J. Anderson, P.E.
BDI/PNS

ADDENDUM NO. 6

CITY of MILTON
NORTH SANTA ROSA REGIONAL WATER RECLAMATION FACILITY

January 8, 2021 **BDI Project No. 25527.11**

The following changes have been made to the plans & specifications for the above project:

A. CONTRACT DOCUMENTS/SPECIFICATIONS

1. Referencing Addenda 4 Questions and Answers. Q&A # 5 and #7 regarding the generator says the *manufacturer* will furnish the generator, ATS and paralleling gear. There is a specification section 16231 for a Packaged Engine Generator in the documents. However, section 01100 section 1.17 states that the Owner would furnish the generator & ATS. The simple question is should the *Contractor* include the cost of the Generator, ATS and Paralleling gear in our bid?
   Section 01100 section 1.17 has been updated and states "The CONTRACTOR shall furnish all materials required to complete the work."

2. With the continuing modifications to Section 11800 for Miscellaneous Equipment on the referenced Project, would the Owner entertain just adding a line item Allowance on the Bid Form for the listed materials and equipment that can be finalized with the Contractor after award? If no, will it be acceptable to submit for approval and deliver all of the listed items to the Owner early in the Project?
   A line item Allowance on the Bid Form for the listed equipment or approved equal to cover all material shall be added.

3. Specification Section 07921: Joint Sealants-Plant Tankage is listed in the Table of Contents but does not appear to be included in the Specifications. Please issue this Section by Addendum.
   This specification is included with this addenda.

4. Spec section 02619-2.1.A.8 calls for DIP pipe fittings to be wrapped in polyethylene. Spec section 02619-2.3 calls for paint identification of buried pipe. Is the intent to paint the buried pipe then cover it will poly?
   Specification 02619 has been revised.

5. Both specification section 02619 and 02622 make reference to a spec section 02221 for pipe bedding, backfilling and compaction requirements. This specification section is not included in the contract documents. Please provide.
   Spec is provided in this addendum.

	SECTION/ PAGE	ITEM	CHANGE
	01100	Special Project Procedures	Entire Spec reissued
	02221	Trenching, Bedding, and Backfill	Entire spec reissued
	02619	Ductile Iron Pipe and Fittings	Entire spec reissued

	SECTION/ PAGE	ITEM	CHANGE
	07921	Joint Sealants	Entire spec reissued
	11295	Sludge Dewatering System	Entire spec reissued
	11305	Fiberglass Manhole for Wastewater	Entire spec reissued
	11320	Biological Treatment	Entire spec reissued
	11441	Submersible Wet Pit Sewage Pump	1.1 A - Reject Tank removed from scope

B. CONSTRUCTION PLANS

N/A

C. QUESTIONS AND CLARIFICATIONS

1. Referencing the General Conditions paragraph 5.06.A and 5.06.A.2. This calls for the owner to provide Builder's Risk insurance unless otherwise provided in the Supplementary Conditions. The Supplementary Conditions do not have any wording changing this. Can you please confirm Owner will be providing the Builder's Risk insurance? Also, the General Conditions Builder's Risk specifications do not call for flood coverage. Can you that this is not required?
   General and Supplementary Conditions have been reissued in entirety. General conditions will be replacing item 13 and supplementary conditions will be replacing item of table of contents.

2. We previously asked a question regarding the requirement in the ITB to provide 1 electronic, 1 original and 4 copies of the bid. Will this be addressed?
   This will be addressed in a subsequent addenda.

3. One Influent Systems Electrical Building (ISEB) and one Effluent Systems Electrical Building (ESEB) appear to have been added in Addendum #2 and are shown on C-103, E-411 and E-421 issued with Addendum #3. This is a reference to "Precast Buildings" on the revised Electrical Drawings but we do not see a material specification for these Buildings. Please clarify the type of construction required for the two Electrical Buildings along with the required structural, architectural, mechanical and electrical equipment details. Also, do these Buildings have a cast-in-place slab?
   The ISEB and ESEB shall be Easi-Set type buildings and shall include an integral slab. Additional details for these buildings will be included in future addenda that will address remaining electrical questions.

4. Regarding licensing and permitting for the North Santa Rosa WRF project…based on my initial review, this project is located outside the city limits of Milton at an address that is yet to be designated. Am I correct in assuming I should only need a license and applicable permits from Santa Rosa County or will I need to obtain license/permit from the City as well?
   The contractor is required to show evidence of a license to provide services within the State of Florida. The work being performed is entirely within Santa Rosa County and business licenses may be required from the County as well. The Contractor may reach out to Santa Rosa County to confirm if a license is needed and what the procedures are for obtaining the license and how much it will cost. A copy of the license will need to be included in the proposal or demonstrate the ability to obtain the license prior to commencement of work.

5. Has the job site been assigned a municipal street address?
   The assigned address for the NSRRWRF is: 8580 Transition Road, Milton, FL 32583. The parcel number is 29-2N-27-0000-00103-0000

6. Related to Keynotes 2 and 5 on Drawing P-803, please confirm the New Gas Meter will be furnished and installed by the local Gas Company.
   Contractor shall be responsible for pipe work on site only, the City of Milton will install meter to site.

7. Does the job site have an elevation certificate?
   No, project site is not in flood zone.

Environmental

1. On drawing C-110, what type of valves are the 10" and 6" shown in the detail?
   Valves shown on C-110 are gate valves.

2. On C-110, can the flow be shut off from the force main to make the tie-in or will a hot tap be required?
   Contractor to coordinate shut off from the force main with owner before making tie-in.

3. On drawing C-111 profile, SSMH1 is called to be 5' diameter fiberglass. However, it is not shown as fiberglass in the manhole schedule on sheet C-126.
   C-126 updated accordingly to show fiberglass SSMH1 on manhole schedule.

4. Please furnish a specification for the fiberglass manholes.
   Spec 11305 – Fiberglass Manhole for Wastewater included in this addendum

5. Do under slab pipes require concrete encasement?
   No

6. What if any joint restraints are required on the potable water line along the entrance road on drawings C113 and C115?
   Joint restraints on drawings C-113 and C-115 are required in accordance with C-909.

7. Concerning chain link fencing and gates, Addendum #3 included a re-issue of drawing C-133 where a 40' wide double slide gate is noted. Spec Section 02831, Chain Link Fences and Gates, includes a paragraph for swing gates but not slide gates (2.5.B). Sheet C-905 includes detail B-1 for chain link fence and depicts a gate that appears to be a double swing gate. Please provide a detail / specification for the double slide gate and confirm that it is manually operated.
   Gate detail on sheet C-905 has been updated accordingly.

8. Reference note 10 on drawing C-001, is any of the piping shown on C-110 thru C-115 considered county roads where open cutting trenches is prohibited?
   Open cut shall be allowed within right of way on sheets C-110 thru C-115. County does not allow open cut on paved roadways.

9. Drawing M-302 has a note on the left side of the sheet referencing a 6" manual butterfly valve. The note reads in part "typical of all valves and air lines outside of tank wall". Does this apply to the 14" and 10" air lines as well? Valves are not shown on sheets M-300 and M-317. Please clarify.
   All air valves shall be butterfly valves, valves noted as positioning valves shall be actuated.

10. Referencing the Reject Tank. Sheets M-640 and M-642 both show the tank ID as 105' in plan view. Sheet M-641 section A-1 typical wall sections calls out the ID to be 124'-6". Which is correct?
The reject tank ID is 105'.

11. Drawing M700 shows two 4" sludge lines entering the press building. However, drawing C152 shows one 6" line entering the building. Please clarify.
Two, 4" WAS lines will be installed from the pumps to the building.

12. Please identify which pipelines should be restrained joint lines. Should we assume the restraint details on sheet C-909 apply to all lines?
Yes
13. On restrained pipelines, are field-lok or gripper gaskets allowed for any sizes. This a much cheaper alternative to proprietary restrained joints.
Field-lok or gripper gaskets are acceptable means of pipe restraints.

14. What type of joints are required on the 30" and 24" buried stainless steel air line?
Flanged with spiral wound gaskets.

15. Reference drawings M-300 and M-317 – Should the air piping from the buried stainless steel header, up and over the wall to the expansion joint inside the tank be stainless pipe or ductile iron pipe? We would assume it is stainless but M-317 calls it DIP. Please clarify.
Pipe shall be DIP as shown on the drawings and included in the pipe schedule provided in addendum 4.

16. Detail D4 on M-202 shows a 30" plug valve. This valve is not shown on revised drawings M-200 or M-201. Is it required?
Plug valve removed from Sheet M-202.

17. According to plan sheet M-640 the Reject Storage Tank has a diameter of 105'-0". However, plan sheet M-641, detail A1, notes a tank diameter of 124'-6". Please confirm that the tank dimensions are 105'-0" ID x 32'-11" SWD with 2'-0" of freeboard.
The tanks diameter is 105'-0", detail A1 on sheet M-641 has been updated accordingly.

18. According to plan sheet C-134 the Reject Storage Tank has a high side finished grade elevation of 69.00 and low side of 57.00. Plan Sheet M-641 calls for the finished grade to vary from 69.00 on the high side to 51.00 on the low side. Please confirm that the low side finished grade elevation for the Reject Storage Tank shall be 57.00.
Low side finish grade elevation shall be 57', Sheet M-641 shows elevation change across span of tanks circumference.

SHEET NO.	CHANGE
C-110	New Construction item 11 & 12 updated
C-126	Sanitary Sewer schedule updated
C-905	Gate detail revised
M-202	30" Plug Valve removed
M-641	Detail A1 updated
M-703	Note added

Architectural

N/A

Electrical

1. I have searched on-line and found 2 Hydro Tank air controllers. 1) Whitewater/Air-rite Compressor/Model 610HP 2) USA Blue Book/Hydro-pneumatic Tank Air Controller System/40-110 psi/Part# 33861 Both are very similar and both mount on top of the tank. Over the years I have found that they should be installed inline or near the tank support saddles. The concrete foundations that the tank saddles seat on make a good attachment point for the electrical conduit coming out of the ground. Flex conduit is used over the top of the tank.
   Hydro-pneumatic tank and controller shall be installed per manufacturer recommendations.

2. Sheet E-002, note #11 stated the contractor is responsible for all electrical utility fees. It is extremely difficult to get an accurate quote from Gulf power before the bid. Can this power utility fee be changed to an allowance? If not, can you provide a cost provided by gulf power during the design phase to be used for the bid?
   A line item Allowance on the Bid Form for the power utility fee shall be added.

Structural

1. Referencing the Operation Building structural sheet S-810. The trench drains shown on this drawings do not match the trench drains shown on drawing S-811 that was re-issued in Addenda 4. Which is correct?
   See updated M-810 and M-811 sheets.

2. Referencing Sheet S-837 Detail B1 Trench Drain. The scaled width does not match what is shown on the plan views. Please clarify.
   Please see revised S-837

3. Please reference sheet S-001 "Structural Concrete & Tankage Treatment Schedule". There are several structures that call for the 09981 cementitious coating, 07164 waterproofing and 09960 chemical resistant coating on the walls, for example the Aeration Tank. The cementitious coating is called on be on the exposed exterior. Where do systems 07164 & 09960 go? All walls, interior only, exterior?
   Spec. 09981 "Cementitious Coating" shall apply to the exterior walls of tankage as indicated in table "Structural Concrete & Tankage Treatment Schedule" on Sheet S-001. Cementitious Coating is primarily to ensure tankage walls have a suitable exterior finish. This coating may be omitted in the field if the concrete workmanship in the field is acceptable.

   Spec. 07164 "Waterproofing Concrete Coating" shall apply to tie-holes and concrete joints. Refer to Detail C1 on Sheet S-006 of the Construction Drawings for a description of the supplemental waterproofing applications. Cementitious crystalline waterproofing such as "Xypex" shall not be used in the concrete mix or as a surface coating. The contractor shall submit a copy of the concrete mix design to their coatings manufacturer for a review of any conflicts between the concrete mix and the coating.

Spec. 09900 "Chemical Resistant Lining System" shall apply to all structures as indicated on Sheet S-001 in table "Structural Concrete & Tankage Treatment Schedule". Again the contractor is encouraged to submit for approval coatings products they are familiar and experienced in applying.

4. I am writing regarding the "Structural Concrete & Tankage Treatment Schedule" for the above referenced project (Copy attached). The schedule requires that both the "Waterproofing Concrete Coating – Section 07164" and the "Chemical Resistant Coating – Section 09960" be installed on the following structures: Influent Splitter Box, Headworks Channel, Influent EQ Basin, Clarifier Tank, Aeration Tank, Digester Tank, and Filter Basin.
   In order for both systems to be installed you would have to install the Xypex Coating System first, wait 30 – 45 days to allow the Xypex Chemistry to defuse into the concrete, and then remove the coating by abrasive blasting in order to install the chemical resistant coating system. The Xypex Coating System does not have the cohesive strength or adhesion to the concrete necessary to support the installation of the 100% solids chemical resistance coating. If the Owner desires to have both systems installed as a "belt and suspenders approach" a more cost effective method would be to utilize the Xypex Admix in the concrete mix design (3% by weight of the Portland). By using the Xypex Admix you have the Xypex Chemistry throughout the concrete and you do not have to remove it prior to the installation of the chemical resistant coating system. If the concrete elements are not below grade and waterproofing of the structure is not a concern, then the chemical resistant coating as a standalone system may be more appropriate. If it becomes a choice of one system over the other then I would recommend that the chemical resistant coating system be utilized (certainly in the more aggressive areas of the plant) as it has far superior resistance to high levels of H2S and H2S04.
   See response to question 6

5. Is there any required Roofing over the Precast Roof Deck?
   No

6. Do the interior walls and/or ceiling receive a field applied paint/coating?
   Interior shall be painted, contractor to submit color samples to owner for selection.

