurance coverage and provide policy information.

Contractor must fill out Section 1 in its entirety before sending to the insurance agent.

Contractor is encouraged to send a copy of Section VIII, "General Conditions," Article 4, along with the Certificate of Insurance Form to its insurance agent in order that all required coverages and provisions are accounted for.

Insurance Agency

1) Complete Section 2 of the form.

2) Enter N/A if No Excess Umbrella (9) policy is in effect.

3) All insurance certificates must have a policy number entered otherwise it will result in rejection of the certificate.

4) Certificates must be signed by an authorized representative of the firm.

5) Specify policy if Other (10) is in effect, otherwise enter N/A.

Contractor

1) Complete Section 1 of the form.

2) At the top of the form, check "New" if you are submitting proof of coverage for a new contract. Check "Renewal" if you are submitting proof of renewals.

3) Submit original certificate and subsequent renewals to Division of Environmental Remediation, New York State Department of Environmental Conservation, 12th Floor, New York State Department of Environmental Conservation, 625 Broadway, Albany, New York 12233-7017 , **Attention:** "**Benjamin Rung, P.E., Project Manager**." (Also see Section IV, Article 2 for name of project manager).

ARTICLE 3(b) ***Certificate of Insurance***

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau E, 12th Floor
625 Broadway, Albany, NY 12233-7017

NYSDEC-DER Site 336089
Contract No D010308
Certificate of Insurance
☐ **New** ☐ **Renewal**

SECTION 1

Name and Address of Insured Contractor (for Coverages 1,2,3,4,6,7,8,9,10)

_____
_____
_____

Name of Insured or Additional Insured (for Coverage 5,6,7 & 10)
State of New York & NYS Dept. of Environmental Conservation

Location and Description of Work: City of Newburgh Water Treatment Plant, Site No. 338022

SECTION 2

This is to certify that policies of insurance listed below have been issued to the contractor, named above, and are in force at this time.

Insurance	*Policy #*	*Name of Company Affording Coverage*	*Expir. Date*	*Limits of Liability (in thousands)*	
				Each Occurrence	*Aggregate*
1. Contractor's Liability					
2. Contractor's Protective Liability					
3. Complete Operations/Products					
4. Contractual Liability					
5. Owner's Protective Liability					
6. Automobile Liability					
7. Pollution Liability					
8. Worker's Comp. Disability Benefits				Limits as required by Law Limits as required by Law	
9. Excess Umbrella					
10. Other					

Such insurance as is herein certified: 1) applies to all operations of said insured in connection with the work required by the provisions of the documents forming this contract, 2) applies whether or not the contract documents between the insured contractor and the State of New York Department of Environmental Conservation have been executed, and 3) is written in accordance with the company's regular policies and endorsements, subject to the company's applicable manuals or rules and rates in effect as modified by this certificate and the insurance article of the contract.

No policy referred to herein shall be changed, cancelled or coverage terminated for any reason including expiration of the policy or non-payment of premiums until thirty (30) days written notice has been received by the Division of Environmental Remediation, Remedial Bureau E, NYS Dept. of Environmental Conservation, 12th floor, 625 Broadway, Albany, NY 12233-7017. Such notice shall be mailed via certified or registered mail.

_____ By _____
(Date Issued) (Signature of Authorized Representative)

_____
(Print Insurance Agency Name)

Policy coverages must agree with coverages stated on the Certificate. False statements of coverage are punishable under Section 117 of the New York State Insurance Law.

ARTICLE 3(c) - Instruction for Performance Bond and Labor and Material Payment Bond

1) The performance bond and the labor and material payment bond are to be only submitted by the bidder who receives the Notice of Intent to Award letter from **Department**.

2) Use the forms that are included in the Contract Documents. **DO NOT RETYPE THE FORMS.**

3) Attach a **SEPARATE** certified power of attorney and surety financial statement to **EACH** bond (i.e., one set attached to performance bond and one set attached to labor and material payment bond).

ARTICLE 3(d) - Performance Bond

Date Bond Executed _____ **NYSDEC-DER Site Number**: **336089**

Date Contract Executed By Principal _____

Principal (Name and Address)

_____
_____
_____
_____

Surety (Name and Address - Indicate State of incorporation and location of principal office)

_____
_____
_____
_____

Full and Just Sum of Bond (Express in words) _____

(Express in figures) _____

Know all men by these presents, That we, the **Principal** and **Surety**, above named, are held and firmly bound unto the Department of Environmental Conservation for and on behalf of the People of the State of New York, hereinafter called the Department, in full and just sum of the amount stated above, good and lawful money of the United States of America, to the payment of which said sum, well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the **Principal** has entered into a certain written contract with the Department, covering the project and specification above;

Now, Therefore, the condition of this obligation is such, that if the **Principal** shall well, truly and faithfully comply with and perform all of the terms, covenants and conditions of said contract on their (his, its) part to be kept and performed, according to the true intent and meaning of said contract, and shall protect the Department and the People of the State of New York against, and pay any and all amounts, damages, costs and judgments which may or shall be recovered against the Department or the State of New York may be called upon to pay to any person or corporation by reason of any damages arising or growing out of the doing of said work, or the repair or maintenance thereof, or the manner of doing the same, or the neglect of the **Principal**, or their (its) agents or servants, or the improper performance of the work by the **Principal**, or their (its) agents or servants, or the infringement of any patent or patent rights by reason of the use of materials furnished or work done as aforesaid or otherwise, then this obligation shall be null and void, otherwise to remain in full force and virtue.

And the **Surety**, for value received, hereby stipulates and agrees, if requested to do so by the department to fully perform and complete the work mentioned and described in the contract and specifications, pursuant to the terms, conditions and covenants thereof, if for any cause, the **Principal** fails or neglects to so fully perform and complete the work; and the **Surety** further agrees to commence the work of completion within twenty days after notice thereof from the Department, and to complete the work with all due diligence.

And the **Surety**, for value received hereby stipulates and agrees that no change, extension, alteration or addition to the terms of this contract or specifications, accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

In Testimony Whereof, the **Principal** and the President and Secretary of the **Surety** have caused this instrument to be signed and sealed on the date shown above.

Signed, sealed and delivered in the presence of

_____
Name of Corporation

Corporate Seal of Principal
if a Corporation

By _____

Print Name _____

_____L.S.
Signature

Date _____

Corporate Seal of Surety Company

_____
Corporation Surety

_____
Business Address

By (President)_____

Attest (Secretary)
_____ _**Date** _____

(ACKNOWLEDGMENT BY SURETY COMPANY)

State of)
County of) s.s.:

On this _____ day of _____, 20_____ before me personally came _____ to me known, who being by me duly sworn, did depose and say that he/she resides in_____, that he/she is the _____ ***(title)*** of the _____ ***(firm)***, the corporation described in and which executed the within instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the order of the Board of Directors of said corporation and the he/she signed his name thereto by like order; and that the liabilities of said company do not exceed its assets as ascertained in the manner provided by the laws of the State of New York.

(Seal)

_____
Notary Public

(ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the _____day of _____in the year _____, before me, the undersigned notary public, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose names(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public

ARTICLE 3(e) - New York State Department of Environmental Conservation

Labor and Material Payment Bond

Date Bond Executed:_____ **NYSDEC-DER Site Number: 336089**

Date Contract Executed By Principal _____

Principal (Name and Address) _____

Surety (Name and Address - Indicate State of incorporation and location of principal office)

_____
_____
_____
_____

Full and Just Sum of Bond (Express in words) _____

(Express in figures) _____

Know all men by these presents, That We, the **Principal** and the **Surety** above named, are held and firmly bound unto the Department of Environmental Conservation for and on behalf of the People of the State of New York, in full and just sum of the amount stated above, good and lawful money of the United States of America, to the payment of which said sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the **Principal** has entered into a certain written contract with the Department of Environmental Conservation, covering the project and specification indicated above.

Now, Therefore, the condition of this obligation is such, that if the **Principal** shall promptly pay all moneys due to all persons furnishing labor and materials to him or his subcontractors in the prosecution of the work provided for in the contract, then this obligation shall be void, otherwise to remain in full force and effect;

Provided, however, that the Comptroller of the State of New York having required the **Principal** to furnish this bond in order to comply with the provisions of Section 137 of the State Finance Law, all rights and remedies on this bond shall inure solely to such persons and shall be determined in accordance with the provisions, conditions and limitations of said Section to the same extent as if they were copied at length herein; and

Further, provided, that the place of trial of any action on this bond shall be in the county in which the contract was to be performed, or if the contract was to be performed in more than one county, then in any such county, and not elsewhere.

In Testimony Whereof, the **Principal** and the President and Secretary of the **Surety** have caused this instrument to be signed and sealed on the date shown above.

Signed, sealed and delivered in the presence of

_____
Name of Corporation

Corporate Seal of Principal if a Corporation

By _____
Print Name

_____L.S.
Signature

Date _____

Corporate Seal of Surety Company

_____

Corporation Surety

_____

Business Address

By (President)_____

Attest (Secretary)_____

Date _____

(ACKNOWLEDGMENT BY SURETY COMPANY)

State of _____)
County of_____) s.s.:

On this _____ day of _____, 20_____ before me personally came _____ to me known, who being by me duly sworn, did depose and say that he/she resides in _____, that he/she is the _____ ***(title)*** of the _____***(firm)***, the corporation described in and which executed the within instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the order of the Board of Directors of said corporation and the he/she signed his name thereto by like order; and that the liabilities of said company do not exceed its assets as ascertained in the manner provided by the laws of the State of New York.

Seal

_____

Notary Public

(ACKNOWLEDGMENT)

State of_____)
s.s.:
County of _____)

On the _____day of _____in the year _____, before me, the undersigned notary public, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose names(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____

Notary Public

SECTION VI

Agreement

This Agreement by and between the **New York State Department of Environmental Conservation**, (hereinafter referred to as Department) having offices at 625 Broadway, Albany, New York 12233 and

☐ a corporation organized and existing under the laws of the State of

☐ a partnership, consisting of

☐ an individual conducting business as

the location of whose principal office is_____hereinafter called "Contractor."

WITNESSETH

Whereas, Department is empowered by law to obtain services; the performance of these services is essential to Department; and Department, after fully examining all of its internal capabilities and thoroughly investigating all possible alternative approaches, has determined that certain tasks can best be accomplished through a contract;

Whereas, Contractor hereby represents that it is capable of providing the services which are the subject matter of this Contract;

Now Therefore, Department **and** Contractor, in consideration of the mutual covenants hereinafter set forth agree as follows:

ARTICLE 1 - Defined Terms

Terms used in the Agreement which are defined in the Contract Documents have the intent and meanings assigned to them in the Contract Documents.

ARTICLE 2 - Work

As indicated or specified in the Contract Documents, Contractor shall complete in a timely and workmanlike manner, any and all obligations, duties and responsibilities, and provide any and all labor, materials, equipment, temporary facilities, and incidentals necessary to complete the construction generally identified and shown on the plans and Contract Documents entitled:

New York State Department of Environmental Conservation
Site Name: City of Newburgh – GAC Treatment System at the Washington Lake Filtration Plant
Contract Number: D010308
Date: October 2016

ARTICLE 3 - Engineer

Arcadis CE, Inc. shall assume all duties and responsibilities of and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - Contract Documents

The Documents which comprise the entire Contract between Department and Contractor concerning the Work consist of the following:

4.1 Appendices A and B
4.2 Engineer's written clarifications and interpretations
4.3 Change Orders
4.4 Administrative Agreements
4.5 Field Orders
4.6 Proposed Change Orders signed by Department
4.7 Approved Shop Drawings
4.8 Addenda
4.9 Agreement
4.10 Measurement for Payment
4.11 Bid Forms and Attachments Exclusive of Bonds and Insurance Certificates
4.12 Drawings, Plans
4.13 Supplementary Specifications
4.14 Supplementary Conditions
4.15 Standard Specifications
4.16 General Conditions
4.17 Supplementary Bidding Information and Requirements
4.18 Bidding Information and Requirements
4.19 Terms and Definitions
4.20 Advertisement
4.21 Bonds and Insurance Certificates

In the event of a conflict between the documents set forth above, they shall be entitled to priority according to the order in which they are listed.

ARTICLE 5 - Contractor's Representations

In order to induce Department to enter into this Agreement, Contractor makes the following representations:

5.1 Contractor has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and applicable Laws that in any manner may affect cost, schedule, progress, performance or furnishing of the Work.

5.2 Contractor has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in Information to Bidders, as provided in the General Conditions, and accepts the determination set forth in said Section to the extent of the technical data contained in such reports and drawings upon which Contractor is entitled to reply.

5.3 Contractor has obtained and carefully studied all such examinations, investigations, explorations, tests, reports and studies which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, schedule, progress, performance or furnishing of the Work as Contractor considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

5.4 Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions.

5.5 Contractor has correlated (or assumes responsibility for correlating) the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

5.6 Contractor has given Engineer written notice of all conflicts, errors or discrepancies that he (she) has discovered in the Contract Documents and any written resolution thereof is acceptable to Contractor.

5.7 General Responsibility: The Contractor shall at all times during the Contract term remain responsible. The Contractor agrees, if requested by the Commissioner or his or her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity. Additional responsibilities required of the Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, are specified within the provisions of Article 5 of the General Conditions.

ARTICLE 6 - Contract Term

The number of days within which, or alternatively, the dates by which, the Work, or any specified part thereof, is to be completed (the Contract Times) are set forth as follows:

6.1 The Work will be Substantially Completed within **three hundred thirty (330) calendar days** from the Notice to Proceed.

6.2 Separable parts of the Work, if specified in an Attachment A to this Agreement, will be Substantially Completed within the number of days stated in Attachment A from the Notice to Procced.

6.3 The Work will be completed and ready for final payment in accordance with the General Conditions within **three hundred sixty (360) calendar days** from the Notice to Procced or within 60 days of substantial completion, whichever is sooner.

6.4 Department and Contractor recognize that the Contract Time(s) specified in paragraphs 6.1, 6.2, and 6.3 above are of the essence of this Agreement, and that Department may suffer financial loss if the Work is not completed within the Contract Time(s) specified above, plus any extensions thereof allowed in accordance with the General Conditions, as amended or supplemented in the Supplementary Conditions.

6.5 Accordingly, Contractor agrees to forfeit and pay Department as liquidated damages, and not as a penalty, the amount of **five thousand two hundred ($5,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.1 above for Substantial Completion until the Work is Substantially Complete. Contractor further agrees to pay Department as liquidated damages, and not as a penalty, each of the amounts set forth in Attachment A if applicable to this agreement for each day that expires after each of the contract times specified in paragraph 6.2 above for substantial completion until the each of the separable parts of the work is substantially complete. After substantial completion of the work, if Contractor shall neglect, refuse or fail to complete the remaining work within the contract time or any proper extension thereof granted by Department, Contractor shall pay Department as liquidated damages, and not as a penalty, the amount of **one thousand ($1,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.3 above for completion and readiness for payment. These liquidated damages are additive and represent a reasonable estimate, in lieu of any such proof, of Department's extra expenses for Inspection, engineering services, administrative costs, and Interim excess operating costs for each day that expires after the associated Contract Time.

6.6 In addition to the liquidated damage amounts set forth in paragraph 6.5 above, Contractor agrees to pay Department's additional actual damages arising out of the types of expenses itemized below for each day that expires after each of the Contract Times specified in paragraph 6.1 above for Completion of each of the designated parts of the Work until each of the designated parts of the Work achieves the specified completion. These actual damages are additive and shall equal Department's expenditures for costs other than those itemized in paragraph 6.5, including, but not limited to, delay damage settlements or awards related to other separate contracts, delay penalties or fines imposed by regulatory agencies, contract damage and loss of use, excess financing costs, and professional fees and related expenses incurred thereto.

ARTICLE 7 - Alterations and Omissions

Department reserves the right, at any time during the progress of the work, to alter the plans or omit any portion of the work as it may deem reasonably necessary for the public interest; making allowances for additions and deductions with compensation made in accordance with the Contract Documents.

ARTICLE 8 - Determinations as to Variances

In case of any ambiguity in the Contract Documents, the matter must be immediately submitted to the Representative of Department designated in the Contract Documents, who shall adjust the same, and his (her) decision in relation thereto shall be final and conclusive upon the parties.

ARTICLE 9 - Payment Procedures

Contractor shall submit Applications for Payment on standard form in accordance with the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions, as amended or supplemented in the Supplementary Conditions and in accordance with Section 139-f of the State Finance Law.

9.1 **Progress Payments.** Contractor shall submit Applications for Payments to Engineer for review no more frequently than monthly in accordance with paragraph 13.2 of the General Conditions from the date when the Contract Time commences to run. Department shall make progress payments against the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer as provided below. All progress payments will be calculated on the basis of the progress of

the Work measured by the schedule of values established pursuant to paragraph 1.4.3 of the General Conditions. Progress payments will also be made for materials pertinent to the Contract in accordance with the General Conditions. Contractor shall provide complete and accurate billing invoices to the Department in order to receive payment. Billing invoices submitted to the Department must contain all information and supporting documentation required by the Contract, the Department, and the State Comptroller.

Payments for expenditures incurred under this contract will be rendered electronically to the ***Recipient/Contractor/Vendor*** unless payment by paper check is expressly authorized by the Commissioner of the Department (Commissioner), in the Commissioner's sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary State procedures and practices. The ***Recipient/Contractor/Vendor*** shall comply with the ***Comptroller's/OSC's*** procedures to authorize electronic payments. Authorization forms are available at the ***Comptroller's/OSC's*** website at www.osc.state.ny.us/epay/index.htm, by e-mail at epunit@osc.state.ny.us or by telephone at (518) 474-4032. The ***Recipient/Contractor/Vendor*** acknowledges that it will not receive payment under this ***Contract/Purchase Order*** if it does not comply with the ***Comptroller's/OSC's*** electronic payment procedures, except where the Commissioner has expressly authorized payment by paper check as set forth above.

9.1.1 Prior to Substantial Completion of the Work, progress payments will be made less five percent (5%) the aggregate of payments (i.e. retainage) previously made and less an amount necessary to satisfy any claims, liens, or judgments against Contractor which have not been suitably discharged.

9.2 **Payment upon substantial completion.** When the work or major portions thereof, as contemplated in the Contract Documents, is substantially completed, Contractor shall submit to Department, an Application for Payment in accordance with the General Conditions for the remaining amount of the contract balance or amount due for that major portion completed. Department will pay the remaining Contract balance, or amount due for that major portion completed, less two times the value of any remaining items to be completed and an amount necessary to satisfy any claims, liens, judgments against Contractor which have not been suitably discharged. Payment for remaining items will be made upon their completion.

9.3 **Final Payment.** Upon final completion of the physical Work and acceptance of the Work in accordance with the General Conditions, Department shall pay the remainder of the Contract Price as recommended by Engineer.

ARTICLE 10 - No Estimate on Contractor's Noncompliance

It is further agreed that so long as Contractor has not complied with any lawful or proper direction concerning the work or material given by Department, Contractor shall not be entitled to have any estimate made for the purpose of payment, nor shall any estimate be rendered on account of work done or material furnished until Contractor has fully and satisfactorily complied with such direction.

ARTICLE 11 - Delays, Inefficiencies, and Interference

Contractor agrees to make no claim for any consequential damages attributable to any delays, or act in the performance of this contract which are not directly occasioned by any act or omission to act by the State or any of its representatives. In the event Contractor completes the work prior to the contract completion date set forth in the proposal, Contractor hereby agrees to make no claim for extra costs due to delays, interferences or inefficiencies in the performance of the work.

1) Contractor further agrees that it has included in its bid prices for the various items of the contract any

additional costs for delays, inefficiencies, or interferences affecting the performance or scheduling of contract work caused by, or attributable to, the following instances:

a) The work or the presence on the Site of any third party, including but not limited to that of other contractors or personnel employed by the State, or by other public bodies, by railroad, transportation or utility companies or corporations, or by private enterprises, or any delay in progressing such work by any third party.

b) The existence of any facility or appurtenance owned, operated, or maintained by any third party.

c) The act, or failure to act, of any other public or governmental body, including, but not limited to, approvals, permits, restrictions, regulations or ordinances.

d) Restraining orders, injunctions, or judgments issued by a court.

e) Any labor boycott, strike, picketing or similar situation.

f) Any shortages of supplies or materials required by the contract work.

g) Any situation which was, or should have been within, the contemplation of the parties at the time of entering into the contract.

ARTICLE 12 - Postponement, Suspension or Termination

12.1 Department shall have the right to postpone, suspend or terminate this Contract in whole or in part for the convenience of Department. If, after termination for cause of Contractor it is determined that no cause existed for termination of Contractor, such termination shall be deemed to have been made for the convenience of Department.

12.2 If this Contract is terminated by Department for convenience or cause, Department shall make payment on an equitable basis for all work performed in accordance with the Contract Documents prior to termination in accordance with paragraphs 12.3 and 12.4 below.

12.3 If this contract is terminated for cause, no payment shall be made for anticipated profit on unperformed work or services. Additionally, Department may adjust any payment due to Contractor at the time of termination to account for any additional costs to Department because of Contractor's default.

12.4 If this contract is terminated for convenience, payment shall be made for any services rendered and expenses incurred prior to the termination, in addition to termination settlement costs reasonably incurred by Contractor which had become firm prior to the termination.

12.5 Upon termination of this Contract under this Agreement, Department may take over the work or may award or negotiate a contract with another party to complete work required by these Contract Documents.

12.6 Termination for Non-Responsibility: Upon written notice to the Contractor, and a reasonable opportunity to be heard with appropriate Department officials or staff, the Contract may be terminated by the Commissioner or his or her designee at the Contractor's expense where the Contractor is determined by the Commissioner or his or her designee to be non-responsible. In such event, the Commissioner or his or her designee may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach.

12.7 Suspension of Work (for Non-Responsibility): The Commissioner or his or her designee, in his or her sole discretion, reserves the right to suspend any or all activities under this Contract, at any time, when he or she discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Contract activity may resume at such time as the Commissioner or his or her designee issues a written notice authorizing a resumption of performance under the Contract.

ARTICLE 13 - Completion of Physical Work and Final Acceptance

The time within which Department may bring an action on the Contract against Contractor shall be computed from the date of completion of the physical Work. In accordance with Section 138-a of the State Finance Law, Contractor shall notify Department in writing that the physical Work has been completed. The date of completion must be no more than thirty days prior to the date of the notice. This notice must be delivered personally or by either registered or certified mail, return receipt requested to the exact address given below.

Mr. Gerard W. Burke, Section Chief
NYSDEC - Division of Environmental Remediation
Remedial Bureau E, Section A
625 Broadway, 12th Floor
Albany, NY 12233-7017

If Department disagrees with the date set forth in the notice, it will so advise Contractor in writing within 30 days of receipt of the notice. This notice will be delivered by either registered or certified mail, return receipt requested to Contractor's address as shown in this Agreement.

If Department accepts Contractor's date of completion of physical Work, Department's final acceptance of work shall be as of that date.

When, in the opinion of Department, Contractor has fully performed the physical Work under the Contract, Department shall notify Contractor in writing of final acceptance.

ARTICLE 14 - Final Payment

After the final acceptance of the work, Engineer shall prepare a final agreement of the work performed and the materials placed and shall compute the value of such work and materials under and according to the terms of the contract. This agreement shall be certified, as to its correctness, by Engineer and submitted for final approval to Department. The Representative of Department designated in the Contract Documents shall have the right to reject the whole or any portion of the final agreement, should the said certificate of Engineer be found or known to be inconsistent with the terms of the agreement or otherwise improperly given and upon failure of Contractor to provide requested documentation including but not limited to that regarding payment of wages, suppliers or subcontractors. All certificates upon which partial payments may have been made being merely estimates, shall be subject to correction in the final certificate or final agreement.

ARTICLE 15 - Disposition of Documents and Data

Upon final acceptance of work under this Contract or termination of this Contract pursuant to this Agreement, or upon written demand of Department, Contractor shall promptly deliver or otherwise make available to Department all data, drawings, reports, estimates, and such other information and materials as may have been accumulated by Contractor in performing this Contract.

All documents and data are to be submitted in electronic format to the Engineer and Department. The

Engineer/Department will not approve a final report unless, and until, all documents and data generated in support of that report have been submitted in accordance with the electronic submission protocols. Information on the format of data submissions can be found at: http://www.dec.ny.gov/chemical/62440.html. Information on document submissions can be found at: http://www.dec.ny.gov/regulations/2586.html.

ARTICLE 16 - Applicable Law; Jurisdiction; Service of Legal Process

Contractor agrees:

16.1 That this Agreement is subject to and governed by all applicable federal and New York State law.

16.2 To procure all necessary licenses and permits.

16.3 To voluntarily and irrevocably submit to the jurisdiction of a New York State Court of competent jurisdiction, to resolve any dispute or controversy arising out of this Contract.

16.4 That the venue of any action at law or in equity commenced against Department arising out of a Project in one of Department**'s** regions, shall be in the county in that Region where Department regional headquarters is located.

16.5 That the service of legal process or any notices in connection with a dispute or controversy arising out of this Contract, by United States registered mail, postage prepaid, addressed to the Designated representative of Department at the address stated in the Contract. Documents shall constitute good and valid service of process upon Engineer.

16.6 To waive any defense based on or alleging lack of jurisdiction, improper venue, or invalid service, if there is compliance with paragraphs 16.3 and 16.4 in this Article.

16.7 This Contract may be presented in court as conclusive evidence of the foregoing agreement.

ARTICLE 17 - Sales and Use Tax Exemption

Contractor represents that this project has been bid in such a manner that Department has full advantage of available exemptions from sales and compensating use taxes. Accordingly, Contractor agrees to make all payment requests in a manner which affords Department full advantage of such exemptions. Further, Contractor agrees to complete and to require all subcontractors and material men to complete a Contractor Exempt Purchase Certificate in the name of the New York State Department of Environmental Conservation, which shall be furnished to all persons, firms or corporations from whom they purchase materials, equipment or supplies which are tax exempt by reason of the fact that they will be sold to Department, or will be used as an integral component in the construction, rehabilitation, or improvement of any structure of building required by the Contract Documents.

Contractor agrees to maintain and keep, and to contractually require all subcontractors and material men to maintain and keep, records relating to the tax exemption of material, equipment and Supplies for a period of six years. The six year period shall commence to run as of the date of final payment.

ARTICLE 18 - Effective Date

This Agreement and all Contract Documents shall take effect as of the date it is approved and filed by the Comptroller.

ARTICLE 19 – Vendor Responsibility

The Department recommends that vendors file a required Vendor Responsibility Questionnaire online via the New York State VendRep System. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at http://www.osc.state.ny.us/vendrep/vendor_index.htm or go directly to the VendRep System online at https://portal.osc.state.ny.us.

Vendors must provide their New York State Identification Number when enrolling. To request assignment of a Vendor ID or for VendRep System assistance, contact the Office of the State Comptroller's Help Desk at 866-370-4672 or 518-408-4672 or by email at ciohelpdesk@osc.state.ny.us. Vendors opting to complete and submit a paper questionnaire can obtain the appropriate questionnaire from the VendRep website www.osc.state.ny.us/vendrep or may contact the Department of the Office of the State Comptroller's Help Desk for a copy of the paper form.

ARTICLE 20 – Encouraging Use of New York State Business in Contract Performance

New York State businesses have a substantial presence in State contracts and strongly contribute to the economies of the state and the nation. In recognition of their economic activity and leadership in doing business in New York State, bidders/proposers for this contract for commodities, services or technology are strongly encouraged and expected to consider New York State businesses in the fulfillment of the requirements of the contract. Such partnering may be as subcontractors, suppliers, proteges or other supporting roles.

Bidders/proposers need to be aware that all authorized users of this contract will be strongly encouraged; to the maximum extent practical and consistent with legal requirements, to use responsible and responsive New York State businesses in purchasing commodities that are of equal quality and functionality and in utilizing services and technology. Furthermore, bidders/proposers are reminded that they must continue to utilize small, minority and women-owned businesses, consistent with current State law.

Utilizing New York State businesses in State contracts will help create more private sector jobs, rebuild New York's infrastructure, and maximize economic activity to the mutual benefit of the contractor and its New York State business partners. New York State businesses will promote the contractor's optimal performance under the contract; thereby fully benefiting the public sector programs that are supported by associated procurements.

Public procurements can drive and improve the State's economic engine through promotion of the use of New York businesses by its contractors. The State therefore expects bidders/proposers to provide maximum assistance to New York businesses in their use of the contract. The potential participation by all kinds of New York businesses will deliver great value to the State and its taxpayers.

Bidders/proposers can demonstrate their commitment to the use of New York State businesses by responding to the question below:

Will New York State Businesses be used in the performance of this contract? ☐ Yes ☐ No

If yes, identify New York State businesses that will be used and attach identifying information

A*RTICLE 21 - Contract Price*

The maximum payment which Department shall pay to Contractor, and which Contractor agrees to accept as full payment for its work under this Contract, is the total of:

Bid $_____

Plus change order(s)

IN WITNESS WHEREOF, representatives of the Department and the Contractor have executed this Contract on the day and year written beneath their respective signatures. The signatory for the Department provides the following Agency Certification: "In addition to the acceptance of this contract, I also certify that original copies of this signature page will be attached to all other exact copies of this contract."

FOR DEPARTMENT

By: _____

Title: _____

Date: _____

FOR CONTRACTOR

By: _____

Title: _____

Date: _____

Approved as to Form:

By: _____
For Attorney General

Date: _____

Approved:

Thomas P. DiNapoli
State Comptroller

By: _____

Date: _____

This contract is not effective until it is approved by the State Comptroller and filed in his office (Section 112, State Finance Law).

(CORPORATE ACKNOWLEDGMENT WITH SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20___, before me personally came _____ to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is_____ ***(title)*** of_____ ***(firm)*** the corporation described in and which executed the above instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his(her) name thereto by like order.

Seal

_____
Notary Public

(CORPORATE ACKNOWLEDGMENT WITHOUT SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came_____, to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is an officer of_____ ***(firm)*** ; namely, the _____ ***(title)*** of_____ ***(firm)***; that (s)he is authorized by the governing body of said corporation to sign contracts; and that (s)he did sign the foregoing instrument on behalf of, and with authority to bind said corporation.

_____
Notary Public

(CO-PARTNERSHIP ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____ to me known and known to me to be a member of_____, the firm described in and which executed the foregoing instrument, and (s)he acknowledged to me that (s)he subscribed the name of said firm thereto on behalf of said firm for the purpose therein mentioned.

Seal

_____
Notary Public

(INDIVIDUAL ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____to me personally known, and known to me to be the individual described in, and who executed the foregoing instrument, and (s)he duly acknowledged to me that (s)he executed the same.

Seal

_____
Notary Public

SECTION VI

Agreement

This Agreement by and between the **New York State Department of Environmental Conservation**, (hereinafter referred to as Department) having offices at 625 Broadway, Albany, New York 12233 and

☐ a corporation organized and existing under the laws of the State of

☐ a partnership, consisting of

☐ an individual conducting business as

the location of whose principal office is_____hereinafter called "Contractor."

WITNESSETH

Whereas, Department is empowered by law to obtain services; the performance of these services is essential to Department; and Department, after fully examining all of its internal capabilities and thoroughly investigating all possible alternative approaches, has determined that certain tasks can best be accomplished through a contract;

Whereas, Contractor hereby represents that it is capable of providing the services which are the subject matter of this Contract;

Now Therefore, Department **and** Contractor, in consideration of the mutual covenants hereinafter set forth agree as follows:

ARTICLE 1 - Defined Terms

Terms used in the Agreement which are defined in the Contract Documents have the intent and meanings assigned to them in the Contract Documents.

ARTICLE 2 - Work

As indicated or specified in the Contract Documents, Contractor shall complete in a timely and workmanlike manner, any and all obligations, duties and responsibilities, and provide any and all labor, materials, equipment, temporary facilities, and incidentals necessary to complete the construction generally identified and shown on the plans and Contract Documents entitled:

New York State Department of Environmental Conservation
Site Name: City of Newburgh – GAC Treatment System at the Washington Lake Filtration Plant
Contract Number: D010309
Date: October 2016

ARTICLE 3 - Engineer

Arcadis CE, Inc. shall assume all duties and responsibilities of and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - Contract Documents

The Documents which comprise the entire Contract between Department and Contractor concerning the Work consist of the following:

4.1 Appendices A and B
4.2 Engineer's written clarifications and interpretations
4.3 Change Orders
4.4 Administrative Agreements
4.5 Field Orders
4.6 Proposed Change Orders signed by Department
4.7 Approved Shop Drawings
4.8 Addenda
4.9 Agreement
4.10 Measurement for Payment
4.11 Bid Forms and Attachments Exclusive of Bonds and Insurance Certificates
4.12 Drawings, Plans
4.13 Supplementary Specifications
4.14 Supplementary Conditions
4.15 Standard Specifications
4.16 General Conditions
4.17 Supplementary Bidding Information and Requirements
4.18 Bidding Information and Requirements
4.19 Terms and Definitions
4.20 Advertisement
4.21 Bonds and Insurance Certificates

In the event of a conflict between the documents set forth above, they shall be entitled to priority according to the order in which they are listed.

ARTICLE 5 - Contractor's Representations

In order to induce Department to enter into this Agreement, Contractor makes the following representations:

5.1 Contractor has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and applicable Laws that in any manner may affect cost, schedule, progress, performance or furnishing of the Work.

5.2 Contractor has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in Information to Bidders, as provided in the General Conditions, and accepts the determination set forth in said Section to the extent of the technical data contained in such reports and drawings upon which Contractor is entitled to reply.

5.3 Contractor has obtained and carefully studied all such examinations, investigations, explorations, tests, reports and studies which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, schedule, progress, performance or furnishing of the Work as Contractor considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

5.4 Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions.

5.5 Contractor has correlated (or assumes responsibility for correlating) the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

5.6 Contractor has given Engineer written notice of all conflicts, errors or discrepancies that he (she) has discovered in the Contract Documents and any written resolution thereof is acceptable to Contractor.

5.7 General Responsibility: The Contractor shall at all times during the Contract term remain responsible. The Contractor agrees, if requested by the Commissioner or his or her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity. Additional responsibilities required of the Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, are specified within the provisions of Article 5 of the General Conditions.

ARTICLE 6 - Contract Term

The number of days within which, or alternatively, the dates by which, the Work, or any specified part thereof, is to be completed (the Contract Times) are set forth as follows:

6.1 The Work will be Substantially Completed within **three hundred thirty (330) calendar days** from the Notice to Proceed.

6.2 Separable parts of the Work, if specified in an Attachment A to this Agreement, will be Substantially Completed within the number of days stated in Attachment A from the Notice to Procced.

6.3 The Work will be completed and ready for final payment in accordance with the General Conditions within **three hundred sixty (360) calendar days** from the Notice to Procced or within 60 days of substantial completion, whichever is sooner.

6.4 Department and Contractor recognize that the Contract Time(s) specified in paragraphs 6.1, 6.2, and 6.3 above are of the essence of this Agreement, and that Department may suffer financial loss if the Work is not completed within the Contract Time(s) specified above, plus any extensions thereof allowed in accordance with the General Conditions, as amended or supplemented in the Supplementary Conditions.

6.5 Accordingly, Contractor agrees to forfeit and pay Department as liquidated damages, and not as a penalty, the amount of **five thousand two hundred ($5,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.1 above for Substantial Completion until the Work is Substantially Complete. Contractor further agrees to pay Department as liquidated damages, and not as a penalty, each of the amounts set forth in Attachment A if applicable to this agreement for each day that expires after each of the contract times specified in paragraph 6.2 above for substantial completion until the each of the separable parts of the work is substantially complete. After substantial completion of the work, if Contractor shall neglect, refuse or fail to complete the remaining work within the contract time or any proper extension thereof granted by Department, Contractor shall pay Department as liquidated damages, and not as a penalty, the amount of **one thousand ($1,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.3 above for completion and readiness for payment. These liquidated damages are additive and represent a reasonable estimate, in lieu of any such proof, of Department's extra expenses for Inspection, engineering services, administrative costs, and Interim excess operating costs for each day that expires after the associated Contract Time.

6.6 In addition to the liquidated damage amounts set forth in paragraph 6.5 above, Contractor agrees to pay Department's additional actual damages arising out of the types of expenses itemized below for each day that expires after each of the Contract Times specified in paragraph 6.1 above for Completion of each of the designated parts of the Work until each of the designated parts of the Work achieves the specified completion. These actual damages are additive and shall equal Department's expenditures for costs other than those itemized in paragraph 6.5, including, but not limited to, delay damage settlements or awards related to other separate contracts, delay penalties or fines imposed by regulatory agencies, contract damage and loss of use, excess financing costs, and professional fees and related expenses incurred thereto.

ARTICLE 7 - Alterations and Omissions

Department reserves the right, at any time during the progress of the work, to alter the plans or omit any portion of the work as it may deem reasonably necessary for the public interest; making allowances for additions and deductions with compensation made in accordance with the Contract Documents.

ARTICLE 8 - Determinations as to Variances

In case of any ambiguity in the Contract Documents, the matter must be immediately submitted to the Representative of Department designated in the Contract Documents, who shall adjust the same, and his (her) decision in relation thereto shall be final and conclusive upon the parties.

ARTICLE 9 - Payment Procedures

Contractor shall submit Applications for Payment on standard form in accordance with the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions, as amended or supplemented in the Supplementary Conditions and in accordance with Section 139-f of the State Finance Law.