7. What is the desired exterior finish for the Precast Walls?
   Exterior shall be painted, contractor to submit color samples to owner for selection.

8. Please reference sheet S-001 "Structural Concrete & Tankage Treatment Schedule". There are several structures that call for the 09981 cementitious coating, 07164 waterproofing and 09960 chemical resistant coating on the walls, for example the Aeration Tank. The cementitious coating is called on be on the exposed exterior. Where do systems 07164 & 09960 go? All walls, interior only, exterior?
   See response to question 6

9. Related to the Structural Concrete & Tankage Treatment Schedule on Drawing S-001 REV 3, issued by Addendum #2, please clarify the following by Addendum:

   a. There appears to be 20 lines that have "YES" under both the Section 07164-Waterproofing Concrete Coating Req'd and Section 09960-Chemical Resistant Coating in Accordance with Milton Utility Standards Columns.
   b. Please clarify the intent of the Coatings required for the interior walls and slabs of the cast in place concrete structures listed on the Structural Concrete & Tankage Treatment Schedule on Drawing S-001 REV 3, issued by Addendum #2.
   c. Our understanding is that both the cementitious crystalline waterproofing (Section 07164) and chemical resistant coating (Section 09960) cannot be applied on the same surface.

See response to question 6

10. Please confirm that the 2.0-MG Reject Storage Tank shall not receive Xypex crystalline waterproofing applied to all concrete surfaces; above-grade, below-grade, exterior and interior of the tank per Specification 07164.
    See response to question 6

SHEET NO.	CHANGE
S-837	Detail B1 – Trench Detail updated

Civil

1. Referencing plan sheet **C-131** Note 8 states all berms are to be constructed of "Clay Material". We do not see any clay material on the site according to the geotechnical reports. Would on site material be acceptable for use in building the berms in lieu of importing clay material? It would be a lot more expensive to import material to build the berms.
   All berms must have a clay core keyed in and compacted to 95% per Santa Rosa County – see Berm Detail added to sheet C-902. Suitable on-site soils may be used for the remainder of the berm material.

The CONTRACTOR shall acknowledge the receipt of this ADDENDUM by signing below, including a copy with the BID, and acknowledge where indicated on page 21 of the Contractor's Proposal Form.

CONTRACTOR _____

BY _____

DATE _____

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:

1) all variations of the proposed substitute item from that specified, and

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

   a. Contractor shall submit the number of Samples required in the Specifications.

   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance*:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

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SC-1.01.A.8 **Add the following language at the end of the last sentence of Paragraph 1.01.A.8:**

The Change Order form to be used on this Project is EJCDC C-941. Agency approval is required before Change Orders are effective.

SC-1.01.A.48 **Add the following language at the end of the last sentence of Paragraph 1.01.A.48:**

A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC-1.01.A.49 **Add the following new Paragraph after Paragraph 1.01.A.48:**

Abnormal Weather Conditions - Conditions of extreme or unusual weather for a given region, elevation, or season as determined by the Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

SC-1.01.A.50 **Add the following new Paragraph after Paragraph 1.01.A.49:**

Agency - The Project is financed in whole or in part by the Florida State Revolving Fund Loan program and the RESTORE ACT; therefore, the Agencies for these documents is SRF and RESTORE.

SC-2.02.A. **Amend the first sentence of Paragraph 2.02.A. to read as follows:**

Owner shall furnish to Contractor five copies of the Contract Documents (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF).

SC-2.06.B **Delete Paragraph 2.06.B and replace it with the term [Deleted].**

SC-4.01.A **Amend the last sentence of Paragraph 4.01.A by striking out the following words:**

The Contract Time for Phase 1 shall commence to run no later than the ninetieth day after the day of Bid opening or the sixtieth day after the Effective Date of the Contract, whichever date is earlier, unless mutually agreed. The Contract Time for Phase 2 shall be delayed for six months from the Bid opening.

SC-4.05.C.2 **Amend Paragraph 4.05.C.2 by striking out the following text: "abnormal weather conditions;" and inserting the following text:**

Abnormal Weather Conditions;

SC-5.03 **Add the following new Paragraph immediately after 5.03.B:**

C. In the preparation of Drawings and Specifications, Engineer relied upon the following report of exploration and tests of subsurface conditions at the Sites:

1. Report of Geotechnical Exploration File #10-192 for East Milton Waste Water Treatment Plant (LMJ)

2. East Milton Waste Water Treatment Plant Stormwater Ponds File #10-192 (LMJ)

3. Report of Geotechnical Exploration File #11-216 Parcel 26-3N-28-000-00200-0000 (LMJ)

SC 5.06 **Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:**

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:	**Statutory**
Federal, if applicable (e.g., Longshoreman's):	**Statutory**

Employer's Liability:

Bodily injury, each accident	**$ 1,000,000**
Bodily injury by disease, each employee	**$ 1,000,000**
Bodily injury/disease aggregate	**$ 1,000,000**

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate	**$ 2,000,000**
Products - Completed Operations Aggregate	**$ 1,000,000**
Personal and Advertising Injury	**$ 1,000,000**
Each Occurrence (Bodily Injury and Property Damage)	**$ 1,000,000**

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:

Each person	**$ 1,000,000**
Each accident	**$ 1,000,000**

Property Damage:

Each accident	**$ 1,000,000**
[or]	
Combined Single Limit of	**$ 1,000,000**

4. Excess or Umbrella Liability:

Per Occurrence	**$ 5,000,000**
General Aggregate	**$ 5,000,000**

5. Contractor's Pollution Liability:

Each Occurrence	**$ 1,000,000**
General Aggregate	**$ 1,000,000**

☐ **If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract**

7. Contractor's Professional Liability:

Each Claim	**$ 1,000,000**
Annual Aggregate	**$ 1,000,000**

SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:

1. Regular working hours will be 7:00 AM to 7:00 PM Monday through Friday;

2. Owner's legal holidays are New Years, MLK Jr. Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving (2 days), Christmas (2 days).

SC-7.04.A Amend the third sentence of Paragraph 7.04.A by striking out the following words:

Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item is permitted.

SC-7.04.A.1 Amend the last sentence of Paragraph a.3 by striking out "and;" and adding a period at the end of Paragraph a.3.

SC-7.04.A.1 Delete paragraph 7.04.A.1.a.4 in its entirety and insert the following in its place:

[Deleted]

SC-7.06.A Amend Paragraph 7.06.A by adding the following text to the end of the paragraph:

The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC-7.06.B Delete paragraph 7.06.B in its entirety and insert the following in its place:

[Deleted]

SC-7.06.E Amend the second sentence of Paragraph 7.06.E by striking out "Owner may also require Contractor to retain specific replacements; provided, however, that".

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.

2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.

4. Liaison:

a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

6. Shop Drawings and Samples:

a. **Record date of receipt of Samples and Contractor-approved Shop Drawings.**

b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

8. Review of Work and Rejection of Defective Work:

a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

9. Inspections, Tests, and System Start-ups:

a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

10. Records:

a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.

c. Maintain records for use in preparing Project documentation.

11. Reports:

a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.

b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the

discovery of any Constituent of Concern or Hazardous Environmental Condition.

12. **Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.**

13. **Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.**

14. **Completion:**

    a. **Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.**

    b. **Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.**

    c. **Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.**

C. **The RPR shall not:**

1. **Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).**

2. **Exceed limitations of Engineer's authority as set forth in the Contract Documents.**

3. **Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.**

4. **Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.**

5. **Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.**

6. **Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.**

7. **Accept Shop Drawing or Sample submittals from anyone other than Contractor.**

8. **Authorize Owner to occupy the Project in whole or in part.**

SC-11.07.C **Add the following new Paragraph after Paragraph 11.07.B :**

All Contract Change Orders must be concurred in by the Agency before they are effective.

SC-13.02.C **Delete Paragraph 13.02.C in its entirety and insert the following in its place:**

[Deleted]

SC-15.01.B **Amend the second sentence of Paragraph 15.01.B.1 by striking out the following text: "a bill of sale, invoice, or other."**

SC-15.01.B.3 **Add the following language at the end of paragraph 15.01.B.3:**

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-15.01.B.4 **Add the following new Paragraph after Paragraph 15.01.B.3.**

The Application for Payment form to be used on this project is EJCDC C-620. The Agency must approve all Applications for Payment before payment is made.

SC-15.01.D.1 **Delete Paragraph 15.01.D.1 in it entirety and insert the following in its place:**

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01. E will become due twenty (20) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-15.02.A **Amend Paragraph 15.02.A by striking out the following text: "no later than seven days after the time of payment by Owner" and insert "no later than the time of payment by Owner."**

SC-18.09 **Add the following new paragraph after Paragraph 18.08:**

Tribal Sovereignty. No provision of this Agreement will be constructed by any of the signatories as abridging or debilitating any sovereign powers of the Creek-Seminole Tribe; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowners(s); or interfering with the government-to-government relationship between the United States and the Tribe.

SC-19 **Add Article 19 titled "FEDERAL REQUIREMENTS"**

SC-19.01 **Add the following language as Paragraph 19.01 with the "Agency Not a Party";**

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

SC-19.02 **Add the following sections after Article 19.01 with the title "Contract Approval":**

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney (Attachment GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

SC-19.03 Add the following language after Article 19.02.B with the title "Conflict of Interest":

Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

SC-19.04 Add the following language after Article 19.03.A with the title "Gratuities":

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

SC-19.05 Add the following language after Article 19.04.B with the title "Small, Minority and Women's Businesses":

A. Contracting with small and minority businesses, women's business enterprises, and labor surplus area firms. If Contractor intends to let any subcontracts for a portion of the work, Contractor must take all necessary affirmative steps to assure that minority businesses, women's business enterprises and labor surplus firms are used when possible. Affirmative steps must include:

(1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists:

(2) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

(3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;

(4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;

(5) Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and.

SC-19.06 Add the following after Article 19.05.A.(5) with the title "Anti-Kickback":

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

SC-19.07 Add the following after Article 19.06.A with the title "Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended":

A. Contractor to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387. Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

SC-19.08 Add the following after Article 19.07.A with the title "Equal Employment Opportunity":

A. The Contract is considered a federally assisted construction contract. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 CFR 60-1.3 must include the equal opportunity clause provided under 41 CFR 160-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR Part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

SC-19.9 Add the following after Article 19.08.A with the title "Byrd Anti-Lobbying Amendment (31 U.S.C. 1352":

A. Contractors that apply or bid for an award exceeding $100,000 must file the required certification (RD Instruction 1940-Q, Exhibit A-1). The Contractor certifies to the Owner and every subcontractor certifies to the Contractor that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of

Congress, or an employee of a member of Congress in connection with obtaining the Contract if it is covered by 31 U.S.C. 1352. The Contractor and every subcontractor must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining an Federal award. Such disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

SC-19.10 Add the following after Article 19.09.A with the title "Environmental Requirements":

When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:

A. Wetlands –When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

B. Floodplains –When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.

C. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact or human remains shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).

D. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

SC-19.11 Add the following after Article 19.10.D with the title "Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708)":

A. Where applicable, for contracts awarded by the Owner in excess of $100,000 that involve the employment of mechanics or laborers, the Contractor bust comply with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, the Contractor must compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that o laborer or mechanic must be required to work in surroundings or

under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

SC 19.12 Add the following after Article 19.11.A with the title "Debarment and Suspension (Executive Orders 12549 and 12689)":

A. A contract award (see 2CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive orders 12549 (3 CFR Part 1986 Comp., p. 189) and 12689 (3 CFR Part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

SC 19.13 Add the following after Article 19.12.A with the title "Procurement of Recovered Materials":

A. The Contractor must comply with 2 CFR part 200.322, "Procurement of recovered materials."

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SECTION 01100 - SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.1 WORKMANSHIP, MATERIAL AND EQUIPMENT

A. When a particular product is specified or called for, it is intended and shall be understood that the proposal tendered by the CONTRACTOR included those products in his bid. Should the CONTRACTOR desire to submit products considered equal to those specified, the CONTRACTOR shall furnish information as described in the General Conditions and Section 01630. The alternate product or products submitted by the CONTRACTOR shall meet the requirements of the specifications and shall, in all respects, be equal to the products specified by name herein.

B. All apparatus, mechanism, equipment, machinery and manufactured articles for incorporation into the Work shall be the new and unused standard products of recognized reputable MANUFACTURERS.

C. CONTRACTOR must provide for disposal of excess excavated material.

1.2 SERVICES OF MANUFACTURERS' FIELD SERVICE TECHNICIAN

A. Bid prices of equipment furnished under Division 11, 13, 14, 15, and 16 shall include the cost of a competent field service technician of the MANUFACTURERS of all equipment to supervise the installation, adjustment, and testing of the equipment and to instruct the OWNER's operating personnel on operation and maintenance. The approved MANUFACTURER's operation and maintenance data as specified in Section 01730 shall be delivered to the ENGINEER prior to instructing the OWNER's personnel. This supervision may be divided into two or more time periods as required by the installation program or as approved by the ENGINEER.