9.1 **Progress Payments.** Contractor shall submit Applications for Payments to Engineer for review no more frequently than monthly in accordance with paragraph 13.2 of the General Conditions from the date when the Contract Time commences to run. Department shall make progress payments against the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer as provided below. All progress payments will be calculated on the basis of the progress of

the Work measured by the schedule of values established pursuant to paragraph 1.4.3 of the General Conditions. Progress payments will also be made for materials pertinent to the Contract in accordance with the General Conditions. Contractor shall provide complete and accurate billing invoices to the Department in order to receive payment. Billing invoices submitted to the Department must contain all information and supporting documentation required by the Contract, the Department, and the State Comptroller.

Payments for expenditures incurred under this contract will be rendered electronically to the ***Recipient/Contractor/Vendor*** unless payment by paper check is expressly authorized by the Commissioner of the Department (Commissioner), in the Commissioner's sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary State procedures and practices. The ***Recipient/Contractor/Vendor*** shall comply with the ***Comptroller's/OSC's*** procedures to authorize electronic payments. Authorization forms are available at the ***Comptroller's/OSC's*** website at www.osc.state.ny.us/epay/index.htm, by e-mail at epunit@osc.state.ny.us or by telephone at (518) 474-4032. The ***Recipient/Contractor/Vendor*** acknowledges that it will not receive payment under this ***Contract/Purchase Order*** if it does not comply with the ***Comptroller's/OSC's*** electronic payment procedures, except where the Commissioner has expressly authorized payment by paper check as set forth above.

9.1.1 Prior to Substantial Completion of the Work, progress payments will be made less five percent (5%) the aggregate of payments (i.e. retainage) previously made and less an amount necessary to satisfy any claims, liens, or judgments against Contractor which have not been suitably discharged.

9.2 **Payment upon substantial completion.** When the work or major portions thereof, as contemplated in the Contract Documents, is substantially completed, Contractor shall submit to Department, an Application for Payment in accordance with the General Conditions for the remaining amount of the contract balance or amount due for that major portion completed. Department will pay the remaining Contract balance, or amount due for that major portion completed, less two times the value of any remaining items to be completed and an amount necessary to satisfy any claims, liens, judgments against Contractor which have not been suitably discharged. Payment for remaining items will be made upon their completion.

9.3 **Final Payment.** Upon final completion of the physical Work and acceptance of the Work in accordance with the General Conditions, Department shall pay the remainder of the Contract Price as recommended by Engineer.

ARTICLE 10 - No Estimate on Contractor's Noncompliance

It is further agreed that so long as Contractor has not complied with any lawful or proper direction concerning the work or material given by Department, Contractor shall not be entitled to have any estimate made for the purpose of payment, nor shall any estimate be rendered on account of work done or material furnished until Contractor has fully and satisfactorily complied with such direction.

ARTICLE 11 - Delays, Inefficiencies, and Interference

Contractor agrees to make no claim for any consequential damages attributable to any delays, or act in the performance of this contract which are not directly occasioned by any act or omission to act by the State or any of its representatives. In the event Contractor completes the work prior to the contract completion date set forth in the proposal, Contractor hereby agrees to make no claim for extra costs due to delays, interferences or inefficiencies in the performance of the work.

1) Contractor further agrees that it has included in its bid prices for the various items of the contract any

additional costs for delays, inefficiencies, or interferences affecting the performance or scheduling of contract work caused by, or attributable to, the following instances:

a) The work or the presence on the Site of any third party, including but not limited to that of other contractors or personnel employed by the State, or by other public bodies, by railroad, transportation or utility companies or corporations, or by private enterprises, or any delay in progressing such work by any third party.

b) The existence of any facility or appurtenance owned, operated, or maintained by any third party.

c) The act, or failure to act, of any other public or governmental body, including, but not limited to, approvals, permits, restrictions, regulations or ordinances.

d) Restraining orders, injunctions, or judgments issued by a court.

e) Any labor boycott, strike, picketing or similar situation.

f) Any shortages of supplies or materials required by the contract work.

g) Any situation which was, or should have been within, the contemplation of the parties at the time of entering into the contract.

ARTICLE 12 - Postponement, Suspension or Termination

12.1 Department shall have the right to postpone, suspend or terminate this Contract in whole or in part for the convenience of Department. If, after termination for cause of Contractor it is determined that no cause existed for termination of Contractor, such termination shall be deemed to have been made for the convenience of Department.

12.2 If this Contract is terminated by Department for convenience or cause, Department shall make payment on an equitable basis for all work performed in accordance with the Contract Documents prior to termination in accordance with paragraphs 12.3 and 12.4 below.

12.3 If this contract is terminated for cause, no payment shall be made for anticipated profit on unperformed work or services. Additionally, Department may adjust any payment due to Contractor at the time of termination to account for any additional costs to Department because of Contractor's default.

12.4 If this contract is terminated for convenience, payment shall be made for any services rendered and expenses incurred prior to the termination, in addition to termination settlement costs reasonably incurred by Contractor which had become firm prior to the termination.

12.5 Upon termination of this Contract under this Agreement, Department may take over the work or may award or negotiate a contract with another party to complete work required by these Contract Documents.

12.6 Termination for Non-Responsibility: Upon written notice to the Contractor, and a reasonable opportunity to be heard with appropriate Department officials or staff, the Contract may be terminated by the Commissioner or his or her designee at the Contractor's expense where the Contractor is determined by the Commissioner or his or her designee to be non-responsible. In such event, the Commissioner or his or her designee may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach.

12.7 Suspension of Work (for Non-Responsibility): The Commissioner or his or her designee, in his or her sole discretion, reserves the right to suspend any or all activities under this Contract, at any time, when he or she discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Contract activity may resume at such time as the Commissioner or his or her designee issues a written notice authorizing a resumption of performance under the Contract.

ARTICLE 13 - Completion of Physical Work and Final Acceptance

The time within which Department may bring an action on the Contract against Contractor shall be computed from the date of completion of the physical Work. In accordance with Section 138-a of the State Finance Law, Contractor shall notify Department in writing that the physical Work has been completed. The date of completion must be no more than thirty days prior to the date of the notice. This notice must be delivered personally or by either registered or certified mail, return receipt requested to the exact address given below.

Mr. Gerard W. Burke, Section Chief
NYSDEC - Division of Environmental Remediation
Remedial Bureau E, Section A
625 Broadway, 12th Floor
Albany, NY 12233-7017

If Department disagrees with the date set forth in the notice, it will so advise Contractor in writing within 30 days of receipt of the notice. This notice will be delivered by either registered or certified mail, return receipt requested to Contractor's address as shown in this Agreement.

If Department accepts Contractor's date of completion of physical Work, Department's final acceptance of work shall be as of that date.

When, in the opinion of Department, Contractor has fully performed the physical Work under the Contract, Department shall notify Contractor in writing of final acceptance.

ARTICLE 14 - Final Payment

After the final acceptance of the work, Engineer shall prepare a final agreement of the work performed and the materials placed and shall compute the value of such work and materials under and according to the terms of the contract. This agreement shall be certified, as to its correctness, by Engineer and submitted for final approval to Department. The Representative of Department designated in the Contract Documents shall have the right to reject the whole or any portion of the final agreement, should the said certificate of Engineer be found or known to be inconsistent with the terms of the agreement or otherwise improperly given and upon failure of Contractor to provide requested documentation including but not limited to that regarding payment of wages, suppliers or subcontractors. All certificates upon which partial payments may have been made being merely estimates, shall be subject to correction in the final certificate or final agreement.

ARTICLE 15 - Disposition of Documents and Data

Upon final acceptance of work under this Contract or termination of this Contract pursuant to this Agreement, or upon written demand of Department, Contractor shall promptly deliver or otherwise make available to Department all data, drawings, reports, estimates, and such other information and materials as may have been accumulated by Contractor in performing this Contract.

All documents and data are to be submitted in electronic format to the Engineer and Department. The

Engineer/Department will not approve a final report unless, and until, all documents and data generated in support of that report have been submitted in accordance with the electronic submission protocols. Information on the format of data submissions can be found at: http://www.dec.ny.gov/chemical/62440.html. Information on document submissions can be found at: http://www.dec.ny.gov/regulations/2586.html.

ARTICLE 16 - Applicable Law; Jurisdiction; Service of Legal Process

Contractor agrees:

16.1 That this Agreement is subject to and governed by all applicable federal and New York State law.

16.2 To procure all necessary licenses and permits.

16.3 To voluntarily and irrevocably submit to the jurisdiction of a New York State Court of competent jurisdiction, to resolve any dispute or controversy arising out of this Contract.

16.4 That the venue of any action at law or in equity commenced against Department arising out of a Project in one of Department**'s** regions, shall be in the county in that Region where Department regional headquarters is located.

16.5 That the service of legal process or any notices in connection with a dispute or controversy arising out of this Contract, by United States registered mail, postage prepaid, addressed to the Designated representative of Department at the address stated in the Contract. Documents shall constitute good and valid service of process upon Engineer.

16.6 To waive any defense based on or alleging lack of jurisdiction, improper venue, or invalid service, if there is compliance with paragraphs 16.3 and 16.4 in this Article.

16.7 This Contract may be presented in court as conclusive evidence of the foregoing agreement.

ARTICLE 17 - Sales and Use Tax Exemption

Contractor represents that this project has been bid in such a manner that Department has full advantage of available exemptions from sales and compensating use taxes. Accordingly, Contractor agrees to make all payment requests in a manner which affords Department full advantage of such exemptions. Further, Contractor agrees to complete and to require all subcontractors and material men to complete a Contractor Exempt Purchase Certificate in the name of the New York State Department of Environmental Conservation, which shall be furnished to all persons, firms or corporations from whom they purchase materials, equipment or supplies which are tax exempt by reason of the fact that they will be sold to Department, or will be used as an integral component in the construction, rehabilitation, or improvement of any structure of building required by the Contract Documents.

Contractor agrees to maintain and keep, and to contractually require all subcontractors and material men to maintain and keep, records relating to the tax exemption of material, equipment and Supplies for a period of six years. The six year period shall commence to run as of the date of final payment.

ARTICLE 18 - Effective Date

This Agreement and all Contract Documents shall take effect as of the date it is approved and filed by the Comptroller.

ARTICLE 19 – Vendor Responsibility

The Department recommends that vendors file a required Vendor Responsibility Questionnaire online via the New York State VendRep System. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at http://www.osc.state.ny.us/vendrep/vendor_index.htm or go directly to the VendRep System online at https://portal.osc.state.ny.us.

Vendors must provide their New York State Identification Number when enrolling. To request assignment of a Vendor ID or for VendRep System assistance, contact the Office of the State Comptroller's Help Desk at 866-370-4672 or 518-408-4672 or by email at ciohelpdesk@osc.state.ny.us. Vendors opting to complete and submit a paper questionnaire can obtain the appropriate questionnaire from the VendRep website www.osc.state.ny.us/vendrep or may contact the Department of the Office of the State Comptroller's Help Desk for a copy of the paper form.

ARTICLE 20 – Encouraging Use of New York State Business in Contract Performance

New York State businesses have a substantial presence in State contracts and strongly contribute to the economies of the state and the nation. In recognition of their economic activity and leadership in doing business in New York State, bidders/proposers for this contract for commodities, services or technology are strongly encouraged and expected to consider New York State businesses in the fulfillment of the requirements of the contract. Such partnering may be as subcontractors, suppliers, proteges or other supporting roles.

Bidders/proposers need to be aware that all authorized users of this contract will be strongly encouraged; to the maximum extent practical and consistent with legal requirements, to use responsible and responsive New York State businesses in purchasing commodities that are of equal quality and functionality and in utilizing services and technology. Furthermore, bidders/proposers are reminded that they must continue to utilize small, minority and women-owned businesses, consistent with current State law.

Utilizing New York State businesses in State contracts will help create more private sector jobs, rebuild New York's infrastructure, and maximize economic activity to the mutual benefit of the contractor and its New York State business partners. New York State businesses will promote the contractor's optimal performance under the contract; thereby fully benefiting the public sector programs that are supported by associated procurements.

Public procurements can drive and improve the State's economic engine through promotion of the use of New York businesses by its contractors. The State therefore expects bidders/proposers to provide maximum assistance to New York businesses in their use of the contract. The potential participation by all kinds of New York businesses will deliver great value to the State and its taxpayers.

Bidders/proposers can demonstrate their commitment to the use of New York State businesses by responding to the question below:

Will New York State Businesses be used in the performance of this contract? ☐ Yes ☐ No

If yes, identify New York State businesses that will be used and attach identifying information

A*RTICLE 21 - Contract Price*

The maximum payment which Department shall pay to Contractor, and which Contractor agrees to accept as full payment for its work under this Contract, is the total of:

Bid $_____

Plus change order(s)

IN WITNESS WHEREOF, representatives of the Department and the Contractor have executed this Contract on the day and year written beneath their respective signatures. The signatory for the Department provides the following Agency Certification: "In addition to the acceptance of this contract, I also certify that original copies of this signature page will be attached to all other exact copies of this contract."

FOR DEPARTMENT

By: _____

Title: _____

Date: _____

FOR CONTRACTOR

By: _____

Title: _____

Date: _____

Approved as to Form:

By: _____
For Attorney General

Date: _____

Approved:

Thomas P. DiNapoli
State Comptroller

By: _____

Date: _____

This contract is not effective until it is approved by the State Comptroller and filed in his office (Section 112, State Finance Law).

(CORPORATE ACKNOWLEDGMENT WITH SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20___, before me personally came _____ to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is_____ ***(title)*** of_____ ***(firm)*** the corporation described in and which executed the above instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his(her) name thereto by like order.

Seal

_____
Notary Public

(CORPORATE ACKNOWLEDGMENT WITHOUT SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came_____, to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is an officer of_____ ***(firm)*** ; namely, the _____ ***(title)*** of_____ ***(firm)***; that (s)he is authorized by the governing body of said corporation to sign contracts; and that (s)he did sign the foregoing instrument on behalf of, and with authority to bind said corporation.

_____
Notary Public

(CO-PARTNERSHIP ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____ to me known and known to me to be a member of_____, the firm described in and which executed the foregoing instrument, and (s)he acknowledged to me that (s)he subscribed the name of said firm thereto on behalf of said firm for the purpose therein mentioned.

Seal

_____
Notary Public

(INDIVIDUAL ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____to me personally known, and known to me to be the individual described in, and who executed the foregoing instrument, and (s)he duly acknowledged to me that (s)he executed the same.

Seal

_____
Notary Public

SECTION VI

Agreement

This Agreement by and between the **New York State Department of Environmental Conservation**, (hereinafter referred to as Department) having offices at 625 Broadway, Albany, New York 12233 and

☐ a corporation organized and existing under the laws of the State of

☐ a partnership, consisting of

☐ an individual conducting business as

the location of whose principal office is_____hereinafter called "Contractor."

WITNESSETH

Whereas, Department is empowered by law to obtain services; the performance of these services is essential to Department; and Department, after fully examining all of its internal capabilities and thoroughly investigating all possible alternative approaches, has determined that certain tasks can best be accomplished through a contract;

Whereas, Contractor hereby represents that it is capable of providing the services which are the subject matter of this Contract;

Now Therefore, Department **and** Contractor, in consideration of the mutual covenants hereinafter set forth agree as follows:

ARTICLE 1 - Defined Terms

Terms used in the Agreement which are defined in the Contract Documents have the intent and meanings assigned to them in the Contract Documents.

ARTICLE 2 - Work

As indicated or specified in the Contract Documents, Contractor shall complete in a timely and workmanlike manner, any and all obligations, duties and responsibilities, and provide any and all labor, materials, equipment, temporary facilities, and incidentals necessary to complete the construction generally identified and shown on the plans and Contract Documents entitled:

New York State Department of Environmental Conservation
Site Name: City of Newburgh – GAC Treatment System at the Washington Lake Filtration Plant
Contract Number: D010310
Date: October 2016

ARTICLE 3 - Engineer

Arcadis CE, Inc. shall assume all duties and responsibilities of and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - Contract Documents

The Documents which comprise the entire Contract between Department and Contractor concerning the Work consist of the following:

4.1 Appendices A and B
4.2 Engineer's written clarifications and interpretations
4.3 Change Orders
4.4 Administrative Agreements
4.5 Field Orders
4.6 Proposed Change Orders signed by Department
4.7 Approved Shop Drawings
4.8 Addenda
4.9 Agreement
4.10 Measurement for Payment
4.11 Bid Forms and Attachments Exclusive of Bonds and Insurance Certificates
4.12 Drawings, Plans
4.13 Supplementary Specifications
4.14 Supplementary Conditions
4.15 Standard Specifications
4.16 General Conditions
4.17 Supplementary Bidding Information and Requirements
4.18 Bidding Information and Requirements
4.19 Terms and Definitions
4.20 Advertisement
4.21 Bonds and Insurance Certificates

In the event of a conflict between the documents set forth above, they shall be entitled to priority according to the order in which they are listed.

ARTICLE 5 - Contractor's Representations

In order to induce Department to enter into this Agreement, Contractor makes the following representations:

5.1 Contractor has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and applicable Laws that in any manner may affect cost, schedule, progress, performance or furnishing of the Work.

5.2 Contractor has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in Information to Bidders, as provided in the General Conditions, and accepts the determination set forth in said Section to the extent of the technical data contained in such reports and drawings upon which Contractor is entitled to reply.

5.3 Contractor has obtained and carefully studied all such examinations, investigations, explorations, tests, reports and studies which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, schedule, progress, performance or furnishing of the Work as Contractor considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

5.4 Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions.

5.5 Contractor has correlated (or assumes responsibility for correlating) the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

5.6 Contractor has given Engineer written notice of all conflicts, errors or discrepancies that he (she) has discovered in the Contract Documents and any written resolution thereof is acceptable to Contractor.

5.7 General Responsibility: The Contractor shall at all times during the Contract term remain responsible. The Contractor agrees, if requested by the Commissioner or his or her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity. Additional responsibilities required of the Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, are specified within the provisions of Article 5 of the General Conditions.

ARTICLE 6 - Contract Term

The number of days within which, or alternatively, the dates by which, the Work, or any specified part thereof, is to be completed (the Contract Times) are set forth as follows:

6.1 The Work will be Substantially Completed within **three hundred thirty (330) calendar days** from the Notice to Proceed.

6.2 Separable parts of the Work, if specified in an Attachment A to this Agreement, will be Substantially Completed within the number of days stated in Attachment A from the Notice to Procced.

6.3 The Work will be completed and ready for final payment in accordance with the General Conditions within **three hundred sixty (360) calendar days** from the Notice to Procced or within 60 days of substantial completion, whichever is sooner.

6.4 Department and Contractor recognize that the Contract Time(s) specified in paragraphs 6.1, 6.2, and 6.3 above are of the essence of this Agreement, and that Department may suffer financial loss if the Work is not completed within the Contract Time(s) specified above, plus any extensions thereof allowed in accordance with the General Conditions, as amended or supplemented in the Supplementary Conditions.

6.5 Accordingly, Contractor agrees to forfeit and pay Department as liquidated damages, and not as a penalty, the amount of **five thousand two hundred ($5,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.1 above for Substantial Completion until the Work is Substantially Complete. Contractor further agrees to pay Department as liquidated damages, and not as a penalty, each of the amounts set forth in Attachment A if applicable to this agreement for each day that expires after each of the contract times specified in paragraph 6.2 above for substantial completion until the each of the separable parts of the work is substantially complete. After substantial completion of the work, if Contractor shall neglect, refuse or fail to complete the remaining work within the contract time or any proper extension thereof granted by Department, Contractor shall pay Department as liquidated damages, and not as a penalty, the amount of **one thousand ($1,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.3 above for completion and readiness for payment. These liquidated damages are additive and represent a reasonable estimate, in lieu of any such proof, of Department's extra expenses for Inspection, engineering services, administrative costs, and Interim excess operating costs for each day that expires after the associated Contract Time.

6.6 In addition to the liquidated damage amounts set forth in paragraph 6.5 above, Contractor agrees to pay Department's additional actual damages arising out of the types of expenses itemized below for each day that expires after each of the Contract Times specified in paragraph 6.1 above for Completion of each of the designated parts of the Work until each of the designated parts of the Work achieves the specified completion. These actual damages are additive and shall equal Department's expenditures for costs other than those itemized in paragraph 6.5, including, but not limited to, delay damage settlements or awards related to other separate contracts, delay penalties or fines imposed by regulatory agencies, contract damage and loss of use, excess financing costs, and professional fees and related expenses incurred thereto.

ARTICLE 7 - Alterations and Omissions

Department reserves the right, at any time during the progress of the work, to alter the plans or omit any portion of the work as it may deem reasonably necessary for the public interest; making allowances for additions and deductions with compensation made in accordance with the Contract Documents.

ARTICLE 8 - Determinations as to Variances

In case of any ambiguity in the Contract Documents, the matter must be immediately submitted to the Representative of Department designated in the Contract Documents, who shall adjust the same, and his (her) decision in relation thereto shall be final and conclusive upon the parties.

ARTICLE 9 - Payment Procedures

Contractor shall submit Applications for Payment on standard form in accordance with the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions, as amended or supplemented in the Supplementary Conditions and in accordance with Section 139-f of the State Finance Law.

9.1 **Progress Payments.** Contractor shall submit Applications for Payments to Engineer for review no more frequently than monthly in accordance with paragraph 13.2 of the General Conditions from the date when the Contract Time commences to run. Department shall make progress payments against the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer as provided below. All progress payments will be calculated on the basis of the progress of

the Work measured by the schedule of values established pursuant to paragraph 1.4.3 of the General Conditions. Progress payments will also be made for materials pertinent to the Contract in accordance with the General Conditions. Contractor shall provide complete and accurate billing invoices to the Department in order to receive payment. Billing invoices submitted to the Department must contain all information and supporting documentation required by the Contract, the Department, and the State Comptroller.

Payments for expenditures incurred under this contract will be rendered electronically to the ***Recipient/Contractor/Vendor*** unless payment by paper check is expressly authorized by the Commissioner of the Department (Commissioner), in the Commissioner's sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary State procedures and practices. The ***Recipient/Contractor/Vendor*** shall comply with the ***Comptroller's/OSC's*** procedures to authorize electronic payments. Authorization forms are available at the ***Comptroller's/OSC's*** website at www.osc.state.ny.us/epay/index.htm, by e-mail at epunit@osc.state.ny.us or by telephone at (518) 474-4032. The ***Recipient/Contractor/Vendor*** acknowledges that it will not receive payment under this ***Contract/Purchase Order*** if it does not comply with the ***Comptroller's/OSC's*** electronic payment procedures, except where the Commissioner has expressly authorized payment by paper check as set forth above.

9.1.1 Prior to Substantial Completion of the Work, progress payments will be made less five percent (5%) the aggregate of payments (i.e. retainage) previously made and less an amount necessary to satisfy any claims, liens, or judgments against Contractor which have not been suitably discharged.

9.2 **Payment upon substantial completion.** When the work or major portions thereof, as contemplated in the Contract Documents, is substantially completed, Contractor shall submit to Department, an Application for Payment in accordance with the General Conditions for the remaining amount of the contract balance or amount due for that major portion completed. Department will pay the remaining Contract balance, or amount due for that major portion completed, less two times the value of any remaining items to be completed and an amount necessary to satisfy any claims, liens, judgments against Contractor which have not been suitably discharged. Payment for remaining items will be made upon their completion.

9.3 **Final Payment.** Upon final completion of the physical Work and acceptance of the Work in accordance with the General Conditions, Department shall pay the remainder of the Contract Price as recommended by Engineer.

ARTICLE 10 - No Estimate on Contractor's Noncompliance

It is further agreed that so long as Contractor has not complied with any lawful or proper direction concerning the work or material given by Department, Contractor shall not be entitled to have any estimate made for the purpose of payment, nor shall any estimate be rendered on account of work done or material furnished until Contractor has fully and satisfactorily complied with such direction.

ARTICLE 11 - Delays, Inefficiencies, and Interference

Contractor agrees to make no claim for any consequential damages attributable to any delays, or act in the performance of this contract which are not directly occasioned by any act or omission to act by the State or any of its representatives. In the event Contractor completes the work prior to the contract completion date set forth in the proposal, Contractor hereby agrees to make no claim for extra costs due to delays, interferences or inefficiencies in the performance of the work.

1) Contractor further agrees that it has included in its bid prices for the various items of the contract any

additional costs for delays, inefficiencies, or interferences affecting the performance or scheduling of contract work caused by, or attributable to, the following instances:

a) The work or the presence on the Site of any third party, including but not limited to that of other contractors or personnel employed by the State, or by other public bodies, by railroad, transportation or utility companies or corporations, or by private enterprises, or any delay in progressing such work by any third party.

b) The existence of any facility or appurtenance owned, operated, or maintained by any third party.

c) The act, or failure to act, of any other public or governmental body, including, but not limited to, approvals, permits, restrictions, regulations or ordinances.

d) Restraining orders, injunctions, or judgments issued by a court.

e) Any labor boycott, strike, picketing or similar situation.

f) Any shortages of supplies or materials required by the contract work.

g) Any situation which was, or should have been within, the contemplation of the parties at the time of entering into the contract.

ARTICLE 12 - Postponement, Suspension or Termination

12.1 Department shall have the right to postpone, suspend or terminate this Contract in whole or in part for the convenience of Department. If, after termination for cause of Contractor it is determined that no cause existed for termination of Contractor, such termination shall be deemed to have been made for the convenience of Department.

12.2 If this Contract is terminated by Department for convenience or cause, Department shall make payment on an equitable basis for all work performed in accordance with the Contract Documents prior to termination in accordance with paragraphs 12.3 and 12.4 below.

12.3 If this contract is terminated for cause, no payment shall be made for anticipated profit on unperformed work or services. Additionally, Department may adjust any payment due to Contractor at the time of termination to account for any additional costs to Department because of Contractor's default.

12.4 If this contract is terminated for convenience, payment shall be made for any services rendered and expenses incurred prior to the termination, in addition to termination settlement costs reasonably incurred by Contractor which had become firm prior to the termination.

12.5 Upon termination of this Contract under this Agreement, Department may take over the work or may award or negotiate a contract with another party to complete work required by these Contract Documents.

12.6 Termination for Non-Responsibility: Upon written notice to the Contractor, and a reasonable opportunity to be heard with appropriate Department officials or staff, the Contract may be terminated by the Commissioner or his or her designee at the Contractor's expense where the Contractor is determined by the Commissioner or his or her designee to be non-responsible. In such event, the Commissioner or his or her designee may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach.

12.7 Suspension of Work (for Non-Responsibility): The Commissioner or his or her designee, in his or her sole discretion, reserves the right to suspend any or all activities under this Contract, at any time, when he or she discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Contract activity may resume at such time as the Commissioner or his or her designee issues a written notice authorizing a resumption of performance under the Contract.

ARTICLE 13 - Completion of Physical Work and Final Acceptance

The time within which Department may bring an action on the Contract against Contractor shall be computed from the date of completion of the physical Work. In accordance with Section 138-a of the State Finance Law, Contractor shall notify Department in writing that the physical Work has been completed. The date of completion must be no more than thirty days prior to the date of the notice. This notice must be delivered personally or by either registered or certified mail, return receipt requested to the exact address given below.

Mr. Gerard W. Burke, Section Chief
NYSDEC - Division of Environmental Remediation
Remedial Bureau E, Section A
625 Broadway, 12th Floor
Albany, NY 12233-7017

If Department disagrees with the date set forth in the notice, it will so advise Contractor in writing within 30 days of receipt of the notice. This notice will be delivered by either registered or certified mail, return receipt requested to Contractor's address as shown in this Agreement.

If Department accepts Contractor's date of completion of physical Work, Department's final acceptance of work shall be as of that date.

When, in the opinion of Department, Contractor has fully performed the physical Work under the Contract, Department shall notify Contractor in writing of final acceptance.

ARTICLE 14 - Final Payment

After the final acceptance of the work, Engineer shall prepare a final agreement of the work performed and the materials placed and shall compute the value of such work and materials under and according to the terms of the contract. This agreement shall be certified, as to its correctness, by Engineer and submitted for final approval to Department. The Representative of Department designated in the Contract Documents shall have the right to reject the whole or any portion of the final agreement, should the said certificate of Engineer be found or known to be inconsistent with the terms of the agreement or otherwise improperly given and upon failure of Contractor to provide requested documentation including but not limited to that regarding payment of wages, suppliers or subcontractors. All certificates upon which partial payments may have been made being merely estimates, shall be subject to correction in the final certificate or final agreement.

ARTICLE 15 - Disposition of Documents and Data

Upon final acceptance of work under this Contract or termination of this Contract pursuant to this Agreement, or upon written demand of Department, Contractor shall promptly deliver or otherwise make available to Department all data, drawings, reports, estimates, and such other information and materials as may have been accumulated by Contractor in performing this Contract.

All documents and data are to be submitted in electronic format to the Engineer and Department. The

Engineer/Department will not approve a final report unless, and until, all documents and data generated in support of that report have been submitted in accordance with the electronic submission protocols. Information on the format of data submissions can be found at: http://www.dec.ny.gov/chemical/62440.html. Information on document submissions can be found at: http://www.dec.ny.gov/regulations/2586.html.

ARTICLE 16 - Applicable Law; Jurisdiction; Service of Legal Process

Contractor agrees:

16.1 That this Agreement is subject to and governed by all applicable federal and New York State law.

16.2 To procure all necessary licenses and permits.

16.3 To voluntarily and irrevocably submit to the jurisdiction of a New York State Court of competent jurisdiction, to resolve any dispute or controversy arising out of this Contract.

16.4 That the venue of any action at law or in equity commenced against Department arising out of a Project in one of Department**'s** regions, shall be in the county in that Region where Department regional headquarters is located.

16.5 That the service of legal process or any notices in connection with a dispute or controversy arising out of this Contract, by United States registered mail, postage prepaid, addressed to the Designated representative of Department at the address stated in the Contract. Documents shall constitute good and valid service of process upon Engineer.

16.6 To waive any defense based on or alleging lack of jurisdiction, improper venue, or invalid service, if there is compliance with paragraphs 16.3 and 16.4 in this Article.

16.7 This Contract may be presented in court as conclusive evidence of the foregoing agreement.

ARTICLE 17 - Sales and Use Tax Exemption

Contractor represents that this project has been bid in such a manner that Department has full advantage of available exemptions from sales and compensating use taxes. Accordingly, Contractor agrees to make all payment requests in a manner which affords Department full advantage of such exemptions. Further, Contractor agrees to complete and to require all subcontractors and material men to complete a Contractor Exempt Purchase Certificate in the name of the New York State Department of Environmental Conservation, which shall be furnished to all persons, firms or corporations from whom they purchase materials, equipment or supplies which are tax exempt by reason of the fact that they will be sold to Department, or will be used as an integral component in the construction, rehabilitation, or improvement of any structure of building required by the Contract Documents.

Contractor agrees to maintain and keep, and to contractually require all subcontractors and material men to maintain and keep, records relating to the tax exemption of material, equipment and Supplies for a period of six years. The six year period shall commence to run as of the date of final payment.

ARTICLE 18 - Effective Date

This Agreement and all Contract Documents shall take effect as of the date it is approved and filed by the Comptroller.

ARTICLE 19 – Vendor Responsibility

The Department recommends that vendors file a required Vendor Responsibility Questionnaire online via the New York State VendRep System. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at http://www.osc.state.ny.us/vendrep/vendor_index.htm or go directly to the VendRep System online at https://portal.osc.state.ny.us.

Vendors must provide their New York State Identification Number when enrolling. To request assignment of a Vendor ID or for VendRep System assistance, contact the Office of the State Comptroller's Help Desk at 866-370-4672 or 518-408-4672 or by email at ciohelpdesk@osc.state.ny.us. Vendors opting to complete and submit a paper questionnaire can obtain the appropriate questionnaire from the VendRep website www.osc.state.ny.us/vendrep or may contact the Department of the Office of the State Comptroller's Help Desk for a copy of the paper form.

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New York State businesses have a substantial presence in State contracts and strongly contribute to the economies of the state and the nation. In recognition of their economic activity and leadership in doing business in New York State, bidders/proposers for this contract for commodities, services or technology are strongly encouraged and expected to consider New York State businesses in the fulfillment of the requirements of the contract. Such partnering may be as subcontractors, suppliers, proteges or other supporting roles.

Bidders/proposers need to be aware that all authorized users of this contract will be strongly encouraged; to the maximum extent practical and consistent with legal requirements, to use responsible and responsive New York State businesses in purchasing commodities that are of equal quality and functionality and in utilizing services and technology. Furthermore, bidders/proposers are reminded that they must continue to utilize small, minority and women-owned businesses, consistent with current State law.

Utilizing New York State businesses in State contracts will help create more private sector jobs, rebuild New York's infrastructure, and maximize economic activity to the mutual benefit of the contractor and its New York State business partners. New York State businesses will promote the contractor's optimal performance under the contract; thereby fully benefiting the public sector programs that are supported by associated procurements.

Public procurements can drive and improve the State's economic engine through promotion of the use of New York businesses by its contractors. The State therefore expects bidders/proposers to provide maximum assistance to New York businesses in their use of the contract. The potential participation by all kinds of New York businesses will deliver great value to the State and its taxpayers.

Bidders/proposers can demonstrate their commitment to the use of New York State businesses by responding to the question below:

Will New York State Businesses be used in the performance of this contract? ☐ Yes ☐ No

If yes, identify New York State businesses that will be used and attach identifying information

A*RTICLE 21 - Contract Price*

The maximum payment which Department shall pay to Contractor, and which Contractor agrees to accept as full payment for its work under this Contract, is the total of:

Bid $_____

Plus change order(s)

IN WITNESS WHEREOF, representatives of the Department and the Contractor have executed this Contract on the day and year written beneath their respective signatures. The signatory for the Department provides the following Agency Certification: "In addition to the acceptance of this contract, I also certify that original copies of this signature page will be attached to all other exact copies of this contract."

FOR DEPARTMENT

By: _____

Title: _____

Date: _____

FOR CONTRACTOR

By: _____

Title: _____

Date: _____

Approved as to Form:

By: _____
For Attorney General

Date: _____

Approved:

Thomas P. DiNapoli
State Comptroller

By: _____

Date: _____

This contract is not effective until it is approved by the State Comptroller and filed in his office (Section 112, State Finance Law).

(CORPORATE ACKNOWLEDGMENT WITH SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20___, before me personally came _____ to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is_____ ***(title)*** of_____ ***(firm)*** the corporation described in and which executed the above instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his(her) name thereto by like order.

Seal

_____
Notary Public

(CORPORATE ACKNOWLEDGMENT WITHOUT SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came_____, to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is an officer of_____ ***(firm)*** ; namely, the _____ ***(title)*** of_____ ***(firm)***; that (s)he is authorized by the governing body of said corporation to sign contracts; and that (s)he did sign the foregoing instrument on behalf of, and with authority to bind said corporation.

_____
Notary Public

(CO-PARTNERSHIP ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____ to me known and known to me to be a member of_____, the firm described in and which executed the foregoing instrument, and (s)he acknowledged to me that (s)he subscribed the name of said firm thereto on behalf of said firm for the purpose therein mentioned.

Seal

_____
Notary Public

(INDIVIDUAL ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____to me personally known, and known to me to be the individual described in, and who executed the foregoing instrument, and (s)he duly acknowledged to me that (s)he executed the same.

Seal

_____
Notary Public

SECTION VI

Agreement

This Agreement by and between the **New York State Department of Environmental Conservation**, (hereinafter referred to as Department) having offices at 625 Broadway, Albany, New York 12233 and

☐ a corporation organized and existing under the laws of the State of

☐ a partnership, consisting of

☐ an individual conducting business as

the location of whose principal office is_____hereinafter called "Contractor."

WITNESSETH

Whereas, Department is empowered by law to obtain services; the performance of these services is essential to Department; and Department, after fully examining all of its internal capabilities and thoroughly investigating all possible alternative approaches, has determined that certain tasks can best be accomplished through a contract;

Whereas, Contractor hereby represents that it is capable of providing the services which are the subject matter of this Contract;

Now Therefore, Department **and** Contractor, in consideration of the mutual covenants hereinafter set forth agree as follows:

ARTICLE 1 - Defined Terms

Terms used in the Agreement which are defined in the Contract Documents have the intent and meanings assigned to them in the Contract Documents.

ARTICLE 2 - Work

As indicated or specified in the Contract Documents, Contractor shall complete in a timely and workmanlike manner, any and all obligations, duties and responsibilities, and provide any and all labor, materials, equipment, temporary facilities, and incidentals necessary to complete the construction generally identified and shown on the plans and Contract Documents entitled:

New York State Department of Environmental Conservation
Site Name: City of Newburgh – GAC Treatment System at the Washington Lake Filtration Plant
Contract Number: D010326
Date: October 2016

ARTICLE 3 - Engineer

Arcadis CE, Inc. shall assume all duties and responsibilities of and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - Contract Documents

The Documents which comprise the entire Contract between Department and Contractor concerning the Work consist of the following:

4.1 Appendices A and B
4.2 Engineer's written clarifications and interpretations
4.3 Change Orders
4.4 Administrative Agreements
4.5 Field Orders
4.6 Proposed Change Orders signed by Department
4.7 Approved Shop Drawings
4.8 Addenda
4.9 Agreement
4.10 Measurement for Payment
4.11 Bid Forms and Attachments Exclusive of Bonds and Insurance Certificates
4.12 Drawings, Plans
4.13 Supplementary Specifications
4.14 Supplementary Conditions
4.15 Standard Specifications
4.16 General Conditions
4.17 Supplementary Bidding Information and Requirements
4.18 Bidding Information and Requirements
4.19 Terms and Definitions
4.20 Advertisement
4.21 Bonds and Insurance Certificates

In the event of a conflict between the documents set forth above, they shall be entitled to priority according to the order in which they are listed.

ARTICLE 5 - Contractor's Representations

In order to induce Department to enter into this Agreement, Contractor makes the following representations:

5.1 Contractor has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and applicable Laws that in any manner may affect cost, schedule, progress, performance or furnishing of the Work.

5.2 Contractor has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in Information to Bidders, as provided in the General Conditions, and accepts the determination set forth in said Section to the extent of the technical data contained in such reports and drawings upon which Contractor is entitled to reply.

5.3 Contractor has obtained and carefully studied all such examinations, investigations, explorations, tests, reports and studies which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, schedule, progress, performance or furnishing of the Work as Contractor considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

5.4 Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 3 of the General Conditions.

5.5 Contractor has correlated (or assumes responsibility for correlating) the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

5.6 Contractor has given Engineer written notice of all conflicts, errors or discrepancies that he (she) has discovered in the Contract Documents and any written resolution thereof is acceptable to Contractor.

5.7 General Responsibility: The Contractor shall at all times during the Contract term remain responsible. The Contractor agrees, if requested by the Commissioner or his or her designee, to present evidence of its continuing legal authority to do business in New York State, integrity, experience, ability, prior performance, and organizational and financial capacity. Additional responsibilities required of the Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, are specified within the provisions of Article 5 of the General Conditions.

ARTICLE 6 - Contract Term

The number of days within which, or alternatively, the dates by which, the Work, or any specified part thereof, is to be completed (the Contract Times) are set forth as follows:

6.1 The Work will be Substantially Completed within **three hundred thirty (330) calendar days** from the Notice to Proceed.

6.2 Separable parts of the Work, if specified in an Attachment A to this Agreement, will be Substantially Completed within the number of days stated in Attachment A from the Notice to Procced.

6.3 The Work will be completed and ready for final payment in accordance with the General Conditions within **three hundred sixty (360) calendar days** from the Notice to Procced or within 60 days of substantial completion, whichever is sooner.

6.4 Department and Contractor recognize that the Contract Time(s) specified in paragraphs 6.1, 6.2, and 6.3 above are of the essence of this Agreement, and that Department may suffer financial loss if the Work is not completed within the Contract Time(s) specified above, plus any extensions thereof allowed in accordance with the General Conditions, as amended or supplemented in the Supplementary Conditions.

6.5 Accordingly, Contractor agrees to forfeit and pay Department as liquidated damages, and not as a penalty, the amount of **five thousand two hundred ($5,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.1 above for Substantial Completion until the Work is Substantially Complete. Contractor further agrees to pay Department as liquidated damages, and not as a penalty, each of the amounts set forth in Attachment A if applicable to this agreement for each day that expires after each of the contract times specified in paragraph 6.2 above for substantial completion until the each of the separable parts of the work is substantially complete. After substantial completion of the work, if Contractor shall neglect, refuse or fail to complete the remaining work within the contract time or any proper extension thereof granted by Department, Contractor shall pay Department as liquidated damages, and not as a penalty, the amount of **one thousand ($1,000) dollars** for each day that expires after the Contract Time specified in paragraph 6.3 above for completion and readiness for payment. These liquidated damages are additive and represent a reasonable estimate, in lieu of any such proof, of Department's extra expenses for Inspection, engineering services, administrative costs, and Interim excess operating costs for each day that expires after the associated Contract Time.

6.6 In addition to the liquidated damage amounts set forth in paragraph 6.5 above, Contractor agrees to pay Department's additional actual damages arising out of the types of expenses itemized below for each day that expires after each of the Contract Times specified in paragraph 6.1 above for Completion of each of the designated parts of the Work until each of the designated parts of the Work achieves the specified completion. These actual damages are additive and shall equal Department's expenditures for costs other than those itemized in paragraph 6.5, including, but not limited to, delay damage settlements or awards related to other separate contracts, delay penalties or fines imposed by regulatory agencies, contract damage and loss of use, excess financing costs, and professional fees and related expenses incurred thereto.

ARTICLE 7 - Alterations and Omissions

Department reserves the right, at any time during the progress of the work, to alter the plans or omit any portion of the work as it may deem reasonably necessary for the public interest; making allowances for additions and deductions with compensation made in accordance with the Contract Documents.

ARTICLE 8 - Determinations as to Variances

In case of any ambiguity in the Contract Documents, the matter must be immediately submitted to the Representative of Department designated in the Contract Documents, who shall adjust the same, and his (her) decision in relation thereto shall be final and conclusive upon the parties.

ARTICLE 9 - Payment Procedures

Contractor shall submit Applications for Payment on standard form in accordance with the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions, as amended or supplemented in the Supplementary Conditions and in accordance with Section 139-f of the State Finance Law.

9.1 **Progress Payments.** Contractor shall submit Applications for Payments to Engineer for review no more frequently than monthly in accordance with paragraph 13.2 of the General Conditions from the date when the Contract Time commences to run. Department shall make progress payments against the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer as provided below. All progress payments will be calculated on the basis of the progress of

the Work measured by the schedule of values established pursuant to paragraph 1.4.3 of the General Conditions. Progress payments will also be made for materials pertinent to the Contract in accordance with the General Conditions. Contractor shall provide complete and accurate billing invoices to the Department in order to receive payment. Billing invoices submitted to the Department must contain all information and supporting documentation required by the Contract, the Department, and the State Comptroller.

Payments for expenditures incurred under this contract will be rendered electronically to the ***Recipient/Contractor/Vendor*** unless payment by paper check is expressly authorized by the Commissioner of the Department (Commissioner), in the Commissioner's sole discretion, due to extenuating circumstances. Such electronic payment shall be made in accordance with ordinary State procedures and practices. The ***Recipient/Contractor/Vendor*** shall comply with the ***Comptroller's/OSC's*** procedures to authorize electronic payments. Authorization forms are available at the ***Comptroller's/OSC's*** website at www.osc.state.ny.us/epay/index.htm, by e-mail at epunit@osc.state.ny.us or by telephone at (518) 474-4032. The ***Recipient/Contractor/Vendor*** acknowledges that it will not receive payment under this ***Contract/Purchase Order*** if it does not comply with the ***Comptroller's/OSC's*** electronic payment procedures, except where the Commissioner has expressly authorized payment by paper check as set forth above.

9.1.1 Prior to Substantial Completion of the Work, progress payments will be made less five percent (5%) the aggregate of payments (i.e. retainage) previously made and less an amount necessary to satisfy any claims, liens, or judgments against Contractor which have not been suitably discharged.

9.2 **Payment upon substantial completion.** When the work or major portions thereof, as contemplated in the Contract Documents, is substantially completed, Contractor shall submit to Department, an Application for Payment in accordance with the General Conditions for the remaining amount of the contract balance or amount due for that major portion completed. Department will pay the remaining Contract balance, or amount due for that major portion completed, less two times the value of any remaining items to be completed and an amount necessary to satisfy any claims, liens, judgments against Contractor which have not been suitably discharged. Payment for remaining items will be made upon their completion.

9.3 **Final Payment.** Upon final completion of the physical Work and acceptance of the Work in accordance with the General Conditions, Department shall pay the remainder of the Contract Price as recommended by Engineer.

ARTICLE 10 - No Estimate on Contractor's Noncompliance

It is further agreed that so long as Contractor has not complied with any lawful or proper direction concerning the work or material given by Department, Contractor shall not be entitled to have any estimate made for the purpose of payment, nor shall any estimate be rendered on account of work done or material furnished until Contractor has fully and satisfactorily complied with such direction.

ARTICLE 11 - Delays, Inefficiencies, and Interference

Contractor agrees to make no claim for any consequential damages attributable to any delays, or act in the performance of this contract which are not directly occasioned by any act or omission to act by the State or any of its representatives. In the event Contractor completes the work prior to the contract completion date set forth in the proposal, Contractor hereby agrees to make no claim for extra costs due to delays, interferences or inefficiencies in the performance of the work.

1) Contractor further agrees that it has included in its bid prices for the various items of the contract any

additional costs for delays, inefficiencies, or interferences affecting the performance or scheduling of contract work caused by, or attributable to, the following instances:

a) The work or the presence on the Site of any third party, including but not limited to that of other contractors or personnel employed by the State, or by other public bodies, by railroad, transportation or utility companies or corporations, or by private enterprises, or any delay in progressing such work by any third party.

b) The existence of any facility or appurtenance owned, operated, or maintained by any third party.

c) The act, or failure to act, of any other public or governmental body, including, but not limited to, approvals, permits, restrictions, regulations or ordinances.

d) Restraining orders, injunctions, or judgments issued by a court.

e) Any labor boycott, strike, picketing or similar situation.

f) Any shortages of supplies or materials required by the contract work.

g) Any situation which was, or should have been within, the contemplation of the parties at the time of entering into the contract.

ARTICLE 12 - Postponement, Suspension or Termination

12.1 Department shall have the right to postpone, suspend or terminate this Contract in whole or in part for the convenience of Department. If, after termination for cause of Contractor it is determined that no cause existed for termination of Contractor, such termination shall be deemed to have been made for the convenience of Department.

12.2 If this Contract is terminated by Department for convenience or cause, Department shall make payment on an equitable basis for all work performed in accordance with the Contract Documents prior to termination in accordance with paragraphs 12.3 and 12.4 below.

12.3 If this contract is terminated for cause, no payment shall be made for anticipated profit on unperformed work or services. Additionally, Department may adjust any payment due to Contractor at the time of termination to account for any additional costs to Department because of Contractor's default.

12.4 If this contract is terminated for convenience, payment shall be made for any services rendered and expenses incurred prior to the termination, in addition to termination settlement costs reasonably incurred by Contractor which had become firm prior to the termination.

12.5 Upon termination of this Contract under this Agreement, Department may take over the work or may award or negotiate a contract with another party to complete work required by these Contract Documents.

12.6 Termination for Non-Responsibility: Upon written notice to the Contractor, and a reasonable opportunity to be heard with appropriate Department officials or staff, the Contract may be terminated by the Commissioner or his or her designee at the Contractor's expense where the Contractor is determined by the Commissioner or his or her designee to be non-responsible. In such event, the Commissioner or his or her designee may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach.

12.7 Suspension of Work (for Non-Responsibility): The Commissioner or his or her designee, in his or her sole discretion, reserves the right to suspend any or all activities under this Contract, at any time, when he or she discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Contract activity may resume at such time as the Commissioner or his or her designee issues a written notice authorizing a resumption of performance under the Contract.

ARTICLE 13 - Completion of Physical Work and Final Acceptance

The time within which Department may bring an action on the Contract against Contractor shall be computed from the date of completion of the physical Work. In accordance with Section 138-a of the State Finance Law, Contractor shall notify Department in writing that the physical Work has been completed. The date of completion must be no more than thirty days prior to the date of the notice. This notice must be delivered personally or by either registered or certified mail, return receipt requested to the exact address given below.

Mr. Gerard W. Burke, Section Chief
NYSDEC - Division of Environmental Remediation
Remedial Bureau E, Section A
625 Broadway, 12th Floor
Albany, NY 12233-7017

If Department disagrees with the date set forth in the notice, it will so advise Contractor in writing within 30 days of receipt of the notice. This notice will be delivered by either registered or certified mail, return receipt requested to Contractor's address as shown in this Agreement.

If Department accepts Contractor's date of completion of physical Work, Department's final acceptance of work shall be as of that date.

When, in the opinion of Department, Contractor has fully performed the physical Work under the Contract, Department shall notify Contractor in writing of final acceptance.

ARTICLE 14 - Final Payment

After the final acceptance of the work, Engineer shall prepare a final agreement of the work performed and the materials placed and shall compute the value of such work and materials under and according to the terms of the contract. This agreement shall be certified, as to its correctness, by Engineer and submitted for final approval to Department. The Representative of Department designated in the Contract Documents shall have the right to reject the whole or any portion of the final agreement, should the said certificate of Engineer be found or known to be inconsistent with the terms of the agreement or otherwise improperly given and upon failure of Contractor to provide requested documentation including but not limited to that regarding payment of wages, suppliers or subcontractors. All certificates upon which partial payments may have been made being merely estimates, shall be subject to correction in the final certificate or final agreement.

ARTICLE 15 - Disposition of Documents and Data

Upon final acceptance of work under this Contract or termination of this Contract pursuant to this Agreement, or upon written demand of Department, Contractor shall promptly deliver or otherwise make available to Department all data, drawings, reports, estimates, and such other information and materials as may have been accumulated by Contractor in performing this Contract.

All documents and data are to be submitted in electronic format to the Engineer and Department. The

Engineer/Department will not approve a final report unless, and until, all documents and data generated in support of that report have been submitted in accordance with the electronic submission protocols. Information on the format of data submissions can be found at: http://www.dec.ny.gov/chemical/62440.html. Information on document submissions can be found at: http://www.dec.ny.gov/regulations/2586.html.

ARTICLE 16 - Applicable Law; Jurisdiction; Service of Legal Process

Contractor agrees:

16.1 That this Agreement is subject to and governed by all applicable federal and New York State law.

16.2 To procure all necessary licenses and permits.

16.3 To voluntarily and irrevocably submit to the jurisdiction of a New York State Court of competent jurisdiction, to resolve any dispute or controversy arising out of this Contract.

16.4 That the venue of any action at law or in equity commenced against Department arising out of a Project in one of Department**'s** regions, shall be in the county in that Region where Department regional headquarters is located.

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16.7 This Contract may be presented in court as conclusive evidence of the foregoing agreement.

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Contractor represents that this project has been bid in such a manner that Department has full advantage of available exemptions from sales and compensating use taxes. Accordingly, Contractor agrees to make all payment requests in a manner which affords Department full advantage of such exemptions. Further, Contractor agrees to complete and to require all subcontractors and material men to complete a Contractor Exempt Purchase Certificate in the name of the New York State Department of Environmental Conservation, which shall be furnished to all persons, firms or corporations from whom they purchase materials, equipment or supplies which are tax exempt by reason of the fact that they will be sold to Department, or will be used as an integral component in the construction, rehabilitation, or improvement of any structure of building required by the Contract Documents.

Contractor agrees to maintain and keep, and to contractually require all subcontractors and material men to maintain and keep, records relating to the tax exemption of material, equipment and Supplies for a period of six years. The six year period shall commence to run as of the date of final payment.

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This Agreement and all Contract Documents shall take effect as of the date it is approved and filed by the Comptroller.

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The Department recommends that vendors file a required Vendor Responsibility Questionnaire online via the New York State VendRep System. To enroll in and use the New York State VendRep System, see the VendRep System Instructions available at http://www.osc.state.ny.us/vendrep/vendor_index.htm or go directly to the VendRep System online at https://portal.osc.state.ny.us.

Vendors must provide their New York State Identification Number when enrolling. To request assignment of a Vendor ID or for VendRep System assistance, contact the Office of the State Comptroller's Help Desk at 866-370-4672 or 518-408-4672 or by email at ciohelpdesk@osc.state.ny.us. Vendors opting to complete and submit a paper questionnaire can obtain the appropriate questionnaire from the VendRep website www.osc.state.ny.us/vendrep or may contact the Department of the Office of the State Comptroller's Help Desk for a copy of the paper form.

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Bidders/proposers need to be aware that all authorized users of this contract will be strongly encouraged; to the maximum extent practical and consistent with legal requirements, to use responsible and responsive New York State businesses in purchasing commodities that are of equal quality and functionality and in utilizing services and technology. Furthermore, bidders/proposers are reminded that they must continue to utilize small, minority and women-owned businesses, consistent with current State law.

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Public procurements can drive and improve the State's economic engine through promotion of the use of New York businesses by its contractors. The State therefore expects bidders/proposers to provide maximum assistance to New York businesses in their use of the contract. The potential participation by all kinds of New York businesses will deliver great value to the State and its taxpayers.

Bidders/proposers can demonstrate their commitment to the use of New York State businesses by responding to the question below:

Will New York State Businesses be used in the performance of this contract? ☐ Yes ☐ No

If yes, identify New York State businesses that will be used and attach identifying information

A*RTICLE 21 - Contract Price*

The maximum payment which Department shall pay to Contractor, and which Contractor agrees to accept as full payment for its work under this Contract, is the total of:

Bid $_____

Plus change order(s)

IN WITNESS WHEREOF, representatives of the Department and the Contractor have executed this Contract on the day and year written beneath their respective signatures. The signatory for the Department provides the following Agency Certification: "In addition to the acceptance of this contract, I also certify that original copies of this signature page will be attached to all other exact copies of this contract."

FOR DEPARTMENT

By: _____

Title: _____

Date: _____

FOR CONTRACTOR

By: _____

Title: _____

Date: _____

Approved as to Form:

By: _____
For Attorney General

Date: _____

Approved:

Thomas P. DiNapoli
State Comptroller

By: _____

Date: _____

This contract is not effective until it is approved by the State Comptroller and filed in his office (Section 112, State Finance Law).

(CORPORATE ACKNOWLEDGMENT WITH SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20___, before me personally came _____ to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is_____ ***(title)*** of_____ ***(firm)*** the corporation described in and which executed the above instrument; that (s)he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that (s)he signed his(her) name thereto by like order.

Seal

_____
Notary Public

(CORPORATE ACKNOWLEDGMENT WITHOUT SEAL)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came_____, to me known, who being duly sworn, did depose and say that (s)he resides in_____, New York; that (s)he is an officer of_____ ***(firm)*** ; namely, the _____ ***(title)*** of_____ ***(firm)***; that (s)he is authorized by the governing body of said corporation to sign contracts; and that (s)he did sign the foregoing instrument on behalf of, and with authority to bind said corporation.

_____
Notary Public

(CO-PARTNERSHIP ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____ to me known and known to me to be a member of_____, the firm described in and which executed the foregoing instrument, and (s)he acknowledged to me that (s)he subscribed the name of said firm thereto on behalf of said firm for the purpose therein mentioned.

Seal

_____
Notary Public

(INDIVIDUAL ACKNOWLEDGMENT)

State of)
County of) s.s.:

On the_____day of_____, 20_____, before me personally came _____to me personally known, and known to me to be the individual described in, and who executed the foregoing instrument, and (s)he duly acknowledged to me that (s)he executed the same.

Seal

_____
Notary Public

SECTION 03 41 33

DESIGNED PRECAST CONCRETE VAULTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all professional services, labor, materials, equipment and incidentals as shown, specified and required to design, furnish, and install all precast concrete structures.
   2. The Work includes:
      a. Low Service Meter Vault including Cover Slabs.
      b. Treated Water Meter Vault including Cover Slabs.
      c. Backwash Feed Vault including Cover Slabs.

B. General:
   1. Structures shall conform in shape, size, dimensions, material, and other respects to the details shown or as ordered by ENGINEER.
   2. Concrete for inverts in precast concrete structures shall be Class A and shall conform to the requirements specified under Section 03 00 05 Concrete.

C. Related Sections:
   1. Section 03 15 00, Concrete Accessories
   2. Section 03 20 00, Concrete Reinforcing
   3. Section 03 30 00, Cast-In-Place Concrete
   4. Section 05 54 63, Floor Access Hatch Covers.
   5. Section 05 56 00, Metal Castings.
   6. Section 31 23 05, Excavation and Fill.
   7. Division 40, Process Integration

1.2 QUALITY ASSURANCE

A. Standards referenced in this Section are:
   1. American Association of State Highway and Transportation Officials (AASHTO) HS-20. 2. ASTM A 82, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
   3. ASTM A 153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   4. ASTM A 185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
   5. ASTM A 497, Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.

6. ASTM A 615, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
7. ASTM A 706, Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
8. ASTM C 33, Standard Specification for Concrete Aggregates.
9. AWWA C 302, Reinforced Concrete Pressure Pipe, Non-Cylinder Type for Water and Other Liquids.
10. ASTM C 150, Standard Specification for Portland Cement.
11. ASTM C 260, Air-Entraining Admixtures for Concrete.
12. ASTM C 478, Specification for Precast Reinforced Concrete Manhole Sections. ASTM C 494, Standard Specification for Chemical Admixtures for Concrete.
13. PCI MNL-116, Manual for Quality Control for Plants and Production of Structural Precast Concrete Products.

B. Fabrication Tolerances:
   1. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances of PCI MNL-116, unless otherwise indicated. Keep bar sizes small, even where this will reduce the spacing of the bars.
   2. Units shall be true to dimensions. Unit bow, as fabricated and installed, shall not exceed 1/8 inch per unit in the short dimension and 1/4-inch per unit in the long dimension. Step in alignment face and jog in alignment shall not exceed 1/4-inch. Provide a 3/4-inch chamfer or 1 x 2-inch radius on all exposed edges and corners.
   3. Imperfections such as air bubbles, ripples, joint lines, warpage, stains, projections, honeycombs, uneven matrix plate, and other defects will not be acceptable.

C. Qualifications and Responsibilities of Contractor's Design Professional:
   1. Professional Engineer:
      a. Engage a registered professional engineer qualified to practice in the State of New York and experienced in providing engineering services of the kind indicated.
      b. Responsibilities include but are not necessarily limited to:
         1) Carefully reviewing precast concrete structure performance and design criteria stated in the Contract Documents.
         2) Preparing written requests for clarifications or interpretations of performance or design criteria for submittal to ENGINEER by CONTRACTOR.
         3) Preparing or supervising the preparation of design calculations and related drawings, Shop Drawings, testing plan development, test-result interpretation and a comprehensive engineering analysis verifying compliance of the precast concrete structure with the requirements of the Contract Documents.
         4) Signing and sealing all calculations and design drawings, and Shop Drawings.

5) Certifying that:
   i. it has performed the design of the precast concrete structure in accordance with the performance and design criteria stated in the Contract Documents, and
   ii. the said design conforms to all applicable local, state and federal codes, rules and regulations, and to the prevailing standards of practice.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:
   1. Qualifications:
      a. Submit qualifications data for the Contractor's Design Professional.
   2. Precast Structures:
      a. Drawing showing design and construction of all precast concrete, as well as the location and details of all items that are to be embedded in the precast units.
      b. Design calculations and shop drawings, signed and stamped with a seal of a Registered Professional Engineer licensed to practice in the State of New York.
      c. Test result from concrete cylinder strength tests.
   3. Certificate of Performance: Submit certification of performance of the delegated design by the Contractor's design professional (Attachment A, located at the end of this Section).

B. Shop Tests:
   1. Submit description of proposed testing methods, procedures and apparatus. Prepare and submit report for each test.

1.4 DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials:
   1. Deliver precast concrete units to project site in such quantities and at such times to assure continuity of installation.

B. Storage of Materials:
   1. Store units at project site in a manner that will prevent cracking, distortion, warping, staining, or other physical damage and so that precast copings are without damage at time of installation.

C. Handling of Materials:
   1. Lift and support units only at designated lifting or supporting points as shown on final Shop Drawings.

PART 2 – PRODUCTS

2.1 PRECAST CONCRETE STRUCTURES

A. Layout and details shall be as shown and specified. Design shall be adequate to withstand live loads, lateral earth pressure loading, and uplift case.
   1. Design Criteria:
      a. Top slab live load: 300 psf or AASHTO HS-20 truck wheel loads, whichever causes the greater stress.
      b. Lateral soil pressure above ground water surface: 65 pcf equivalent fluid pressure.
      c. Lateral soil pressure below ground water surface: 90 pcf equivalent fluid pressure.
      d. Maximum allowable soil bearing pressure: 2000 psf.
      e. Unit weight of soil = 120 pcf.
      f. Ground water table for normal ground water = Elevation at grade.
      g. Ground water table for 100 year storm = Elevation at grade.
      h. Vertical surcharge on soil of 300 psf.
      i. Safety factor for uplift normal ground water > 1.5.
      j. Safety factor for uplift 100 year storm ground water > 1.1
   2. Design shall meet the requirements of ACI 350 and the Building Code.

B. Concrete Mix: Standard-weight concrete consisting of specified portland cement, pigments, aggregates, admixtures, and water to produce the following properties:
   1. Compressive Strength: 4,500 psi minimum at 28 days.
   2. Total Air Content: Not less than 4 percent nor more than 6 percent.

C. Where precast structures are made up of various precast components such as base sections, riser sections and top sections, the joint between sections shall be watertight and be the tongue and groove type complying with AWWA C302.

D. Walls shall be precast with wall pipes or with pipe sleeves with water stop suitable for use with mechanical link seal as shown on the Drawings.

E. Precast structure shall be designed and constructed to accept access hatches or castings as shown and specified.

F. Precast structures shall be designed to support the weight of equipment lifted from the station to the top slab.

G. Underground precast units shall have a shop-applied coal tar epoxy applied to the exterior surface.

H. Lifting holes, if used, shall be tapered. Tapered, solid rubber plugs shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by plugs driven from the outside face only.

I. Mark date of manufacture and name of trademark of manufacturer on inside of barrel.

2.2 ACCESS HATCHES AND CASTINGS

A. All necessary access hatches and castings as shown and specified shall be cast into concrete as necessary.

2.3 SHOP TESTING

A. Shop Tests:
   1. At a minimum, conduct the following shop tests:
      a. Conduct concrete cylinder strength tests. Cylinders shall be cured in the same manner as the precast structures. Collect a minimum of five test cylinders from every 50 cubic yards of concrete poured at a minimum.

PART 3 – EXECUTION

3.1 INSPECTION

A. CONTRACTOR and his installer shall examine the substrate and the conditions under which Work is to be performed and notify OWNER of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to OWNER.

3.2 INSTALLATION

A. Set units in true alignment. All joints shall be sealed with cement mortar inside and out and troweled smooth to the contour of the wall surface. Raised or rough joint finishes will not be accepted.

B. Precast structures shall be set on a crushed stone, crushed gravel, or concrete foundation as shown on drawings and in accordance with geotechnical recommendations. Precast units shall be set at the proper grade and carefully leveled and aligned.

C. Install units in accordance with manufacturer's recommendations.

D. Replace precast concrete units damaged for any reason or which fail to perform as specified.

3.3 ATTACHMENTS

A. Attachments listed below, following the "End of Section" designation, are part of this Specification section.
   1. Attachment A, Professional Design Services Performance Certification.

+ + END OF SECTION + +

ATTACHMENT A

Professional Design Services Performance Certification

1. My name is _____.

2. My New York state professional engineering license number is _____ .

3. My license expires _____, 20___.

4. The Project for which I have performed professional design services is described as _____.

5. The Specification Section(s) under which I have performed my services is/are _____.

6. The name and address of the individual or entity for whom I have performed my professional design services is:

_____

_____

_____

ATTACHMENT A (continued)

Professional Design Services Performance Certification (cont'd)

7. I hereby certify that, to the best of my knowledge, information and belief, I have performed or supervised the performance of the professional design services hereunder, and that said services have been performed in accordance with all applicable local, state and federal codes, rules and regulations and in accordance with the standard of care currently expected of professional engineers/architects performing similar services for projects of similar size and complexity in theState of New York.

_____
Signature

_____
Typed or Printed Name

_____
Name of Firm

_____
Street Address

[SEAL] _____
City/State/Zip Code

Telephone: _____

Fax: _____

SECTION 26 29 23

LOW-VOLTAGE VARIABLE FREQUENCY DRIVES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment, services, and incidentals as shown, specified, and required to furnish and install low-voltage variable frequency drives, complete and operational.
   2. Variable frequency drives required under this Section are low-voltage, voltage source inverter, pulse width modulated. Variable frequency drives shall be customized.
   3. Low-voltage variable frequency drives included in this Section are associated with equipment as indicated on the drawings

B. Related Sections:
   1. Section 26 05 29, Hangers and Supports for Electrical Systems.
   2. Section 26 05 53, Identification for Electrical Systems.
   3. Section 26 43 00, Surge Protective Devices.
   4. Section 43 21 13.12 Centrifugal End Suction Pumps Dry Pit (HLPs in PGTB).
   5. Section 43 21 13.23 Centrifugal Axial Split Case Pumps (GFPs in Head House).

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. IEEE 519, Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.
   2. ISO 9000, Quality Management Systems, Fundamentals and Vocabulary.
   3. ISO 9001, Quality Management Systems, Requirements.
   4. ISO 9002, Quality Systems, Model for Quality Assurance in Production, Installation and Servicing.
   5. NEMA ICS 2, Controllers, Contactors and Overload Relays Rated 600 Volts.
   6. NEMA ICS 7, Industrial Control and Systems Adjustable Speed Drives.
   7. NEMA MG 1, Motor and Generators.
   8. UL 489, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures.
   9. UL 508, Industrial Control Equipment.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer:
      a. Low-voltage variable frequency drive manufacturer shall have not less than five years of experience designing and regularly manufacturing and servicing substantially similar equipment to that required, and upon ENGINEER's request shall submit documentation of not less than five installations in satisfactory operation for not less than five years each.
      b. Manufacturer shall be certified under ISO 9000, ISO 9001, or ISO 9002 for materials and equipment specified.
      c. For all required factory tests, low-voltage variable frequency drive manufacturer shall use a factory test facility that has calibrated its testing apparatus in the previous twelve months, and is staffed by qualified, experienced technicians.

B. Component Supply and Compatibility:
   1. Drives specified under this Section employ a low switching frequency or pattern to minimize instantaneous rate of voltage change over time (dv/dt), and the adverse effects of potential bearing currents. Where alternate manufacturers are proposed, obtain manufacturer recommendations regarding bearing currents and provide equipment required at no additional cost to DEPARTMENT.
   2. Each low-voltage variable frequency drive shall be fully compatible with associated driven equipment and motors. Variable frequency drives shall be matched to specific load requirements for each system. Operation of variable frequency drive shall not overstress motor insulation.
   3. To centralize responsibility and to ensure that all equipment is properly coordinated, variable drives specified under this Section shall be obtained from the Supplier of the associated driven equipment.
   4. Similar components of drives associated with each system shall be products of a single manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Dimensional information and construction details of enclosures. Enclosure details shall consist of exterior and interior front door with nameplate legends, interior door front and rear views, and terminal block layout.
      b. Three-line power and control schematic diagrams.
      c. Wiring diagrams showing the interconnection of conductors to all devices with terminal assignments for remote devices.
      d. Functional description of system operation.
      e. VFD heat dissipation at full load, including heat rejection/cooling system.

f. Certification of VFD IEEE 519 compliance.

2. Product Data:
   a. Manufacturer's technical specifications.
   b. Manufacturer's catalog cuts and product literature.
3. Testing Plans:
   a. Not less than thirty days prior to source quality control testing, submit descriptions of proposed shop testing methods, procedures, apparatus, and limitations.
   b. Not less than thirty days prior to field quality control testing, submit descriptions of proposed field testing methods, procedures, and apparatus.

B. Informational Submittals: Submit the following:
1. Certificates:
   a. Certification letters from low-voltage variable frequency drive manufacturer and motor manufacturer that the approved driven equipment has been reviewed and that variable frequency drive units and motors are compatible, and shall be provided in accordance with the Contract Documents and requirements of the driven equipment.
2. Source Quality Control Submittals:
   a. Within five days of completing source quality control tests and inspections, submit test results with indication of whether all criteria of the Contract Documents for the specified equipment were met.
3. Field Quality Control Submittals:
   a. Within five days of completing field quality control tests and inspections, submit test results with indication of whether all criteria of the Contract Documents for the specified equipment were met.
4. Manufacturer Reports:
   a. Within five days of each visit to the Site by manufacturer's representative, submit written report of reason for visit, problems encountered, solutions implemented, and remaining work.
5. Qualifications Statements:
   a. Manufacturer, when requested by ENGINEER.

C. Closeout Submittals: Submit the following:
1. Operation and Maintenance Data:
   a. Submit complete installation, operation and maintenance manuals including test reports, maintenance data and schedules, description of operation, list of recommended spare parts, and spare parts ordering information.
   b. Manuals shall include record drawings of control schematics, including point-to-point wiring diagrams.
   c. Include a listing of all programmable drive parameters and their settings at Substantial Completion. Submit parameters as both printed pages in the operations and maintenance manual and in electronic format on compact disc that can be directly uploaded to the drive in event of drive replacement or repair.
   d. Comply with Section 01 78 23, Operations and Maintenance Data.

D. Maintenance Materials Submittals: Submit the following:
   1. Spare Parts and Extra Stock Materials:
      a. Furnish, tag, and box for shipment and long-term storage spare parts and special tools for low-voltage variable frequency drives. Each set of spare parts and tools shall include manufacturer's recommended spare parts inventory for one year and include, at minimum, the following:

Item	Quantity per Four VFDs per HP Rating
1) Transistor and diode modules with accessories	One set
2) Power supply module	One
3) Fans	One set
4) Power fuses	One set of each size and type used
5) Control power fuses	Two sets of each size and type used
6) Pilot lights	Two per ten of each type used

      b. Furnish a list of recommended spare parts for an operating period of one year. Describe each part, the quantity recommended, and current unit price.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading:
   1. Packing:
      a. Inspect prior to packing to ensure that assemblies and components are complete and undamaged.
      b. Protect mating connections.
      c. Cover all openings into enclosures with-vapor inhibiting, water-repellent material.
      d. Indoor containers shall be bolted to skids.
   2. Upon delivery, check materials and equipment for evidence of water that may have entered equipment during transit.
   3. Handling:
      a. Lift, roll or jack low-voltage variable frequency drive equipment into locations shown.
      b. Variable frequency drives shall be equipped for handling required for installation. Handle equipment in accordance with manufacturer’s requirements.

B. Storage and Protection:
   1. Store low-voltage variable frequency drive equipment in a clean, dry location with controls for uniform temperature and humidity. Protect equipment with coverings and maintain environmental controls.

PART 2 – PRODUCTS

2.1 EQUIPMENT PERFORMANCE

A. System Performance:
   1. Driven equipment to be controlled by a low-voltage variable frequency drive shall be provided with a customized variable frequency drive. Each drive unit shall include an adjustable frequency controller with associated controls for continuous speed adjustment and protection of the driven equipment. Output speed control of motor shall be continuous throughout speed range of two to 60 Hertz under variable torque load or constant torque as specified for the driven equipment.
   2. Low-voltage variable frequency drives associated with each set of driven equipment shall be similar to each other.
   3. Variable frequency drives shall be UL-listed or ETL-listed and designed, built, and tested in accordance with UL 489, NEMA ICS 2, NEMA ICS 7, and UL 508.

2.2 MANUFACTURERS

A. Provide low-voltage variable frequency drives by one of the following:
   1. Allen Bradley, Inc.
   2. Siemens-Robicon Corporation
   3. ABB.
   4. Or equal.

2.3 ENCLOSURE

A. Provide each low-voltage variable frequency drive with freestanding, front-access, NEMA 12, filtered and gasketed enclosure. Enclosure shall house all components required for the associated variable frequency drive.

B. Enclosure shall provide adequate cooling for components within and include positive ventilation.

C. Enclosure door shall include an operator interface for access to controller's digital keypad and display.

D. Equip enclosure front with nameplates for identification of equipment and operating functions. Nameplates shall be in accordance with Section 26 05 53, Identification for Electrical Systems.

E. Equip enclosure with phenolic type terminal blocks suitably labeled for all internal and remote wiring requirements, plus twenty percent spare.

2.4 ADJUSTABLE FREQUENCY CONTROLLER

A. General:
   1. Adjustable frequency controller shall be microprocessor-based, pulse width modulated design, suitable for operation on a 480-volt, three-phase supply. Controller shall produce an adjustable AC voltage/frequency output to vary speed of driven equipment. Controller shall consist of the following sections:
      a. Switched Insulated Gate Bi-Polar Transistor (IGBT) bridge converter input section (Active Front End).
      b. Fixed DC bus section.
      c. Six-pulse power transistor inverter output section.
   2. Controller switching frequency shall be adjustable and allow operation at 5,000 Hertz or less. Controller technology shall include a switching scheme that reduces the dv/dt of output supply.
   3. Equip controller with a three-percent DC bus reactor and input line reactor.
   4. Controller's solid state converter input section switching devices shall have 1600 volt PIV rating.
   5. Overload rating of 110 percent variable torque, 150 percent constant torque for one minute.
   6. RMS harmonic content of output current shall be less than five percent of fundamental current.
   7. Able to withstand output terminal line-to-line short circuits without component failure.

B. Operating Criteria:
   1. Operating criteria shall be in accordance with the following:
      a. Ambient temperature range of zero to 40 degrees C.
      b. Operational humidity of up to 90 percent non-condensing.
      c. Altitude up to 3,300 feet above sea level.
      d. Nominal voltage of 480-volts plus or minus ten percent, three-phase, three-wire. Include an under-voltage feature to allow trip-free operation down to 35 percent under-voltage.
      e. Nominal frequency of 60 Hertz plus or minus three Hertz.
      f. Input power factor of 95 percent displacement power factor at all operating speeds.
      g. Efficiency of 96 percent at full speed and full load.