B. After installation of the equipment has been completed and the equipment is presumably ready for operation, but before it is operated by others, the MANUFACTURER's field service technician shall inspect, operate, test and adjust the equipment. The inspection shall include at least the following points where applicable:
   1. Soundness (without cracked or otherwise damaged parts).
   2. Completeness in all details, as specified and required.
   3. Correctness of setting, alignment, and relative arrangement of various parts.
   4. Adequacy and correctness of packing, sealing, and lubricants.
   5. Calibration and adjustment of all related instrumentation and controls.
   6. Energize equipment.
   7. Deficiency correction
   8. Demonstration of compliance with application performance specification.

C. The operation, testing, and adjustment shall be as required to prove that the equipment has been left in proper condition for satisfactory operation under the conditions specified.

D. Upon completion of this work, the MANUFACTURER's field service technician shall submit, in triplicate, to the ENGINEER a complete, signed report of the results of his inspection, operation, adjustments, and tests. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance.

E. Each equipment MANUFACTURER shall provide instruction to the OWNER's operating personnel. Training shall not be performed until the requirements of paragraph B, C and D above have been fully satisfied and any specified performance testing completed. Training shall be provided for the number of days specified in each equipment Section of these Specifications. Training shall be scheduled with at least two weeks prior notice. Training shall be provided on an 8-hour per day basis. Partial days (less than eight (8) full working hours) shall not be credited toward the specified durations. Training shall not be concurrent with on-going testing debugging or installation activities; but shall be a separate activity devoted exclusively to the instruction of the OWNER's personnel in the operation and maintenance of the MANUFACTURER's equipment. Training shall be performed by qualified representatives of each equipment MANUFACTURER specifically skilled in providing instruction to operation personnel. Training shall provide an overview of operations and maintenance requirements and shall include but not be limited to:

1. Description of unit and component parts.
2. Operating capabilities and performance criteria.
3. Operating procedures.
4. Maintenance procedures
5. Servicing and lubrication schedules.
6. Troubleshooting.
7. Electrical instrumentation and control requirements and interface as a minimum. The operating and maintenance data to be provided in accordance with Specification Section 01730 shall be used as a basis for training.

F. A certificate from the MANUFACTURER stating that the installation of the equipment is satisfactory, that the unit has been satisfactorily tested, is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication, and care of the unit shall be submitted before start-up and acceptance by the OWNER. The certificate shall indicate date and time instruction was given and names of operating personnel in attendance. This certification shall be submitted on the certification sheet, the form of which is at the end of this section.

G. See the detailed Specifications for additional requirements for furnishing the services of the MANUFACTURER's field service technician.

H. For equipment furnished under Divisions other than 11,13, 14, 15 and 16, the CONTRACTOR, unless otherwise specified, shall furnish the services of accredited field services technicians of the MANUFACTURER only when some evident malfunction or over-heating makes such services necessary in the opinion of the ENGINEER.

1.3 RESPONSIBILITY OF CONTRACTOR

A. The CONTRACTOR shall be responsible for the entire Work determined by the Drawings, Specifications and Contract from the date of the starting of the Work until it is accepted as evidence of approval of the Completion Certificate by the OWNER. He shall be responsible for removals, renewals and replacements due to action of the elements and all other causes except as otherwise provided in the Specifications. The CONTRACTOR shall keep the Contract under his own control and it shall be his responsibility to see that the Work is properly supervised and carried on faithfully and efficiently. The CONTRACTOR shall supervise the work personally or shall have a competent, English speaking superintendent or representative, who shall be on the site of the project at all working hours, and who shall be clothed with full authority by the CONTRACTOR to direct the performance of the work and make arrangement for all necessary materials, equipment and labor without delay.

B. Renewals or repairs necessitated because of defective materials or workmanship, or due to action of the elements or other natural causes, including fire and flood, prior to the acceptance as determined by the Completion Certificate, shall be done anew in accordance with the Contract and Specifications at the expense of the CONTRACTOR.

1.4 PROVISIONS FOR CONTROL OF EROSION

A. Sufficient precautions shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the state. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 nephelometric turbidity units (NTU), or as otherwise required by the state or other controlling body, in water used for public water supply or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 NTU unless otherwise permitted. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

1. Erosion evident within the limits of construction shall be the responsibility of the CONTRACTOR during the full term of the contract and for the full (1) year guarantee period. Areas subject to erosion during this time shall be fully restored to original or design conditions (as applicable) within 10 days of notice to the CONTRACTOR.

1.5 HURRICANE PREPAREDNESS PLAN

A. Within 20 days of the date of Notice to Proceed, the CONTRACTOR shall submit to the ENGINEER and OWNER a Hurricane Preparedness Plan. The plan should outline the necessary measures which the CONTRACTOR proposes to perform at no additional cost to the OWNER in case of a hurricane warning. Such measures shall be in accordance with local and state requirements.

B. In the event of inclement weather, CONTRACTOR will, and will cause Subcontractors to protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of ENGINEER, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of the CONTRACTOR or Subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of CONTRACTOR.

1.6 WARRANTIES

A. Unless specified otherwise in the Contract Documents, all equipment supplied under these Specifications shall be warranted by the CONTRACTOR and the equipment MANUFACTURERS for a period of one (1) year. Warranty period shall commence on the date of Initiation of Operation by the OWNER.

B. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the OWNER.

C. The MANUFACTURER's warranty period shall run concurrently with the CONTRACTOR's warranty or guarantee period. No exception to this provision shall be allowed. The CONTRACTOR shall be responsible for obtaining equipment warranties from each of the respective supplier or MANUFACTURERS for all the equipment specified. The form of warranty is included at the end of this section.

D. In the event that the MANUFACTURER is unwilling to provide a one-year warranty commencing at the time of OWNER acceptance, the CONTRACTOR shall obtain from the MANUFACTURER a two (2) year warranty starting at the time of equipment delivery to the job site. This two-year warranty shall not relieve the CONTRACTOR of the one-year warranty starting at the time of OWNER acceptance of the equipment.

1.7 UTILITY CROSSINGS

A. It is intended that wherever existing utilities such as water, chemical, electrical or other service lines must be crossed, deflection of the pressure pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the OWNER or

ENGINEER this procedure is not feasible he/she may approve the use of fittings for a utility crossing as detailed on the Drawings.

1.8 CONSTRUCTION CONDITIONS AND SUBSURFACE INVESTIGATION

A. The CONTRACTOR shall strictly adhere to the specific requirements of the governmental unit(s) or agency(ies) having jurisdiction over the work. Wherever there is a difference in the requirements of a jurisdictional body and these Specifications, the more stringent shall apply.

B. The CONTRACTOR shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the nature and location of the work, the conformation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the groundwater conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this contract. The prices established for the work to be done will reflect all costs pertaining to the work. Any claims for extras based on substrata, groundwater table, and other such conditions will not be allowed.

1.9 PUBLIC NUISANCE

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

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

1.10 SUSPENSION OF WORK DUE TO WEATHER

A. During inclement weather, all work which might be damaged or rendered inferior by such weather conditions shall be suspended. During suspension of the work from any cause, the work shall be suitably covered and protected so as to preserve it from injury by the weather. Refer to Supplemental Conditions for additional requirements.

1.11 RELOCATIONS

A. The CONTRACTOR shall be responsible for the relocation of structures, including but not limited to light poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the bid.

1.12 PUMPING

A. The CONTRACTOR with his own equipment shall do all pumping necessary to prevent flotation of any part of the structures during construction operations.

B. The CONTRACTOR shall, for the duration of the contract and with his own equipment, pump out water and wastewater which may seep or leak into the excavations or structures. Galleries and other operating areas shall be kept dry at all times. The extent of pumping required in the tanks, channels and other non-operating areas will be determined by the ENGINEER. Discharges shall be in conformance with applicable regulations and permits.

1.13 EASEMENT FOR WORK ON PRIVATE PROPERTY

A. The CONTRACTOR shall maintain his construction operations within the presently existing road right-of-way and established easements throughout the project. In the event that the CONTRACTOR deems it necessary or advisable to operate beyond the limits of the existing right-of-way and established easements, he shall be responsible for making special agreements with the property owners. Immediately after an award of contract is made, the CONTRACTOR shall submit to the OWNER a listing of those areas in which he deems it to be necessary to work outside of the road right-of-way or easements. The listing shall be subject to the approval of the OWNER and as construction areas are secured, copies of all written agreements shall be placed on file with the OWNER and ENGINEER.

B. The CONTRACTOR shall be responsible for any encroachments on rights-of-way or property of the public or adjoining property owners and shall hold the OWNER, ENGINEER and Consultant(s) harmless because of any encroachments which may be a result of his lack of proper layout. In this regard, he shall, without extra cost to the OWNER, move any work or that portion of any work that encroaches on the property of others, or that is built beyond legal building or setback limits, and he shall rebuild the affected work or portion of work at the proper location and in full compliance with the Contract Documents.

C. Before final payment will be authorized, the CONTRACTOR will be required to furnish the OWNER with written releases from property owners or public agencies where side agreements or special easements have been made by the CONTRACTOR or when the CONTRACTOR's operations, for any reason, have not been kept within the construction easements by the OWNER.

D. In the event the CONTRACTOR is unable to secure the written releases required in the above paragraph, he shall inform the OWNER of the reasons for his failure to do so. The OWNER or its representatives will then examine the site and the OWNER will direct the CONTRACTOR to complete any work that may be necessary to satisfy the terms of the permit or easement. Should the CONTRACTOR refuse to do the work, the OWNER reserves the right to have it done by separate contract and deduct the cost of

same from moneys due the CONTRACTOR, or he may require the CONTRACTOR to furnish a bond in a sum satisfactory to the OWNER to cover any legal claims for damages. When the OWNER is satisfied that the work has been completed in agreement with the Contract Documents and the terms of the permit or easement, he reserves the right to waive the requirement of obtaining the statement if the CONTRACTOR's failure to obtain such statement is due to the grantor's refusal to sign and this refusal is not based upon any legitimate claims that the CONTRACTOR has failed to fulfill the terms of the license or easement, or if the CONTRACTOR is unable to contact or has undue hardship in contacting the grantors.

1.14 EXAMINATION OF PRIVATE PROPERTY PRIOR TO CONSTRUCTION

A. If the CONTRACTOR desires to enter private property to determine their condition and/or possible blasting damage prior to construction, the CONTRACTOR shall first obtain a letter of permission and introduction from the OWNER.

1.15 DAILY REPORTS

A. The CONTRACTOR shall maintain daily reports of construction activities, including non-work days. The report shall include:
   1. Manpower, number of men by craft;
   2. Equipment on the project;
   3. Major deliveries;
   4. Activities work with reference to the CPM schedule activity numbers;
   5. New problems; and
   6. Other pertinent information

B. A similar report shall be maintained for/by each Subcontractor.

C. The reports shall be available to the ENGINEER's Field Office within two days of the respective report date. Each report shall be signed by the CONTRACTOR's Superintendent or Project Manager.

D. Information provided on the daily report shall not constitute notice of delay or any other notice required by the CONTRACT DOCUMENTS. Notice shall be as required therein.

1.16 FINAL GUARANTEE

A. All work shall be guaranteed by the CONTRACTOR for a period of one year from and after the date of Initiation of Operation by the OWNER.

B. If, within the guarantee period, repairs or changes are required in connection with guaranteed work, which, in the opinion of the OWNER, is rendered necessary as the

result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, the CONTRACTOR shall, promptly upon receipt of notice from the OWNER and without expense to the OWNER, do the following:

1. Place in satisfactory condition in every particular all of such guaranteed work and correct all defects therein.
2. Make good all damage to the building or site, or equipment or piping or contents thereof, which, in the opinion of the OWNER, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the contract.
3. Make good any work or material, or the equipment and contents of building, structure or site disturbed in fulfilling any such guarantee.
4. Restart the warranty period as follows: Where defective Work (and damage to other Work resulting therefrom) has been corrected, removed, or replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

C. If the CONTRACTOR, after notice, fails within ten days to proceed to comply with the terms of this guarantee, the OWNER may have the defects corrected, and the CONTRACTOR and his surety shall be liable for all expense incurred, provided, however, that in case of an emergency where, in the opinion of the OWNER, delay would cause loss or damage, repairs may be started without notice being given to the CONTRACTOR and the CONTRACTOR shall pay the cost thereof.

D. All special guarantees or warranties applicable to specific parts of the work as may be stipulated in the Contract Specifications or other papers forming a part of this Contract shall be subject to the terms of this paragraph during the first year of life of each such guarantee. All special guarantees and MANUFACTURERS' warranties shall be assembled by the CONTRACTOR and delivered to the ENGINEER, along with a summary list thereof, before the acceptance of the work.

1.17 OWNER-FURNISHED MATERIAL

A. The CONTRACTOR shall furnish all materials required to complete the work.

1.18 SPARE PARTS

A. Spare parts for certain equipment provided under Divisions 11, 13, 14, 15, and 16 have been specified in the pertinent sections of the Specifications. The CONTRACTOR shall collect and store all spare parts as required by the MANUFACTURER in accordance with Section 01610. In addition, the CONTRACTOR shall furnish to the ENGINEER an inventory addition, the CONTRACTOR shall furnish to the ENGINEER an inventory listing all spare parts, the equipment they are associated with, the name and address and telephone number of the supplier, and the delivered cost of

each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost. The CONTRACTOR shall deliver the spare parts to the ENGINEER ten (10) days prior to facility start-up.