C. Features:
   1. Controller shall have the following features:
      a. Digital keypad and display module shall provide parameter setting, adjustments, and monitoring of control functions and faults. Display messages shall be in English.
      b. Serial communication port shall allow connecting to programmable controller interface using manufacturer standard protocol.
      c. Independent acceleration/deceleration rates shall provide two to 600 seconds minimum. When called to stop, motor shall decelerate to minimum speed before stopping.

d. Power loss feature shall allow five cycle ride through capability for input supply interruptions.
e. Time delay automatic restart shall allow restart after controller fault conditions with programmable attempts.
f. Coasting motor restart shall allow controller to restart into a coasting motor without damage or tripping. Coasting motor restart feature shall allow switching from bypass mode to low-voltage variable frequency drive mode while operating, without shutdown.
g. Isolated control inputs and outputs.

D. Protection:
1. Controller shall have protective functions as follows:
a. Input line metal oxide varistor transient surge protective device in compliance with Section 26 43 00.
b. Electronic over-current trip instantaneous and inverse time overload protection with thermal memory retention.
c. Over-temperature trip temperature protection.
d. Current limit trip protection.
e. Input line over- and under-voltage trip protection.

2.7 CONTROLS

A. General:
1. Equip each low-voltage variable frequency drive control system with relays, switches, fuses, indicating lights, and components required for a complete, functional system.
2. Variable frequency drive control shall be powered from a suitably sized and protected control power transformer.
3. Variable frequency drive control shall include status indicators, controller, and system fault condition displays and operating controls. Provide status indicators and operating controls associated with drive control on front door of enclosure.
4. Control arrangement shall be such that variable frequency drive internal electronic supply voltage is isolated from field wiring.

B. Control and Pilot Devices:
1. Relays shall be standard, latching type, and pneumatic or solid state time delay type. Provide relays with contacts rated ten amps, quantity as required.
2. Pilot devices shall be heavy duty type, rated 10 amps continuous. Indicating lights shall be push-to-test transformer type with 12-volt secondaries.

C. Operation:
1. Controls for each low-voltage variable frequency drive shall consist of all devices necessary for the following:
a. Stop/Start and Speed Control: Stop/start and speed control shall respond to drive-mounted selector switch. With switch in “REMOTE” position, stop/start and speed control shall be based on a stop/start

contact and four- to 20-mADC speed signal from remote process control panel. With switch in "LOCAL" position, stop/start control shall be based on remote stop/start pushbuttons located adjacent to driven equipment, and speed control shall be based on drive-mounted speed potentiometer.

b. Emergency Stop Control: Emergency stop control shall respond to remote stop pushbutton located adjacent to driven equipment. When activated driven equipment shall stop immediately in all operating modes.

c. Motor Over-temperature Shutdown: Motor over-temperature control shall respond to remote contact that activates on motor over-temperature. When over-temperature is detected, driven equipment shall stop. Include provisions to remotely supply 120-volt power to thermistor control module located at motor.

d. Discharge Pressure Shutdown: Pressure control shall respond to a remote discharge pressure switch. When high pressure is detected, driven equipment shall stop after an adjustable time delay.

e. Seal water control (required for pumps and other equipment that require seal water): Seal water control shall include provisions to supply 120-volt power to remote seal water solenoid. Seal water solenoid shall energize when equipment requiring seal water is enabled. Equipment requiring seal water start shall be delayed until remote-located pressure switch verifies seal water flow. Upon loss of seal water, after an adjustable period of time, an alarm shall be initiated but equipment requiring seal water shall not shut down. When equipment requiring seal water is stopped, seal water solenoid shall remain energized for an adjustable period of time.

f. Motor Space Heater Control: Motor space heater control shall energize remote motor's internal heater when driven equipment is stopped. Include provisions to supply 120-volt power to heater.

D. Auxiliary Features:

1. Provide each low-voltage variable frequency drive with the following:

a. Status Indicators: Status indicators shall include separate pilot lights for indication of motor run (red), and bypass mode (blue).

b. Shutdown Indicators: Shutdown indicators shall include separate pilot lights (amber) for each shutdown condition. Arrange shutdown indication circuitry so that, when activated, indicator requires manual reset.

c. Contact Outputs: Contact outputs shall include separate dry contacts for remote indication of motor run, seal water alarm for equipment with seal water systems, each shutdown condition, and controller faults.

d. Speed Output: Speed output shall include four- to 20-mADC signal for remote indication of motor speed.E. Wiring and Device Identification:

1. Provide control wiring and device identification for each low-voltage variable frequency drive:

a. Identify all control conductors with permanent type wire markers. Each wire shall be identified by a unique number and shall be attached to wire at each termination point.
b. Identify each control device with permanent type marker. Each device shall be identified by a unique number and shall be attached to each device.
c. Numbering system for each wire and control device shall be identified on wiring diagrams and shall reflect actual designations used in the Work.

2.8 SOURCE QUALITY CONTROL

A. Tests:
1. Perform factory tests on each low-voltage variable frequency drive prior to shipping. Tests shall consist of simulating expected load to be driven by operating load through speed ranges specified for driven equipment, for minimum of two hours per drive unit.
2. Provide factory control and alarm tests on each drive unit by simulating each control signal and each alarm function to verify proper and correct drive unit action.
3. Perform specified tests in addition to standard factory tests typically performed.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine conditions under which the Work will be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install equipment in accordance with manufacturer's recommendations and instructions and in conformance with Laws and Regulations, and the Contract Documents.

B. Unless otherwise shown or indicated, install equipment on concrete bases Section 26 05 29 Hangers and Supports for Electrical Systems.

C. Install equipment with sufficient access and working space provided for ready and safe operation and maintenance.

D. For installations against masonry walls, provide an insulation board, 1/4-inch minimum thickness, between equipment and wall for corrosion protection. Trim board neatly within outline of equipment.

E. Install all terminations, lugs, and required appurtenances necessary to properly terminate power supplies.

F. Install control wiring terminations and appurtenances necessary to complete installing control and monitoring devices.

G. Immediately prior to Substantial Completion, replace all enclosure filters and frames provided under this Contract with new filters and frames, except expanded metal filter types. Immediately prior to Substantial Completion, clean expanded metal filters.

3.3 FIELD QUALITY CONTROL

A. Site Tests:
   1. After installation, inspect, adjust, and test each low-voltage variable frequency drive at the Site. Testing and inspection shall be in accordance with manufacturer's recommendations and be performed by manufacturer's factory-trained representative. Through CONTRACTOR, manufacturer's factory-trained representative shall inform DEPARTMENT and ENGINEER when equipment is correctly installed and ready to be energized. Do not energize equipment without permission of ENGINEER.
   2. Perform the following equipment inspection and testing and provide reports documenting procedures and results.
      a. Verify all device settings and drive adjustments.
      b. Inspect all mechanical and electrical interlocks and controls for proper operation.
      c. Test each drive through specified speed ranges and loads for a minimum of two hours per drive unit.
      d. Test each drive by using actual control signal for remote and local operation.
      e. Test each drive alarm function.
      f. Perform other tests recommended by equipment manufacturer.

B. Manufacturer Services:
   1. Unloading and Installation: Manufacturer's factory-trained representative shall be present during unloading of equipment and installation at equipment's final location. Representative shall train installing personnel in advance in the proper handling and rigging of equipment. Services by manufacturer's representative under this paragraph shall be at least 1 eight-hour day at the Site.
   2. Post-installation Check: Manufacturer's factory-trained representative shall check and approve the installed equipment before initial operation. Manufacturer shall calibrate, set and program low-voltage variable frequency drives provided. Services by manufacturer's representative under this paragraph shall be at least 1 eight-hour day at the Site.
   3. Manufacturer's factory-trained representative shall adjust the system to final settings as specified in Article 3.5 of this Section.
   4. Manufacturer's factory-trained representative shall test the system as

specified in Paragraph 3.3.A of this Section. Representative shall operate and test the system in presence of ENGINEER and verify that equipment is in conformance with the Contract Documents. Services by manufacturer's representative under this paragraph shall be at least 1 eight-hour day at the Site.

5. Representative shall revisit the Site as often as necessary until all deficiencies are corrected, prior to readiness for final payment.
6. Provide services of manufacturer's factory-trained representatives to correct defective Work within 72 hours of notification by CITY during the correction period specified in the General Conditions as may be amended by the Supplementary Conditions.
7. Replacement parts or equipment provided during the correction period shall be equal to or better than original.
8. Training: Provide services of qualified factory trained specialists from manufacturer to instruct CITY's operations and maintenance personnel in recommended operation and maintenance of equipment. Training requirements, duration of instruction, and other qualifications shall be in accordance with Section 01 79 23, Instruction of Operations and Maintenance Personnel.

3.4 ADJUSTING

A. Immediately prior to Substantial Completion, when testing is acceptably completed and low-voltage variable frequency drives are operating, manufacturer's representative shall return to the Site and make final adjustments as required to each variable frequency drive furnished under this Section.

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SECTION 40 60 05

INSTRUMENTATION AND CONTROL

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope
   1. CONTRACTOR shall retain services of a System Integrator to provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish, install, calibrate, train, test, start-up, and place in satisfactory operation a complete and operating instrumentation and control system in accordance with the Contract Documents. The DEPARTMENT furnished GAC Contactor System will be furnished with field instruments that shall be installed and integrated by the CONTRACTOR.
   2. CONTRACTOR shall assign PLC Input/Output (I/O) tags using the Contract tag numbers.
   3. Work includes, but is not limited to, the following:
      a. Installation of GAC Control Panel (GAC-CP) including configuration of GAC PLC and OIT.
      b. Installation of new GAC Contactor System field instruments and interfacing the signals identified in the contract documents with GAC Control Panel.
      c. Configuration of Remote OIT panel.
      d. GAC Feed Pumps and High Lift Pumps controls.
      e. Installation of Head House Control Panel (HH-CP) including configuration of HH PLC and OIT.
      f. Configuration of Remote OIT panel.
      g. Providing all the field instruments, with the exception of Vendor supplied, and supervision of the installation of all instruments.
      h. Intercept Existing Clearwell No. 3 Level signal and loop to new panel. The System Integrator shall coordinate with the plant to ensure all existing signals/communications and functionality of the existing controls are maintained after the signal is split.
      i. Intercept Exsiting 1.2 MG Tank Level signal and loop to new panel. The System Integrator shall coordinate with the plant to ensure all existing signals/communications and functionality of the existing controls are maintained after the signal is split.
      j. Chemical Analyzer Monitoring System with online Chlorine, Fluoride, Phosphate and pH monitoring. Flow pacing of the chemical pumps.
      k. All work as shown and as described in the Contract Documents.

B. Abbreviations:
   1. PLC: Programmable Logic Controller

2. OIT: Operator Interface Terminal
3. R-OIT: Remote Operator Interface Terminal
4. GAC: Granular Activated Carbon
5. HH: Head House
6. VFD: Variable Frequency Drive

1.2 REFERENCES

A. The following organizations have generated standards that are to be used as guides in assuring quality and reliability of components and systems; govern nomenclature; define parameters of configuration and construction, in addition to specific details in this Specification and the Contract Drawings:
   1. ISA, International Society of Automation.
   2. API, American Petroleum Institute.
   3. UL, Underwriters' Laboratories, Inc.
   4. AWWA, American Water Works Association.
   5. NRC, Nuclear Regulatory Commission.
   6. NEMA, National Electrical Manufacturers Association.
   7. OSHA, Occupational Safety and Health Administration.
   8. ANSI, American National Standards Institute.
   9. NFPA, National Fire Protection Association.
   10. SAMA, Scientific Apparatus Manufacturers Association.
   11. IEEE, Institute of Electrical and Electronic Engineers.
   12. NEC, National Electrical Code.
   13. FM, Factory Mutual.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. System Integrator:
      a. Shall be financially sound with at least five years' continuous experience in designing, implementing, supplying, and supporting instrumentation and control systems comparable to the instrumentation and control systems required for the Project, relative to hardware, software, cost, and complexity.
      b. Shall have record of successful instrumentation and control system equipment installations. Upon Engineer's request, submit record of experience listing for each project: project name and contact information, name and contact information for CONTRACTOR, name and contact information for engineer or architect, approximate contract value of instrumentation and controls Work for which Instrumentation Supplier was responsible.
      c. Shall have at time of Bid experienced engineering and technical staff capable of designing, supplying, implementing, and supporting the instrument and control system and complying with submittal and training requirements of the Contract Documents.

d. Shall be capable of training operations and maintenance personnel in instrumentation and control applications, and in operating, programming, and maintaining the control system and equipment. Shall have UL-approved panel shop.

B. Manufacturer:

a. Manufacturers of instrumentation and control equipment furnished under this Section shall be experienced producing similar equipment and shall have the following qualifications:
   1) Shall manufacture instrumentation and control system components that are fully-developed, field-proven, and of standardized designs.
   2) Shall have system of traceability of manufactured unit through production and testing in accordance with ANSI/ASQ Z1.4.
   3) Shall have guaranteed availability clause (99.99 percent, minimum for one year) for microprocessor-based components and appurtenances.
   4) Shall have documented product safety policy relevant to products proposed for the Work.

C. Pre-submittal Conference
1. Schedule and conduct pre-submittal conference for instrumentation and control system within 30 days after Notice to Proceed.
2. Required attendance for pre-submittal conference: CONTRACTOR, Systems Integrator, GAC CONTACTOR SYSTEM MANUFACTURER, ENGINEER, and DEPARTMENT. Pre-submittal conference will be 4 hours. Conference will be held at the Site.
3. Purpose of pre-submittal conference is to review manner in which CONTRACTOR intends to comply with requirements of the Contract Documents before submittals are prepared.
4. Prepare items listed below for presentation at pre-submittal conference. Submit information to ENGINEER two weeks prior to pre-submittal conference.
   a. List of materials and equipment required for instrumentation and control system, and brand and model proposed for each item.
   b. List of proposed exceptions to the Contract Documents along with brief explanation of each.
   c. Sample of each type of submittal specified in this Section. These may be submittals prepared for other projects.
   d. Flow chart showing steps to be taken in preparing and coordinating instrumentation and control system submittals.
   e. General outline of types of tests to be performed to verify that all sensors and transducers, instruments, and digital processing equipment are functioning properly.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Field Instruments:
         1) Manufacturer's product name and complete model number of devices proposed for use, including manufacturer's name and address.
         2) Instrument tag number in accordance with the Contract Documents.
         3) Data sheets and manufacturer's catalog literature. Provide data sheets in accordance with ISA 20 and annotated for features proposed for use. For instruments not included in ISA 20, submit data sheets using a format similar to ISA 20.
         4) Description of construction features.
         5) Performance and operation data.
         6) Installation, mounting, and calibration details; instructions and recommendations.
         7) Service requirements.
         8) Dimensions of instruments and details of mating flanges and locations of closed tanks, pipe sizes for insertion instruments, and upstream/downstream straight run pipe lengths required.
         9) Range of each device and calibration information.
         10) Descriptions of materials of construction and listing of NEMA ratings for equipment.
      b. Panels and Enclosures:
         1) Layout drawings that include:
            a) Front, rear, and internal panel views to scale.
            b) Tag number and functional name of components mounted in and on panel, or enclosure, as applicable.
            c) Product information on panel components.
            d) Nameplate location and legend including text, letter size and colors to be used.
            e) Location of anchorage connections.
            f) Location of external wiring and piping connections.
            g) Mounting and installation details, coordinated with actual application.
            h) Calculations for heating and cooling of panels.
            i) Subpanel layouts and mounting details for items located inside control panels.
         2) Product information on panel components including:
            a) Manufacturer's product name and complete model number of devices being provided, including manufacturer's name and address.
            b) Instrument tag number in accordance with the Contract Documents.

c) Data sheets and catalog literature. Submit data sheets in ISA 20 Format and annotated for features proposed for use.
d) Description of construction features.
e) Performance and operation data.
f) Installation, mounting, and calibration details; instructions and recommendations.
g) Service requirements.

3) Wiring and piping diagrams, including the following:
a) Name of each panel, or enclosure.
b) Wire sizes and types.
c) Pipe sizes and types.
d) Terminal strip and terminal numbers.
e) Wire color coding.
f) Functional name and manufacturer's designation for components to which wiring and piping are connected.
g) Lightning and surge protection grounding.

4) Electrical control schematics in accordance with NFPA 79. Drawings shall be in accordance with convention indicated in Annex D of the NFPA 79. Typical wiring diagrams that do not accurately reflect actual wiring to be furnished are unacceptable. Tables or charts for describing wire numbers are unacceptable.

5) Bill of materials for each panel including tag number, functional name, manufacturer's name, model number and quantity for components mounted in or on the panel or enclosure.

6) Detail showing anchorage plan of wire bundles between subpanels and front panel mounted devices.

c. Chemical Monitoring System, include the following:
1) Provide complete shop drawings as a packaged Chemical Monitoring System based on the schematic shown in the Contract Documents for ENGINEER approval.

d. Field wiring and piping diagrams, include the following:
1) Wire and pipe sizes and types.
2) Terminal numbers at field devices and in panels.
3) Fiber optic termination designations in the field and in panels.
4) Color coding.
5) Conduit numbers in which wiring will be located.
6) Locations, functional names, and manufacturer's designations of items to which wiring or piping are connected.

e. Functional Description, include the following:
1) Detailed functional descriptions for all the equipment provided under this contract.

f. Proposed operator interface graphics layouts are shared by all three screens. Each graphic display layout will be subject to modification from System Integrator's submitted format within limits of software package used for development. Implement such modifications in accordance with ENGINEER's comments. Provide at minimum one

meeting where screens can be reviewed live (over Web) or in person prior to approval.

g. Complete point-to-point interconnection wiring diagrams of field wiring associated with the system. Diagrams shall include the following:
   1) Field wiring between each equipment item, panel, instruments, and other devices, and wiring to control stations, panel boards, and motor starters. Some of this equipment may be specified in other Sections, CONTRACTOR is responsible for providing complete point-to-point interconnection wiring diagrams for control and monitoring of that equipment.
   2) Numbered terminal block and terminal identification for each wire termination.
   3) Identification of assigned wire numbers for interconnections. Assign each wire a unique number.
   4) Schedule showing the wiring numbers and the conduit number in which the numbered wire is installed.
   5) Junction and pull boxes through which wiring will be routed.
   6) Identification of equipment in accordance with the Contract Documents.

B. Informational Submittals: Submit the following:
   1. Manufacturer's Instructions:
      a. Shipping, handling, storage, installation, and start-up instructions.
   2. Special Procedure Submittals:
      a. Submit notification to ENGINEER at least 14 days before readiness to begin system checkout. Schedule system checkout on dates agreed to by ENGINEER.
      b. Submit written procedure for system checkout to ENGINEER one months prior to starting system checkout. Two months prior to starting system checkout submit written procedure for start-up to ENGINEER.
   3. Field Quality Control Submittals:
      a. Submit the following prior to commencing system checkout and start-up.
         1) Completed calibration sheets for each installed instrument showing five-point calibration (0, 25, 50, 75, 100 percent of span), signed by factory-authorized serviceman.
      b. Field calibration reports.
      c. Field testing reports.
   4. Reports:
      a. Installation inspection and check-out report.
      b. Submit written report of results of each visit to Site including purpose and time of visit, tasks performed, and results obtained. Submit within two days of completion of visit to the Site.
   5. Qualifications Statements:
      a. Systems Integrator, when required by ENGINEER.

b. Manufacturer, when required by ENGINEER.

C. Closeout Submittals: Submit the following:
1. Operations and Maintenance Data:
a. Submit in accordance with Contract requirements.
b. Include acceptable test reports, maintenance data and schedules, description of operation, wiring diagrams, and list of spare parts recommended for one year of operation with current price list.
c. Shall include Name, address and telephone number of the control panel supplier and local service representative.
d. Complete list of supplied system hardware parts with full model numbers referred to system part designations, including spare parts and test equipment provided.
e. Revise all system Shop Drawing submittals including any revised controls to reflect as-built conditions in accordance with the following.
1) Two copies of each revised Shop Drawings and documentation to replace outdated drawings and documentation contained in operation and maintenance manuals. Submit half-size black line drawings for each drawing larger than 11 inches by 17 inches. Include specific instructions for outdated drawing removal and replacement with record documents submittal.
2) Half-size black line prints of wiring diagrams applicable to each control panel shall be placed in clear plastic envelopes and stored in a suitable print pocket or container inside each control panel.
3) Submit CADD drawings of the point-to-point interconnection wiring diagrams updated to reflect final as-built equipment information and as-installed field installation information.
f. Manufacturer's Original Copies of Hardware, Software and Installation, Assembly and Operations Manuals for all control system components. Manuals shall include the following information:
1) Include complete up-to-date system software documentation. Provide hardcopy and electronic copies.
2) General descriptive information covering the basic features of the equipment.
3) Physical description covering layout and installation requirements and all environmental constraints.
4) Functional and operational descriptions covering the procedures for programming, operation, start up, shutdown, and calibration of the control system equipment and explaining how the various control functions are performed.
5) Principles of operation explaining the logic of operation; provide information covering operation to a component level.
6) Maintenance procedures covering checkout, troubleshooting, and servicing; checkout procedures shall provide the means to verify the satisfactory operation of equipment, troubleshooting procedures shall serve as a guide in determining faulty components and

servicing procedure shall cover requirements and recommended time schedule for calibration, cleaning, lubrication and other housekeeping and preventive maintenance procedures.

7) Wiring, schematic and logic diagrams.
8) Safety considerations relating to operation and maintenance procedures.

D. ISA data sheets
   1. ISA Data Sheets shall comply with ISA–TR20.00.01–2001 requirements and shall be computer generated.
   2. All field and panel instruments ISA Data Sheets shall contain the following information, as a minimum.
      a. Tag number per the Specifications and Contract Drawings.
      b. Product (item) name used herein and on the Contract Drawings.
      c. Name of manufacturer or supplier.
      d. Manufacturers complete model number.
      e. Location of the device.
      f. Input output characteristics.
      g. Range, size, and graduations.
      h. Physical size with dimensions, NEMA enclosure classification and mounting details.
      i. Materials of construction of all components.
      j. Instrument or control device sizing calculations, where applicable.
      k. Certified calibration data on all flow metering devices, where applicable.
      l. Environmental requirements during storage and operation.

E. ISA Loop Diagrams: for all analog display, control and I/O loops prepared using ISA standard symbols in accordance with ISA Standard S5.4, include the following:
   1. Instrument tag numbers from Contract Documents.
   2. Functional name of each item.
   3. Manufacturer's model, product, or catalog number for each item.
   4. Location of each item.
   5. Calibrated range of instrument
   6. I/O point address

F. Maintenance Materials Submittals: Submit the following:
   1. Spare Parts:
      a. General:
         1) Provide source quality control for spare parts prior to shipment of instrumentation and control equipment.
         2) For process sensors and other analog instruments, provide manufacturers recommended list of spare parts and test equipment. Separately list each item recommended.
   2. Software:

a. Submit copies of programming and configuration files developed specifically for the Project in accordance with Contract requirements.

1.5 STORAGE AND HANDLING

A. CONTRACTOR shall make all arrangements for transportation, and delivery of the equipment and materials in accordance with the requirements of the Contract Documents, requirements of the System Integrator, and requirements of equipment manufacturers.

B. All hardware shall be packaged at the factory prior to shipment to protect each item from damage during shipment and storage. Containers shall be protected against impact, abrasion, corrosion, discoloration and/or other damages. Clearly label contents of each container and provide information on the required storage conditions necessary for the equipment. Keep ENGINEER and DEPARTMENT informed of equipment delivery.

C. All equipment shall be handled in accordance with manufacturer's instructions and relevant organization standards. Equipment shall be protected from weather, moisture and other conditions which could cause damage. Items which require a controlled environment for storage such as microprocessor units shall be stored in a climate controlled warehouse or facility. Supplier shall notify ENGINEER in writing with copies to DEPARTMENT of the storage requirements and recommendations for the equipment prior to shipment.

1.6 GENERAL DESIGN REQUIREMENTS

A. Power Supplies:
   1. All electrically powered equipment and devices shall be suitable for operation on 115 volt +/- 10 percent, 60 Hz +/- 2 Hz power. If a different voltage or closer regulation are required, a suitable regulator or transformer shall be provided at no additional cost.
   2. Appropriate power supplies shall be furnished by CONTRACTOR for all two wire transmitters. Power supplies shall be mounted in enclosures and installed in the appropriate Control Panels or field panel.
   3. Design all power supplies for a minimum of 130 percent of the maximum simultaneous current draw.
   4. A power on-off switch or an air circuit breaker shall be furnished for each item requiring electrical power.

B. Signal Requirements:
   1. The control system shall be designed to use 4 to 20 mA dc analog signals, unless otherwise specified.
   2. Signal converters and repeaters shall be provided where required. Power supplies shall be sized adequately for signal converter and repeater loads.
   3. Signals shall be isolated from ground.

4. Signals shall not have a transient dc voltage exceeding 300 volts over one millisecond nor a dc component over 300 volts.

C. Miscellaneous:
1. All instrumentation components shall be heavy duty types, designed for continuous service. The system is to contain products of a single manufacturer, when possible, and to consist of equipment models which are currently in production.
2. All equipment provided is to be of modular construction and be capable of field expansion through the installation of plug-in circuit cards and additional cabinets as necessary. Design all logic and control loops to fail safe.
3. System shall consist of equipment models currently in production.
4. Material and equipment, including cabling and interconnections, shall be in accordance with electrical and manufacturer's recommendations, unless indicated otherwise in the Contract Documents.
5. Materials and equipment shall, where applicable, be in accordance with UL standards and be so marked and labeled
6. All instrumentation components shall be designed to return automatically to accurate measurement within 15 seconds upon restoration of power, unless stated otherwise, after a power failure or when transferred to standby power supply.
7. Surge protection shall be provided for all instruments and all other control system components which could be damaged by electrical surges. Lightning arresters shall be provided on both ends of communication lines external to the building, except for Fiberoptic, including leased telephone lines.
8. All field-mounted instruments and system components shall be designed for installation in humid and corrosive service conditions. All field mounted instrument enclosures, junction boxes and appurtenances shall conform to NEMA 4X requirements unless otherwise specified.
9. All relays with interconnections to field devices shall be wired through terminal blocks. Terminals as part of the relay base are not an acceptable alternate.
10. All panel mounted instruments, switches, and other devices shall be selected and arranged to present a pleasing coordinated appearance. All front of panel mounted devices shall be of the same manufacturer and model line.
11. All components furnished, including field and rear of panel instruments, shall be tagged with the item number and nomenclature indicated on the Contract Documents and/or approved Shop Drawings.
12. Coordinate ranges and scales specified in the Contract Documents with manufacturer of the equipment actually furnished for operability over the intended range. Complete the coordination prior to submitting Shop Drawings to ENGINEER.
13. Field-mounted devices shall be treated with an anti-fungus spray.
14. Protect field-mounted devices from exposure to high and freezing temperatures to provide complete operability under the environmental conditions indicated in the Contract Documents.

15. Miscellaneous hardware such as fittings, fasteners, and screws, shall be Type 316 stainless steel or other appropriate material to prevent galvanic reactions, and shall be suitable for service intended. Piping stands shall be provided for fastening instruments as required. Provide threaded pipe stands with flange bolted to slab. Use carbon steel piping and flanges painted in accordance with Contract Documents.
16. Data processing equipment and relays with interconnections to field devices shall be wired through field wiring terminal blocks in the panel. Terminals as part of relay base are unacceptable.
17. Arrange panel-mounted instruments, switches, and other devices ergonomically for functional use and ease of maintenance. Similar types of panel-mounted devices shall be by one same manufacturer and of the same model line.

PART 2 – PRODUCTS

2.1 SYSTEM DESIGN REQUIREMENTS

A. I/I Current Isolator
   1. Provide electrical isolation of current signals without auxiliary supply. Loop-powered without an external power supply to split analog current signals of 4-20 mA into two individual 4-20 mA current signals.
   2. Shall have low internal voltage drop of less than or equal to 2.5 V
   3. Product Manufacturer:
      a. ABB, Phoenix Contact, Rockwell Automation
      b. Or Equal

B. Signal Requirements:
   1. Control system shall use 4 to 20 mA DC analog signals, unless otherwise shown or indicated.
   2. Provide signal converters and repeaters where required. Adequately size power supplies for signal converters and repeater loads.
   3. Isolate signals from ground.
   4. Signals transient DC voltage shall not exceed 300 volts over one millisecond, and shall not have a DC component over 300 volts.
   5. Discrete signals shall use 24 VDC.

C. Surge Protection Requirements:
   1. Provide surge protection to protect electronic instrumentation and control systems from surges propagating along signal and power supply cabling. Protection systems shall be such that the protection level shall not interfere with normal operation, but shall be lower than instrument surge withstand level, and be maintenance-free and self-restoring.
   2. Provide instruments in suitable metallic cases, properly grounded. Ground wires for surge protectors shall be connected to good earth ground and, where practical, run each ground wire individually and insulated from other wires.

Mount protectors within instrument enclosure or in separate junction box compatible with the area designation coupled to the enclosure.

D. Horn
   1. General:
      a. Electronic Audible Horn
      b. Power Supply: 24 VDC
      c. Operating Temperature: 32 to 120 degrees F
      d. Volume: 90 dB at 10 feet minimum; Internal volume control
      e. Enclosure: NEMA 4X
      f. Approved: UL and FM Approved
   2. Manufacturer:
      a. Federal Signal, 350 Vibratone
      b. Or Equal

E. Strobe Light
   1. General:
      a. LED based industrial Beacon, suitable for Dustproof and Weatherproof environment.
      b. Power Supply: 24 VDC
      c. Signal Color: Amber
      d. Operating Temperature: -4 to 113 degrees F
      e. Rating: IP 65 Rated
      f. RoHS Certified
   2. Manufacturer:
      a. Federal Signal, VS-205LED
      b. Or Equal

F. Programmable Logic Controller (PLC)
   1. General:
      a. The PLC shall be configured to perform functions shown and specified.
      b. Provide a dry contact rated at 2 amperes and 120 volts AC for remote indication of processor failure.
      c. PLCs shall be capable of being programmed and updated where installed.
      d. Provide interposing relays for all outputs to motor control centers, solenoids or contactor circuits.
      e. Provide individual fuses for all inputs and outputs. Fuses shall be capable of being inspected without removal of and replaced without disassembly of the module. For individually isolated output modules, front-of-module blown fuse LED status indicators shall be provided for each output point.
   2. Required PLC Features:
      a. Memory: Lithium Battery-backed RAM with minimum retention time of 2 years under worst case conditions, or RAM with EEPROM or NOVRAM backup modules.

b. Provide type and quantity of I/O as required to perform the operational and functional requirements plus 20 percent spare (minimum of one module) for each type of I/O module used. Spare points shall be mounted and wired ready for use and shall require only field wiring connections and software configuration to place the point in service.
c. Operating Temperature: 0 degrees C to 195 degrees C.
d. Power Supply: 24 VDC
e. Data Communications: The PLC shall communicate with the DTAM keypad.
f. PLC Programming Software: Provide one copy of Windows based software, as specified herein, which will provide the ability to develop, document, and maintain ladder logic programs online while directly connected to a processor, or offline on a stand-alone programming terminal. Within five business days prior to the expiration of the Contract, the CONTRACTOR is responsible for upgrading the PLC programming software to the latest version, which includes any new releases and/or patches. The CONTRACTOR shall provide a copy of the latest version of the software to the DEPARTMENT.

3. PLC Manufacturer and Product: Provide the following:
   a. PLC Hardware: Compactlogix Series Processor, as manufactured by Allen-Bradley or Equal.
   b. PLC Software: Provide latest version of RSLogix Studio Programming Software and license as supplied by Allen-Bradley, or equal.

G. Operator Interface Terminal (OIT)
1. System Integrator shall provide three programmable Operator Interface Terminal (OIT), listed below, to enable Operator to control and monitor all equipment. All OIT units shall be flush panel mounted on the front of the panel. OIT units shall be provided with all necessary hardware, cables and software to accomplish the interface as specified herein and shown on the Contract Drawings.
   a. List of 3 OIT Units:
      1) GAC Control Panel OIT on GAC-CP
      2) GAC Building Remote OIT (R-OIT) provided with its on enclosure at the shown location as per the Contract Drawings
      3) Head House Control Panel OIT on HH-CP
2. Performance Requirements:
   a. HH-CP and GAC-CP OITs shall be connected to respective panel PLC via Ethernet switch and shall be able to transfer up to twenty-two 64 word blocks each way.
   b. All OITs shall be provided with off-line development software which allows development of graphic picture files, touch screen key files, alarm files, trend files, system configurations, variables, and screen definitions. Provision shall be made to store commonly used symbols and screen definitions.
3. Each OIT shall be provided with the following minimum requirements:

a. Display: 19-inch Flat Panel Monitor, analog touch screen.
b. Field replaceable Backlight.
c. Aspect Ratio: 5:4
d. Memory: Available Flash: 512MB; RAM: 512MB.
e. Communication: Ethernet.
f. Input Voltage: 18 – 30VDC.
g. Power Consumption: 105 VA.
h. Operating Temperature: 0 – 55 degrees Celsius.
i. Humidity: 5 - 90% without condensation.
j. Rating: NEMA 4X, UL-listed.

4. Product and Manufacturer: Provide one of the following:
   a. PanelView Plus 7 Performance, as manufactured by Allen-Bradley
   b. Software: Latest version of configuration software fully licensed.

H. DIN-RAIL Mounted Managed Network Switch

1. General:
   a. Switch shall be managed industrial rated with fiber optic and Ethernet connections..
   b. Managed type switch shall have a full set of management features, including Command Line Interface, SNMP agent, and web interface. In addition, managed switch shall have features to manipulate configurations, such as the ability to modify, backup and restore configurations.
   c. Provide equipment to operate on 115 VAC, single phase, 60-hertz electrical service.
   d. Provide all necessary items for installation, including mounting brackets, interconnecting cables, hardware and appurtenances.
2. Required Features:
   a. Type: Managed, industrial grade switch with Ethernet connections.
   b. Housing: NEMA TS2.
   c. Ports:
      1) Ethernet: Copper ports, 10/100MB, RJ-45. Quantity as require. Minimum four (4) spare ports at the end of the project.
      2) Fiber Optic: Multi-mode fiber-optic connections. Fiber ports shall be compatible with fiber connectors as specified in specification section 40 66 33, Fiber Optic Cable and Appurtenance. Minimum one (1) spare ports shall be available at the end of the project. Quantity of ports required for the cabinets shall be minimum as follows:
      3) Indicators:
         a) Per-port status LED: Link integrity, disabled, activity, speed, full-duplex indications
         b) System-status LED: System, link status, link duplex, link speed, indications.
      4) Provide per unit: One (1) IEC power cord.

5) Management features shall include
   a) Ability to turn particular port range on or off.
   b) Link speed and duplex settings.
   c) Prioritize settings for ports.
   d) MAC filtering and "port security" features to prevent MAC flooding.
   e) 802.1d Spanning Tree protocol.
   f) SNMP monitoring of device and link health.
   g) VLAN settings.
   h) 802.1q trunking.
   i) QoS settings
   j) IGMP snooping and query.
   k) UL 60950-1 Safety certification
   l) Operating Temperature: -40°C to +140°F
   m) Relative Humidity: 5 to 95 % non-condensing
   n) Sized for Din-rail mounting

3. Products and Manufacturers: Provide one of the following;
   a. Cisco IE 3000 Series (with Cisco IEM-3000-8FM expansion module if required to meet the fiber ports count)
   b. Or Equal.

I. Environmental Conditions:
1. Provide control system suitable for continuous operation under the following conditions:
   a. Indoor Instruments:
      1) Ambient Temperature: Zero degrees F to 120 degrees F.
      2) Relative Humidity: 100 percent, maximum.
   b. Outdoor Instruments:
      1) Ambient Temperature: 20 degrees F to 140 degrees F.
      2) Relative Humidity: 100 percent, maximum.
2. Protect outdoor-mounted field instruments from direct sunlight by providing sunshade for instruments. Construct sunshade out of non-corrosive material. Sunshade shall withstand wind velocity of (100) miles per hour.

2.2 PROCESS TAPS, SENSING LINES, AND ACCESSORIES

A. Pressure Tap Sensing Lines and Accessories:
1. For Process Sensing Taps in Ductile Iron, Steel, and Stainless Steel Piping Systems:
   a. Material and Fittings: Type 316 stainless steel pipe, ASTM A312; and threaded fittings and adapters, ASTM A403 or ASTM A778.
   b. Sizes: 1/2-inch diameter minimum for main sensing piping and 1/4-inch diameter gauge and switch connections.
   c. Pressure Rating: Equal to or greater than the applicable system test pressure as specified in the Contract Documents.

d. Accessories:
   1) For applications not requiring diaphragm seals, provide separate 1/2-inch diameter Type 316 stainless steel threaded ball valve for each gauge and switch.
   2) For applications requiring diaphragm seals, provide separate 1/2-inch diameter threaded Type 316 stainless steel ball valve for seal process side shutoff.

2. For Process Sensing Taps in Copper and Thermoplastic Piping Systems:
   a. Pipe Material and Fittings: Use same type of pipe material and fittings as that used in the process piping system. Provide PVC and CPVC piping in accordance with Contract requirements for Thermoplastic Pipe.
   b. Sizes: 1/2-inch diameter minimum for sensing piping and instrument connections.
   c. Pressure Rating: Equal to or greater than the applicable system test pressure as specified in the Contract Documents.
   d. Accessories:
      1) For copper piping system taps with or without seals, provide separate 1/2-inch diameter minimum threaded brass or bronze ball valve for each gauge and switch.
      2) For PVC and CPVC piping systems with or without diaphragm seals, provide separate 1/2-inch diameter threaded ball valve for process sensing line shutoff.

2.3 PANELS

A. General Provisions:
   1. Provide electrical components and devices, support hardware, fasteners, and interconnecting wiring and piping required to provide control panels complete and operational.
   2. Locate and provide hardware so that connections can be easily made and there is ample room for servicing each item.
   3. Prevent movement by adequately supporting and restraining devices and components mounted on or within panel.
   4. Provide panels with sub-panels for installation of all internally mounted hardware.
   5. Provide numbered terminal strips for terminating field wiring and wiring from other panels, unless otherwise shown or indicated.
   6. Provide copper grounding studs for hardware requiring grounding.
   7. Provide the following convenience accessories inside each panel:
      a. One 120 vac, 20-amp duplex, grounding type receptacle.
      b. One 120 vac fluorescent service light fixture with 20-watt lamp and protective plastic shield or appropriate wattage incandescent bulb for panels two feet by two feet and smaller.

c. One 120 vac snap switch, to turn on service light, mounted in outlet box with cover and located so that switch is easily accessible from access door.
d. Service light with switch and duplex receptacle shall have a dedicated circuit breaker.

8. Control of Environment (Except NEMA 7 Panels):
   a. Provide 120 vac thermostatically-controlled fan-driven heater units to maintain stable temperature within enclosure to protect equipment from harmful effects of condensation, corrosion, and low temperatures inside panels.
   b. Provide automatically controlled closed-loop heat exchangers or closed loop air conditioners to maintain temperature inside each enclosure at optimum operating temperature rating of components inside the enclosure.
   c. Each heat exchanger or air conditioner shall have a dedicated, properly sized and -rated circuit breaker.
   d. Submit supporting calculations as part of panel Shop Drawing submittal if panel equipment to comply with specified environmental requirements is proposed to be deleted as unnecessary.
9. Panels to be located in non-hazardous (non-classified) environments shall comply with UL 50 and UL 508A.
10. Panels to be located in hazardous (classified) environments shall comply with UL 698A and UL 2062.
11. Provide panels under this Section with twenty percent additional space requirements for future use. Install nothing in space reserved for future use.
12. CONTRACTOR is responsible for detailed layout and design of panels, in accordance with the Contract Documents. Base cutouts and design on instrument manufacturers' requirements.
13. Lower 12 inches of free standing panels shall be free of devices, including panduits and terminal strips, for ease of installation and maintenance.
14. For front-opening panels, install no device less than three feet above operating floor level, unless otherwise shown or indicated. For rear-opening panels, install no devices on the door.
15. Wire bundles between subpanels and front panel-mounted devices shall be anchored and protected from damage by opening and closing of panel door.
16. Do not locate front panel-mounted devices requiring manipulation by operating personnel, such as pushbuttons, hand switches, controllers, and similar devices, higher than 5.5 feet above finished floor.
17. Panduits located on either side of terminal strips shall have minimum clearance of 1.5 inches between panduit and terminal strip.
18. Provide three-inch high channel base assembly, drilled to mate panel to floor pad.
19. Provide easily-accessible pocket built into panel door to enclose "as built" panel wiring diagrams.
20. Panels shall be UL-listed.

B. Identification:
   1. Provide laminated plastic nameplate for identification of panels. Use self-tapping stainless steel screws for fastening nameplates to panels. When self-tapping screws may degrade panel's NEMA rating, retain NEMA rating intact by using gaskets on each side of panel surface and use retaining plate on the panel back that is same size as nameplate. When gaskets and retaining plate are used, use full-penetration screws with nuts.
   2. Panel identification nameplates shall have 1/2-inch high engraved letters.
   3. Identify front panel-mounted devices with nameplates engraved with functional description of the device. Nameplate engraving shall be in accordance with the identification provided in the Drawings.
   4. Tag electric components and devices mounted within panels with high adhesive labels.
   5. Identify terminal strips with nameplate engraved as "TB-XX" where "XX' is the numerical identification of terminal strip.
   6. Identify terminals within each terminal strip with sequential numbers and wire numbers.
   7. Internal panel wiring shall be color-coded and numerically identified with unique wire numbers affixed at each end of each wire. Color coding shall be in accordance with panel wiring color code table, below:

Panel Wiring Color Code Table

Description	Color
110 VAC panel power before fuses or breakers	Black
Controlled 110 VAC power (e.g., after relay contacts, selector switch contacts, and similar equipment.)	Red
110 VAC power source from devices external to panel	Yellow
110 VAC neutral	White
24 VDC positive power from power supplies	Brown
24 VDC negative power from power supplies	Brown and white trace
Controlled 24 VDC power (e.g., after PLC output contacts, relay contacts, and similar)	Blue
24 VDC positive power from devices external to panel	Orange
24 VDC negative power from devices external to panel	Orange with white trace
24 VDC four to 20 mA DC signal cable	Grey with red positive, clear negative
Grounding wire	Green

C. Panel Construction Features:
   1. Control panels located in non-environmentally controlled areas and outdoor areas shall be rated NEMA 4X and with the following features:
      a. Panels shall be Type 316L stainless steel construction with minimum thickness of 12-gage for all surfaces, except areas requiring reinforcing, with a smooth-brushed finish.
      b. Stainless steel screw clamp assemblies on three sides of each door.
      c. Rolled lip around three sides of door and along top of enclosure opening.
      d. Hasp and staple for padlocking.
      e. Provide clear-plastic, gasketed lockable hinged door to encompass non NEMA 4X front-of-panel devices.
   2. Wall-Mounted Panels:
      a. General: Wall-mounted panels shall comply with applicable features and standards specified in this Section for the associated NEMA-rated panel.
      b. Unless otherwise indicated or approved by ENGINEER, depth of wall mounted panels shall not exceed 18 inches.
      c. Panels may be all stainless steel, fiberglass, polycarbonate, or acrylonitrile butadiene and styrene (ABS).
      d. Provide appropriate size and number of external mounting feet.
      e. Drilled holes or knockouts in back of wall-mounted panels are not allowed.
      f. Provide corrosion-resistant polyester quick release latches (for nonstainless steel panels) or stainless steel screw clamp assemblies (for stainless steel panels).
   3. Remote-Operator Interface (R-OIT) Enclosure
      a. Free-Stand Consoles
         1) Free-stand shall be stainless steel construction.
         2) Seams shall be continuously welded and ground smooth.
         3) Side and back panel(s) shall be fixed in place.
         4) Console shall have front access door. Door shall be removable or hinged. For removable doors, provide stainless steel quick release screws and clamps on three sides. Do not mount devices on doors.
         5) Hardware, including hinge and means of locking, shall be corrosion-resistant.

D. Electrical Systems:
   1. Power Source and Internal Power Distribution:
      a. Provide in the panel, near where incoming power is terminated, nameplate with panel power supply source, type, voltage, and circuit number.
      b. Protect incoming 120 vac power feeds to power the panel by providing lightning and surge arrestors, properly connected to grounds.
      c. Provide panels with internal 120 vac power distribution system with properly-sized and -rated circuit breakers to distribute power. Power not more than six devices from a single breaker. When power supplies are

included in the panel, not more than two power supplies shall be powered from a single breaker. Convenience receptacles and interior panel lights shall have their own breakers. When one or more field instruments require 120 vac power from the panel for instrument power, power not more than three instruments from a given breaker.

d. Provide space for a minimum of two spare breakers in each panel.

2. Electrical Systems:
   a. Internal wiring shall be Type MTW and THW stranded copper wire with thermoplastic insulation rated for 600 volts at 85 degrees C for single conductors, color-coded and labeled with wire identification.
   b. For DC signal wiring, use shielded cable with 18-gage conductors. DC field signal wiring terminal strips shall be capable of handling wires up and including No. 12 size.
   c. For AC power wiring, use No. 12 minimum AWG. For AC signal and control wiring, use No. 16 minimum AWG. For wiring carrying more than 15 amps, use sizes required by the NEC (NFPA 70).
   d. Inside of panels, route DC signal wiring separately from power wiring with minimum separation distance of six inches.
   e. Use covered panduits to route internal panel cables and wiring. Panduits in each section of panel shall be appropriately sized to accommodate the quantity of wires to be routed with a spare capacity of 40 percent.
   f. Install wire troughs inside panels along horizontal or vertical routes to present a neat appearance. Angled runs are unacceptable.
   g. Wiring that is routed without panduits shall be adequately supported and restrained to prevent sagging or other movement. Use of adhesive anchors to support or restrain wiring is unacceptable.
   h. Terminate internal panel wiring using tube, insulated, crimp-on connectors; soldered connectors are unacceptable. use screw type terminal blocks 600-volt rated, mounted on DIN rails. Fused terminal blocks shall have LED blown fuse indication. Terminal blocks for 4-20 mA signals shall be fused and knife disconnect terminal blocks. Terminal strips shall be identified as specified in this section. Identifiers shall be self-stick, plastic tape strips with permanent type, machine printed numbers. Hand-written labels are not acceptable.
   i. Wiring in panels shall be installed such that, if wires are removed from any one device, power will not be disrupted to other devices.
   j. Provide spare terminals equal in number to 20 percent of terminals used for each type of wiring (e.g., DC signal and AC power).
   k. Provide ground terminals to terminate the shield wire of shielded cables. Termination of more than two shielded wires on a single ground terminal is unacceptable.
   l. Provide a single copper bus bar with 5/16-inch diameter copper grounding stud to connect the panel to external ground. Panel's internal grounds shall be terminated to the bus bar.
   m. Where wires pass through panel walls, provide suitable bushings to prevent cutting or abrading of insulation.

n. When DC power or low voltage AC power is required, furnish and install in the panel required power supplies and transformers.
o. Provide complete wiring diagram of "as-built" circuitry enclosed in transparent plastic.

E. Unwitnessed Factory Test (UFT)
1. The CONTRACTOR shall submit information on factory testing procedures to verify that testing shall fulfill the requirements as specified herein. Witnesses by ENGINEER shall not be part of testing. Submittal shall be made at least two months in advance of any scheduled testing and shall include dates of scheduled tests.
2. When the factory tests have been successfully completed, a report shall be submitted to ENGINEER. The equipment shall not be shipped until Notice of Acceptance of the test is received by the CONTRACTOR.
3. Inspection shall include, but not be limited to, the following:
   a. Nameplates and tags.
   b. Wire sizes and color coding.
   c. Terminal block contact ratings and numbers.
   d. Terminal block spares.
   e. Proper wiring practices and grounding.
   f. Enclosure flatness, finish and color.
4. All input/output devices and components shall be tested to verify operability and basic calibration.
5. The testing is to demonstrate the capability of the equipment, interconnections and accessories to perform as specified.
6. The CONTRACTOR shall demonstrate system software functionality and capability is met as specified.
7. The CONTRACTOR shall demonstrate the operation and display of all software based on a simulation of 100 percent of total input/output count, both analog and discrete. Demonstration shall show that the monitoring and control application software associated with the input/output points performs the functions intended.
8. Testing of communication between PLC and OIT shall be included in the Test Procedure to verify data is updated periodically to OIT.
9. Operator Interfaces Terminal (OIT): Prior to the staging and testing of the system, the display environments shall have been configured per the agreed upon display structure, loaded, and data base parameters linked to the specified fields. During this phase of the factory test, the overall display structure shall be tested, including graphic configuration, passwords, security, etc. Navigation amongst screens shall be thoroughly tested. The operation of alarm displays shall also be tested.
10. Report shall be signed by a licensed Professional Engineer (PE) in control systems.

2.4 EQUIPMENT AND PROCESS CONTROL CRITERIA

A. CONTRACTOR shall provide the services to load, configure, develop, test, document and place in satisfactory operation all software associated with the Instrumentation System and all its ancillary devices, as described herein, required by other sections, indicated on the Contract Drawings and as necessary to provide a properly operating and integrated system.

B. In general, the software packages that will be required to configure and develop shall include but shall not be limited to:
   1. New PLC configuration programs as required.
   2. New OIT configuration programs as required.

C. Control Philosophy:
   1. In order to provide the most reliable system of control and monitoring, a distributed approach to programming shall be implemented.
   2. All control logic, loop control, critical alarming and I/O shall be done at the local PLC level.
      a. GAC-CP PLC
      b. HH-CP PLC
   3. OIT workstations shall contain the database for their attached PLCs, and get the rest of the data over the data highway. All of the following OIT workstations shall have the same screen display and control configuration:
      a. GAC-CP OIT
      b. GAC Building Remote OIT (R-OIT)
      c. HH-CP OIT
   4. OIT shall send only valid data to the PLC where it shall be attached until such time as new valid data is made available. A failure of the OIT shall not prevent PLC from continuing to function normally using the last valid data it received.
   5. OITs, PLCs and network components, shall be monitored for failures by the redundancy of components through the use of watchdog timers. Failure of any component shall be alarmed and annunciated.
   6. OIT's shall monitor and display all digital and analog data available on their connected PLCs and all pertinent data available on the system-wide network. Where possible, the software shall be configured to verify the validity of that data. Data that is in disagreement or out of valid range shall indicate as such through the extensive use of displays and alarms.
   7. All critical alarms initiated in Head House PLC shall energize the Horn and the Alarm Light on the Head House Control Panel. OIT shall be configured with Alarm Test and Acknowledge functions:
      a. In-Test: Horn and the Alarm Light shall energize temporarly for testing purposes.
      b. Acknowledge function: shall acknowledge the Alarm and silent the Horn, while the Alarm Light shall stay 'ON' till the Alarm condition has been cleared. Alarm Light shall de-energize once the Critical Alarm

condition has cleared. Critical Alarms shall be identified and submitted for ENGINEER approval.

8. All critical alarms initiated in GAC PLC shall energize the Horn and the Alarm Light on the Remote OIT Panel and the Alarm Light on the GAC Control Panel. Both OITs (R-OIT and GAC-OIT) shall be configured with Alarm Test and Acknowledge functions:
    a. In-Test: Horn and the Alarm Light shall energize temporarly for testing purposes.
    b. Acknowledge function: shall acknowledge the Alarm and silent the Horn, while both Alarm Lights shall stay 'ON' till the Alarm condition has been cleared. Alarm Light shall de-energize once the Critical Alarm condition has cleared. Critical Alarms shall be identified and submitted for ENGINEER approval.
9. Clearwell No 3 Level (I-02):
    a. Signal for the Existing Clearwell No. 3 is hardwired to the Existing Instrumentation & Control (I&C) Console in the Head House Control Room. Location shown in Contract Drawings. Existing transmitter is a BIF unit that is wired to existing chart recorder on I&C Console.
    b. CONTRACTOR shall intercept the existing signal wired to the Level Recorder and provide signal conditioning as required and an I/I isolator, as specified in this specification, to split and provide one 4-20 mA analog signal to HH-CP and one signal same as existing for the chart recorder. Modifications shall not affect performance of the chart recorder. Proposed location for all this hardware is identified in the Contract Drawings.
    c. CONTRACTOR shall confirm with the CITY existing functionality of the Level Recorder and Alarms has been restored.
    d. Any internal panel modification, wiring and components shall be provided by the System Integrator. Wire new Level signal to Terminal Blocks for connection by the Electrician to HH-CP.
    e. This signal shall be used for GAC Feed Pump control along with being recorded. High and Low Alarms shall also be generated in the PLC based on the Operator Adjustable Alarm Setpoints.
10. GAC Feed Pumps Control Logic (I-02):
    a. All three GAC Feed Pumps shall be provided with a local control station (GFP1-LCS, GFP2-LCS and GFP3-LCS) provided by Electrical Contractor with Local/Off/Remote selector switch, Start/Stop selector switch and Run Status Indicating Light. Each Pump shall have the following modes of operation:
        1) In-Local: Pump shall be controlled Locally through the Start/Stop selector switches on the Local Control Station.
        2) In-Off: Pump shall not be allowed to run.
        3) In-Remote: Pump shall be operated remotely from the GAC PLC in the GAC Control Panel. PLC controls shall include Auto/Manual selection for the pumps based on which the following modes shall be available:

a) In Remote-Manual:
   i. GAC Feed Pumps shall be controlled through OIT, via 'Soft' Start/Stop selector switch and manual LIC Speed Command.
b) In Remote-Auto:
   i. GAC Feed Pumps shall be level controlled based on the Level in the Existing Clearwell No. 3.
   ii. GAC Feed Pumps shall operate in AUTO/LEAD/LAG/STANDBY duty sequence. In Auto duty assignment pump duty shall be cycled automatically based on the pump runtime during the last run cycle.
   iii. At any given time if two pumps are not In-Remote position then the Auto duty sequence shall be disabled and last assigned duty shall be retained for all three pumps.
   iv. In an event that any duty pump fails, standby pump shall replace it immediately for seamless operation.
   v. If a duty pump is in manual, then the duty shall automatically skip to the next pump in the sequence.
   vi. Operating Pump shall be controlled with a Proportional Only Controller configure through a PID block in the PLC. Proportional band shall be adjustable for any two points in the clearwell such that the output from the level controller shall increase its output proportionally from minimum band point (in Feet) to maximum band point (in Feet).
   vii. Low Level in Clearwell No. 3 as sensed via soft Level Switch Lo-Lo LALL-001 shall prevent any GAC Feed Pumps from running to avoid them running dry.
   viii. If Low Level is not detected in Clearwell No. 3 and the Level in the Clearwell No. 3 as sensed via LI-001 has reached the bottom of the Proportional band, defined in the PLC, turn on the lead GAC Feed Pump.
   ix. Proportionally ramp up or down speed of the lead pump within the defined proportional band.
   x. Once Proportional band high limit is detected by the Level Switch High and Lead Pump speed has maxed out, turn on the lag GAC Feed Pump.
   xi. Once the level in Clearwell No. 3 starts decreasing and reaches back to the Proportional band lower limit, turn off the lag pump.
   xii. If the level keeps decreasing further and reaches the Low Level in Clearwell No. 3 as sensed via LAL-001, turn off the lead pump.
   xiii. Pumps shall be alternating Automatically if AUTO duty sequence mode is selected.

b. At all times for each GAC Feed pump following signals shall be displayed:

1) Pump Speed Feedback
2) VFD Enabled Status
3) Pump Fault Status
4) Pump Not In-Remote

11. GAC Contactors (I-02):
    a. GAC Contactor Systems 1 through 9 shall all be manually controlled locally. All GAC Contactor systems are configured in pairs for Duty/Standby configuration.
    b. Following Flows are measured for the GAC Contactor Pairs:

Process Measurement	Flowmeter Tag
Combined Flow to GAC Contactor Pairs 1, 2 and 3	FIT-005
Combined Flow to GAC Contactor Pairs 4, 5 and 6	FIT-006
Combined Flow to GAC Contactor Pairs 7, 8 and 9	FIT-007
Combined Flow to GAC Contactor Pairs 2 and 3	FIT-008
Combined Flow to GAC Contactor Pairs 5 and 6	FIT-009
Combined Flow to GAC Contactor Pairs 8 and 9	FIT-010
Flow to GAC Contactor Pair 3	FIT-011
Flow to GAC Contactor Pair 6	FIT-012
Flow to GAC Contactor Pair 9	FIT-013

    c. Following Flow calculations shall be made in the PLC:

Process Calculation	Difference calculation to be configured in the PLC
Flow to GAC Contactor Pair 1	(FI-005) – (FI-008)
Flow to GAC Contactor Pair 2	(FI-008) – (FI-011)
Flow to GAC Contactor Pair 4	(FI-006) – (FI-009)
Flow to GAC Contactor Pair 5	(FI-009) – (FI-012)
Flow to GAC Contactor Pair 7	(FI-007) – (FI-010)
Flow to GAC Contactor Pair 8	(FI-010) – (FI-013)

    d. All Flows shall be continuously monitored, calculated, recorded and totalized for all individual GAC Contactor units with displays configured as shown on P&ID.
    e. Pressure Switches shall be provided by GAC Contactor Manufacturer, which shall indicate High Differential Pressure Across each of the GAC Contactor Units through following High Pressure Differential Switches:
        1) PDS-016A & PDS-016B
        2) PDS-018A & PDS-018B
        3) PDS-020A & PDS-020B
        4) PDS-022A & PDS-022B
        5) PDS-024A & PDS-024B
        6) PDS-026A & PDS-026B

7) PDS-028A & PDS-028B
8) PDS-030A & PDS-030B
9) PDS-032A & PDS-032B

12. GAC Feed Discharge Temperature (I-02):
    a. GAC Feed Discharge on the Discharge Line shall be continuously monitored through a RTD type Temperature sensor (TIT-014). Temperature shall also be continuously recorded.
    b. Temperature Indication shall be shared with GAC-CP from HH-CP along with all other displays and controls via the Fiber Optic Communication Link. From the GAC-CP PLC the indication shall be hard wired to the HVAC unit DAHU-1. CONTRACTOR shall field coordinate wiring with HVAC supplier. Location of the units is shown in the Contract Drawings.
    c. Obtain a Common Alarm from DAHU-1, wired to the GAC-CP PLC for DAHU-1 unit monitoring.
13. 1.2 MG Contact Tank Level (I-03):
    a. Existing 1.2 MG Contact Tank Level/Pressure Transmitter is mounted in the Transmitter vault (TLPT Vault), location for which has been identified in the Contract Drawings.
    b. CONTRACTOR shall intercept the existing signal wired to the temporary system and provide signal condition as required and an I/I isolator, as per this specification, to split and provide one 4-20 mA analog signal to GAC-CP and one signal same as existing. Modifications shall not affect performance of the existing temporary system
    c. All this hardware shall be housed in a NEMA 6P enclosure within the 1.2 MG Contact Tank Level/Pressure Transmitter vault (TLPT).
    d. CONTRACTOR shall confirm with the CITY existing functionality has been restored.
    e. This signal shall be recorded. High and Low Alarms shall also be generated in the PLC based on the Operator Adjustable Alarm Setpoints.
14. Backwash Tank Level Control (I-03):
    a. Backwash Tank Level (LIT-043): level shall be constantly monitored and recorded in the GAC-CP PLC. Level shall also be used to control the Backwash Feed Valve in the Backwash Feed Vault.
    b. Backwash Feed Valve (FCV-042):
        1) Backwash tank inlet is designed such that it allows Backwash water supply at a constant flow rate.
        2) Backwash Tank Valve (FCV-042) shall be controlled through the GAC-CP PLC and shall have two modes of operations:
            a) In-Manual: Valve shall be controlled through OIT, via ‘Soft’ Open & Close Push Buttons.
            b) In-Automatic: Valve shall be controlled based on the level in the tank based on following:

i. When the Level in the Backwash tank is below Low level sensed via LSL-043 (Operator adjustable setpoint), the Valve shall open.
ii. When the Level in the Backwash tank is above High Level sensed via LSH-043 (Operator adjustable setpoint), the Valve shall close.
iii. Back-up Float Switch (LSHH-043) shall immediately close the Valve if a High-High level is sensed. It shall also generate an alarm that Level Control based on LIT-043 is not functional.

15. Backwash/Storm Water Tanks Interstitial Space Leak Detection (I-03):
    a. Stormwater leak shall be immediately detected in the Interstitial space between the Backwash and Storm Water Tanks.
    b. Leak detection shall trigger an Operator adjustable timer, once the timer expires the GAC-CP PLC shall close the Backwash Feed Valve (FCV-042).
16. GAC Building Ambient Temperature and Relative Humidity (I-03):
    a. Continuously Monitor Ambient Temperature (TI-057) and Relative Humidity (MI-058) in the GAC Building.
    b. Generate High and Low Ambient Temperature Alarms based on the Operator adjustable Setpoints.
    c. GAC-CP PLC shall compute and display Dew Point Value based on the calculation below. PLC shall also compute Fahrenheit to Celsius Temperature Conversion, if required, for the Dew Point calculation.
    d. Dew Point =
    243.04*(LN(RH/100)+((17.625*T)/(243.04+T)))/(17.625-LN(RH/100)-((17.625*T)/(243.04+T)))

    Where:

RH	=	Relative Humidity between 0 to 100%
T	=	Temperature in Celsius
LN	=	Natural Logarithm Function

    e. Dew Point value calculated shall be continuously compared with the GAC Feed Pipe temperature (TI-014) and if the two get within 3°F (Operator Adjustable), generate an Alarm and send it to the Dehumidifier Unit (DAHU-1).
    f. Monitor and Display, General Fault Alarm signal from the Dehumidifier Unit (DAHU-1).
17. GAC Building Electrical Room Ambient Temperature (I-03):
    a. Continuously Monitor Ambient Temperature (TI-058) in the Electrical Room.
    b. Generate High and Low Temperature Alarms based on the Operator adjustable Setpoints.
18. 3” Vacuum relief Valve – FCV-059 (I-03):
    a. Vacuum relief Valve shall be provide with Local/Remote, Open/Close selector switches and local indications for Open & Closed positions.

Open/Close indications shall be wired to the limit switches provided with the valve to get the respective position feedback from the field.

b. High Vacuum Pressure in the 24" GAC discharge line shall be monitored and indicated via PSL-059.

c. Valve shall open mechanically during a power fail and resume normal operation once the power restores.

d. Valve shall normally be controlled in Remote-Auto position, control based on High Vaccum sensed in the 24" GAC discharge Line through PSL-059, therefore the selector switch shall normally be placed in the Remote position for PLC Auto control.

e. Valve have the ability to operate in following modes of operation:

1) In-Local: the valve shall be controlled from the Local Controls on the valve with the Open/Close selector switch. This mode shall only be used for maintenance and the selector switch shall always be placed in Remote position under normal operation of the Plant.

2) In-Remote: the valve control from the GAC-CP PLC shall provide Auto/Manual selection. Based on the selection following two modes of operation shall be provided:

a) Remote-Manual: Valve shall be controlled through OIT, via 'Soft' Open & Close Push Buttons.

b) Remote-Automatic:

i. Valve shall automatically open when there is High Vacuum sensed through PSL-059.

ii. When the High Vacuum signal has cleared for atleast 1-minute (operator adjustable timer), i.e. Low Pressure is not detected by PSL-059 automatically close the valve.

19. Backwash Feed Vault Sump Pump (I-03):

a. Sump Pump (P-062) shall operate automatically locally based on the level float switch provided with the pump to keep the sump dry all the time. Level setpoint for the float shall be coordinated and confirmed in the field with the DEPARTMENT.

b. High-High Level float (LSHH-062) shall alarm at the PLC when level reaches the High-High setpoint indicating that Sump Pump failed to keep the vault dry.

20. Chemical Pumps Pacing Strategy (I-03):

a. Chlorine, Fluoride and Phosphate Pumps in the Chemical building shall be Flow paced based on the Total Flow to the GAC Contact Tank (FI-035).

b. 0.5 to 1.25 adjustable multiplier shall be used for Flow Pacing ratio controllers. Three individual Analog Outputs shall be hardwired to Chemical Control Panel, Fluoride Pump and Phosphate Pump from the GAC-CP PLC for chemical pacing.

21. Electrical Generator & Transfer Switch Signals (I-04):

a. Following Status signals shall be hard wired to the GAC-CP PLC from the respective equipment for status monitoring:

1) Emergency Power

2) Generator Fault
3) ATS Normal
4) MTS Normal

22. 1.2 MG Contact Tank Discharge Temperature:
    a. 1.2 MG Contact tank Discharge 20" line shall be continuously monitored through a RTD type Temperature sensor (TIT-060). Temperature shall also be continuously recorded.
23. High Pressure Distribution Line Pressure (I-04):
    a. Pressure shall be continuously monitored and shall be used for High Lift Pumps control to maintain the desired distribution pressure.
    b. High Pressure Distribution Line Flow (FI-053) setpoints FSH-053A and FSL-053B shall also be used for High Lift Pump Control.
24. High Lift Pumps Control Logic (I-04):
    a. All three High Lift Pumps shall be provided with a local control station (HLP1-LCS, HLP2-LCS and HLP3-LCS), provided by Electrical Contractor, with Local/Off/Remote selector switch, Start/Stop selector switch and Run Status Indicating Light. Each Pump shall have the following modes of operation:
        1) In-Local: Pump shall be controlled Locally through the Start/Stop selector switches on the Local Control Station.
        2) In-Off: Pump shall not be allowed to run, despite the state of the Start/Stop selector switch.
        3) In-Remote: Pump shall be operated remotely from the GAC PLC in the GAC Control Panel. PLC controls shall include Auto/Manual selection for the pumps based on which the following modes shall be available:
            a) In Remote-Manual:
                i. High Lift Pumps shall be controlled through OIT, via 'Soft' Start/Stop selector switch and manual Speed Command.
            b) In Remote-Auto:
                i. High Lift Pumps shall be controlled based on the discharge pressure and flow in the High Pressure Service line.
                ii. Lead pump Start/Stop and operating pumps speed shall be controlled based on a pressure setpoint dialed in by the operator. Operating Pumps shall ramp up and down based on a PID Controller to Maintain the desired pressure setpoint. Lead Pump shall run continuously.
                iii. If the Flow reaches HLP Lag Pump Start Setpoint (FSH-053A), Turn On Lag Pump. Lag Pump shall initially ramp up to 95% of its maximum speed and eventually both Lead & lag Pump speeds shall converge at the output calculated by the PID Controller. Setup and tuning of both controllers and drives shall be performed such that lag pump successfully comes online.
                iv. If the Flow reaches HLP Lag Pump Stop Setpoint (FSL-053B), Turn Off Lag Pump.

v. High Lift Pumps shall operate in AUTO/LEAD/LAG/STANDBY duty sequence. In Auto duty assignment pump duty shall be cycled automatically based on the pump runtime during the last run cycle.
vi. At any given time if two pumps are not In-Remote position then the Auto duty sequence shall be disabled and last assigned duty shall be retained for all three pumps.
vii. In an event that any duty pump fails, standby pump shall replace it immediately for seamless operation.
viii. Pump vendor shall configure the following permissive along with all the other interlocks:
a. If Operating Pump is turned on and low current is sensed by VFD then after 30 seconds, Turn off the pump.

b. At all times for each High Lift Pump following signals shall be displayed:
1) Pump Speed Feedback
2) VFD Enabled Status
3) Pump Fault Status
4) Pump Not In-Remote

25. Flow Readings: Following Flow readings shall continuously be monitored, recorded and totalized in the PLC, and shall be accessible through any of the three OIT's:
a. Total GAC Treated Water Flow to Contact Tank (FIT-035)
b. Low Pressure Distribution Flow (FIT-054)
c. High Pressure Distribution Flow (FIT-053)
d. GAC Backwash Water Flow (FIT-051)

26. Flow Calculations: Following Flow calculation shall be performed by the PLC continuously to monitor Plant Operation. Flow Calculation shall also be totalized in the PLC, and shall be accessible through any of the three OIT's:
a. Total Water Distribution Flow = Summation of Low Pressure & High Pressure Distribution Lines (FI-053 + FI-054)

27. Chemical Monitoring System (I-04):
a. Constantly monitor, record and generate High/Low alarms for following Chemical Parameters for regulation and reporting:
1) Chlorine Value
2) Fluoride Value
3) Phosphate Value
4) pH Value
5) Turbidity Value
b. High and Low Alarm Setpoints shall be operator adjustable.

28. Fire Alarm Signal (I-04)
a. Monitor and indicate Fire Alarm from FACP-1. Active alarm shall be displayed at the OIT for the operator.

D. PLC Programming Conventions
1. General:

a. All logic, sequencing, interlocking, safety and critical alarm and control, shall be implemented at the PLC level using ladder type logic. Individual rungs shall be provided for each logic function. Subroutines shall be used where repetitive logic is required. Alarm logic shall not be performed in subroutines as they may not be active at all times.
b. Commands such as start, stop, open, close, operating mode, sequence selection, etc., that are sent from the OITs by operator initiative or response, shall be pulsed and latched via PLC software.
c. All analog loop control such as temperature, flow or level shall be performed at the PLC level, not in the OITs. All calculations and logic necessary to keep an individual loop in operation, in the event of failure of, or loss of communication with the OITs, shall also be done in the PLC.
d. All data points, both analog and digital, associated with the PLC based loop controllers, shall be available to the operator at the OITs and fully displayed and adjustable (where possible).
e. The PLC ladder program shall be written so that the operator, via OIT, can select the mode in which he wants each individual loop to operate (i.e. manual/auto or local/remote setpoint). He shall also be able to view and manually adjust all parameters such as setpoint, output, gain, integral, derivative, etc. from the OITs. Once entered, the valid data shall remain stored in the PLC until such time as new valid data is received.

2. Program Structure:
a. All programming shall be implemented using ladder logic style programming only. Other styles of programming shall only be used with the prior written permission of the ENGINEER and only when the task cannot be performed using ladder type logic.
b. The program shall be written using a well-organized and well documented structured approach. All common elements shall be grouped together as much as possible. For example, all logic for a single piece of equipment such as start/stop logic, indication, fault and alarm logic shall be grouped together to allow easy startup and trouble shooting.

3. Safeties and Interlocks:
a. Upon initial startup or a subsequent restart of the PLC, the program shall be written to first initialize all logic and data; next, bring all equipment and controls to a safe and ready status as allowed by safety and interlock status and only then allow equipment to be started as indicated in the individual control strategies. When the system has decided that all conditions are satisfied, it shall then issue a ready status for each piece of affected equipment, for display by the OIT.
b. Upon startup or restart of equipment and systems after a power failure, the program shall retain the status of all equipment prior to the interruption. Upon restoration of stable power, with a suitable and adjustable time delay on each piece of equipment, the program shall

check the status of all controlled equipment and systems for faults and safety trips and only then allow equipment to be started as indicated in the individual control strategies. Items indicating a faulted or unsafe condition shall be immediately locked out and the appropriate alarms generated for display by the OIT.

c. All preset values (for timers, counters, etc.) and variables shall be stored in register memory and shall be made available to the operator at the OIT for display. Adjustment shall be through the keypad.

2.5 SYSTEM DESIGN REQUIREMENTS

A. CONTRACTOR shall include as a minimum, the following spare parts and test equipment for this section:
   1. Spare PLC power supply
   2. Spare Input/Output four of each type provided
   3. One spare field instrument per type shall be provided except for magnetic flowmeters
   4. Six of each type of fuse, relay, lamps used and one of specified power supply.

2.6 SOURCE QUALITY CONTROL

A. Operational Testing:
   1. Test all input/output components to verify that internal panel wiring is properly terminated at correct locations. Verify initial ranges and settings.
   2. Test all system hardware and software to verify proper operation as stand-alone units. Test shall include, but not be limited to, the following:
      a. Power distribution and breaker ratings to match approved Shop Drawings.
      b. Power fail/restart tests.
      c. Diagnostics checks.
      d. Demonstrate that all specified equipment functional capabilities are working properly.
      e. Check and verify process displays are in accordance with approved Shop Drawings.
   3. Test components and devices requiring data transmission to verify that communication between such components is working properly. Verify communication by using the same media required for the completed system at the Site as indicated in the Contract Documents.
   4. Perform integrated system test with all control panels. Simulate inputs/outputs to verify that equipment is performing properly as an integrated system.
   5. Simulation devices shall be of suitable quality to not mask control panel defects.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine conditions under which the Work will be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Environmental Requirements:
   1. Do not install instruments in areas where construction may cause equipment to be damaged, without providing adequate protection for said equipment.

B. Panel shall be factory wired. All internal panel components shall be installed at the factory.

C. Perform all power wiring and control wiring per National Electric Code.

D. Installation of Instrumentation:
   1. Secure field-mounted instruments to stands or brackets in accordance with manufacturer's recommendations, approved or accepted (as applicable) submittals, and the Contract Documents.
   2. Locate sensors where shown on the Contract Drawings. Confirm exact locations in the field with ENGINEER.
   3. Install all devices so that devices are readily accessible for service and do not cause potential hazards.
   4. Control Panels and OITs shall be installed where shown on the Contract drawings.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections: Field-verify calibration and performance of each instrument prior to start-up of the associated equipment, and document on a separate sheet for each.
   1. For each calibration certification sheet, include the following information:
      a. Project name.
      b. Tag number and description.
      c. Manufacturer.
      d. Model and serial number.
      e. Date, time and person who performed calibration.
      f. Calibration data to include.
         1) Input, output, and error at 0, 25, 75, and 100 percent of span for analog instruments.
         2) Switch setting, contact action and deadband, if applicable, for discrete elements.
      g. Space for comments.

h. Signature and date.