B. All spare parts shall be furnished in containers clearly identified in indelible markings as to contents. Each container shall be packed for prolonged storage.

1.19 MAINTENANCE AND LUBRICATION SCHEDULES

A. The CONTRACTOR's attention is directed to Section 01730 for requirements relative to the submission of operating and maintenance data for the mechanical equipment. For all mechanical and electrical equipment furnished, the CONTRACTOR shall provide a list including the equipment name, address, and telephone number of the MANUFACTURER's representative and service company so that service and/or spare parts can be readily obtained.

1.20 EMERGENCIES

A. The CONTRACTOR shall at all times after regular working hours, including weekend and holidays, maintain a telephone where he or his representative can be reached on an emergency basis. The CONTRACTOR or his representative shall be prepared to act to correct conditions on the site deemed to constitute an emergency by either the OWNER, his agent, the ENGINEER or local authorities and is obligated to act to prevent threatened damage, injury or loss without special instructions from the OWNER or ENGINEER. The CONTRACTOR shall give the ENGINEER prompt written notice of all significant changes in the work or deviations from the Contract Documents caused thereby. If a condition on the site requires attention after working hours, either the OWNER, agent, ENGINEER, or local Authority shall call the CONTRACTOR or his representative at the emergency telephone number, identify himself and describe the emergency condition. The CONTRACTOR is expected to dispatch personnel and equipment to adequately institute corrective measures within two (2) hours. If for some reason the CONTRACTOR or his agent cannot be reached at the emergency number after a reasonable time (2-hour), the OWNER shall have the right to immediately initiate corrective measures, and the cost shall be borne by the CONTRACTOR.

B. In the event that the CONTRACTOR fails to maintain safe job conditions and traffic conditions, including, but not limited to, trench settlement and hazardous storage of backfill or construction materials, the OWNER, after failure of the CONTRACTOR to commence substantial steps at the job site to rectify the situation within two (2) hours of the time the CONTRACTOR has been notified of the unsafe condition, may hire guards, take such precautions, make such repairs and take any other steps which the OWNER or the OWNER'S agent in its discretion, considers necessary to protect the property, persons, or the OWNER. The cost of any of these precautions, guards, or steps shall be deducted from the payments due the CONTRACTOR, and the CONTRACTOR will be billed for these services, work and material at prevailing rates.

1.21 CLAIM OR PROPERTY DAMAGES AND CITIZEN'S CONCERNS/INQUIRIES

A. In the event of any indirect or direct damage to public or private property caused in whole or in part by an act, omission or negligence on the part of the CONTRACTOR, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, the CONTRACTOR shall at his own expense and cost promptly remedy and restore such property to a condition equal to or better than that existing before such damage was done. The CONTRACTOR shall perform such restoration by under-pinning, repairing, rebuilding, replanting, or otherwise restoring as may be required by the ENGINEER or OWNER, or shall make good such damage in a satisfactory and acceptable manner. In case of failure on the part of the CONTRACTOR to promptly restore such property or make good such damage, the OWNER may, upon five (5) calendar days written notice, proceed to repair, rebuild or otherwise restore such property as may be necessary and the cost thereof, or a sum sufficient in the judgement of the OWNER to reimburse the owners of the property so damaged, will be deducted from any monies due or to become due the CONTRACTOR under the Contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01100

SECTION 02221 - TRENCHING, BEDDING, AND BACKFILL FOR PIPE

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform all excavation (unclassified), backfill, fill, grading and slope protection required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to: manholes, vaults, duct, conduit, pipe; all backfilling, fill and required borrow; grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing, and water handling.

1.2 RELATED REQUIREMENTS

A. The Contract Documents include, but are not limited to, the following related requirements:

1. Site Clearing is included in Section 02110.
2. Dewatering is included in Section 2240.
3. Ductile Iron Pipe and Fittings is included in Section 02619.

1.3 TRENCH PROTECTION

A. All excavation, trenching and related sheeting, bracing, etc., shall conform to the requirement of the Florida Trench Safety Act (C5/5B2626) which incorporates by references, OSHA's excavation safety standards (29 CFR 1926.650 subpart P).

B. Sheeting and Bracing in Excavations:

1. In connection with construction of below grade structures, the Contractor shall construct, brace, and maintain cofferdams consisting of sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing yard piping and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and rammed.
2. For trench sheeting for pipes, no sheeting is to be withdrawn if driven below mid-diameter of any pipe, and no wood sheeting shall be cut off at a level lower then 1 foot above the top of any pipe unless otherwise instructed by the Engineer. If during the progress of the work the Engineer decides that additional wood sheeting should be left in place, he may instruct the Contractor in writing. If steel

sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.

3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specifications, all sheeting and bracing shall be removed after completion of the substructure, care being taken not to disturb or otherwise injure the finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, by watering or otherwise as may be required.
4. The right of the Engineer to instruct sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such instructions, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or on the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
5. The Contractor shall construct the cofferdams and sheeting outside the neat lines of the foundation unless indicated otherwise to the extent he deems it desirable for his method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing, and cofferdams shall be adequate to withstand all pressures to which the structure will be subjected. Pumping, bracing, and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the masonry enclosed. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.
6. Drawings of the cofferdams, sheeting and bracing and design computations shall be submitted to the Engineer and construction shall not be started until such drawings are received. The drawings and computations shall be prepared and sealed by a Registered Professional Engineer in the State of Florida and shall be in sufficient detail to disclose the method of operation for each of the various stages of construction, if required, for the completion of the substructures.

C. Dewatering, Drainage and Flotation:

1. The Contractor shall construct and place all pipelines, concrete work, structural fill, screened gravel and gravel base course in-the-dry. All trenches and excavations are to be kept dry and free from water at all times when work is in progress and at no time is water to run through the pipeline(s) or structure excavations. The Contractor shall maintain the water level a minimum of one foot below proposed bottom of excavation. For purposes of this Contract, "in-the-dry" is defined as within minus 4 to plus 2 percentage points of the optimum moisture content of the soil.
2. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations and keep such excavations dry so as to obtain a satisfactory

undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

3. Pipe and masonry shall not be laid in water or submerged within 24 hours after being placed. Water shall not flow over new masonry within four (4) days after placement.
4. In no event shall water rise to cause unbalanced pressure on structures until the concrete or mortar has set at least 24 hours. The Contractor shall prevent flotation of the pipe promptly placing backfill.
5. Dewatering shall at all times be conducted in accordance with Section 02240 and in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
6. In the event that it is found that the water in a trench cannot be lowered by industry standards, i.e., well points and pumps; and if it is recognized by the Contractor that it is not feasible to dewater the trench, an alternate construction method may be proposed. The Contractor shall dewater the trench for a minimum of ten (10) calendar days prior to submitting any alternate method of dewatering which shall exhaust all standard means of dewatering. Complete details, specifications, Manufacturer's descriptive literature, installation lists and any other pertinent data regarding the alternate method(s) shall be submitted as an alternate by the Contractor to the Engineer for review within ten (10) days of the time that the Contractor anticipates using such alternate method.
7. The alternate method may be used, so long as the work is performed in a manner which, in the opinion of the Engineer and Owner, conforms to the method and procedure as set forth in the information supplied by the Contractor in his original application for use of an alternate method. The Engineer may revoke the alternate method if at any time, in his opinion, the work is not conforming to any applicable portion of these specifications. All alternate methods proposed for dewatering shall be at the contractor's expense.

1.4 JOB CONDITIONS

A. The Contractor shall examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The Owner and Engineer will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the investigation was made.

B. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Engineer and the Owner of such piping or utility immediately for directions.

2. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
3. Demolish and completely remove from site existing underground utilities indicated on the Drawings to be removed.

C. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.5 SUBMITTALS

A. Furnish the Engineer, for approval, a representative sample of any fill material obtained from onsite sources weighing approximately 100 pounds, at least 7 calendar days prior to the date of anticipated use of such material.

B. For each material obtained from other than onsite sources, the Contractor shall notify the Engineer of the source of the material and shall furnish the Engineer, for approval, a representative sample weighing approximately 100 pounds, at least 7 calendar days prior to the date of anticipated use of such material.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Materials for use as base, fill and backfill shall be as described below.

a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4, A-2-5 and A-3.
b. Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 along with peat and other highly organic soils.

B. Structural Fill:

1. Structural fill material shall be satisfactory soil consisting of medium to fine grain sized sand, free of organic, deleterious and/or compressible material. Rock in excess of 3-1/2 inches in diameter shall not be used in the fill material. Structural fill shall not contain hardpan, stones, rocks, cobbles or other similar materials.

C. Select Common Fill:

1. Select common fill material shall be satisfactory soil containing no more than 15 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 3-1/2 inches in diameter. Select common fill shall not contain broken concrete, masonry, rubble or other similar materials.
2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.

D. Bedding Rock:

1. Bedding rock shall be washed and graded limerock or shell, FDOT No. 89.

PART 3 - EXECUTION

3.1 GENERAL

A. All excavation, backfill and grading necessary to complete the work shall be made by the Contractor and the cost thereof shall be included in the contract price.

B. Material shall be furnished as required from off site sources and hauled to the site.

C. The Contractor shall take all the necessary precautions to maintain he work area in a safe and workable condition.

D. The Contractor shall protect his work at all times by flagging, marking, lighting and barricading. It shall also be the Contractor's responsibility to preserve and protect all above and underground structures, pipe lines, conduits, cables, drains or utilities which are existing at the time he encounters them. Failure of the Drawings to show the existence of these obstructions shall not relieve the Contractor from this responsibility. The cost of repair of any damage which occurs to these obstructions during or as a result of construction shall be borne by the Contractor without additional cost to the Owner.

3.2 TRENCH EXCAVATION

A. Excavation for all trenches required for the installation of pipes and electrical ducts shall be made to the depths indicated on the Drawings. Excavate trench to provide a minimum of 36-inch clear cover over the pipe bell unless otherwise noted on the Drawings. Excavate in such manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches, for bracing and supporting and for pumping and drainage facilities. The trench width at the top of the pipe shall not exceed the allowable as determined by the depth of cut and indicated on the Drawings.

B. Rock shall be removed to a minimum 4 or 6 inches clearance around the bottom and sides of all the pipe or ducts being laid as shown on the Drawings.

C. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Engineer. Excavate unsatisfactory soil material from the bottom of the trench to a depth determined by the Engineer and replace with rock bedding.

D. Where pipe or ducts are to be laid in bedding or encased in concrete the trench may be excavated by machinery to, or just below, the designated subgrade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

E. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery. The last of the material being excavated shall be done manually in such a manner that will give a flat bottom true to grade so that pipe or duct can be evenly and uniformly supported along its entire length on undisturbed material or bedding rock. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barrel only.

3.3 PIPE INTERFERENCES AND ENCASEMENT

A. The Contractor shall abide by the following schedule of criteria concerning interferences with other utilities. In no case shall there be less than 0.3 feet between any two pipe lines or between pipe lines and structures. Concrete encasement shall be provided in accordance with the typical detail as shown on the Drawings.

3.4 BEDDING

A. Gravity sewer pipe shall have rock or shell bedding to 6-inch over top of pipe, and 4 to 6 inches below the invert depending on diameter as shown on the Drawings. Pressure pipe shall have rock or shell bedding to springline of pipe, and 4 to 6 inches below the invert depending on diameter as shown on the Drawings.

B. Rock or shell bedding shall be placed in maximum lift thicknesses of 4 to 6 inches with each lift compacted using mechanical equipment to a minimum of 90 percent of the maximum dry density as determined by AASHTO T-180.

C. Rock or shell bedding may be used under certain circumstances as a drain for groundwater control, subject to the approval of the Engineer. The Contractor shall take all precautions necessary to maintain the shell or rock bedding in a compacted state and to prevent washing, erosion or loosening of this bed.

D. Where rock or shell bedding is not required for pipe support as shown on the Drawings, the trench bottom or bedding should be prepared in accordance with Section 02221-3.2E

and the top 6 inches shall be compacted using mechanical equipment to a minimum of 90 percent of the maximum dry density as determined by AASHTO T-180.

3.5 BACKFILLING

A. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed, and inspected and the trench filled with suitable bedding material.

B. Backfilling over ducts shall begin not less than three days after placing concrete encasement.

C. All backfilling shall be prosecuted expeditiously and as detailed on the Drawings.

D. Any space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, free from stones having a diameter greater than 1-1/2 inches and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of the pipe. Compact to 95 percent maximum density per AASHTO T-180 in layers not to exceed 4 inches up to the centerline of the pipe from the trench bottom and in layers not to exceed 6 inches from the pipe centerline to 12 inches above the pipe.

E. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.

F. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted with select common fill with mechanical equipment. Compact select common fill in 6-inch layers to 95 percent maximum density per AASHTO T-180.

G. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the fill up to an elevation of at least 1 foot above the bottom of the pipes:

1. Place structural fill in such areas for a distance of not less than 3 feet either side of the center line of the pipe in level layers not exceeding 6 inches in depth.
2. Wet each layer to the extent required and thoroughly compact each layer with a power tamper.