2. System Check-Out and Start-Up Responsibilities:
   a. CONTRACTOR shall perform check-out and start-up of all system components. As part of these services, the CONTRACTOR shall include for those equipment items not manufactured by him the services of an authorized manufacturer's representative to check the equipment installation and place the equipment into operation. The manufacturer's representative shall be thoroughly knowledgeable about the installation, operation and maintenance of the equipment.
   b. Check and approve the installation of all instrumentation and control system components and all cable and wiring connections between the various system components prior to placing the various processes and equipment into operation.
   c. Conduct a complete system checkout and adjustment, including calibration of all instruments, tuning of control loops, checking operation functions, and testing of final control actions. When there are future operational functions included in the Work, they should be included in the system checkout. All problems encountered shall be promptly corrected to prevent any delays in start-up of the various unit processes.
   d. CONTRACTOR shall provide all test equipment necessary to perform the testing during system checkout and start-up.
   e. CONTRACTOR, shall be responsible in conjunction and coordination with the GAC CONTACTOR SYSTEM MANUFACTURER for initial operation of DEPARTMENT furnished GAC Conactor System and shall make any required changes, adjustments or replacements for operation, monitoring and control of the various processes and equipment necessary to perform the functions intended at no additional cost to the DEPARTMENT. These changes or adjustments shall be documented by the CONTRACTOR and submitted to the ENGINEER as part of the Installation Inspection Report described in Paragraph g. below.
   f. CONTRACTOR shall furnish to the ENGINEER certified calibration reports for field instruments and panel mounted devices specified in this Section as soon as calibration is completed.
   g. CONTRACTOR shall furnish ENGINEER an Installation Inspection Report certifying that all equipment has been installed correctly and is operating properly. The report shall be signed by authorized representatives of both CONTRACTOR and the Instrumentation Supplier.
   h. Instrumentation and Control System Field Test:
      1) Following the instrumentation and control system checkout and initial operation, CONTRACTOR, under the supervision of the Instrumentation Supplier, shall perform a complete system test to verify that all equipment and programmed software is operating properly as a fully integrated system, and that the intended

instrumentation and control functions are fully implemented and operational. Any defects or problems found during the test shall be corrected by CONTRACTOR and then retested to demonstrate proper operation.

2) Following demonstration of all system functions, the instrumentation and control system, including field sensors/transducers and instruments shall be running and fully operational for a continuous 48-hour period.

B. Field Services and Operator Instruction:
   1. Provide repairs or replacement of defective materials, equipment or workmanship, including with respect to equipment, the services of factory trained servicemen.
   2. In addition to the calibration required for check-out, provide two additional calibrations on all instruments. The first re-calibration shall be approximately six months after acceptance of the system, and the second shall be approximately eleven months after acceptance. As part of each calibration, provide two copies of the calibration sheets, a detailed list of deficiencies (should any be found), and a statement that the entire system is in proper operation and condition (except for the deficiencies noted) and shall be turned over to the CITY.

3.4 MANUFACTURER'S SERVICES

A. General:
   1. CONTRACTOR shall provide operation and maintenance training for all instrumentation and control system equipment as specified herein.
   2. For all instruments, the CONTRACTOR shall provide for on-Site training by an authorized representative of the equipment manufacturer as part of his services. The manufacturer's representative shall be fully knowledgeable in the operation and maintenance of the equipment.
   3. CONTRACTOR shall be responsible for all costs associated with training and shall provide all required materials, texts and required supplies.
   4. Training shall conform to the requirements of Section 01 79 23, Instruction of Operations and Maintenance Personnel and include training for the topics listed and for personnel specified. Include separate site visits as required to accommodate schedule. Overall length of schedule and total number of hours included in the training schedule shall be sufficient to provide the training required in this specification, including hours for specific topics listed herein.

B. On-Site Training:
   1. General:
      a. Provide on-Site operation and maintenance training and the equipment manufacturer representatives prior to placing the equipment in continuous operation.

b. Training courses shall include time for plant personnel (up to five people) to develop and demonstrate understanding of training concepts. Training shall include hands on training with equipment.
c. At the conclusion of each course the instructor shall review and summarize the course material with plant personnel. Review and summary shall include exercises demonstrating proper response to normal operational needs, emergencies and maintenance tasks.
d. Training shall accomplish the following:
    1) Provide instruction covering use and operation of the equipment to perform the intended functions.
    2) Provide instruction covering procedures for routine, preventive and troubleshooting maintenance, including equipment calibration.
    3) Explain procedures for placing the equipment in and out of operation and explain necessary actions and precautions to be taken regarding the overall control system.
    4) Provide classes and field training as to how to change process control and alarm set points in all microprocessor based controllers and transmitters. Maintenance personnel shall be trained to enter passwords, programming or configuration data, etc.

2. Primary Sensors/Transducers and Field Instruments:
    a. The services of equipment manufacturer's representatives shall be provided for a minimum of 2 hours for each type of instrument.
    b. Training shall include:
        1) Basic repair and maintenance capabilities of installed equipment.
        2) Procedures for placing the equipment in and out of operation.
        3) Use of any special repair equipment or software packages that are used for repair or maintenance.
        4) Procedures for testing any repair before placing equipment back in service.
3. PLC and OIT Training
    a. Training shall be provided for atleast 2 full days and include:
        1) Hardware and software configuration of PLC and OIT programs.
        2) Perform a walk through with students identifying system components. Instructor shall test each student’s knowledge of system components during walk through.
        3) Identify key operating and alarm features of the project specific PLC and HMI programs.
        4) Test students knowledge of proper response to alarms, capabilities to replace hardware components, switch hardware and software between online and offline, add new components, know when to call for assistance, demonstrate understanding of hardware and safety requirements, understand impact of changes made to rest of the control system.
        5) Provide instruction covering basic editing of PLC programs and OIT screens. Instruction shall include testing students programming

capabilities by having students make minor changes to programs and test changes online.

3.5 OPERATIONAL AVAILABILITY DEMONSTRATION

A. Operational Availability Demonstration:
   1. Operational Availability Demonstration (OAD) shall begin following completion of the GAC Control System Field Test as specified herein and after all training and contract documents requirements for acceptance have been satisfied. OAD shall continue until a time frame has been achieved wherein the system (both hardware and software) availability meets or exceeds 99.9 percent for 30 consecutive days and no system failures have occurred which result in starting the OAD over again. During the OAD the system shall be available to plant operating personnel for use in normal operation of the plant.
   2. For the purpose of the OAD the system will be defined as consisting of the following systems and components:
      a. All operator interfaces (conventional and digital) and connected PLC's.
   3. The conditions listed below shall constitute system failures which are considered critical to the operability and maintainability of the system. The OAD shall be terminated if one or more of these conditions occur. Following correction of the problem, a new 30 consecutive day OAD shall begin.
      a. Failure to repair a hardware or software problem within 120 consecutive hours from the time of notification of a system failure.
      b. Recurrent hardware or software problems: if the same type of problem occurs three times or more.
      c. Software problem causing a processor to halt execution.
   4. The following conditions shall constitute a system failure in determining the system availability based on the equation specified herein:
      a. Failure of any operator interface (conventional or digital) or PLC.
      b. Loss of communications between devices on the communications network.
      c. Failure of one or more input/output components.
      d. Failures of any type affecting ten or more input/output points simultaneously.
      e. Failure of any type affecting one or more regulatory control loops or sequential control strategies thereby causing a loss of the automatic control of the process variable or process sequence operation.
      f. Failure of power supply. Where redundant power supplies are provided, failure of one power supply shall not constitute a system failure; provided the backup power supply operates properly and maintains supply power. Failure of the backup supply to operate properly and maintain supply power shall constitute a system failure.
      g. Failure of two or more primary sensors/transducers or field instruments simultaneously.
   5. The system availability shall be calculated based on the following equation:

$$A = \frac{TTO}{TTO + TTR} \; x\; 100\%$$

Where:

A = system availability in percent
TTO = total time in operation
TTR = total time to repair

6. Time to repair shall be the period between the time that CONTRACTOR is notified of a system failure and the time that the system has been restored to proper operation in terms of hours with an allowance for the following dead times which shall not be counted as part of the time to repair period.
   a. Actual travel time for service personnel to get to the plant site up to 6 hours per incident from the time CONTRACTOR is notified of a system failure.
   b. Time for receipt of spare parts to the plant site once requested up to 24 hours per incident. No work shall be done on the system while waiting for delivery of spare parts.
   c. Dead time shall not be counted as part of the system available period. The dead time shall be logged and the duration of the OAD extended for an amount of time equal to the total dead time.
      1) Completion of a 30 consecutive day period without any restarts of the OAD and with system availability in excess of 99.99 percent shall satisfactorily demonstrate a successful OAD test. When all contract work is completed and with a successful OAD test, this will constitute acceptance of the system by the OWNER.
      2) All parts and maintenance materials required to repair the system prior to completion of the OAD shall be supplied by CONTRACTOR at no additional cost to DEPARTMENT. If parts are obtained from the required plant spare parts inventory, they shall be replaced to provide a full complement of parts as specified.

B. A Control System Malfunction/Repair Reporting Form shall be completed by the plant personnel and ENGINEER to document system failures, to record CONTRACTOR notification, arrival and repair times and CONTRACTOR repair actions. Format of the form shall be developed and agreed upon prior to the start of the OAD.

+ + END OF SECTION + +

TAG	DESCRIPTION	DRAWING NO.	SIGNAL TYPE	RANGE /SETPOINT	UNITS	SIGNAL FROM/TO	SIGNAL TO/FROM
						DEVICE	CONTROL PANEL (PLC)
	HEAD HOUSE CONTROL PANEL (HH-CP)						
LI-001	Clearwell No. 3 Level	I-02	AI		FT.	LY-001	PLC
SI-002	GAC Feed Pump No. 1 Speed Feedback	I-02	AI	0-100	%	VFD GAC FEED PUMP 1	PLC
SI-003	GAC Feed Pump No. 2 Speed Feedback	I-02	AI	0-100	%	VFD GAC FEED PUMP 2	PLC
SI-004	GAC Feed Pump No. 3 Speed Feedback	I-02	AI	0-100	%	VFD GAC FEED PUMP 3	PLC
SC-002	GAC Feed Pump No. 1 Speed Command	I-02	AO	0-100	%	PLC	VFD GAC FEED PUMP 1
SC-003	GAC Feed Pump No. 2 Speed Command	I-02	AO	0-100	%	PLC	VFD GAC FEED PUMP 2
SC-004	GAC Feed Pump No. 3 Speed Command	I-02	AO	0-100	%	PLC	VFD GAC FEED PUMP 3
HS-002A	GAC Feed Pump No. 1 Start/Stop	I-02	DO			PLC	VFD GAC FEED PUMP 1
HS-003A	GAC Feed Pump No. 2 Start/Stop	I-02	DO			PLC	VFD GAC FEED PUMP 2
HS-004A	GAC Feed Pump No. 3 Start/Stop	I-02	DO			PLC	VFD GAC FEED PUMP 3
YIL-002	GAC Feed Pump No. 1 VFD Enabled	I-02	DI			VFD GAC FEED PUMP 1	PLC
UA-002	GAC Feed Pump No. 1 Fault	I-02	DI			VFD GAC FEED PUMP 1	PLC
YIL-003	GAC Feed Pump No. 2 VFD Enabled	I-02	DI			VFD GAC FEED PUMP 2	PLC
UA-003	GAC Feed Pump No. 2 Fault	I-02	DI			VFD GAC FEED PUMP 2	PLC
YIL-004	GAC Feed Pump No. 3 VFD Enabled	I-02	DI			VFD GAC FEED PUMP 3	PLC
UA-004	GAC Feed Pump No. 3 Fault	I-02	DI			VFD GAC FEED PUMP 3	PLC
YN-002	GAC Feed Pump No. 1 Not In Remote	I-02	DI			LCS PUMP 1	PLC
YN-003	GAC Feed Pump No. 2 Not In Remote	I-02	DI			LCS PUMP 2	PLC
YN-004	GAC Feed Pump No. 3 Not In Remote	I-02	DI			LCS PUMP 3	PLC
TI-014	GAC Influent Water Temperature	I-02	AI			TIT-014	PLC
UA-064A	Head House Control Panel Horn Output		DO			PLC	HH-CP
UA-064B	Head House Control Panel Alarm Strobe Output		DO			PLC	HH-CP
	GAC CONTROL PANEL (GAC-CP)						

TAG	DESCRIPTION	DRAWING NO.	SIGNAL TYPE	RANGE /SETPOINT	UNITS	SIGNAL FROM/TO	SIGNAL TO/FROM
						DEVICE	CONTROL PANEL (PLC)
TI-014	GAC Influent Water Temperature	I-02	AO			PLC	DAHU-1
UA-014	Dehumudifier (DAHU-1) Common Alarm	I-02	DI			DAHU-1	PLC
FI-005	Flow to GAC Pair 1, 2 & 3	I-02	AI			FIT-005	PLC
FI-008	Flow to GAC Pair 2 & 3	I-02	AI			FIT-006	PLC
FI-011	Flow to GAC Pair 3	I-02	AI			FIT-007	PLC
FI-006	Flow to GAC Pair 4, 5 & 6	I-02	AI			FIT-008	PLC
FI-009	Flow to GAC Pair 5 & 6	I-02	AI			FIT-009	PLC
FI-012	Flow to GAC Pair 6	I-02	AI			FIT-010	PLC
FI-007	Flow to GAC Pair 7, 8 & 9	I-02	AI			FIT-011	PLC
FI-010	Flow to GAC Pair 8 & 9	I-02	AI			FIT-012	PLC
FI-013	Flow to GAC Pair 9	I-02	AI			FIT-013	PLC
PDA-016A	High Differential Pressure GAC Unit 1A	I-02	DI			PDS-016A	PLC
PDA-018A	High Differential Pressure GAC Unit 2A	I-02	DI			PDS-018A	PLC
PDA-020A	High Differential Pressure GAC Unit 3A	I-02	DI			PDS-020A	PLC
PDA-022A	High Differential Pressure GAC Unit 4A	I-02	DI			PDS-022A	PLC
PDA-024A	High Differential Pressure GAC Unit 5A	I-02	DI			PDS-024A	PLC
PDA-026A	High Differential Pressure GAC Unit 6A	I-02	DI			PDS-026A	PLC
PDA-028A	High Differential Pressure GAC Unit 7A	I-02	DI			PDS-028A	PLC
PDA-030A	High Differential Pressure GAC Unit 8A	I-02	DI			PDS-030A	PLC
PDA-032A	High Differential Pressure GAC Unit 9A	I-02	DI			PDS-032A	PLC
PDA-016B	High Differential Pressure GAC Unit 1B	I-02	DI			PDS-016B	PLC
PDA-018B	High Differential Pressure GAC Unit 2B	I-02	DI			PDS-018B	PLC
PDA-020B	High Differential Pressure GAC Unit 3B	I-02	DI			PDS-020B	PLC
PDA-022B	High Differential Pressure GAC Unit 4B	I-02	DI			PDS-022B	PLC
PDA-024B	High Differential Pressure GAC Unit 5B	I-02	DI			PDS-024B	PLC
PDA-026B	High Differential Pressure GAC Unit 6B	I-02	DI			PDS-026B	PLC
PDA-028B	High Differential Pressure GAC Unit 7B	I-02	DI			PDS-028B	PLC
PDA-030B	High Differential Pressure GAC Unit 8B	I-02	DI			PDS-030B	PLC
PDA-032B	High Differential Pressure GAC Unit 9B	I-02	DI			PDS-032B	PLC
LI-040	1.2 MG Contact Tank Level	I-03	AI			PY-040	PLC
FI-035	Total Flow to GAC Contact Tank	I-03	AI			FIT-035	PLC
LAH-055	Stormwater Detected	I-03	DI			LSH-055	PLC
HS-042	Backwash Feed Valve Open/Close Command	I-03	DO			PLC	FCV-042
ZIC-059	Treated Water Drain Valve Closed	I-03	DI			ZSC-059	PLC
ZIO-059	Treated Water Drain Valve Open	I-03	DI			ZSO-059	PLC
YIL-059	Treated Water Drain Valve In-Remote	I-03	DI			LCS FCV-059	PLC

TAG	DESCRIPTION	DRAWING NO.	SIGNAL TYPE	RANGE /SETPOINT	UNITS	SIGNAL FROM/TO	SIGNAL TO/FROM
						DEVICE	CONTROL PANEL (PLC)
HS-059	Treated Water Drain Valve Line	I-03	DO			PLC	FCV-059
PAL-059	High Vacuum GAC Discharge Line	I-03	DI			PSL-059	PLC
LI-043	Backwash Tank Level	I-03	AI			LIT-043	PLC
LAHH-043	Backwash tank Level High-High (Backup Float)	I-03	DI			LSHH-043	PLC
TI-056	GAC Building Electrical Room Ambient Temperature	I-03	AI	10-120	F	TIT-056	PLC
TI-057	GAC Building Ambient Temperature	I-03	AI	10-120	F	TIT-057	PLC
MI-058	GAC Building Relative Humidity	I-03	AI	0-100	%	MIT-058	PLC
FI-054	Low Pressure Distribution Flow	I-03	AI			FIT-054	PLC
FFIC-035A	Chlorine Pacing Signal	I-03	AO	0-100	%	PLC	CHEMICAL CP
FFIC-035B	Fluoride Pacing Signal	I-03	AO	0-100	%	PLC	FLUORIDE DOSING PUMP
FFIC-035C	Phosphate Pacing Signal	I-03	AO	0-100	%	PLC	PHOSPHATE DOSING PUMP
LAHH-062	Backwash Feed Vault High-High Level	I-03	DI			LSHH-062	PLC
AI-044	Distribution Chloride Value	I-04	AI			AIT-044	PLC
AI-045	Distribution Fluoride Value	I-04	AI			AIT-045	PLC
AI-046	Distribution Phosphate Value	I-04	AI			AIT-046	PLC
AI-047	Distribution pH Value	I-04	AI	0-14	pH	AIT-047	PLC
AI-062	GAC Units Discharge Turbidity Value	I-04	AI	0-5	NTU	AIT-047	PLC
SI-048	High Lift Pump No. 1 Speed Feedback	I-04	AI	0-100	%	VFD HIGH LIFT PUMP 1	PLC
SI-049	High Lift Pump No. 2 Speed Feedback	I-04	AI	0-100	%	VFD HIGH LIFT PUMP 2	PLC
SI-050	High Lift Pump No. 3 Speed Feedback	I-04	AI	0-100	%	VFD HIGH LIFT PUMP 3	PLC
SC-048	High Lift Pump No. 1 Speed Command	I-04	AO	0-100	%	PLC	VFD HIGH LIFT PUMP 1
SC-049	High Lift Pump No. 2 Speed Command	I-04	AO	0-100	%	PLC	VFD HIGH LIFT PUMP 2
SC-050	High Lift Pump No. 3 Speed Command	I-04	AO	0-100	%	PLC	VFD HIGH LIFT PUMP 3
YIL-002	High Lift Pump No. 1 VFD Enabled	I-04	DI			VFD HIGH LIFT PUMP 1	PLC
UA-002	High Lift Pump No. 1 Fault	I-04	DI			VFD HIGH LIFT PUMP 1	PLC
YIL-003	High Lift Pump No. 2 VFD Enabled	I-04	DI			VFD HIGH LIFT PUMP 2	PLC
UA-003	High Lift Pump No. 2 Fault	I-04	DI			VFD HIGH LIFT PUMP 2	PLC
YIL-004	High Lift Pump No. 3 VFD Enabled	I-04	DI			VFD HIGH LIFT PUMP 3	PLC
UA-004	High Lift Pump No. 3 Fault	I-04	DI			VFD HIGH LIFT PUMP 3	PLC
YN-002	High Lift Pump No. 1 Not In Remote	I-04	DI			LCS PUMP 1	PLC
YN-003	High Lift Pump No. 2 Not In Remote	I-04	DI			LCS PUMP 2	PLC
YN-004	High Lift Pump No. 3 Not In Remote	I-04	DI			LCS PUMP 3	PLC
HS-048	High Lift Pump No. 1 Start/Stop	I-04	DO			PLC	VFD HIGH LIFT PUMP 1
HS-049	High Lift Pump No. 2 Start/Stop	I-04	DO			PLC	VFD HIGH LIFT PUMP 2
HS-050	High Lift Pump No. 3 Start/Stop	I-04	DO			PLC	VFD HIGH LIFT PUMP 3
YN-015A	ATS Normal	I-04	DI			STANDBY GENERATOR	PLC

TAG	DESCRIPTION	DRAWING NO.	SIGNAL TYPE	RANGE /SETPOINT	UNITS	SIGNAL FROM/TO DEVICE	SIGNAL TO/FROM CONTROL PANEL (PLC)
YN-015B	MTS Normal	I-04	DI			STANDBY GENERATOR	PLC
UA-015A	Emergency Power	I-04	DI			STANDBY GENERATOR	PLC
UA-015B	Generator Fault	I-04	DI			STANDBY GENERATOR	PLC
FI-051	GAC Backwash Flow	I-04	AI			FIT-051	PLC
FI-053	High Pressure Distribution Flow	I-04	AI			FIT-053	PLC
PI-052	High Pressure Distribution Pressure	I-04	AI			PIT-052	PLC
UA-061	Fire Alarm	I-04	DI			FFCP-1	PLC
TI-060	1.2 MG Contact Tank Discharge Temperature	I-04	AI			TIT-060	PLC
UA-062B	GAC Control Panel Alarm Strobe Output		DO			PLC	GAC-CP
UA-063A	Remote OIT (R-OIT) Horn Output		DO			PLC	R-OIT
UA-063B	Remote OIT (R-OIT) Alarm Strobe Output		DO			PLC	R-OIT

+ + END OF SECTION + +

INDEX

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		**Analyzer - Chlorine**		SHEET 1 OF 1	
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.4	ADDENDUM/C.O.
TAG NO.		**AE / AIT - 044**			
Ref. Dwg. No.:	1	I-04			
PROCESS					
Location:	2	GAC Building Mezz. Floor			
Service:	3	Distribution Water			
Vessel / Line No.:	4	Chemical Monitoring System			
Fluid:	5	Potable Water			
Temp. Min/Max:	6	33 to 80 F			
Level Min/Max:	7	N/A			
SENSOR					
Type:	8	Colorimetric			
Element:	9	Colorimetric DPD chemistry (Reagents) to continuosuly monitor free or total residual chlorine			
Range:	10	0.03 to 5 mg/L			
Inlet Pressure	11	1 to 5 psig			
Sample Flow Rate	12	200 to 500 mL per minute minimum			
Pressure Limit	13	1.5 to 75 PSI			
Cycle Time	14	2.5 minutes			
Inlet/Drain Connections	15	1/4" OD polyethlyene tube, quick-disconnect fitting Inlet and 1/2" flexible hose Drain			
TRANSMITTER					
Type:	16	Analyzer/Transmitter.			
Output:	17	4-20 mADC isolated.			
Power Supply:	18	120 VAC, 60 Hz @ 2.5 A			
Relays:	19	Two SDPT.			
Switch Action:	20	Selectable for sample concentration alarm, analyzer system warning, or analyzer system shutdown alarms.			
Setpoints:	21	Not Applicable			
Rating:	22	10 A at 120 VAC, non-inductive.			
Indication / Display:	23	Integral LCD; 3-1/2" digit measurement readout			
Enclosure/Housing:	24	ABS plastic, two clear polycarbonate windows, IP62-rated with the gasgeted door latched.			
Mounting:	25	Wall Mounting			
Dimensions	26	454 mm x 314 mm x 179 mm			
Additional Features:	27				
NOTES					
General:	28	The analyzer assembly shall contain all wiring. No exposed wiring shall be permitted.			
Materials:	29	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.			
Installation:	30	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation sahll be followed for piping & connections.			
Replaceable Cap:	31	N/A			
Consumables:	32	1 year supply of all required reagents for full functionality of the analzyer.			
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	35				
MANUFACTURE		Provide the following:			
Manufacturer:	36	HACH CL17			

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		**Analyzer - pH**		SHEET 1	OF 1
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.13	ADDENDUM/C.O. 1
TAG NO.		**AE / AIT - 047**			
Ref. Dwg. No.:	1	I-04			
PROCESS					
Location:	2	GAC Building Mezz. Floor			
Service:	3	Distribution Water			
Vessel / Line No.:	4	Chemical Monitoring System			
Fluid:	5	Potable Water			
Temp. Min/Max:	6	33 to 80 °F			
Press. Limit:	7	100 PSI at 80 °F			
PERFORMANCE					
Range:	8	0 - 14 pH units.			
Sensitivity:	9	±0.01 pH			
Temperature:	10	Ambient: -4 to 140 deg F; Coefficient: < 0.03% of Range per deg C.			
Relative Humidity:	11	0-95% pH non-condensing.			
Repeatability:	12	±0.01% of Span.			
Stability:	13	0.03 pH per 24 hours, non-cumulative			
Resolution:	14	0.004% mA(12-bit) analog output.			
Response Time:	15	95% of Range in 5 seconds.			
SENSOR					
Type:	16	Probe Type			
Element:	17	pH and Reference Electrodes.			
Enclosure/Housing:	18	Epoxy Body; Chemical Resistant Liquid Crystal Polymer.			
Mounting:	19	Flow Through Cell, Insertion Type.			
Connections:	20	Process Conn.: 3/4 inch NPT.			
Commun. Cable:	21	PVC jacketed submersible cable to transmitter; Length as required.			
Additional Features:	22	Thermistor for Process Temperature Correction.			
TRANSMITTER					
Type:	23	Microprocessor-based, dual sensor Analyzer/Transmitter.			
Output:	24	4-20 mADC direct acting, 0-600 ohms.			
Power Supply:	25	120 VAC ±10, 50/60 Hz, 10 watts.			
Relays:	26	Four SPDT, form C relays; Selectable Hi-Hi, Hi, Lo, Lo-Lo.			
Rating:	27	5 A at 120 VAC.			
Indication / Display:	28	Local LCD; 1/2 inch character height min.; Built-In Self-Diagnostics and Simulator (See Notes, Lines 36 & 37).			
Enclosure/Housing:	29	NEMA 4X; Polycarbonate face panel; Epoxy-coated cast aluminum door and case.			
Mounting:	30	Surface Mount (Mount on 1/4" S.S. Back Plate)			
Area Classification:	31	Not Applicable			
Additional Features:	32	Keypad (See Notes, Line 38, 39).			
NOTES					
Function:	33	Continuous monitoring system shall consist of pH sensor and a microprocessor based analyzer/transmitter designed to measure sample pH and produce a proportional output signal linear to the pH.			
Materials:	34	All wetted parts shall be chemical resistant liquid crystal polymer or other material compatible with the process fluid. Refer to Materials Compatibility Chart.			
Installation:	35	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.			
Simulator:	36	Provide simulator used in conjunction with front panel controls and display to verify calibration, proper internal functioning of the analog-to-digital conversion, processing, outputs and setting up alarms.			
Self-Diagnostics:	37	Error messages shall indicate operational/equipment malfunctions, including EPROM failure (data is not valid), scaling card not present/not recognized, analog-to-digital converter not responding, RAM failure, and internal serial communication failure. All configuration data shall be stored in non-volatile EEPROM.			
Keypad:	38	Provide front panel, membrane sealed keypad for display control and transmitter function control testing and calibration. Front panel switch shall also allow alternate display of readouts for pH, Temperature and mA outputs.			
Two-Channel:	39	Transmitter shall have two channels to accommodate pH and Turbidity Probe cables and process two signals simultaensouly. Transmitter shall provide two individual 4-20 mA outputs for pH and Turbidity values.			
MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	40	Hach	ABB	Endress & Hauser	

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		**Analyzer - Phosphate**		SHEET 1 OF 1	
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.14	ADDENDUM/C.O.
TAG NO.		**AE / AIT - 046**			
Ref. Dwg. No.:	1	I-04			
PROCESS					
Location:	2	GAC Building Mezz. Floor			
Service:	3	Distribution Water			
Vessel / Line No.:	4	Chemical Monitoring System			
Fluid:	5	Potable Water			
Temp. Min/Max:	6	33 to 80 degree F			
PERFORMANCE					
Range:	7	4 ppb - 3000 ppb as PO4			
Accuracy:	8	±4% of Reading.			
Repeatability:	9	±1% of Reading.			
Temperature:	10	41 to 113 degrees F.			
Response Time:	11	10 minutes at 77 degrees F			
SENSOR					
Type:	12	Phosphate Sensor.			
Reagent:	13	Type as recommended by manufacturer; (See Notes, Line 32).			
Capillary Tubing:	14	Sample tubing length as required from process port to Analyzer/Transmitter.			
Mounting:	15	Integral Mount to Analyzer/Transmitter.			
Sample Pressure:	16	2 to 87 PSI			
Additional Features:	17	Sensitivity Adjustment Dial; Air Purge Option; Provide means to filter process fluid.			
TRANSMITTER					
Type:	18	Microprocessor-based Phosphate Analyzer/Transmitter to continuously monitor in a sample stream.			
Output:	19	4-20 mADC.			
Power Supply:	20	120 VAC, 60 Hz.; Battery backup for Controller Memory Storage and Date/Time.			
Relays:	21	4 Programmable Relays (2 Sample Concentration Alarms, 1 System Warning Alarm, 1 Malfunction Alarm).			
Indication / Display:	22	5.7" LCD sreen. Programmable Controller/Recorder with keypad and LCD display; Date/Time Stamp Indication; Engineering Units.			
Enclosure/Housing:	23	NEMA 4X Enclosure with Viewing Window.			
Mounting:	24	Wall or Surface Mount; 316 S.S. Mounting Hardware/Brackets.			
Connections:	25	Sample Inlet: 6mm OD quick connect fitting. Drain Outlet: 11mm ID slip-on fitting			
Commun. Cable:	26	As required			
Area Classification:	27	Not Applicable			
Additional Features:	28	Integral Auto 1-point Calibration System; Security Features.			
NOTES					
General:	29	Unit shall consist of a sensor and a microprocessor based analyzer/transmitter designed to measure sample phosphate and produce an output signal linear to phosphate. All components shall be housed in one enclosure.			
Materials:	30	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.			
Installation:	31	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.			
Consumables:	32	Provide sufficient quantities of reagents and expendables for one year of operation. Bi or Tri-Monthly replacement cycle. The analyzer shall use quick connect reagent bottles with pre-installed tubing. Reagents shall be pressurized using a built-in air compressor.			
	33				
	34				
MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	35	Hach			

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Analyzer - Turbidity		SHEET 1 OF 1
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.17 / ADDENDUM/C.O. 1
TAG NO.		**AE - 061**		
Ref. Dwg. No.:	1	I-03		
PROCESS				
Location:	2	GAC Building		
Service:	3	GAC Contactors Discharge		
Line Size.:	4	24"		
Fluid:	5	Treated Water		
Temp. Min/Max:	6	32 to 104 F		
Press. Min/Max:	7	0/14.5 PSI		
PERFORMANCE				
Range:	8	0 to 700 NTU		
Accuracy:	9	0-40 NTU: +/-2% of reading plus 0.01 NTU.		
Temperature:	10	Ambient: 32 to 104 degrees F.		
Repeatability:	11	Better than 1%		
Signal Average	12	5 to 90 seconds		
Response Time:	13	T90<30 sec at 100 mL/min		
Sample Flow Rate:	14	200 to 500 mL/min		
SENSOR				
Type:	15	90 Degree Scattered Light (Laser) Principle Sensor (See Notes, Line 25).		
Element:	16	Flow Through Nephelometric.		
Enclosure/Housing:	17	S.S: Optics Carrier and Sleeve. S.S: Threaded cable fitting.		
Capillary Tubing:	18	Refer to Materials Compatibility Chart.		
Mounting:	19	Pipe Mounting Kit; S.S. Hardware.		
Connections:	20	Process Conn.: 1/4 inch NPT.		
Commun. Cable:	21	Integral shielded cable to Analyzer/Transmitter.		
Area Classification:	22	Note Applicable		
Additional Features:	23	Air Bubble Compensation		
TRANSMITTER				
	24	Shall be wired to Channel 2 on AIT-047, shared for pH & Turbidity		
NOTES				
Function:	25	Continuous monitoring system consisting of a sensor and a microprocessor-based analyzer/transmitter designed to continuously measure the turbidity of liquids and produce an output signal linearly proportional to the turbidity.		
Measuring Principle:	26	Unit shall utilize back scattered light type signal analysis to measure and detect the light scattered at 90 degrees of the incident light beam.		
Materials:	27	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.		
Installation:	28	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation. Provide all hardware as required.		
Keypad:	29	Keypad shall be panel mounted and used for configuration, calibration, and diagnostics. All user settings shall be retained in memory. Configuration values shall be password protected.		
	30	Turbidity Analyzer shall be EPA compliant for drinking water.		
	31			
MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	32	Hach	ABB	Royce Water Industries

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Flow Indicator - Rotameter		SHEET 1 OF 2
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.27 / ADDENDUM/C.O.
TAG NO.		FI - 060	FI - 062	FI - 063
Ref. Dwg. No.:	1	I-09	I-09	I-09
PROCESS				
Location:	2	GAC Building Mezz. Floor	GAC Building Mezz. Floor	GAC Building Mezz. Floor
Service:	3	Pressurized Sampling Inlet	Chlorine Sample Flow	Fluoride Sample Flow
Vessel / Line No.:	4	-	-	-
Fluid:	5	Potable Water	Potable Water	Potable Water
Temp. Min/Max:	6	33 to 150 F	33 to 150 F	33 to 150 F
Press. Min/Max:	7	0 - 100 PSI	0 - 100 PSI	0 - 100 PSI
Flow Min/Max:	8	0 to 32 GPH	0 to 8 GPH	0 to 8 GPH
PERFORMANCE				
Range:	9	0 to 32 GPH	0 to 8 GPH	0 to 8 GPH
Accuracy:	10	± 2 to 5 % of Maximum Flow	± 2 to 5 % of Maximum Flow	± 2 to 5 % of Maximum Flow
Operating Temp.:	11	150 degrees F maximum.	150 degrees F maximum.	150 degrees F maximum.
Operating Press.:	12	100 PSIG maximum.	100 PSIG maximum.	100 PSIG maximum.
ROTAMETER				
Type:	13	Low Flow Variable-Area Flow Meter; (See Notes, Line 25).	Low Flow Variable-Area Flow Meter; (See Notes, Line 25).	Low Flow Variable-Area Flow Meter; (See Notes, Line 25).
Tube:	14	Borosilicate Glass Tube	Borosilicate Glass Tube	Borosilicate Glass Tube
Float:	15	316 S.S.	316 S.S.	316 S.S.
O-Ring:	16	Buna N	Buna N	Buna N
Retainers:	17	316 S.S.	316 S.S.	316 S.S.
Plugs/Adapters:	18	316 S.S.	316 S.S.	316 S.S.
End Fittings:	19	316 S.S.	316 S.S.	316 S.S.
Indication / Display:	20	Scaled Indication	Scaled Indication	Scaled Indication
Enclosure/Housing:	21	Rugged Glass type	Rugged Glass type	Rugged Glass type
Mounting:	22	Pipeline Mount 1" NPT	Pipeline Mount 1" NPT	Pipeline Mount 1" NPT
Area Classification:	23	Not Applicable	Not Applicable	Not Applicable
Additional Features:	24	RoHS Certified	RoHS Certified	RoHS Certified

NOTES		
General:	25	A Low Flow Rotameter constitutes flow conditions BELOW (and including) 40 GPH or 115 SCFH. A High Flow Rotameter constitutes flow conditions ABOVE 40 GPH or 115 SCFH.
Materials:	26	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.
Installation:	27	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.
Tube Material:	28	A Borosilicate Glass Tube shall be used for most applications. A glass tube is not suited for applications with: water over 90°C (194°F), high pH (softens glass), wet steam (softens glass), caustic soda (dissolves glass), and hydrofluoric acid (etches glass). For these applications a stainless steel tube shall be used with a float that is magnetically coupled with an indicating gauge.
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MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	38	Brooks Instruments	Yokogawa	OMEGA

PRODUCT		Flow Indicator - Rotameter		SHEET 2 OF 2
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.27 / ADDENDUM/C.O. 1
TAG NO.		FI - 064	FI - 065	
Ref. Dwg. No.:	1	I-09	I-09	
PROCESS				
Location:	2	GAC Building Mezz. Floor	GAC Building Mezz. Floor	
Service:	3	Phosphate Sample Flow	Turbidity Sample Flow	
Vessel / Line No.:	4	-	-	
Fluid:	5	Potable Water	Potable Water	
Temp. Min/Max:	6	33 to 150 F	33 to 150 F	
Press. Min/Max:	7	0 - 100 PSI	0 - 75 PSI	
Flow Min/Max:	8	0 to 8 GPH	0 to 8 GPH	
PERFORMANCE				
Range:	9	0 to 8 GPH	0 to 8 GPH	
Accuracy:	10	± 2 to 5 % of Maximum Flow	± 2 to 5 % of Maximum Flow	
Operating Temp.:	11	150 degrees F maximum.	150 degrees F maximum.	
Operating Press.:	12	100 PSIG maximum.	75 PSIG maximum.	
ROTAMETER				
Type:	13	Low Flow Variable-Area Flow Meter; (See Notes, Line 25).	Low Flow Variable-Area Flow Meter; (See Notes, Line 25).	
Tube:	14	Borosilicate Glass Tube	Borosilicate Glass Tube	
Float:	15	316 S.S.	316 S.S.	
O-Ring:	16	Buna N	Buna N	
Retainers:	17	316 S.S.	316 S.S.	
Plugs/Adapters:	18	316 S.S.	316 S.S.	
End Fittings:	19	316 S.S.	316 S.S.	
Indication / Display:	20	Scaled Indication	Scaled Indication	
Enclosure/Housing:	21	Rugged Glass type	Rugged Glass type	
Mounting:	22	Pipeline Mount 1" NPT	Pipeline Mount 1" NPT	
Area Classification:	23	Not Applicable	Not Applicable	
Additional Features:	24	RoHS Certified	RoHS Certified	

NOTES		
General:	25	A Low Flow Rotameter constitutes flow conditions BELOW (and including) 40 GPH or 115 SCFH. A High Flow Rotameter constitutes flow conditions ABOVE 40 GPH or 115 SCFH.
Materials:	26	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.
Installation:	27	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.
Tube Material:	28	A Borosilicate Glass Tube shall be used for most applications. A glass tube is not suited for applications with: water over 90°C (194°F), high pH (softens glass), wet steam (softens glass), caustic soda (dissolves glass), and hydrofluoric acid (etches glass). For these applications a stainless steel tube shall be used with a float that is magnetically coupled with an indicating gauge.
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MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	38	Brooks Instruments	Yokogawa	OMEGA