3.6 GRADING

A. Grading shall be performed at such places as are indicated on the Drawings, to the lines, grades, and elevations shown or as approved by the Engineer and shall be made in such a manner that the requirements for formation of embankments can be followed. All unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as required. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. Temporary

drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution or condition of the work.

B. If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extras will be considered for the stockpiling or double handling of excavated material.

C. The Engineer's right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies on the Drawings or in order to obtain satisfactory construction.

D. Stones or rock fragments larger than 1-1/2 inches in their greatest dimensions will not be permitted in the top 12-inches of the subgrade line of all dikes, fills or embankments.

E. All fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings, or as approved in writing by the Engineer.

F. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings or as approved in writing by the Engineer.

G. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines which must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and drains plugged at manholes.

H. The Contractor shall replace all pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein.

3.7 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

A. All surplus and/or unsuitable excavated material shall be disposed of in the following manner:

1. Transport from Owner's property and legally dispose of. Any permit required for the hauling and disposing of this material beyond Owner's property shall be obtained prior to commencing hauling operations.

B. Suitable excavated material may be used for fill if it meets the specifications for select common fill and is approved by the Engineer. Excavated material so approved may be neatly stockpiled at the site where designated by the Owner/Engineer provided there is an area available where it will not interfere with the operation of the facility nor inconvenience traffic or adjoining property owners.

3.8 FORCE MAIN, RECLAIMED WATER FORCE MAIN, POTABLE WATER MAIN, AND GRAVITY SEWER MARKING TAPE

A. All polyvinyl chloride (PVC) and ductile iron (DI) pipelines 4-inches and greater shall have identification marking tape. A polyethylene double-safe detectable marking tape shall be installed continuously in the backfill along the entire length of all gravity sewer, sewage force mains, potable water, reclaimed water or any other yard piping for identification and detection purposes. All ductile iron pipelines marking tape shall be nondetectable type, but shall have all of the design features as specified herein. Buried ductile iron pipe for unforeseen conflicts shall be encased in a colored tubular polywrap conforming to 100% polyethylene material in accordance with ASTM D1248-84 Type 1, Class C, grade E-1, tensile strength 1200 psi, elongation 300%.

B. The tape shall be as manufactured by Thor Enterprises or equal. The polyethylene tape shall meet the requirements of ASTM D 1248, Type I Class A, Grade E-1 for polyethylene plastics molding and extrusion materials. The tape shall have a minimum tensile strength of 1750 psi, a minimum elongation of 250 percent, not less than 50 gauge solid aluminum core and a nominal thickness of 5 mils. The tape shall be composed of 2 mil clear film reverse - printed laminated to aluminum, foil-laminated to 2 mil clear film and reverse-printed. Minimum total thickness 4 mils.

C. The marking tape for all sewage force mains, gravity sewer pipes, plant process piping, potable water piping, and reclaimed water piping shall conform to the American Public Works Association and Utility Location Coordination Council Color coding. The continuous warning message shall be repeated every 16 to 36 inches in lettering no less than 2 inches high. The message for all piping shall be printed on one side in black letters (typical for all lettering)

D. Marking Tape Message and Color:
   1. The message for PVC or DI sewage force mains and plant process piping shall be fade-resistant green color and shall be as follows:

      a. CAUTION: BURIED SEWER FORCE MAIN BELOW

   2. The message for PVC or DI gravity sanitary sewer pipe including service connections installed in areas of earthen cover only, shall be fade-resistant green color and shall be as follows:

      a. CAUTION: BURIED GRAVITY SANITARY SEWER LINE BELOW

   3. The message for PVC or DI potable water pipe including service connections shall be fade-resistant blue color and shall be as follows:

      a. CAUTION: BURIED POTABLE WATER LINE BELOW

   4. The message for PVC or DI reclaimed water pipe including service connections shall be fade-resistant purple color and shall be as follows:

a. CAUTION: BURIED RECLAIMED WATER LINE BELOW

E. Minimum marking tape widths shall be as follows:

Pipe Inside Diameter, Inches	Minimum Tape Width, Inches	No. of Tape strips
4 through 12	4	1
14-20	4	2
24 & Larger	4	3

F. The Contractor shall submit typical samples of the printed marking tape to the Engineer for approval prior to installation (minimum length to show repeat of message).

G. The marking tape shall be placed in the trench backfill directly above and centered over the pipeline. The marking tape shall be installed between 12 and 18 inches above the top of the pipe. The Contractor shall exercise care to prevent damage to the polyethylene tape when placing the remaining backfill.

H. Where the pipeline passes through in a manhole, vault or other underground structure, the polyethylene marking tape shall be placed on top of that portion of the pipeline, located inside the structure and shall be secured to the pipeline with adhesive tape.

I. Openings for air valves and similar appurtenances shall be provided by making an X-shaped cut in the polyethylene and temporarily folding back the film. After the polyethylene is installed over the appurtenance, the slack shall be taped securely to appurtenance and the cut in the polyethylene shall be repaired with adhesive tape.

J. The Contractor shall deliver to the Owner 100 feet of the polyethylene marking tape of each color and each color and each width size after construction is completed.

END OF SECTION 02221

SECTION 02619 - DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required to install ductile iron pipe and fittings complete, tested, and ready for use, as shown on the Drawings and/or as specified herein.

1.2 RELATED WORK (REQUIREMENTS)

A. The Contract Documents include, but are not limited to, the following related requirements:
   1. Site preparation is included in Section 02100.
   2. Granular Materials are included in Section 02220.
   3. Trenching, Bedding, Backfilling and Compaction for Pipe are included in Section 02221.
   4. Seeding and Sodding is included in Sections 02932 and 02933.
   5. Testing and Cleaning of Gravity Sewers are included in Section 02610.
   6. Testing and Cleaning of Pressure Lines are included in Section 02622.

1.3 SUBMITTALS

A. The CONTRACTOR shall submit to the ENGINEER, within twenty (20) calendar days after receipt of Notice to Proceed, a list of materials to be furnished, and the names of the suppliers and the date of delivery of materials to the site.

B. Submit shop drawings to the ENGINEER for review in accordance with Section 01300, showing the complete laying plan of all pipe, including all fittings, adapters, valves, and specials along with the MANUFACTURER's drawings and specifications indicating complete details of all items. The pipe details shall include a pipe class laying schedule which specifies pipe class, class coding, joints, station limits, and transition stations, and a list of abbreviated terms with their full meaning. The CONTRACTOR shall provide details of fittings to be furnished. The above shall be submitted to the ENGINEER for approval before fabrication and shipment of these items. The locations of all pipes shall conform to the locations indicated on the Drawings. In most cases, a certain amount of flexibility in the positioning of pipes will be allowed. Horizontal and vertical deflections may require beveled, special deflection; or short pipes. The deflections at joints shall not exceed 75 percent of that recommended by the MANUFACTURER.

C. Furnish in duplicate to the ENGINEER, prior to each shipment of pipe, submit MANUFACTURER's certification and certified test reports that the pipe and linings and coating for this contract was manufactured and tested in accordance with the ASTM and ANSI/AWWA Standards specified herein.

1.4 QUALIFICATIONS

A. All ductile iron pipe and fittings shall be furnished by MANUFACTURERS who are fully experienced, reputable, and qualified in the manufacture of the material to be furnished. The pipe and fittings shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.5 QUALITY ASSURANCE

A. All ductile-iron pipe and fittings shall be from a single MANUFACTURER. All ductile-iron pipe to be installed under this contract may be inspected at the foundry for compliance with these specifications by an independent testing laboratory provided by the OWNER. The CONTRACTOR shall require the MANUFACTURER's cooperation in these inspections. The cost of foundry inspection of all pipe approved for this contract will be borne by the OWNER.

B. Inspection of the pipe will also be made by the ENGINEER or other representatives of the OWNER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

C. Each joint of ductile iron pipe shall be hydrostatically tested at the point of manufacture to 500 psi for a duration of at least ten (10) seconds. Testing may be performed prior to machining bell and spigot. Failure of ductile iron pipe shall be defined as any rupture of pipe wall. Certified test certificates shall be furnished in duplicate to the ENGINEER prior to time of shipment.

1.6 CONNECTION TO EXISTING LINES

A. Lines installed under other Contracts, to which piping of this Contract must connect, the following work shall be performed:
   1. Removing the temporary or permanent plug provided in the pipe installed under another Contract (if any).
   2. Furnishing and installing piping and accessories and making proper connections.

B. For connections to the existing lines to which the piping of this Contract must connect, the following work shall be performed:
   1. Exposed buried lines to confirm or determine end connection, pipe materi-

al, and diameter.

2. Furnish and install appropriate piping and make proper connections.

PART 2 – PRODUCTS

2. 1 MATERIALS

A. Ductile iron pipe and fittings 3-inches through 54-inches for buried service shall meet the following requirements:

1. Ductile iron pipe shall conform to ANSI A21.51 and AWWA C-151. Ductile iron pipe shall have a minimum tensile strength of 60,000 psi with a minimum yield strength of 42,000 psi and a minimum elongation of 10 percent. Thickness of pipe supplied shall not be less than Class 51 unless specifically indicated on the Drawings or specified herein. Type of bedding conditions used shall be as shown on the Drawings. Ductile iron pipe and fittings in below grade structures shall be flanged Class 53.
2. Unrestrained joint pipe shall be supplied in lengths not in excess of 21 feet. Unrestrained joint pipe shall be either the rubber-ring type, push-on joint, or standard mechanical joint pipe as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, Clow Corp., or equal.
3. Unrestrained fittings shall meet the requirements of AWWA C-110. Rubber gaskets shall conform to ANSI A21.11 for mechanical and push-on type joints. Mechanical joint fittings and restrained joint pipe shall be furnished with sufficient quantities of accessories as required for each joint.
4. Restrained joint fittings where shown or specified shall be manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51, C110/A21.10 and C111/A21.11. Push-on joints for such pipe shall be in accordance with ANSI/AWWA C111/A21.11. Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 and C151/A21.51. Restrained joint fittings shall be ductile iron in accordance with applicable requirements of ANSI/AWWA C110/A21.10. Mechanical joints for such fittings shall be in accordance with ANSI/AWWA C110/A21.10 and C111/A21.11. Restrained joints, where shown or specified, shall be designed to withstand vertical and longitudinal forces and be capable of holding against withdrawal with no axial movement resulting from an internal hydrostatic pressure of 120 psi for the raw sewage force mains and 150 psi for reclaimed water irrigation mains and potable water mains.
5. All buried service pipe and fittings shall be ductile iron and shall have push-on type line joints and all fittings shall be mechanical joint, unrestrained or restrained.
6. Restrained pipe joints that achieve restraint by incorporating cut out sections in the wall of the pipe shall have a minimum wall thickness at the point of cut out that corresponds with the minimum specified wall thickness for the rest of the pipe.
7. Restrained joints shall be suitable for 120 psi or 150 psi working pressure

for purpose as specified above and fabricated of heavy section ductile iron casting. Gaskets shall meet the material requirements of ANSI/AWWA C111 for mechanical joint gaskets. Bolts and nuts on mechanical joint or flanged joint pipe and fittings, above and below ground shall be low alloy, high strength steel equal to "Corten" conforming to ANSI A21.11 and A21.15 for Class 125 ANSI B16.1 for the purpose intended. Restrained joints for buried pressure piping and fittings shall "Super-Lock" as manufactured by the Clow Corporation; “Flex-Ring” and "Lok-Ring" as manufactured by the American Cast Iron Pipe Company; “TR-FLEX” as manufactured by U.S. Pipe and Foundry Company; or equal, or Megalug retainer glands as manufactured by EBAA Iron, Inc. for mechanical joint pipe and fittings. The minimum number of restrained joints required for resisting forces at fittings and changes in direction of pipe shall be determined from the length of restrained pipe on each side of fittings and changes in direction necessary to develop adequate resisting friction with the soil as shown on the drawings.

8. 9. Adapters to connect ductile iron fittings to pipe or fittings of dissimilar materials shall be supplied by the CONTRACTOR in accordance with the pipe MANUFACTURER recommendations, and as approved by the ENGINEER.

10. Pipe outlets where shown shall be made with tees, tapping saddles or factory welded-on bosses for above ground piping. Bosses shall be ductile iron, factory welded on ductile iron pipe having a minimum Pressure Class 350 for 6-inch to 12-inch sizes, Pressure Class 250 for 16-inch to 36-inch sizes, and Pressure Class 350 for 42-inch to 48-inch sizes.

11. Flexible joint pipe shall be ball and socket type self-restraining without the use of bolts and designed for a maximum working pressure of 350 psi having a class rating as recommended by the MANUFACTURER, but a minimum Class 56 for 4-inch to 24-inch sizes. Boltless restraint shall be achieved by external lugs interlocked into a retainer gland. Each joint shall be capable of a maximum deflection of 15 deg. Flexible joint pipe shall be USIFLEX by U.S. Pipe and Foundry Company, Flex-Lok Boltless Ball Joint Pipe by American Cast Iron Pipe Company or equal. Subaqueous canal crossings shall be either flexible ball and joint pipe or Class 53 factory restrained mechanical joint pipe, fitting and accessories. All bolts and accessories shall be "Corten", conforming to ANSI A21.11 and shall be drilled to match ANSI B16.1, Class 125 or 250 for the purpose intended.

12. CONTRACTOR may supply short body ductile iron fittings in conformance with AWWA C153 in lieu of C110 and C111 for sizes 3-inch through 24-inch.