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Flow Meter - Magnetic Flow Tube		SHEET 1 OF 2
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.29 / ADDENDUM/C.O.
TAG NO.		FE / FIT - 005, 006, 007	FE / FIT - 008, 009, 010	FE / FIT - 011, 012, 013
Ref. Dwg. No.:	1	I-02	I-02	I-02
PROCESS				
Location:	2	GAC Building	GAC Building	GAC Building
Service:	3	GAC Contactor Feed To 3 Units	GAC Contactor Feed To 2 Units	GAC Contactor Feed
Line Size:	4	12"	12"	12"
Fluid:	5	Water	Water	Water
Temp. Min/Max:	6	33 to 80 F	33 to 80 F	33 to 80 F
Flow Min/Max:	7	0-3000 GPM	0-2000 GPM	0-1000 GPM
PERFORMANCE				
Range:	8	0-3000 GPM	0-2000 GPM	0-1000 GPM
Accuracy:	9	±0.5% of flow rate over 1-31 fps range; ±0.005 fps for flows below 1 fps.	±0.5% of flow rate over 1-31 fps range; ±0.005 fps for flows below 1 fps.	±0.5% of flow rate over 1-31 fps range; ±0.005 fps for flows below 1 fps.
Temperature:	10	32.2 to 122 degrees F.	32.2 to 122 degrees F.	32.2 to 122 degrees F.
Repeatability:	11	±0.2% of range.	±0.2% of range.	±0.2% of range.
Fluid Conductivity:	12	> 20 µS/cm.	> 20 µS/cm.	> 20 µS/cm.
Impedance:	13	Minimum Pre-amp Input: 1012 ohms.	Minimum Pre-amp Input: 1012 ohms.	Minimum Pre-amp Input: 1012 ohms.
Drift:	14	Complete zero stability.	Complete zero stability.	Complete zero stability.
FLOW TUBE				
Type:	15	Lined Metal Flow Tube.	Lined Metal Flow Tube.	Lined Metal Flow Tube.
Element:	16	Conical or Elliptical Shaped Electrode.	Conical or Elliptical Shaped Electrode.	Conical or Elliptical Shaped Electrode.
Electrode/Liner:	17	Polypropylene (or Equal)	Polypropylene (or Equal)	Polypropylene (or Equal)
Line Size:	18	12"	12"	12"
Enclosure/Housing:	19	Die-cast, Low-copper Aluminum Alloy; Submersible in 30 feet water for 48 hours; Epoxy paint finish.	Die-cast, Low-copper Aluminum Alloy; Submersible in 30 feet water for 48 hours; Epoxy paint finish.	Die-cast, Low-copper Aluminum Alloy; Submersible in 30 feet water for 48 hours; Epoxy paint finish.
Mounting:	19	Carbon Steel Flange End Connections.	Carbon Steel Flange End Connections.	Carbon Steel Flange End Connections.
ANSI Class:	20			
Additional Features:	21	316 S.S. Grounding Rings/Straps.	316 S.S. Grounding Rings/Straps.	316 S.S. Grounding Rings/Straps.
TRANSMITTER				
Type:	22	Pulsed DC Magnetic Flow Transmitter.	Pulsed DC Magnetic Flow Transmitter.	Pulsed DC Magnetic Flow Transmitter.
Output:	23	4-20 mADC direct-acting, galvanically isolated; into 0-1000 ohms.	4-20 mADC direct-acting, galvanically isolated; into 0-1000 ohms.	4-20 mADC direct-acting, galvanically isolated; into 0-1000 ohms.
Power Supply:	24	120 VAC ±10%, 60 Hz ±3 Hz.	120 VAC ±10%, 60 Hz ±3 Hz.	120 VAC ±10%, 60 Hz ±3 Hz.
Indication / Display:	25	Local LCD; Display Flow in Engineering Units; Provide Totalizer (See Notes, Line 39).	Local LCD; Display Flow in Engineering Units; Provide Totalizer (See Notes, Line 39).	Local LCD; Display Flow in Engineering Units; Provide Totalizer (See Notes, Line 39).
Enclosure/Housing:	26	Integral	Integral	Integral
Mounting:	27	Wall Mount; 316 S.S. hardware.	Wall Mount; 316 S.S. hardware.	Wall Mount; 316 S.S. hardware.
Connections:	28	Electrical Conn.: 3/4 inch NPT.	Electrical Conn.: 3/4 inch NPT.	Electrical Conn.: 3/4 inch NPT.
Commun. Cable:	29	Shielded Cable to flow tube.	Shielded Cable to flow tube.	Shielded Cable to flow tube.
Area Classification:	30	N/A	N/A	N/A
Additional Features:	31	Automatic zeroing.	Automatic zeroing.	Automatic zeroing.
NOTES				
Function:	32	System shall monitor liquid flows, display monitored flow value, and output a signal proportional to monitored flow.		
Installation:	33	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.		
Calibration:	34	Provide ISO Factory Calibration Certificate. Provide one calibrator suitable to calibrate all flow tubes provided.		
Accuracy:	35	Accuracy shall be: - Unaffected by changes in fluid velocity, density, pressure, temp. or conductivity (above min. conductivity limits). - Verified by flow test curves. Submit flow test curves for furnished meters with a minimum of 10 equally spaced flow points, using water and a weight or volume tank. A "master meter" used as a reference standard is not acceptable. A test setup shall be submitted and approved prior to testing.		
Span Adjustment:	36	Unit shall have pre-calibrated continuous span adjustment over entire range. Provide direct reading thumbwheel switch or potentiometer for 1-31 ft/sec.		
Signal Conditioning:	37	Adjustable signal conditioning damping circuit with response times of 1-25 seconds minimum.		
Low Flow Cutoff:	38	Automatic low flow cutoff circuitry shall stop pulse output and local totalization when flow drops below 0.5% ±0.2% of calibrated upper range value.		
Totalizer:	39	Totalizer shall be: - 7-digit electromechanical or 8-digit electronic LCD unit, with reset and lithium battery backup. - Driven by high accuracy, field adjustable scaled pulse output (0.1-10 Hz or greater). - Integral with transmitter and visible through viewing window, or externally mounted adjacent to transmitter in a separate NEMA 4X enclosure or condulet with viewing window.		
Spool Piece:	40	Provide a replacement spool piece for each size flow tube where no bypass piping is provided.		
	41	**FE / FIT - 005, 006, 007, 008, 009, 010, 011, 012 & 013**		
MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	42	Endress & Hauser	Krohne America, Inc.	ABB

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Flow Meter - Magnetic Flow Tube		SHEET 2 OF 2
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.29 / ADDENDUM/C.O.
TAG NO.		**FE / FIT - 035**	**FE / FIT - 051**	**FE / FIT - 053**
Ref. Dwg. No.:	1	I-03	I-04	I-04
PROCESS				
Location:	2	FIT-035 Meter Vault	GAC Building	GAC Building
Service:	3	Contact Tank Feed	GAC Backwash Supply	High Pressure Distribution
Vessel / Line No.:	4	24"	8"	20"
Fluid:	5	Water	Water	Water
Temp. Min/Max:	6	33 to 80 F	33 to 80 F	33 to 80 F
Flow Min/Max:	7	0 - 6200 GPM	0-1000 GPM	0 - 4000 GPM
PERFORMANCE				
Range:	8	0 - 6500 GPM	0-1500	0 - 6000 GPM
Accuracy:	9	±0.5% of flow rate over 1-31 fps range; ±0.005 fps for flows below 1 fps.	±0.5% of flow rate over 1-31 fps range; ±0.005 fps for flows below 1 fps.	±0.5% of flow rate over 1-31 fps range; ±0.005 fps for flows below 1 fps.
Temperature:	10	32.2 to 122 degrees F.	32.2 to 122 degrees F.	32.2 to 122 degrees F.
Repeatability:	11	±0.2% of range.	±0.2% of range.	±0.2% of range.
Fluid Conductivity:	12	> 20 µS/cm.	> 20 µS/cm.	> 20 µS/cm.
Impedance:	13	Minimum Pre-amp Input: 1012 ohms.	Minimum Pre-amp Input: 1012 ohms.	Minimum Pre-amp Input: 1012 ohms.
Drift:	14	Complete zero stability.	Complete zero stability.	Complete zero stability.
FLOW TUBE				
Type:	15	Lined Metal Flow Tube.	Lined Metal Flow Tube.	Lined Metal Flow Tube.
Element:	16	Conical or Elliptical Shaped Electrode.	Conical or Elliptical Shaped Electrode.	Conical or Elliptical Shaped Electrode.
Electrode/Liner:	17	Elastomer (or Equal)	Elastomer (or Equal)	Elastomer (or Equal)
Line Size:	18	24"	8"	20"
Enclosure/Housing:	19	Die-cast, Low-copper Aluminum Alloy; Submersible in 30 feet water for 48 hours; Epoxy paint finish.	Die-cast, Low-copper Aluminum Alloy; Submersible in 30 feet water for 48 hours; Epoxy paint finish.	Die-cast, Low-copper Aluminum Alloy; Submersible in 30 feet water for 48 hours; Epoxy paint finish.
Mounting:	19	Carbon Steel Flange End Connections.	Carbon Steel Flange End Connections.	Flange End Connections.
ANSI Class:	20			
Additional Features:	21	316 S.S. Grounding Rings/Straps.	316 S.S. Grounding Rings/Straps.	316 S.S. Grounding Rings/Straps.
TRANSMITTER				
Type:	22	Pulsed DC Magnetic Flow Transmitter.	Pulsed DC Magnetic Flow Transmitter.	Pulsed DC Magnetic Flow Transmitter.
Output:	23	4-20 mADC direct-acting, galvanically isolated; into 0-1000 ohms.	4-20 mADC direct-acting, galvanically isolated; into 0-1000 ohms.	4-20 mADC direct-acting, galvanically isolated; into 0-1000 ohms.
Power Supply:	24	120 VAC ±10%, 60 Hz ±3 Hz.	120 VAC ±10%, 60 Hz ±3 Hz.	120 VAC ±10%, 60 Hz ±3 Hz.
Indication / Display:	25	Local LCD; Display Flow in Engineering Units; Provide Totalizer (See Notes, Line 39).	Local LCD; Display Flow in Engineering Units; Provide Totalizer (See Notes, Line 39).	Local LCD; Display Flow in Engineering Units; Provide Totalizer (See Notes, Line 39).
Enclosure/Housing:	26	Integral	Integral	Integral
Mounting:	27	Wall Mount; 316 S.S. hardware.	Wall Mount; 316 S.S. hardware.	Wall Mount; 316 S.S. hardware.
Connections:	28	Electrical Conn.: 3/4 inch NPT.	Electrical Conn.: 3/4 inch NPT.	Electrical Conn.: 3/4 inch NPT.
Commun. Cable:	29	Shielded Cable to flow tube.	Shielded Cable to flow tube.	Shielded Cable to flow tube.
Area Classification:	30	N/A	N/A	N/A
Additional Features:	31	Automatic zeroing.	Automatic zeroing.	Automatic zeroing.
NOTES				
Function:	32	System shall monitor liquid flows, display monitored flow value, and output a signal proportional to monitored flow.		
Installation:	33	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.		
Calibration:	34	Provide ISO Factory Calibration Certificate. Provide one calibrator suitable to calibrate all flow tubes provided.		
Accuracy:	35	Accuracy shall be: - Unaffected by changes in fluid velocity, density, pressure, temp. or conductivity (above min. conductivity limits). - Verified by flow test curves. Submit flow test curves for furnished meters with a minimum of 10 equally spaced flow points, using water and a weight or volume tank. A "master meter" used as a reference standard is not acceptable. A test setup shall be submitted and approved prior to testing.		
Span Adjustment:	36	Unit shall have pre-calibrated continuous span adjustment over entire range. Provide direct reading thumbwheel switch or potentiometer for 1-31 ft/sec.		
Signal Conditioning:	37	Adjustable signal conditioning damping circuit with response times of 1-25 seconds minimum.		
Low Flow Cutoff:	38	Automatic low flow cutoff circuitry shall stop pulse output and local totalization when flow drops below 0.5% ±0.2% of calibrated upper range value.		
Totalizer:	39	Totalizer shall be: - 7-digit electromechanical or 8-digit electronic LCD unit, with reset and lithium battery backup. - Driven by high accuracy, field adjustable scaled pulse output (0.1-10 Hz or greater). - Integral with transmitter and visible through viewing window, or externally mounted adjacent to transmitter in a separate NEMA 4X enclosure or condulet with viewing window.		
Spool Piece:	40	Provide a replacement spool piece for each size flow tube where no bypass piping is provided.		
	41			
MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	42	Endress & Hauser	Krohne America, Inc.	ABB

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		**Level Transmitter - Submersible Pressure Type**		SHEET 1	OF 1
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.53	ADDENDUM/C.O.
TAG NO.		**LE / LIT - 043**			
Ref. Dwg. No.:	1	I-03			
PROCESS					
Location:	2	Backwash Tank Stilling Well			
Service:	3	Backwash Tank Level			
Vessel / Line No.:	4	Backwash Tank			
Fluid:	5	Potable Water			
Temp. Min/Max:	6	33 to 80 F			
Press. Min/Max:	7	0 to 6 PSI			
Level Min/Max:	8	0 to 9.23 Feet			
PERFORMANCE					
Range:	9	0 - 10 Feet			
Span:	10	±0.50% Full Scale.			
Accuracy:	11	±0.25% Full Scale.			
Temperature:	12	-25 to 180 degrees F.			
Zero Offset:	13	±0.50% Full Scale.			
SENSOR					
Type:	14	Hydrostatic Pressure Sensor.			
Diaphragm Seal:	15	Hastelloy C (or Equal)			
Enclosure/Housing:	16	Submersible Sensor, IP68 Type 6 ingress protection; Refer to Materials Compatibility Chart.			
Mounting:	17	316 S.S. Brackets/Hardware. (See I-08 for detail)			
Commun. Cable:	18	Submersible cable; Length as required.			
Area Classification:	19	N/A			
Additional Features:	20	Vent to the atmosphere, as necessary.			
TRANSMITTER					
Type:	21	Differential Pressure Transmitter.			
Input:	22	4-20 mADC.			
Output:	23	4-20 mA, 2 wire, current limited to 30 mA DC			
Power Supply:	24	24 VDC with surge and lightning protection.			
Relays:	25	2 relay outputs for Low Level Alarm.			
Indication / Display:	26				
Enclosure/Housing:	27	NEMA 4X; 316 S.S. Enclosure.			
Mounting:	28	Panel Mount; Provide Mounting Bracket and Hardware.			
Elec. Connections:	29	Attached 3-wire, 20 gauge polyethylene shielded unspliced cable.			
Area Classification:	30	Not Applicable			
Additional Features:	31	Terminal Housing and Protective Cap.			
NOTES					
Function:	32	System shall measure level by continuously measuring hydrostatic pressure via its sensing element, an ion implanted silicon semiconductor chip with integrated Wheatstone Bridge.			
Installation:	33	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.			
Calibration:	34	Provide ISO Factory Calibration Certificate.			
Materials:	35	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.			
	36				
	37				
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MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	39	AMETEK/Drexelbrook	GE/Druck	KPSI	

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Level Switch - Conductance Type		SHEET 1 OF 1
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.57 / ADDENDUM/C.O.
TAG NO.		**LE/LSH - 055**		
Ref. Dwg. No.:	1	I-03		
PROCESS				
Location:	2	Backwash/Stormwater Tanks		
Service:	3	Interstitial Space Leak Detection		
Vessel / Line No.:	4	BW/SW Tank Interstitial Space		
Fluid:	5	Potable Water		
Temp. Min/Max:	6	32 to 100 F		
Level Min/Max:	7	0 - 5		
PERFORMANCE				
Temperature:	8	-40 to 140 degrees F.		
Sensitivity:	9	10K ohms resistance; (See Notes, Line 31).		
SENSOR				
Type:	10	Level Sensor Control/Alarm Electrode.		
Element:	11	Electrode.		
No. of Electrodes:	12	1		
Insulation:	13	PVC		
Electrode Rod:	14	Shell-303 SS Insulator-Ceramic Seal-Glass & Copper		
Mounting:	15	3/8-18 PTF SAE Short Mounting Thread		
Additional Features:	16	Electrode Spacer. Wire suspension electrodes.		
SWITCH				
Type:	17	Solid State Control Relay.		
Power Supply:	18	120 VAC (-20, +10%), 60 Hz.; 9 V-A, 6 watts required.		
Relays:	19	3 separate, isolated sets of Form C (SPDT) contacts: 1 set wetted for local use, 2 sets dry for remote monitoring or external load control.		
Rating:	20	10A at 120 VAC.		
Contacts:	21	Silver cadmium oxide.		
Switch Action:	22	Switch Opens/Closes at predefined setpoint(s); Normally Closed contact.		
Setpoints:	23	High		
Indication / Display:	24	Not Applicable		
Enclosure/Housing:	25	Electorde Relay shall be mounted in GAC-CP. Appropriate length of cable from the electrode to the Electrode Relay shall be provided.		
Mounting:	26	-		
Area Classification:	27	Not Applicable		
Additional Features:	28			

NOTES		
Function:	29	Complete level sensing system shall utilize conductance type measuring techniques to energize and de-energize independent control relays when the monitored medium reaches the corresponding level electrode elevation.
Installation:	30	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.
Sensitivity:	31	Sensitivity shall be field changeable to adjust for process fluid conductivity by means of external resistor replacement and relay shall be field convertible for direct or inverse operation.
Quantity:	32	Provide one control relay per control or alarm electrode. Ground common electrode to each relay.
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MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	36	B/W Controls - Division of AMETEK	Endress + Hauser	

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Level Switch - Float Type (Single Point)		SHEET 1 OF 1	
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.59	ADDENDUM/C.O. 1
TAG NO.		LSHH - 043	LSHH-062		
Ref. Dwg. No.:	1	I-03	I-03		
PROCESS					
Location:	2	Backwash Tank Stilling Well	Backwash Feed Vault		
Service:	3	Backwash Tank	Backwash Feed Vault Sump Level		
Vessel / Line No.:	4	Backwash Tank	Backwash Feed Vault		
Fluid:	5	Treated Water	Treated Water		
Temp. Min/Max:	6	33 to 80 F	33 to 80 F		
Level Min/Max:	7				
Density Min/Max:	8	0 - 10 Feet	0 - 10 Feet		
PERFORMANCE					
Operating Temp.:	9	-40 to 140 degrees F.	-40 to 140 degrees F.		
SWITCH					
Type:	10	Displacement Type Liquid Level Sensor with Mechanical (Non-Mercury) Switch.	Displacement Type Liquid Level Sensor with Mechanical (Non-Mercury) Switch.		
Relays:	11	SPDT rated 16A resistive at 120 VAC and 5A resistive at 30 VDC.	SPDT rated 16A resistive at 120 VAC and 5A resistive at 30 VDC.		
Switch Action:	12	Switch Opens/Closes at predefined setpoint(s); Normally Closed contact.	Switch Opens/Closes at predefined setpoint(s); Normally Closed contact.		
Setpoints:	13	High High	High High		
Enclosure/Housing:	14	NEMA 4X; Hollow hermetically sealed, rigidly molded polypropylene float body; Contains switch and weight.	NEMA 4X; Hollow hermetically sealed, rigidly molded polypropylene float body; Contains switch and weight.		
Mounting:	15	Pole Mount; 316 S.S. Hardware.	Pole Mount; 316 S.S. Hardware.		
Electrical Cable:	16	Heavy duty, 3-conductor, flexible, submersible cable sheathed in PVC with watertight seal; Length as required.	Heavy duty, 3-conductor, flexible, submersible cable sheathed in PVC with watertight seal; Length as required.		
Area Classification:	17	Not Applicable	Not Applicable		
Additional Features:	18	Weight (See Notes, Line 21).	Weight (See Notes, Line 21).		
NOTES					
General:	19	Direct acting, pear shaped, eccentric weighted, displacement type liquid level sensor.			
Installation:	20	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.			
Weight:	21	Provide eccentric metal weight to cause sensor to hang straight down from cable when not immersed and only allow float to pivot when immersed in liquid.			
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MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	34	FLYGT - Division of ITT Industries	STI	SJE-Rhombus	

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT	Pressure Gauge - Bourdon Type	SHEET 1 OF 1	
PROJECT	GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT	SPEC. NO. 40 60 05 - 3.5.C.73	ADDENDUM/C.O.

GAUGE		
Type:	1	Liquid Filled Gauge for pressure ranges >15 psi and vacuum ranges <30 inches-Hg.
Element:	2	316 S.S. Bourdon Tube and Socket; Heliarc Welded, unless otherwise specified.
Accuracy:	3	±0.5% of span.
Diaphragm Seal:	4	A diaphragm seal is required for all mediums except air or potable water. Diaphragm material shall be compatible with the process fluid. Refer to Diaphragm Seal Data Sheet for requirements.
Pressure Snubber:	5	Provide sintered stainless steel or brass (for copper pipe) pressure snubber threaded into gauge socket or in external steel housing with 1/4 inch NPT male and female connections.
Indication / Display:	6	Glass window; White and Black markings on Dial; 300 series S.S. movement; Built-In overload/underload stops; Rotary geared with Teflon S coating, or cam and roller type.
Enclosure/Housing:	7	4-1/2 inch Black Case; Solid front design constructed of glass filled polyester; Full blowout back for overpressure protection.
Mounting:	8	Stem Mounting; 1/4 inch male NPT connection on bottom.
Additional Features:	9	Threaded, glass filled polyester ring.
NOTES		
General:	10	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.
Installation:	11	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.
Calibration:	12	Adjustable pointer and externally accessible zero adjustment; Provide ISO Factory Calibration Certificate.
Process Isolation:	13	Provide all valves for process isolation in accordance with specifications in this Section.
Fill Fluid:	14	Use silicone except for process fluids containing chlorine. When the process fluid contains chlorine, the filling liquid shall be Halocarbon 63 or Fluorolube 63.
	15	
	16	
	17	

MANUFACTURE				
Manufacturer:	18	Provide products of one of the following, Or Equal:		
		Ashcroft	Helicoid	WIKA Instrument Corporation

INSTRUMENT

Requirements specified above shall apply to all instrument tag numbers listed below.

	Tag No.	Process Fluid	Area Classification / Process Press. Min/Max (PSI)	Performance Range	Location / Service / Reference Drawing No.
1	PI - 054A	Potable Water	N/A 0 - 15 PSI	30" Hg - 30 PSI	Contact Tank Discharge Pressure I-03
2	PI - 054B	Potable Water	N/A 0 - 15 PSI	30" Hg - 30 PSI	Low Pressure Line Regulated Press. I-03
3	PI - 048A	Potable Water	N/A -10 - 15 PSI	30" Hg - 30 PSI	High Lift Pumps Combined Suction I-04
4	PI - 048B	Potable Water	N/A 0 - 100 PSI	0 - 150 PSI	High Lift Pump 1 Discharge Pressure I-04
5	PI - 049B	Potable Water	N/A 0 - 100 PSI	0 - 150 PSI	High Lift Pump 2 Discharge Pressure I-04
6	PI - 050B	Potable Water	N/A 0 - 100 PSI	0 - 150 PSI	High Lift Pump 3 Discharge Pressure I-04
7	PI - 061	Potable Water	N/A 0 - 40 PSI	0 - 60 PSI	Pressurized Sampling Inlet Pressure I-08
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9					
10					
11					
12					
13					
14					
15					

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Pressure Switch		SHEET 1 OF 1
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.75 / ADDENDUM/C.O.
TAG NO.		**PSL - 059**		
Ref. Dwg. No.:	1	I-03		
PROCESS				
Location:	2	GAC Building		
Service:	3	GAC Contactors Discharge		
Line Size:	4	24"		
Fluid:	5	Potable Water		
Temp. Min/Max:	6	33 to 80 F		
Press. Min/Max:	7	28/1 in.Hg (Vacuum Type)		
Velocity Min/Max:	8	1 to 5 fps		
PERFORMANCE				
Range:	9	30/0 in.Hg		
Temperature:	10	-4 to 140 degrees F.		
Repeatability:	11	±1% of range.		
Deadband:	12	Adjustable		
SENSOR				
Type:	13	Diaphragm/Piston Pressure Sensor. Vacuum Type.		
Element:	14	Transducer.		
Diaphragm Seal:	15	Refer to Materials Compatiblity Chart		
Capillary Tubing:	16	316 S.S. Capillary to extend from process connection to switch.		
Mounting:	17	Integral Mount to Switch.		
Area Classification:	18	Not Applicable		
Additional Features:	19			
SWITCH				
Type:	20	Snap Action Switch.		
Power Supply:	21	24 VDC		
Relays:	22	SPDT, snap action.		
Rating:	23	10A at 120 VAC; 0.5A at 30 VDC.		
Switch Action:	24	Switch Opens/Closes at predefined setpoint(s); Normally Closed contact.		
Setpoints:	25	Low Pressure. Field Adjustable		
Enclosure/Housing:	26	NEMA 4;		
Mounting:	27	Pipe Stand Mount; External Mounting Lugs; 316 S.S. Hardware.		
Connections:	28	Process Conn.: 1/4 inch NPT male; Electrical Conn.: 1/2" NPT male conduit with free leads.		
Area Classification:	29	No Applicable		
Additional Features:	30	Set/Reset Point Adjustment (See Notes, Line 34).		
NOTES				
General:	31	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.		
Function:	32	Pressure Switch shall sense gauge or absolute pressure and open or close a contact when the pressure reaches the specified trip point.		
Installation:	33	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.		
Set/Reset Point:	34	Provide Set and Reset Point adjustable external adjusting nuts and pressure setting scales. Provide metal cover with gasket for adjusting nuts.		
Diaphragm Seal:	35	A diaphragm seal is required for all mediums except air or potable water. Diaphragm material shall be compatible with the process fluid. Refer to Diaphragm Seal Data Sheet for requirements.		
	36			
	37			
	38			
MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	39	Barksdale Inc	Ashcroft	United Electric

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Pressure Transmitter		SHEET 1 OF 1	
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.76	ADDENDUM/C.O.
TAG NO.		**PIT - 052**			
Ref. Dwg. No.:	1	I-04			
PROCESS					
Location:	2	GAC Building			
Service:	3	High Distribution Service Line			
Vessel / Line No.:	4				
Fluid:	5	Water			
Temp. Min/Max:	6	33 to 80 F			
Press. Min/Max:	7	0 to 100 psi			
PERFORMANCE					
Range:	8	0 to 150 psi			
Accuracy:	9	±0.1% of calibrated span (includes effects of linearity, hysteresis, and repeatability).			
Temperature:	10	-20 to 180 °F; (See Notes, Line 35).			
Repeatability:	11	±0.05% of calibrated span.			
Damping:	12	Internal Adjustment.			
Hysteresis:	13	±0.05% of calibrated span.			
Stability:	14	Less than ±0.25% of Transmitter upper range limit (drift over 6 month period).			
Overrange Protec.:	15	Positive overrange protection: At least 1.25 times maximum span limit.			
SENSOR					
Type:	16	Pressure Gauge.			
Element:	17	Transducer.			
Diaphragm Seal:	18	Not Required			
Capillary Tubing:	19	316 S.S. Capillary to extend from process connection to transmitter.			
Mounting:	20	Integral Mount to Transmitter.			
Area Classification:	21	Not Applicable			
Additional Features:	22				
TRANSMITTER					
Type:	23	Solid state, 2-wire, Differential Capacitance or Resonant Wire Type Transmitter.			
Output:	24	4-20 mADC; (See Notes, Line 36).			
Power Supply:	25	24 VDC; Operates on power from receiver or remote power supply.			
Indication / Display:	26	Integral LCD Indication for Pressure in Engineering Units.			
Enclosure/Housing:	27	NEMA 4X; Epoxy painted; Die-cast low copper aluminum alloy housing; Covers threaded and seated on O-rings.			
Mounting:	28	Pipe Stand Mount.			
Connections:	29	Process Conn. 1/2 inch NPT; Electrical Conn.: 1/2 inch NPT.			
Area Classification:	30	Not Applicable			
Additional Features:	31	Built-In Surge and RFI protection.			
NOTES					
General:	32	All wetted parts shall be compatible with the process fluid. Refer to Materials Compatibility Chart.			
Installation:	33	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.			
Calibration:	34	Zero and Span (coarse & fine) adjustments in electronics compartment. Provide Zero Elevation and Suppression so that the extent of suppression plus the calibration span does not exceed the upper range limits of the sensor.			
Amb. Temp. Effect:	35	Total Error per 100 deg. F change between Ambient Temperature Limits: < ±1.0% transmitter range limit (max. span).			
Output:	36	Digital process variable signal superimposed on 4-20 mADC signal without compromising loop integrity.			
Shutoff Valve:	37	Provide a single shutoff valve at each process line tap to enable live process removal of transmitter. Provide Type 316 S.S. 3-valve manifold for shutoff and pressure equalization on differential pressure and flow measurement applications.			
Calibration Valve:	38	For each unit, provide an additional calibration valve port.			
Hand-held Unit:	39	Provide a hand held interface with keyboard and LED display for easy configuration and testing of transmitter.			
Diaphragm Seal:	40	A diaphragm seal is required for all mediums except air or potable water. Diaphragm material shall be compatible with the process fluid. Refer to Diaphragm Seal Data Sheet for requirements.			
	41				
MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	42	ABB	Rosemount - Division of Emerson		

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Temperature Transmitter - RTD Type		SHEET 1 OF 2	
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.80	ADDENDUM/C.O. 1
TAG NO.		TIT - 014	TIT-060		
Ref. Dwg. No.:	1	I-02	I-04		
PROCESS					
Location:	2	Head House Building	GAC CP Building		
Service:	3	GAC Pumps Discharge Temperature	1.2MG Contact Tank Discharge Low		
Vessel / Line No.:	4	-	-		
Fluid:	5	Raw Water	Treated Water		
Temp. Min/Max:	6	0-180 F	0-180 F		
PERFORMANCE					
Range:	7	0-180 F	0-180 F		
Sensor Accuracy:	8	±0.5 deg. F or ±0.5% of actual temp., greater of two from 32-1200 deg. F.	±0.5 deg. F or ±0.5% of actual temp., greater of two from 32-1200 deg. F.		
Trans. Accuracy:	9	±0.2% of calibrated span, including repeatability and linearity.	±0.2% of calibrated span, including repeatability and linearity.		
Stability:	10	<0.1 deg. F shift from initial calibration in 1 year.	<0.1 deg. F shift from initial calibration in 1 year.		
Resistance:	11	100 ohms at 32 degrees F; 0.22 ohms per degree F Change.	100 ohms at 32 degrees F; 0.22 ohms per degree F Change.		
SENSOR					
Type:	12	3 or 4-Wire RTD Type Standard Length Sensor Assembly.	3 or 4-Wire RTD Type Standard Length Sensor Assembly.		
Element:	13	Platinum RTD element.	Platinum RTD element.		
Sheath:	14	316 S.S.; Sheath Length, Diameter and Grounding State as recommended by manufacturer.	316 S.S.; Sheath Length, Diameter and Grounding State as recommended by manufacturer.		
Thermowell:	15	(See Notes, Line 34).	(See Notes, Line 34).		
Enclosure/Housing:	16	Waterproof Housing.	Waterproof Housing.		
Mounting:	17	10" Sensor Insertion Length; Coordinate with process piping and installation requirements.	10" Sensor Insertion Length; Coordinate with process piping and installation requirements.		
Commun. Cable:	18	Cable to Transmitter; Length as Required.	Cable to Transmitter; Length as Required.		
Additional Features:	19	Extension fittings.	Extension fittings.		
TRANSMITTER					
Type:	20	Solid-State Electronic Transmitter.	Solid-State Electronic Transmitter.		
Input:	21	Input isolation.	Input isolation.		
Output:	22	4-20mADC direct acting isolated, 0-600 ohms.	4-20mADC direct acting isolated, 0-600 ohms.		
Power Supply:	23	4-20mADC direct acting isolated, 0-600 ohms.	4-20mADC direct acting isolated, 0-600 ohms.		
Relays:	24	As Required.	As Required.		
Indication / Display:	25	3-1/2 digit LCD visible through enclosure window; Engineering Units.	3-1/2 digit LCD visible through enclosure window; Engineering Units.		
Enclosure/Housing:	26	NEMA 4X; Die cast, low copper aluminum enclosure.	NEMA 4X; Die cast, low copper aluminum enclosure.		
Mounting:	27	Pipe Stand Mount; Provide mounting brackets.	Pipe Stand Mount; Provide mounting brackets.		
Connections:	28	3/4 inch internal NPT; Barrier terminal strip wiring connections.	3/4 inch internal NPT; Barrier terminal strip wiring connections.		
Area Classification:	29	Not Applicable	Not Applicable		
Additional Features:	30	Temperature Effect (See Notes, Line 36); Built-in EMI and RFI protection.	Temperature Effect (See Notes, Line 36); Built-in EMI and RFI protection.		
NOTES					
Function:	31	Sensor shall create electrical resistance proportional to process medium temperature. Transmitter shall condition and convert resistance to provide a DC analog output signal linearly proportional to process medium temperature.			
Installation:	32	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.			
Calibration:	33	Provide ISO Factory Calibration Certificate. Unit shall be factory calibrated for operating temperature and field adjustable for span and zero settings.			
Thermowell:	34	Thermowells provide isolation between temperature sensor and environment allowing removal/replacement of temperature sensor without compromising ambient region or process. Thermowell material shall be compatible with the process fluid. Refer to Materials Compatibility Chart.			
Power Supply	35	Transmitter Power Supply Effect: Maximum of ± 0.005% of span per one VDC change in power supply.			
Temperature Effect:	36	Not more than ±0.5% span for a 50C change in ambient temperature within operative limits.			
MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	37	ABB	Rosemount - Division of Emerson		

PRODUCT		Temperature Transmitter - RTD Type		SHEET 2 OF 2
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.80 / ADDENDUM/C.O.
TAG NO.		TIT - 056	TIT - 057	
Ref. Dwg. No.:	1	I-02	I-02	
PROCESS				
Location:	2	GAC Building	GAC Building	
Service:	3	GAC Building Ambient Temperature	Electrical Room Ambient Temperature	
Vessel / Line No.:	4	-	-	
Pressure Min/Max:	5	0 - 50 PSI	0 - 50 PSI	
Temp. Min/Max:	6	10-120 F	10-120 F	
PERFORMANCE				
Range:	7	0-130 F	0-130 F	
Sensor Accuracy:	8	+/- 0.3 percent of Full Scale	+/- 0.3 percent of Full Scale	
Trans. Accuracy:	9	+/- 0.1 percent of Full Scale	+/- 0.1 percent of Full Scale	
Output Temperature Range:	10	User selectable between -30 to 250 degrees F with a minimum span of 40 degrees F	User selectable between -30 to 250 degrees F with a minimum span of 40 degrees F	
Response time:	11	250 ms	250 ms	
SENSOR				
Type:	12	RTD Type	RTD Type	
Element:	13	Platinum (Pt1000)	Platinum (Pt1000)	
Sheath:	14	Not Applicable	Not Applicable	
Thermowell:	15	Not Applicable	Not Applicable	
Enclosure/Housing:	16	Not Applicable	Not Applicable	
Mounting:	17	Integral Mount to the Transmitter	Integral Mount to the Transmitter	
Commun. Cable:	18	Not Applicable	Not Applicable	
Probe Length:	19	2" to 18", as required	2" to 18", as required	
TRANSMITTER				
Type:	20	Solid-State Electronic Transmitter.	Solid-State Electronic Transmitter.	
Input:	21	-	-	
Output:	22	4-20mA (2-wire loop powered)	4-20mA (2-wire loop powered)	
Power Supply:	23	24 VDC	24 VDC	
Relays:	24	As Required.	As Required.	
Indication / Display:	25	LCD visible; Engineering Units.	LCD visible; Engineering Units.	
Enclosure/Housing:	26	Weatherproof and Explosion-proof for Class I, Groups B, C, D; Class II, Groups E, F, G; Class III	Weatherproof and Explosion-proof for Class I, Groups B, C, D; Class II, Groups E, F, G; Class III	
Mounting:	27	Type 316 SS Bracket	Type 316 SS Bracket	
Conduit Connections:	28	1/2" female NPT	1/2" female NPT	
Area Classification:	29	Not Applicable	Not Applicable	
Additional Features:	30	Temperature Effect (See Notes, Line 36); Built-in EMI and RFI protection.	Temperature Effect (See Notes, Line 36); Built-in EMI and RFI protection.	
NOTES				
Function:	31	Sensor shall create electrical resistance proportional to process medium temperature. Transmitter shall condition and convert resistance to provide a DC analog output signal linearly proportional to process medium temperature.		
Installation:	32	Refer to Contract Drawing Installation Details and manufacturer's recommendations for installation.		
Calibration:	33	Provide ISO Factory Calibration Certificate. Unit shall be factory calibrated for operating temperature and field adjustable for span and zero settings.		
Thermowell:	34	Not Applicable		
Power Supply	35	Transmitter Power Supply Effect: Maximum of ± 0.005% of span per one VDC change in power supply.		
Temperature Effect:	36	Transmitter Ambient Temperature Effect: Not more than ±0.5% span for a 50 deg. C change in ambient temperature within operative limits.		
	37			
MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	38	Dwyer	Rosemount - Division of Emerson	