13. All fittings shall be cast and machined at one foundry location to assure quality control and test data. The standard grade of iron shall be 70-50-05. Analyses of the ductile iron shall be made with the chemical limits set in this standard (C110 and/or C153). Results of chemical analyses shall be provided to the ENGINEER as part of the shop drawings.

B. Ductile iron pipe and fittings 3-inches through 54-inches for above ground service or in below ground concrete pits shall meet the following requirements:

1. Ductile iron pipe shall conform to ANSI A21.51 and AWWA C-151. Thickness of pipe shall be a minimum of Class 53 for all sizes of flanged pipe.
2. Flanged ductile-iron pipe shall conform to current AWWA/ANSI Specification C115/A21.15 and C110/A21.10 with factory-applied screwed long hub flanges except as otherwise specified hereinafter. Flanges shall be fully machined faced and drilled after being screwed tight on the pipe, with flanges true to 90 degrees with the pipe axis and shall be flush with end of pipe conforming to ANSI B161.1, 125 pound std. or Class 250, for the purpose intended. No welding of flanges or accessories in the field will be acceptable.
3. Pipe for use with split-type flexible coupling joints shall have radius grooved ends.
4. Wall sleeve with integral water stops, or wall pipe casings with integral thrust collars shall be continuously welded on each side of the waterstop or thrust collar and shall be of the sizes and types as shown on the Drawings. Wall sleeves, where specified, shall be fabricated of Schedule 40 Type 304 stainless steel or PVC and shall have integral water stops continuously welded on each side of the waterstop. Seal strips for wall sleeves, where required on the Drawings, shall be Link Seal as manufactured by Thunderline Corp., Wayne, Michigan, or equal.
5. Full face type 1/16-inch thick red rubber ring gaskets shall conform to ANSI A21.11. Ring gaskets shall be of approved composition suitable for the required service.
6. Pipe and fittings exposed to view in the finished work and to be painted in accordance with Section 09902 shall not receive the standard tar or asphalt coat on the outside surfaces but shall be shop primed on the outside with one coat of Kop Coat No. 622 Rust Inhibitive Primer or equal. Should portions of the pipe inadvertently be given the outside bituminous coating instead of the rust inhibitive primer as required for exposed piping the surfaces shall be sealed with a non-bleeding sealer coat such as Kop Coat Tar Stop, Mobil Anti-Bleeding Aluminum Sealer or Aqua Lock Glidden. Sealing shall be a part of the work of this section.
7. Bolts and nuts on flanged pipe and fittings shall be low alloy, high strength steel equal to "Corten," conforming to ANSI A21.11 and A21.15 or 304 stainless steel and shall be drilled to match ANSI B16.1 Class 125 or 250 flanges for the purpose intended.

2.2 LINING AND COATINGS

A. All pipe and fittings for potable water service and reclaimed water irrigation reuse mains shall have a cement mortar lining and a bituminous seal coat on the inside in accordance with ANSI A21.4 and be coated on the exterior with a 1-2 mils thick bituminous coat in accordance with ANSI A21.51.

B. All ductile iron pipe and fittings for wastewater service (including but not limited to raw sewage lines, all process lines, and reject water lines) including pressure and gravity mains, unless otherwise noted, shall have a ceramic epoxy lining on the interior and bituminous coating on the exterior except for 6 inches back from the spigot end. The bituminous coating shall not be applied to the first 6 inches of the exterior of the spigot ends. All pipe and fittings shall be delivered to the application facility without asphalt, cement lining, or any other lining on the interior surface. Because removal of old linings may not be possible, the intent of this specification is that the entire interior of the pipe and fittings shall be as cast without ever having been lined with any substance prior to the application of the specified lining. Any pipe or fittings furnished for this project must not have been lined prior to the awarding of the contract for this project.

1. Lining Material - The material used for the lining shall be a two component amine cured epoxy of at least 87 percent solids. Protecto 401 by Vulcan Painters, Birmingham, Alabama or Permit 9043, Type II Glass Filled Epoxy by Permite Corporation, Atlanta, Georgia are the Standards of Quality. The following test requirements shall be certified by the material supplier, and a history of satisfactory performance for the material in the service required and upon the surface specified shall be submitted. The following are the minimum requirements to be met:
   a. A permeability rating of zero permeance when a film of at least 40 mils is tested according to ASTM D1653 or a permeability rating of 0.0 perms when measured using Method A of ASTM E66 procedure A with a test duration of 42 days.
   b. The material shall contain at least 20 percent by volume of ceramic quartz pigment in the dried film.
   c. The following test must be run on ductile iron panels with the results certified by the lining material supplier of the material being submitted.

	Test	Rating/Method
1.	Direct Impact	ASTM D-2794
2.	3% Sulfuric Acid Immersion @ 120/F	ASTM D-714
3.	25% Sodium Hydroxide Immersion @ 140/ F	ASTM D-714
4.	Deionized Water Immersion @ 160/ F	ASTM D-714
5.	Moisture and Ultraviolet Light Cycle 8 hours light/ 4 hours 100% humidity	ASTM G-5377

2. Application of Lining - The lining shall be applied by a competent firm with at least a five-year history of applying linings to the interior of ductile pipe and fittings.
   a. Surface Preparation: Prior to abrasive blasting the entire area which will receive the protective compound shall be inspected for

oil, grease, etc. Any areas where oil, grease, or any substance which can be removed by solvent is present shall be solvent cleaned using the guidelines outlined in SSPC-SP-1 Solvent Cleaning. After the surface has been made free of grease, oil, or other substances, all areas which are to receive the protective compounds shall be abrasive blasted using compressed air nozzles with sand or grit abrasive media. The blast media shall strike 100 percent of the surface area at sufficient force to remove rust and oxides. The entire surface to be lined shall be struck with the blast media so that all rust, loose, oxides, etc., are removed from the surface. Only slight stains and specks of tightly adhering oxides may be left on the surface. Any area where rust appears before coating must be reblasted to remove all rust.

b. Lining: After surface preparation and within 8 hours of surface preparation of the barrel of the pipe from the inside shoulder of the gasket groove to the end of the interior spigot shall receive a minimum coating of 40 mils dry film thickness of the protective lining. If flange fittings or pipe are included in the project the linings must not be used on the face of the flange; however, full face gaskets must be used to protect the ends of the pipe. All fittings shall be lined with a minimum of 40 mils of the protective lining. Push-on type fittings shall be lined from the gasket groove to the gasket groove. The 40 mils system shall not be applied in the gasket grooves.

c. Coating of Gasket Groove and Spigot Ends: Due to the tolerances involved, the gasket groove and spigot end up to 6 inches back from the end of the spigot end must be coated with a minimum of 10 mils dry of Protecto Joint Compound. This coating shall be applied by brush to ensure coverage. Care should be taken that the coating is smooth without excess buildup in the gasket groove or on the spigot end. All materials for the gasket groove and spigot end shall be applied after the application of the lining.

d. Number of Coats: The number of coats of lining material applied shall be as recommended by the lining MANUFACTURER. However, in no case shall the material be applied above the dry thickness per coat recommended by the lining MANUFACTURER in printed literature. The time between coats shall never exceed that time recommended by the lining material MANUFACTURER. If at any time the lining must be recoated beyond the lining material MANUFACTURER's recommended recoat time, the surface of the existing lining shall be roughened sufficiently to prevent delamination between coats.

3. Inspection:

a. All pipe shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC-PA-2 film thickness testing.

b. The barrel of all pipe and fittings shall be pinhole detected with a nondestructive 2,500-volt pinhole test.
c. Each pipe joint and fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on that date.

4. Certification: The pipe or fitting MANUFACTURER must supply a certificate attesting to the fact that the Applicator met the requirements of this specification, that the material used was as specified, and that the material was applied as required by the specification.
5. Repair: All pinholes and damaged lined areas shall be repaired in accordance with written repair procedure furnished by the MANUFACTURER of the lining material so that the repaired area is equal in performance to the undamaged lined areas.
6. The exterior of the pipe shall receive a bituminous coating approximately 1-2 mils thick in accordance with ANSI A21.51.
7. Pipe and fittings exposed to view in the finished work shall not receive the standard tar or asphalt coat on the outside surfaces but shall be shop primed on the outside with one coat of Kop Coat No. 622 Rust Inhibitive Primer or equal and painted in accordance with Section 09901/09902. Should portions of the pipe inadvertently be given the outside coating of coal tar enamel instead of the rust inhibitive primer as required for exposed piping, the surfaces shall be sealed with a non-bleeding sealer coat such as Kop Coat Tar Stop, Mobil Anti-Bleeding Aluminum Sealer, or equal. Sealing shall be a part of the work of this section.

2.3 IDENTIFICATION

A. Each length of pipe and each fitting shall be marked with the name of the MANUFACTURER, size, and class. All gaskets shall be marked with the name of the MANUFACTURER, size, and proper insertion directions.
B. All below ground ductile iron pipe and fittings shall have an identification color code.
   1. Raw sewage force mains and gravity sewer pipe - Green, similar to Kop Coat, No. 0336.
   2. Reclaimed water irrigation reuse mains and service tubing - Purple, similar to Pantone 522C. Marking tape color shall be red, similar to Kop Coat No. 0508.
   3. Potable water mains and service tubing - Blue, similar to Kop Coat No. 8155.
C. All buried ductile iron pipe shall be painted along its entire length with 2-inch stripes on at least three quarter points for pipe sizes 12-inches and larger. For pipe sizes smaller than 12-inches, a single 2-inch wide stripe along the top of the pipe shall be provided. Paint and marking tape colors shall be as described above and Section 02221, Article 3.11.

2.4 FUTURE STRUCTURE AND MANHOLE CONNECTIONS

Pipe stubs for all future manhole connections shall not be less than 24-inches in length. Watertight plugs or caps shall be furnished.

PART 3 – EXECUTION

3.1 INSTALLING DUCTILE IRON PIPE AND FITTINGS

A. All water, sewer, and reclaimed water mains shall be installed in accordance with recommendations of the pipe MANUFACTURER and as specified herein.

B. Care shall be taken in the handling, storage, and installation of pipe and fittings to prevent injury to the pipe or coatings. All pipe and fittings shall be examined before installing, and no pipe shall be installed which is found to be defective. Pipe or fittings shall not be dropped. All damage to the pipe coatings shall be repaired according to the MANUFACTURER's recommendations.

C. All pipe and fittings shall be kept clean and shall be thoroughly cleaned before installation.

D. Pipe shall be laid to the lines and grades shown on the Drawings with bedding and backfill as shown on the Drawings and as specified in Section 02221. Blocking under the pipe will not be permitted.

E. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when laid, shall conform to the lines and grades required. Ductile iron pipe and fittings shall be installed in accordance with requirements of AWWA Standard Specification C600 except as otherwise provided herein. A firm, even bearing throughout the length of the pipe shall be constructed by tamping FDOT No. 89 stone at the sides of the pipe up to 6-inches over the top of the pipe, and then an additional 6 inches of selected material for a total of 12 inches over the top of the pipe. Blocking will not be permitted. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the CONTRACTOR, at his own expense.

F. When installation is not in progress, including lunchtime, or the potential exists for dirt of debris to enter the pipe, the open ends of the pipe shall be closed with watertight plugs or other approved means.

G. Under no circumstances shall the pipe or accessories be dropped into the trench.

H.

I. All plugs, caps, bends and other locations where unbalanced forces exist shall be anchored by restrained joints. The length of pipe for which restrained joints shall be used are shown on the Drawings.

J. In all cases where ductile iron pipe is installed, a marking tape shall be located above the top of the pipe as specified in Section 02221.

K. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be jointed with a bell shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.

3. 2 PUSH-ON JOINTS

A. Push-on joints shall be made in accordance with the MANUFACTURER's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe to be laid shall then be aligned and inserted in the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

3.3 MECHANICAL JOINTS

A. Mechanical joints shall be made in accordance with Appendix A of ANSI/AWWA C111 and the MANUFACTURER's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket with soapy water before assembly. Bolts shall be tightened to the specified torques. Under no conditions shall extension wrenches or pipe over handle of ordinary ratchet wrench be used to secure greater leverage.

3.4 FLANGED JOINTS

A. Flanged joints shall be installed where shown on the Drawings. Extreme care shall be exercised to insure that there is no restraint on opposite ends of pipe or fitting which will prevent uniform gasket compression, cause unnecessary stress, bending or torsional strains to flanges or flanged fittings. Adjoining push-on joints shall not be assembled until flanged joints have been tightened. Bolts shall be tightened alternately and evenly. After installation apply a bitumastic coating to bolts and nuts.

3.5 RESTRAINED JOINTS

A. Restrained joints shall be installed at all fittings as shown on the Drawings and specified herein. The joint assemblies shall be made in accordance with the MANUFACTURER's recommendations. After installation, apply a heavy bitumastic coating to all bolts, nuts and accessories.

3.6 FLEXIBLE JOINT PIPE

A. The flexible joint pipe shall be installed in accordance with the MANUFACTURER's recommendations. In addition, the installed deflection shall be limited to 12 deg. per joint and provisions shall be made where required to prevent flotation or buoyancy of the pipe.

3.7 SLEEVE TYPE COUPLINGS

A. Couplings shall be installed where shown. Couplings shall not be assembled until

adjoining push-on joints have been assembled. After installation, apply a heavy bitumastic coating to all bolts, nuts and accessories.