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT	**Flow Meter - Magnetic Insertion Type**		SHEET 1 OF 1	
PROJECT	GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.83	ADDENDUM/C.O.
TAG NO.		**FE / FIT - 054**		
Ref. Dwg. No.:	1	I-03		
PROCESS				
Location:	2	FIT-054 Meter Vault		
Service:	3	Low Pressure Distribution		
Vessel / Line No.:	4	36"		
Fluid:	5	Water		
Temp. Min/Max:	6	33 to 80 F		
Press. Min/Max:	7	0 to 15 PSI		
Flow Min/Max:	8	0 - 8000 GPM		
PERFORMANCE				
Range:	9	0 - 8000 GPM		
Accuracy Velocity:	10	+/- 2% of Rate		
Temperature:	11	0 to 140 degrees F		
Repeatability:	12			
Fluid Conductivity:	13	> 50 µS/cm		
SENSOR				
Electrode:	14	Stainless Steel 316L		
Body:	15	Stainless Steel		
Seals:	16	Suitable for Potable Water (WRAS listed). Refer to Materials Compatibility table		
Flow Sensor Cable Length:	17	As Required		
	18			
	19			
TRANSMITTER				
Power Supply	20	120 V AC		
Output:	21	4 to 20 mA		
Digital Outputs:	22	As Required		
Environmental Protection:	23	IP67 (NEMA 4X)		
Additional Features:	24	Tamper-Proof Security		
Enclosure:	25	Powder-coated Aluminum with glass window		
	26			
NOTES	27			
	28			
	29			
	30			
	31			
	32			
MANUFACTURE		Provide products of one of the following, Or Equal:		
Manufacturer:	33	ABB AquaProbe		

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		**Relative Humidty**		SHEET 1	OF 1
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.84	ADDENDUM/C.O.
TAG NO.		**ME / MIT - 058**			
Ref. Dwg. No.:	1	I-03			
PROCESS					
Location:	2	GAC Building Room			
Service:	3	Ambient Space RH sensing			
Vessel / Line No.:	4	-			
Fluid:	5	Ambient Space			
Temp. Min/Max:	6	-40 to 140 F			
Relative Humidity Min/Max:	7	0 to 100% RH			
Level Min/Max:	8				
Transmitter					
Accuracy:	9	+/- 2% for 10-90% RH			
Repeatability:	10	+/- 0.1%			
Power Requirements:	11	24 VDC			
Output Signal:	12	4 - 20 mA Analog Output			
Response Time:	13	15 seconds			
Conduit Connection:	14	1/2 female NPT			
RH Sensor Type:	15	Capactiance Polymer			
Housing Material:	16	Aluminum			
Local Indication:	17	2 line alphanumeric LCD Display			
Protection Classification:	18	Rated for Explosion - Proof Area			
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
NOTES					
Agency Approvals:	29	FM, CE.			
	30				
	31				
	32				
	33				
	34				
MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	35	Dwyer			

DATA SHEETS - PRIMARY SENSORS AND FIELD INSTRUMENTS

PRODUCT		Analyzer - Fluoride		SHEET 1 OF 1	
PROJECT		GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT		SPEC. NO. 40 60 05 - 3.5.C.85	ADDENDUM/C.O.
TAG NO.		AIT-045			
Ref. Dwg. No.:	1	I-04			
PROCESS					
Location:	2	GAC Building Mezz. Floor			
Service:	3	Distribution Water Monitoring			
Vessel / Line No.:	4	Chemical Monitoring System			
Fluid:	5	Potable Water			
Temp. Min/Max:	6	33 to 80 F			
Press. Min/Max:	7	0 to 40 psig			
RH Min/Max:	8	0 to 95% non-condensing			
Anlyzer					
Type:	9	Ion Selective Electrode (Formic Acid Reagent)			
Accuracy:	10	+/- 10%			
Range:	11	10 ppb to 200 ppm			
Inlet Pressure	12	8 to 100 psig			
Sample Flow Rate	13	40 mL/minute			
Response Time:	14	95% within 2 minutes of injecting a standard solution			
Enclosure Rating:	15	Waterproof; IP66; NEMA 4X			
Inlet Connection:	16	1/4" NPTF tube fitting			
Output:	17	4 to 20 mA			
Relay Details:	18	3 Relay output each rated at 5A			
Certifications:	19	CE, CSA, UL, FCC Class A limits			
Power Supply:	20	120V AC			
Local Indication:	21	Custom backlit LCD with temperautre, concentration, mV, error codes and menu driven prompts			
Drain Connection:	22	3/4" NPT male			
	23				
	24				
	25				
	26				
	27				
	28				
NOTES					
Consumables:	29	1 year supply of all required reagents for full functionality of the analzyer.			
Additional Features:	30	Unit shall be provided with an integral air pump for sampling.			
	31				
	32				
	33				
	34				
MANUFACTURE		Provide products of one of the following, Or Equal:			
Manufacturer:	35	Thermofisher Scientific			

REFERENCES: Materials Compatibility and Area Classification Charts

MATERIALS COMPATIBILITY CHART

Process Fluid	Diaphragm	O-Ring	Gasket			
Wastewater / Sludge	316 SS	Buna-N	Buna-N			
Potassium	Carpenter 20	Viton	Viton			
Sodium Hypochlorite	Teflon	Teflon	Teflon			
Polymer	316 SS	Buna-N	Buna-N			
Phosphoric Acid	316 SS	Buna-N	Buna-N			
Alum	316 SS	Teflon	Teflon			
Chlorine Gas	Teflon	Teflon	Teflon			
Chlorine Solution	Teflon	Teflon	Teflon			
Sodium Chloride	Teflon	Teflon	Teflon			
Ammonia	316 SS	Teflon	Teflon			
Methanol	316 SS	Teflon	Teflon			
Carbon	316 SS	Buna-N	Buna-N			
Lime	316 SS	Teflon	Teflon			
Ferric Chloride	Teflon	Teflon	Teflon			
Caustic Soda	Teflon	Teflon	Teflon			
Sodium Bisulfite	Teflon	Teflon	Teflon			
Sodium Hydroxide	Teflon	Teflon	Teflon			
Scrubber Solution	Teflon	Teflon	Teflon			
Fluoride	Hastelloy C	Viton	Viton			
Phosphate	316 SS	Teflon	Teflon			
Potable Water	316 SS	Buna-N	Buna-N			

AREA CLASSIFICATION CHART

Location	Description
Class 1	Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.
Class 1, Division 1	A location (1) In which ignitable concentrations of flammable gases or vapors can exist under normal operating conditions; or (2) In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or (3) In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors and might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition.
Class 1, Division 2	A location (1) In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment; or (2) In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation and might become hazardous through failure or abnormal operation of the ventilating equipment; or (3) That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.
Class 2	Class II locations are those that are hazardous because of the presence of combustible dust.
Class 2, Division 1	A location (1) In which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures; or (2) Where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, through operation of protection devices, or from other causes; or (3) In which Group E combustible dusts may be present in quantities sufficient to be hazardous.
Class 2, Division 2	A location (1) In which combustible dusts due to abnormal operations may be present in the air in quantities sufficient to produce explosive or ignitable mixtures; or (2) Where combustible dust accumulations are present but are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus, but could as a result of infrequent malfunctioning of handling or processing equipment become suspended in the air; or (3) In which combustible dust accumulations on , in, or in the vicinity of the electrical equipment could be sufficient to interfere with the safe dissipation of heat from electrical equipment, or could be ignitable by abnormal operation or failure of electrical equipment.
Class 3	Class III locations are those that are hazardous because of the presence of easily ignitable fibers or filings, but in which such fibers or filings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.
Class 3, Division 1	A location in which easily ignitable fibers or materials producing filings are handled, manufactured or used.
Class 3, Division 2	A location in which easily ignitable fibers are stored or handled (except in the process of manufacture).

* Source: NEC 2005 Edition - Article 500

SECTION XII

MEASUREMENT FOR PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section covers the methods and procedures that the Department will use to measure the CONTRACTOR's Work and provide payment. This description of the measurement and payment features will not, in any way, limit the responsibility of the CONTRACTOR for making a thorough investigation of the Contract Documents and Site conditions to determine the scope of the work included in each bid item.

B. Items listed starting in Article 1.7 of this Section refer to and are the same pay items listed in the Bid Form and constitute all pay items for completing the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant services, CONTRACTOR or ENGINEER's field offices, sanitary services, security, temporary controls, supervision, project sign, testing, safety provisions and safety devices, submittals and record drawings, power and fuel, traffic maintenance, removal of waste, coordination with CITY's operations, information technology (including hardware, software, and services) required during construction, bonds, insurance, or other requirements of the General Conditions, Supplementary Conditions, General Requirements, and other requirements of the Contract Documents. Payment will constitute complete compensation for all Work required by the Contract Documents, including all costs of accepting the general risks, liabilities and obligations, expressed or implied. Compensation for providing, as required, all supervision, labor, equipment, overhead, profit, material, tests, required services, applicable taxes, and for performing all other related Work items, shall be included in prices stipulated for lump sum and unit price pay items listed in this Section and included in the Contract.

C. Payment will be made to the CONTRACTOR in accordance with the specified methods of measurement and the unit or lump sum prices stipulated in the acceptance of the bid. Payment will constitute complete compensation for all work required by the Contract Documents including all costs of accepting the general risks, liabilities and obligations, expressed or implied. Payment under all tasks will include, but necessarily be limited to, compensation for furnishing all supervision, labor, equipment overhead, profit, material, services, applicable taxes, and for performing all other related work required. No other payment will be made.

D. Each lump sum and unit bid price shall include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

E. For unit price items, the CONTRACTOR shall be paid for the actual amount of work accepted and for the actual amount of materials in place during the period of construction. After the work is completed and before final payment is made, the ENGINEER or CONTRACTOR as specified in the pay items will make final measurements to determine the quantities of the various items of work accepted as the basis for final payment. The CONTRACTOR shall accept compensation as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals

necessary to the completed work and for performing all work contemplated and embraced by the Contract.

F. For lump sum items, the CONTRACTOR will be paid on the basis of actual work accepted until the work is completed. Upon completion of the item, 100 percent of the lump sum price may be paid, subject to the terms of the Agreement. The pay items listed below describe the measurement of and payment for the Work to be done under respective items listed in the Bid as outlined in the approved schedule of values.

G. No payment will be made for work performed by the CONTRACTOR to replace defective work, work which is not required by the Contract Documents, work outside the limits of the Contract and additional work necessary due to actions of the CONTRACTOR.

H. All units of measurement shall be standard United States convention, as applied to the specific items of work by tradition and as interpreted by the ENGINEER. Each unit or lump sum price stated in the Bid shall constitute full compensation, as herein specified, for each item of Work completed.

1.2 ENGINEER'S ESTIMATE OF QUANTITIES

A. The estimated quantities for Unit Price Items, as listed in the Bid Schedule, are approximate only and are included solely for purpose of the comparison of Bids. The ENGINEER does not expressly, or by implication, agree that nature of materials encountered or required shall correspond therewith and reserves the right to increase or decrease any such quantities or to eliminate quantities as the ENGINEER may deem necessary.

1.3 RELATED PROVISIONS

A. Payments to CONTRACTOR: Refer to Section VI Agreement Articles 9 and 14, Section VIII General Conditions and Section IX Supplementary Conditions.

B. Changes in Contract Price: Refer to Section VIII General Conditions, Section XI Supplementary Conditions and Section XI 01 26 00, Contract Modification Procedures.

C. Schedule of Values: Refer to Section VIII General Conditions, Section IX Supplementary Conditions, and Section XI 01 29 73, Schedule of Values.

1.4 QUANTITIES

A. The Estimated quantities indicated in the Bid Schedule are the quantities for the evaluation of bids. The actual quantities of items to be paid for on a unit price basis may vary significantly from the quantities indicated in the Bid Schedule.

1.5 SUBMITTALS

A. Schedule of Values (Bid Breakdown): Submit in accordance with Section VIII General Conditions Articles 1.4, 1.6 and 13.1.

1.6 INCIDENTAL ITEMS

A. Except for the items designated hereunder for Measurement and Payment, the costs of items necessary to complete the work as specified are considered incidental to the items specified for Measurement and Payment. The costs of incidental items shall be included in the prices of items specified for Measurement and Payment.

PART 2 - MEASUREMENT

A. Under this Contract, the CONTRACTOR shall provide all labor, equipment, and materials and shall complete all Work as shown and described in the Contract Documents and as directed by the ENGINEER, in accordance with the expressed intent of the Contract to secure a complete construction of a functionally complete Project. The bid items described in this Section shall together include all work set forth in the Contract Documents or required to properly complete the Work. Any necessary Work that is not explicitly described shall be considered included in the item to which it properly belongs. Where used in the Contract Documents, the word "including" ("includes", "include") shall mean "including (includes, include) but not limited to". Each item includes:

1. All tools, labor, material, equipment, plant services, bonds and insurance, tests, adjustments, warranties, overhead, supervision and other expenses required to perform the Work.

2. All accessories, manuals, and services pertinent to the proper installation of materials and equipment.

3. All accessories, manuals, and services pertinent to the proper start-up, operation, and maintenance of materials and equipment.

B. Lump Sum Items: Measurement of all Lump Sum Items will be on a total job basis.

4. The quantities of Work performed under lump sum items will not be measured except for the purpose of determining reasonable interim payments. Interim payments will be made in accordance with the estimated value of Work performed and found acceptable as determined by the ENGINEER, or as specified in this Section.

5. For each lump sum bid item, the CONTRACTOR shall provide a schedule of values per Subpart 1.5 of this Section. The schedule of values shall include a breakdown of major cost items included within the lump sum in sufficient detail to document the specific costs of all items included in the lump sum bid item. The schedule of values shall be provided prior to initiation of the Work.

6. Measurement for Progress Payments of all lump sum items will be on a percent complete basis as established in the Contract Documents.

C. Unit Price Items: For each unit price bid item, the CONTRACTOR shall provide a schedule of values per Subpart 1.5 of this Section. The schedule of values shall include a breakdown of major cost items included within the unit price in sufficient detail to document the specific costs of all items included in the unit price bid item. The schedule of values shall be provided prior to initiation

of the Work. Where items are specified to be measured on a unit basis, measurement will be of each particular unit as specified.

1. Volumetric Basis - Where solid or semi-solid items (e.g. sludge and sediment) are specified to be measured on a volumetric basis, the volume will be determined on an in-place basis (prior to excavation for excavation or after placement and compaction for imported fill) between the existing and final ground surfaces as measured by land surveys. If no tolerance is specified, the tolerance shall be interpreted to be 0.00 foot. Where liquid items are specified to be measured on a volumetric basis, the volume will be determined by direct readings obtained from a graduated container containing the liquid or from a calibrated meter designed to measure the quantity of liquid passing an established point or boundary (e.g. flow meter).

2. Area Basis - Where items are specified to be measured on an areal basis, the area will be measured as the actual surface area within the specified limits. If a specified width of an item is indicated, the area will be determined by the actual length along the centerline multiplied by the specified width. No adjustments will be made for the overlap of materials.

3. Length Basis - Where items are specified to be measured on a length basis, the length will be measured as the actual length along the centerline within specified limits. No adjustments will be made for the overlap of materials

4. Weight Basis - Where items are specified to be measured on a weight basis, the weight will be measured based on certified weigh scale tickets obtained from a weigh scale certified by the County Office of Weights and Measures and approved by the ENGINEER. The weights shall be taken in the presence of a Department representative. When the weight is per ton, trucks shall be weighed prior to loading and after loading. The measured tonnage will be the difference between the prior- and post-loading measured truck weights.

D. Measurement and payment will be made only for Work that has been acceptably performed within the limits shown on the Contract Documents and in conformance with the Contract Documents, as specified, or ordered by the ENGINEER.

PART 3 – BID ITEMS

Electric Construction Contract No. D010310

A. Bid Item LS-1 – GAC Treatment System Construction

1. Measurement and Payment: The bid lump sum price for Bid Item LS-1 – All Work required for the construction of the GAC Treatment System Construction, except for Work as required under other Bid Items, shall be the amount paid to the CONTRACTOR to demolish the 1 million gallon buried concrete storage tank, other demolition, site work, GAC Treatment Building, pavements, yard piping, tanks, installation of DEPARTMENT furnished equipment, site restoration and ancillary work at the Site in accordance with the requirements of the Contract Documents. Payments will be made based on percentage of work completed.

B. Bid Item UP-1 – Bedrock Excavation and Disposal

1. Payment: Bid Item UP-1 shall be bid unit cost price per cubic yard, as quantified by the in place measure and comparison of before and after surveys as approved by the Department's Representative. Provide all labor, materials, equipment and incidentals necessary to excavate, load, transport and dispose of bedrock at an acceptable location required for foundations, yard piping and site grading.
2. Measurement for payment of Bid Item UP-1 – Bedrock Excavation and Disposal shall be the actual number of cubic yards approved by the Department's Representative.

C. Bid Item UP-2 – Select Granular Fill

1. Payment: Bid Item UP-2 shall be bid unit cost price per cubic yard, as quantified by the in place measure and comparison of before and after surveys as approved by the Department's Representative. Provide all labor, materials, equipment and incidentals necessary to furnish, place, and compact select granular fill.
2. Measurement for payment of Bid Item UP-2 – Select Granular Fill shall be the actual number of cubic yards approved by the Department's Representative.

D. Bid Item UP-3 – Sediment Removal and Disposal

1. Payment: Bid Item UP-3 shall be bid unit cost price per cubic yard, as quantified by the in place measure and comparison of before and after surveys as approved by the Department's Representative. Provide all labor, materials, equipment and incidentals necessary to characterize, remove, dewater, transport and dispose of sediment from the existing underground 1 MG storage reservoir at a permit solid waste landfill facility.
2. Measurement for payment of Bid Item UP-3 – Sediment Removal and Disposal shall be the actual number of cubic yards approved by the Department's Representative.

END OF SECTION

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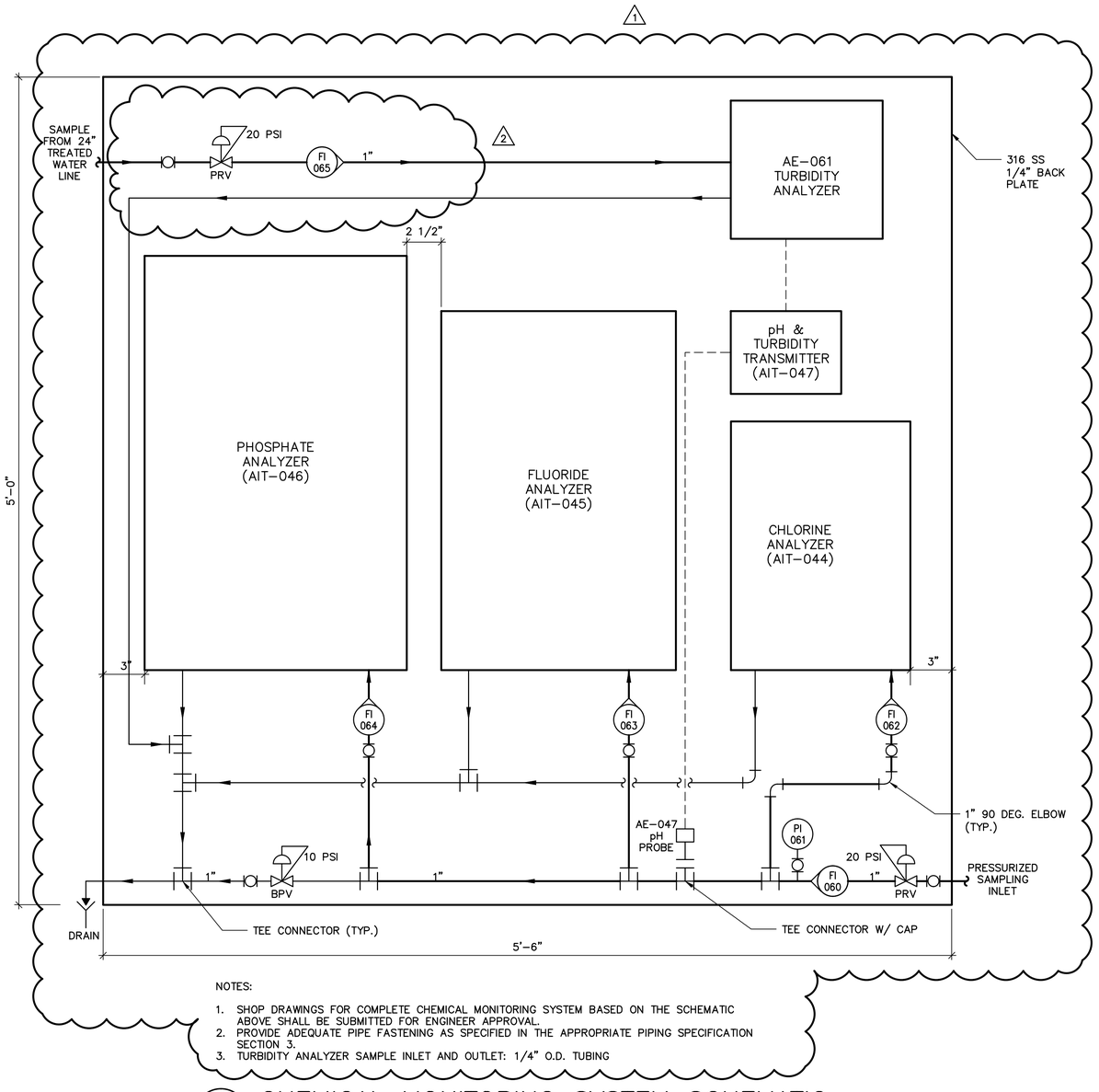
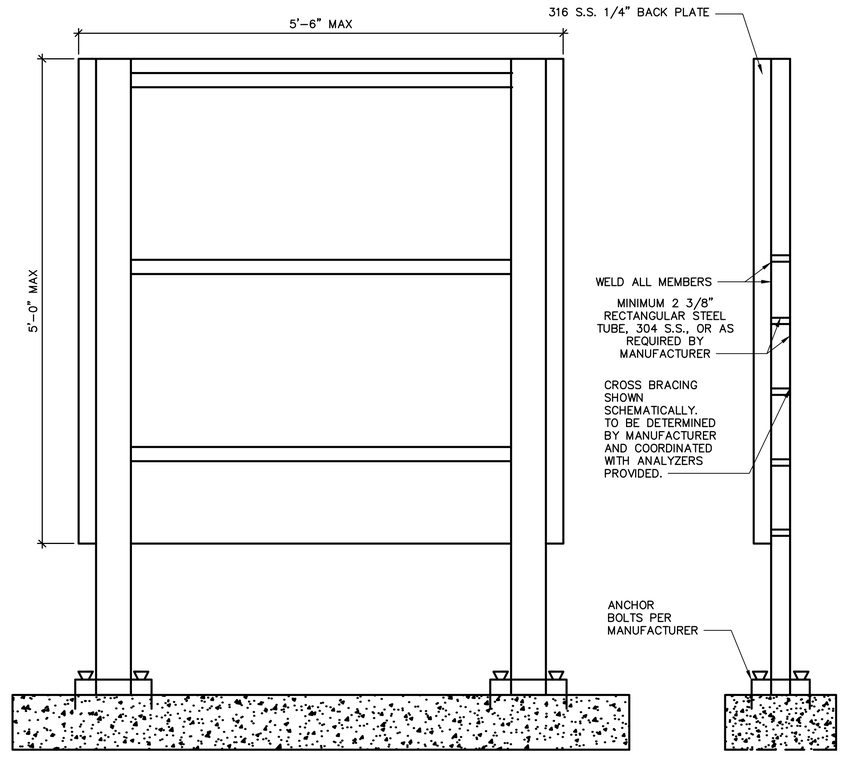


NOTES:

1. SHOP DRAWINGS FOR COMPLETE CHEMICAL MONITORING SYSTEM BASED ON THE SCHEMATIC ABOVE SHALL BE SUBMITTED FOR ENGINEER APPROVAL.
2. PROVIDE ADEQUATE PIPE FASTENING AS SPECIFIED IN THE APPROPRIATE PIPING SPECIFICATION SECTION 3.
3. TURBIDITY ANALYZER SAMPLE INLET AND OUTLET: 1/4" O.D. TUBING

1 I–09 CHEMICAL MONITORING SYSTEM SCHEMATIC

NOT TO SCALE



REAR VIEW
NOT TO SCALE

SIDE VIEW
NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL PROVIDE A FULLY PRE–ASSEMBLED PANEL AND INSTALL ON MEZZANINE AS SHOWN ON CONTRACT DRAWINGS.
2. CONTRACTOR SHALL MOUNT PANEL TO FLOOR SUCH AS THAT PANEL IS FREE STANDING AND NOT SUPPORTED OFF BUILDING WALL.

2 I–09 CHEMICAL MONITORING SYSTEM MOUNTING DETAIL

NOT TO SCALE

ARCADIS

LEGAL ENTITY:
ARCADIS CE, INC.

CONSULTANTS

SEALS

STATE OF NEW YORK · EDWARD G. KOWALSKI · 079462 · LICENSED PROFESSIONAL ENGINEER

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

CITY OF NEWBURGH

GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT

NO.	DATE	ISSUED FOR	BY
2	11/16	ADDENDUM #2	RH
1	11/16	ADDENDUM #1	RH

DATE: OCTOBER 2016
PROJECT NO.: 00266443.0000
FILE NAME: 0266443A–I09
DESIGNED BY: R. HARTMANN
DRAWN BY: Z. AMIN
CHECKED BY: E. KOWALSKI

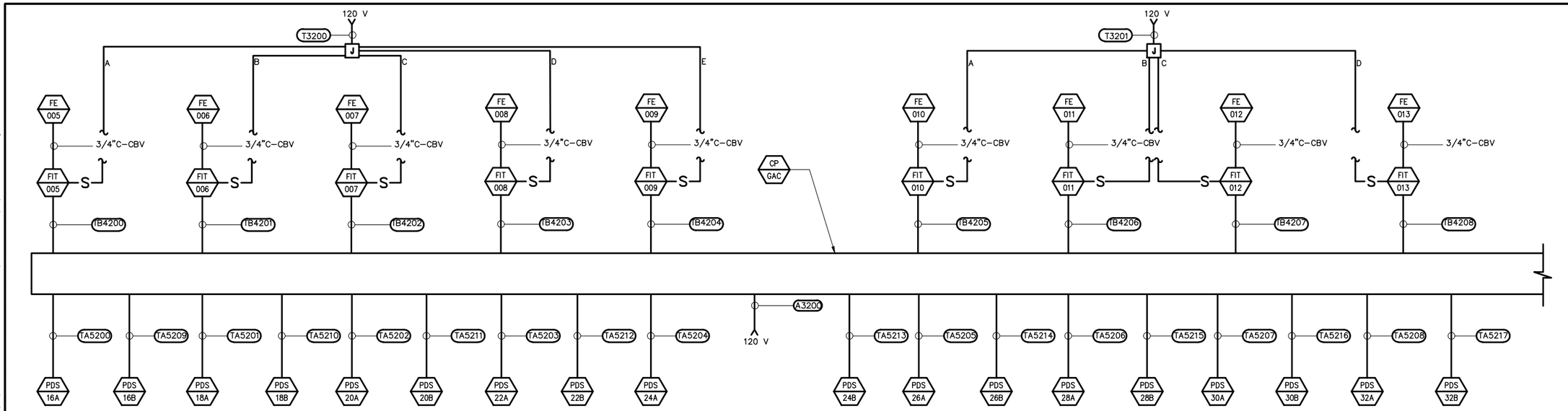
SHEET TITLE

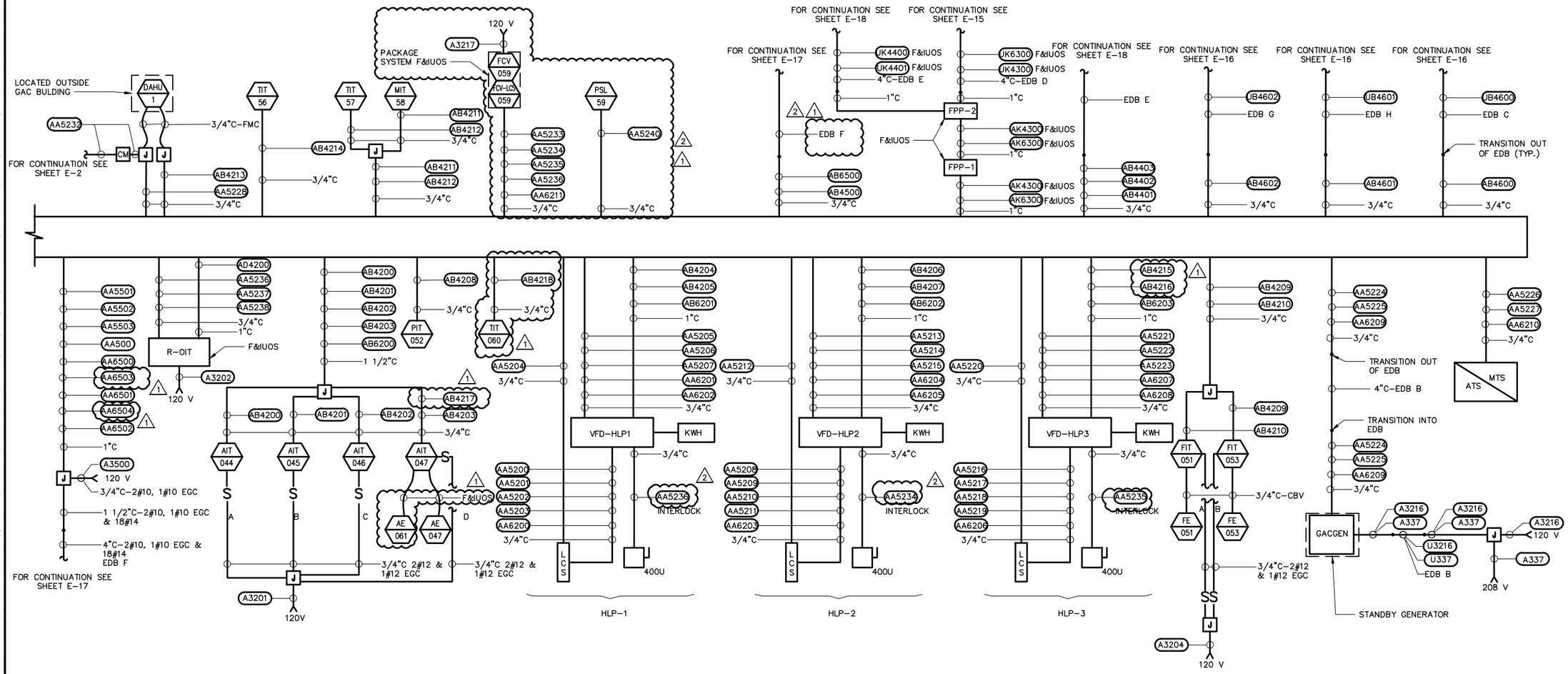
INSTRUMENTATION

INSTRUMENTS MOUNTING DETAIL SHEET 3 OF 3

SCALE: AS SHOWN

I–09
SHEET 13 OF 103





ARCADIS

LEGAL ENTITY:
ARCADIS CE, INC.

CONSULTANTS

SEALS

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

CITY OF NEWBURGH

GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT

NO.	DATE	ISSUED FOR	BY
2	10/11/16	ADDENDUM #2	MAL
1	4/11/16	ADDENDUM #1	MAL

DATE: OCTOBER 2016
PROJECT NO.: 00266443.0000
FILE NAME: 0266443A-E08-R2
DESIGNED BY: M. LADERMAN
DRAWN BY: H. SAFARPOUR
CHECKED BY: G. MOORE

SHEET TITLE

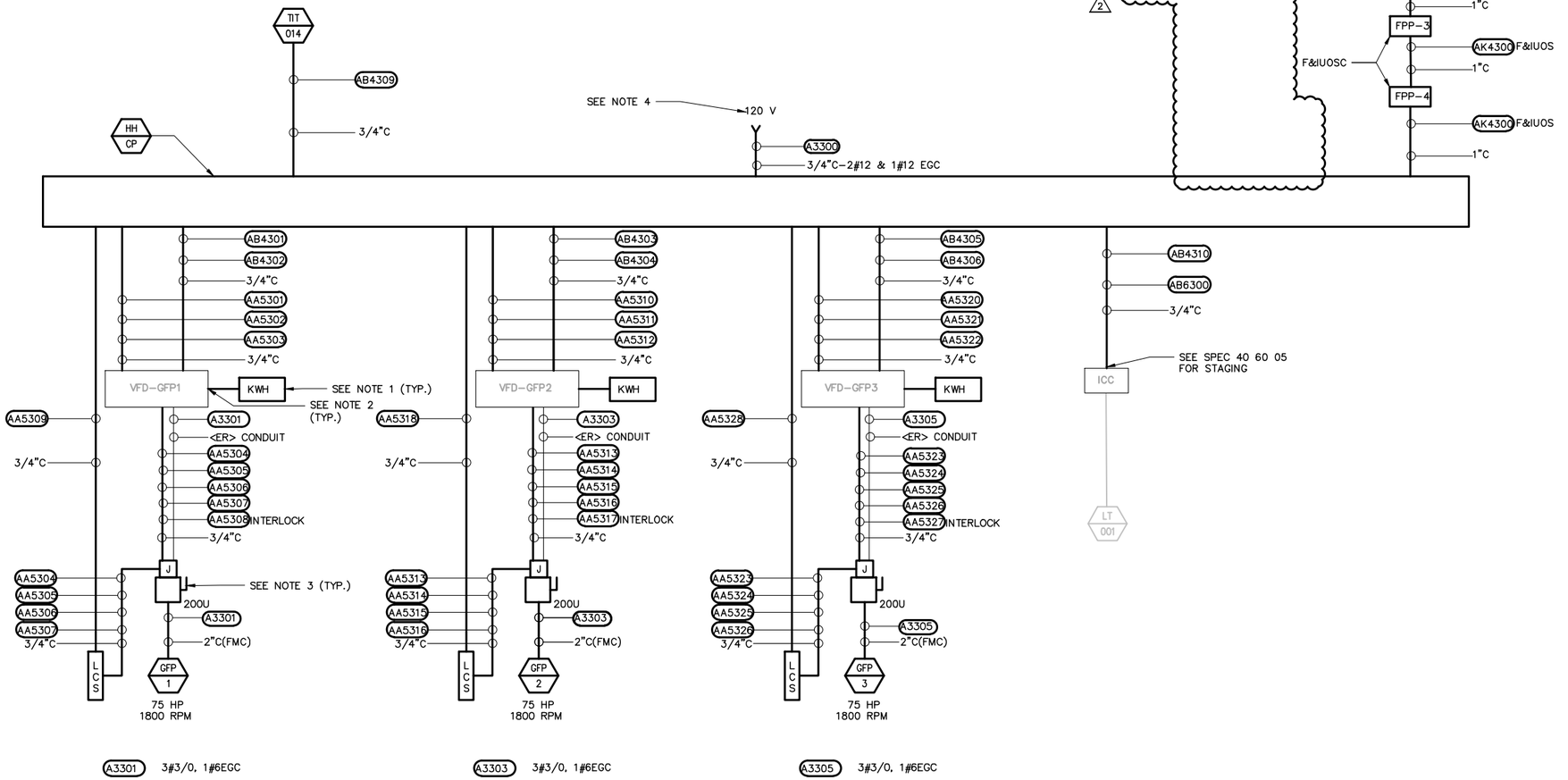
ELECTRICAL

GAC TREATMENT BUILDING BLOCK DIAGRAM

SCALE: AS SHOWN

E-08

SHEET 91 OF 103



HEAD HOUSE (HH) POWER RISER AND BLOCK DIAGRAM

NOTES:

1. ADD SUBMETER TO LOCALLY REPORT KWHR USAGE.
2. ADD 22-COM-ETHERNET MODULE. PROGRAM MODULE. REPROGRAM DRIVE.
3. PROVIDE 2EA FORM C (NONC) A300 CONTACTS. USE ONE TO INTERLOCK DISCONNECT SWITCH WITH VFD TO PREVENT 'FLY TO CATCH'.
4. PROVIDE SINGLE POLE 20A CB IN CKT#21 OF <ER> GENERAL ELECTRIC PANELBOARD LP1. UPDATE SCHEDULE.

1 1

ARCADIS

LEGAL ENTITY:
ARCADIS CE, INC.

CONSULTANTS

SEALS

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

CITY OF NEWBURGH

GAC TREATMENT SYSTEM AT WASHINGTON LAKE FILTRATION PLANT

NO.	DATE	ISSUED FOR	BY
2	10/11/16	ADDENDUM #2	ML
1	4/11/16	ADDENDUM #1	ML

DATE: OCTOBER 2016
PROJECT NO.: 00266443.0000
FILE NAME: 0266443A-E15-R2
DESIGNED BY: M. LADERMAN
DRAWN BY: H. SAFARPOUR
CHECKED BY: G. MOORE

SHEET TITLE

ELECTRICAL

HEAD HOUSE BLOCK AND RISER DIAGRAM

SCALE: AS SHOWN

E-15

SHEET 98 OF 103