3.8 POLYETHYLENE ENCASEMENT

A. The polyethylene encasement shall be installed in accordance with either method specified in ANSI/AWWA C105.

3.9 GRAVITY SEWER CONFLICT PIPING

A. Installation of ductile iron gravity sewer pipe and fittings, where specified for pipeline conflicts, shall be as specified in Article 2.01 (A) above.

3.10 TESTING (PRESSURE PIPING)

A. All pressure mains shall be field tested. Hydrostatic pressure and leakage tests shall conform with Section 4 of AWWA C600 Specification with the exception that the CONTRACTOR shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.

B. The pressure required for the field hydrostatic pressure test shall be 100 psi for the raw sewage lift/pump stations and force mains and 150 psi for potable water mains and reclaimed water irrigation mains, unless otherwise noted. The CONTRACTOR shall provide temporary plugs and blocking necessary to maintain the required test pressure. Fill line slowly with water. Maintain flow velocity of less than 2.0 feet per second. Corporation cocks at least 1-inch in diameter, pipe riser and angle globe valves shall be provided at each pipe dead-end in order to bleed air from the line. Duration of pressure test shall be at least 2 hours. The cost of these items shall be included as a part of testing.

C. The leakage test shall be a separate test at the maximum operating pressure as determined by the ENGINEER following the pressure test and shall be of not less than 2 hours duration. All leaks evident at the surface shall be repaired and leakage eliminated regardless of total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced. The pipe lines shall be tested in such sections as may be approved by the ENGINEER by shutting valves or installing temporary plugs as required. The line shall be filled with water and all air removed and the test pressure shall be maintained in the pipe for the entire test period by means of a force pump to be furnished by the CONTRACTOR. Accurate means shall be provided for measuring the water required to maintain this pressure. The amount of water required is a measure of the leakage.

D. The amount of leakage which will be permitted shall be in accordance with AWWA C600 Standards for all pressure. No pipe installation shall be accepted if

the leakage is greater than that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133{,}200}$$

In which L is the allowable leakage in gallons per hour; S is the length of pipe tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge.

E. The CONTRACTOR must submit his plan for testing to the ENGINEER for review at least ten (10) days before starting the test. The CONTRACTOR shall remove and adequately dispose of all blocking material and equipment after completion and acceptance of the field hydrostatic test, unless otherwise approved by the ENGINEER. Any damage to the pipe coating shall be repaired by the CONTRACTOR. Lines shall be totally free and clean prior to final acceptance.

3.11 TESTING (GRAVITY SEWERS)

A. Testing and cleaning of gravity sewer lines shall be as specified in Section 02610 - Polyvinyl Chloride (PVC) Gravity Sewer Pipe.

3.12 CHLORINATION OF PIPELINES

A. Before being placed in service, all new potable water pipelines and reclaimed water irrigation mains including service connections and accessories shall be chlorinated using the continuous feed method specified in AWWA C651 "Standard Procedure for Disinfecting Water Mains." The procedure shall be approved by the ENGINEER in advance.

B. The location of the chlorination and sampling points shall be determined by the ENGINEER in the field. Taps for chlorination and sampling shall be installed by the CONTRACTOR. The CONTRACTOR shall uncover and backfill the taps as required.

C. The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines, and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for about 24 hours.

D. Following the chlorination period, all treated water shall be flushed from the lines at their extremities, and replaced and water from the distribution system. All treated water flushed from the lines shall be disposed of by discharging to the nearest sanitary sewer or by other approved means. No discharge to any storm sewer or natural water course will be allowed. Bacteriological sampling and analysis of the replacement water shall then be made by the ENGINEER in full accordance with AWWA Specification C651. The CONTRACTOR will be required to rechlorinate, if necessary. The line shall not be placed in service until the requirements of the State and County Public Health Department are met.

E. Special disinfecting procedures shall be used in connections to existing mains and

where the method outlined above is not practical.

F. The CONTRACTOR shall make all arrangements necessary with the County Health Department for examination of samples of water from disinfected water mains. These samples shall be examined for compliance with Department of Health and Rehabilitative Services requirements. Sampling shall be made daily and continuously until two successive examinations are found satisfactory. Should three examinations be found unsatisfactory, the line shall be flushed and disinfected again. The cost of all sampling, flushing and disinfecting shall be included in the contract price and no additional charge shall be made to the OWNER for this work.

3.13 CLEANING

A. At the conclusion of the work the CONTRACTOR shall thoroughly clean all of the new pipelines by flushing with water and pigged to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed.

B. After the pipelines are cleaned and if the groundwater level is above the pipe, or following a heavy rain, the ENGINEER will examine the pipe for leaks. If defective pipes or joints are discovered at this time, they shall be repaired or replaced by the CONTRACTOR.

END OF SECTION 02619

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SECTION 07921 - JOINT SEALANTS – PLANT TANKAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes joint sealants for the following applications:

1. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:

a. Control, and expansion and construction joints in cast-in-place plant concrete tankage.

2. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:

a. Control, and expansion and construction joints in cast-in-place plant concrete tankage.

3. Joints in the following horizontal traffic surfaces:

a. Isolation joints in cast-in-place concrete slabs.

4. Joints in horizontal concrete surfaces where topping or grout is to be placed.

a. Do not place sealant in horizontal concrete slab, mat foundation or elevated slabs joints which will receive topping or grout material.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

D. Qualification Data: For Installer and testing agency.

E. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.

F. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

G. Field Test Report Log: For each elastomeric sealant application.

H. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

I. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Multicomponent Nonsag Immersible Urethane Sealant:

1. Available Products:

   a. Pacific Polymers, Inc.; Elasto-Thane 227 R Type II (Gun Grade).
   b. Pecora Corporation; Dynatred.
   c. Tremco; Vulkem 227.
   d. Tremco; Vulkem 322 DS.

2. Type and Grade: M (multicomponent) and NS (nonsag).

3. Class: 25.
4. Uses Related to Exposure: NT (nontraffic) and I (immersible), Class 1.
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

2.4 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.

3. Remove laitance and form-release agents from concrete.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:

    a. Perform 10 tests for the first 500 ft. of joint length for each type of elastomeric sealant and joint substrate.
    b. Perform 1 test for each 200 ft of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
4. Inspect tested joints and report on the following:

    a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
    b. Whether sealants filled joint cavities and are free of voids.
    c. Whether sealant dimensions and configurations comply with specified requirements.

5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07921

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SECTION 11295 – SLUDGE DEWATERING SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. Contractor shall furnish and install two (2) sludge dewatering screw press(es) as indicated on the drawings. Each screw press shall be manufactured from AISI 304L stainless steel shapes. Fabrication and assembly shall be in conformance with these specifications and drawings.

B. Contractor shall furnished a complete dewatering system including screw press, drive motors, gear reducers, support legs, anchor bolts, piping and wiring, controls, and all accessories and appurtenances specified or otherwise required for a complete and properly operating installation.

C. Contractor shall coordinate all details of the equipment with other related parts of the work. He shall verify that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations required to accommodate equipment differing in dimensions, weight, or other characteristics from these specifications and drawings.

D. Contractor shall install the equipment according to instructions and recommendations of the equipment manufacturer.

E. Power supply for main control panel and inline polymer mixer is 460 V, 60 Hz, 3-phase. Power supply for the air compressor and polymer dosing system shall be 120 V, 60 Hz, 1-phase.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Publications:

1. Section A322: Carbon and Alloy Steel Bar Specifications.
2. Section A507-10: Standard Specification for Drawing Alloy Steel, Sheet and Strip, Hot-Rolled and Cold Rolled

B. ISO 281:2007 Calculation Method for Fatigue Life for Roller Bearings.

C. American Institute of Steel Construction (AISC) Publications

D. American Welding Society (AWS), European Welding Federation (EWF), and International Institute of Welding (IIW) Publications

E. American Structures Painting Council (ASPC) Publications

F. International Organization for Standardization (ISO) Publications.

1.3 SUBMITTALS

A. The following information shall be submitted to the engineer. In accordance with Section 01300, copies of all materials required to establish compliance with this Section. Submittals shall include the following:

B. Product Data: Include the following:

1. Descriptive literature, brochures, catalogs, cut-sheets and other detailed descriptive material of the equipment.
2. Motor characteristics and performance information.
3. Gear reducer data including service factor, efficiency, torque rating, and materials.
4. Parts list including a list of recommended spare parts.

C. Shop Drawings: Include the following:

1. Manufacturer's installation drawings.
2. Wiring and schematic diagrams.

D. Operations and maintenance manual: See Section 01300.

E. Detailed installation instructions, with clear step-by-step points on the correct mechanical and electrical installation procedures.

F. Equipment weights and lifting points.

G. Recommendations for short and long term storage.

H. A copy of the manufacturer's warranty.

I. A copy of documents proving certification of the Manufacturer's Quality Management System according to ISO 9001 and Environmental Protection Management System according to ISO 14001.

J. Failure to include all drawings applicable to the equipment specified in this section will result in rejection of the entire submittal with no further review.

1.4 QUALITY ASSURANCE

A. To ensure quality, conformance, reliability, and environmental practices with regard to the manufacturing and production of the machinery described in this section, the equipment manufacturer shall meet the requirements listed in this section.

B. Manufacturer shall have established an ISO 9001 certified quality management system. Manufacturers without an ISO 9001 certified quality management program must provide complete documentation of their existing quality management system with supplemental information clarifying why areas do not meet ISO 9001 standards. Meeting national quality management standards alone shall not be considered an acceptable substitute because ISO standards exceed national quality management standards.

C. Manufacturer shall have established an ISO 14001 certified environmental protection management system. Manufacturers without an ISO 14001 certified environmental protection management system must provide complete documentation of their existing environmental protection management system with supplemental information clarifying why areas do not meet ISO 14001 standards. Meeting national or local environmental protection management standards alone shall not be considered an acceptable substitute because ISO standards exceed national and local environmental protection management standards.

D. All stainless steel components shall be treated in one of the two following manners:

1. Weld Passivation and Urethane Clearcoat – All stainless steel sheet metal shall be passivated. All stainless steel shall have welds passivated. All stainless steel plate shall be particle blasted and receive a urethane clearcoat.

2. Pickling Bath – All stainless steel components and structures shall be submersed in a chemical bath of nitric acid and hydrofluoric acid (pickling bath) to remove any residues that may be present on the material as a result of forming, manufacture, or handling. After removal from the pickling bath, the equipment must be washed with a high-pressure wash of cold water to remove any remaining surface debris and promote the formation of an oxidized passive layer which is critical to the long life of the stainless steel.

3. Manufacturer shall provide a 20-year warranty which includes corrosion damage on stainless steel components not treated in this manner.

E. No stainless steel components may be fabricated or assembled in a factory where carbon steel products are also fabricated, in order to prevent contamination by rust. Manufacturer shall provide a 20-year warranty which includes corrosion damage on stainless steel components not manufactured in this manner.

F. Screw Press shall be manufacturer's standard product and only be modified as necessary to comply with the drawings, specifications, and specified service conditions.

G. All welding is performed in accordance with American Welding Society (AWS), European Welding Federation (EWF), International Institute of Welding (IIW), or equivalent.

H. Manufacturer shall provide screw press, motors, gear reducers, controls, control panels, and lifting attachments as a complete integrated package to ensure proper coordination, compatibility, and operation of the system.

I. Manufacturer shall provide services by a factory-trained service technician, specifically trained on the type of equipment specified. Service technician requirements include, but are not limited to the following:
   1. Manufacturer shall have a minimum of ten (10) service technicians based in the United States for field service of the equipment. Manufacturer shall have multiple service locations with a minimum of one dedicated service location for both the eastern and western regions of the US. Service technician shall have a minimum of five (5) years' experience servicing wastewater equipment.
   2. Service technician shall be present during initial energizing of equipment to determine directional testing as described in Section 4.01 C (Installation).
   3. Service technician shall inspect and verify location of anchor bolts, placement, leveling, alignment and field erection of equipment, as well as control panel operation and electrical connections.
   4. Service technician shall provide classroom and/or field training on the operation and maintenance of the equipment to operator personnel.
   5. Manufacturer shall state field service rates for a service technician to owner and contractor. In the event that the field service time required by this section should not be sufficient to properly place the equipment into operation, additional time shall be purchased by contractor to correct deficiencies in installation, equipment, or material without additional cost to owner.

J. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or installation, defective workmanship or materials, and breakage or other failure. Materials shall be suitable for service conditions.

K. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service prior to delivery, except as required by testing.

L. Each major component of equipment shall have the manufacturer's name, address and product identification on a nameplate securely affixed to the equipment.

1.5 DELIVERY, STORAGE, AND HANDLING OF EQUIPMENT

A. Equipment shall be shipped and delivered fully assembled, except where partial disassembly is required in order to conform to transportation regulations or for the protection of components.

B. Contractor shall be responsible for unloading and shall have equipment on-site at the time of delivery permitting proper hoisting of the equipment.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. BDP Industries Dewatering System Model DSP-30 Screw Press was used for the design of the system. 30

B. Huber Technology, Inc has been pre-approved by the engineer as an equal. Other engineer-approved equals may be considered.

C. Liquid polymer blending system: Veloblend VM-P from Velocity Dynamics, Inc., or pre-approved equal. Purchase of the polymer blending system shall be coordinated through the dewatering system manufacturer.

D. Inline Polymer Mixer shall be provided by dewatering system manufacturer

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

A. Sludge Characteristics: Sludge to be dewatered shall be well-mixed and well blended having the following characteristics: Each dewatering screw press shall be capable of dewatering municipal wastewater sludge to a final solids content of 20%. The solids capture rate shall be a minimum of 95 %. The polymer consumption shall not exceed 30 lbs of active polymer substance per ton of sludge solids fed.

Parameter	Value	Units
Sludge Type	Waste Activated Sludge	
Biological Treatment Process	Extended Aeration with Secondary Clarifier	
Digestion Process	Aerobic Digestion	
Solids Concentration	1.5	%

B. Performance Requirements: Each dewatering screw press shall be capable of dewatering the above specified municipal wastewater sludge to meet the performance requirements outlined below:

Requirement	Value	Units
Hydraulic Loading Rate	≥95	gpm at 1.5% feed solids
Solids Loading Rate	375	lb/hr at 1.5% feed solids
Cake Solids	≥90% of ultimate dewaterability*	
Capture Rate	95	%
Polymer Dose	40 lb active polymer per dry ton solids or ± 20% of optimal dose determined by ultimate dewaterability testing, whichever is more	

* If after installation, the solids content of thickened sludge is found to be 20% or greater, the equipment shall be determined to be sufficient for dewatering and a dewaterability test will not be required. If the final solids content of the dewatered sludge is found to be less than 20%, the Kopp test shall be completed to determine the dewaterability. The costs of the Kopp test, if required, will be covered by the screw press manufacturer. The screw press equipment must be capable of thickening the solids to equal or greater than 90% of the ultimate dewaterability per the Kopp test.

C. The sludge dewatering plant consists of the following major parts:
   1. Screw Press including support legs
   2. Polymer Dosing System
   3. Polymer Injection/Mixing System
   4. Control Panel

D. All parts of the dewatering press shall be designed and appropriate for the service specified and indicated and for continuous operation.

E. Sufficient room for inspection, maintenance, repair and adjustment shall be provided. Contractor shall provide hoisting equipment to facilitate installation and maintenance work.

F. The physical layout shown on the drawings is based on the BDP. If equipment by another manufacturer is to be supplied, contractor shall include in the bid all necessary modifications to the piping, electrical, structural, and mechanical layouts to accommodate the equipment proposed. Also if equipment by another manufacturer is to be supplied the manufacturer must meet the requirements of section 1.06. Contractor shall pay engineer in responsible charge for all modifications of drawings.

G. All parts shall be designed and manufactured to handle the forces that may be exerted on the screw press during fabrication, shipping, erection, and proper operation according to the O&M manual.

H. All components shall be so arranged that they can be serviced from the operating floor.

I. All components shall be balanced so that jamming at any point will not result in structural failure, but will cause the drive motor to stall. All components, including the

gear reducer, shall be designed to withstand, without damage or permanent distortion, the full stalling torque of the drive motor.

2.3 SLUDGE DEWATERING PRESS DESIGN SPECIFICATIONS

A. MATERIALS

1. Sludge dewatering press shall be manufactured from AISI 304L stainless steel shapes (rods, angles, and channels), pipes, and sheets. In particular, wedge wire basket, screw, shaft, support legs, fasteners and anchor bolts shall be made of this material. Presses with carbon steel components shall not be acceptable because of corrosive wastewater environments.
2. Press access covers shall be either stainless steel or a composite of acrylonitrile butadiene styrene (ABS) and poly(methyl methacrylate) (PMMA). Materials other than stainless steel shall be acceptable if the material meets the following requirements:
    a. Is not a structural load-bearing component.
    b. Is equal to or exceeds stainless steel's resistance to wastewater environment chemicals.
    c. Is resistant to heat degradation up to 185°F (85°C).
    d. Is equal to or exceeds stainless steel's resistance to UV degradation.
    e. Is resilient to impact
3. Wipers for helical screw flights shall be of wear resistant polyurethane (PU) material. Wipers must have a basket contact width of at least .315 in (8 mm) to provide sufficient basket cleaning. The wiper is held in place by stainless steel clamps and set screws which can be easily removed. The wiper shall have a self-contained a dampening mechanism to maintain constant contact with the basket while limiting wear. Wiper self-contained dampening mechanism shall compensate for up to 4mm of radial wiper wear. Equipment using brushes or wipers without this functionality shall provide service trips and replacement parts for the first two (2) brush or wiper replacements to account for additional maintenance time. Equipment without wipers or brushes shall provide four (4) replacement baskets and augers to account for additional equipment wear. Equipment with moving and fixed ring systems shall provide service trips and replacement parts for the first four (4) replacement intervals to account for both the additional maintenance time and additional equipment wear.

B. DESIGN

1. The screw press shall be installed inclined (at 12º). Horizontal units shall provide a diverter chute to prevent wet material from discharging into the downstream process during startup.
2. Dewatering of the sludge takes place in a basket, which consists of three sections of wedge wire or slotted screen baskets. Basket openings shall vary in each of the

three sections, from wider openings to tighter openings, to facilitate optimum release of water from the sludge.

3. The screw press support legs shall be capable of field adjustment for ease of installation.
4. Apart from a flanged connection for the purposes of removing air for odor control purposes, the screw press shall be completely enclosed to prevent odor emission. The whole dewatering section and basket area shall be easily accessible through an inspection lids, which are mounted via hinges on the side of the machine.
5. The wedge wire or slotted screen basket where the wet sludge enters the basket shall provide a minimum free surface area of 18.2% of the active wedge wire surface area to facilitate free water drainage. Flanges and reinforcement bars, or supporting structures around the basket blocking the drainage of water shall be deducted from the active surface area. Baskets without this minimum free surface area must provide additional length of basket until they achieve this minimum free surface area.
6. Each section of the wedge wire or slotted screen basket shall be split in half along the length of the basket to allow for easy separation of the basket into halves for servicing of the wiper. The basket shall be fastened together using bolt fasteners made of stainless steel. The screw press shall be provided with alignment pins for ease of basket alignment during reassembly. The bottom half of the wedge wire basket shall remain inside of the machine during servicing of the wiper for ease of maintenance. Designs which require the bottom half of the basket to be removed from the machine for servicing the wiper will not be accepted because of additional service requirements.
7. A screw shall be installed inside of the screen basket. The screw transports the sludge from the inlet to the discharge area at the end of the pressure zone. Its shaft diameter shall be conical towards the discharge section of the machine. The flights of the helical screw shall be provided with a PU wiper to clean the wedge wire or slotted screen from the inside.
8. The screw shall be shafted and shall be made of stainless steel. A shaft-less screw is not acceptable because of the pressure and torque involved with dewatering. A bearing shall support the feed end of the screw shaft. Wear strips are not acceptable because of the frequent requirement for service.
9. A screw drive shall be provided at the discharge side of the press. The nominal motor power shall be 3.0 hp or 5.0 hp. The motor speed shall be controlled with a Variable Frequency Drive (VFD). The drive unit shall be directly coupled to the screw shaft through a planetary gearbox.
10. A pressure sensor shall be installed at the inlet housing of the screw press. The pressure sensor provides a signal which is used to control the speed of the auger. The pressure in the inlet box shall automatically adjust the speed of the screw via the control system and the range for the pressure shall be adjustable at the HMI. Designs which do not control the screw speed based on the inlet pressure are not acceptable because they require frequent operator attention.
11. The cleaning of the wedge wire or slotted screen from the outside shall be performed by a rotating or oscillating spray bar washing system utilizing a single drive (drive: 0.25 hp, 460 V, 3 phase) or pneumatic made of stainless steel piping

and PVDF spray nozzles. The spray wash system shall cover the entire area of the basket around rotating around the circumference of the basket. Its spraying shall cover the entire area of the screen and also cover the interior of the screw press housing.

12. Spray water supply shall be designed for a minimum flow of 44 gpm (can be filtered non-potable water, allowed particle size 800 microns at maximum 200 ppm) at a minimum pressure of 70 psig. Water pressure at each nozzle of the spray bar shall be a minimum of 70 psig. Average spray water consumption shall not exceed 112 Gallons at 70 psig per wash cycle. Spray washing systems that operate at pressures less than 70 psig shall provide any necessary basket cleaning services at the owner's request for the first 10 years of operation to account for insufficient cleaning of the basket.
13. A pneumatically actuated cone that serves for adjusting the pressure in the pressure zone shall be provided at the discharge end of the screening basket. The pressurized air supply shall be provided by the contractor.
14. The pneumatically actuated cone is controlled by a 5-2-way solenoid valve. The solenoid directs the pressurized air to the ports which engage or disengage the cone at the discharge of the screw press. The control valve shall be installed in a local control station which also houses the pressure control valve and the pressure switch. The switch monitors the availability of pressurized air. If the supply of pressurized air is interrupted, the switch shall send a signal to the PLC and an alarm message will be generated.
15. Sludge cake shall be automatically discharged through a rectangular sludge discharge opening. The discharge height shall be minimum 37 in above floor level. Designs with standard discharge height lower than this minimum level must include provisions to interface properly with downstream equipment and a platform to allow proper service access to the equipment.
16. Contractor shall provide a 6 in diameter drain line for the filtrate and connect it to the bottom drain connection of the screw press. The contractor shall also provide a 1.5 in flush connection with manual ball valve for the drain connection.

2.4 INTERNAL PIPING

A. The sludge feed pumps shall be provided by the manufacturer of the screw press system per 11337 – Rotary Lobe Pump. The sludge feed pumps shall be controlled through a variable frequency controller (VFD) to be supplied by the manufacturer of the screw press.

B. Contractor shall provide sludge feed pipe from the sludge feed pump (with VFD) through a magnetic-inductive flow meter through an inline motorized polymer mixer.

C. Motorized inline polymer mixing device shall be supplied by the screw press manufacturer.

D. Pipe flocculator shall be supplied by the contractor and shall provide a minimum retention time of 60 seconds at design flow for the polymer and sludge mixture.

E. The design of the flocculation pipe reactor shall be approved by the screw press manufacturer.

F. The size of the piping needs to take into account: maximum capacity, loading rate, minimum velocity in piping to avoid sedimentation and conditions that do not negatively affect the flocculation process.

2.5 DRIVE

A. The press screw shall be driven by a shaft mounted planetary gearbox and motor assembly. The planetary gearbox shall be bolted to a machined flange welded to the upper end of the press.

B. The planetary gearbox shall be driven by a 1,680 rpm, 3-phase, 60 Hertz, 230/460 V, continuous-duty permanent magnet motor with a conduit box suitable for outdoor operation. The motor power shall be 3.0 or 5.0 hp. Motor efficiency shall exceed 75% over the complete operational range of the press.

C. Spray wash system shall be driven by a gearbox connected to a 0.25 hp, 3-phase, 60 Hertz, 230/460 V motor.

D. Drives shall be enclosed by protective FRP covers.

E. Chain drives, belt drives, hydraulic drives or a separate upper bearing for the transport screw will not be acceptable for this project.

2.6 AIR COMPRESSOR

A. Screw press manufacturer will provide one (1) portable air compressor as manufactured by Speedaire, model #52YM09 or equivalent for each screw press. Screw press manufacturer shall also provide desiccant dryer to be compatible with air compressor if recommended for screw press use.

B. Air compressor shall use an induction type motor rated for 2.0 Hp, 120 V, 60 Hz, 15 Amps.

C. Shall have a NPT outlet of 1/4 in.

D. Tank shall be minimum 15 gallons.

2.7 ODOR CONTROL FANS

A. Screw press manufacturer will provide one (1) fan for the purposes of odor control for each installed screw press. This fan shall be properly sized to conduct six or more air changes per hour within the screw press unit.

B. The odor control fans shall be able to be wall or floor mounted. The fans will be controlled through the same control panels as the screw press units.

C. The odor control fans shall be connected to the screw press unit via PVC or other pipe sized to match the flanged connection odor control connection on the screw press unit.

2.8 MOTORIZED INLINE POLYMER MIXER (IPM)

A. A motorized inline polymer mixing system shall be provided for each dewatering press to facilitate polymer delivery to the sludge. The polymer solution shall be fed through a supply chamber along the vertical shaft of the rotating paddle. The shaft seal shall be located in the supply chamber to allow continuous lubrication and cooling by polymer.

B. Mixer shall be capable of providing sufficient mixing energy for sludge concentrations specified in the Performance and Design Requirements. The speed of the paddle shall be adjustable to provide varying mixing energy as needed for viscous sludges or concentrated polymer solutions.

C. The paddle shall be designed and controlled to prevent accumulation of rag.

D. The inline polymer mixer shall be capable of operating under the following conditions:

E. Operating Pressure: 2.9 to 7.25 psi (maximum 15 psi)

F. Head loss: $\leq$ 3.0 psi

G. Polymer solution: 0.3 – 0.5 %

H. Mixer housing, shaft, and paddle shall be made of 316Ti stainless steel. O-rings shall be made of nitrile butadiene rubber (NBR).

I. The inline polymer mixer shall have a direct gear drive, permanent-magnet motor with integrally mounted frequency converter. Motor efficiency shall be class IE4 with a minimum efficiency of 89% over the operating range of the mixer. Motor horsepower shall be no greater than 7.5 hp.

J. Polymer system manufacturer shall provide one elevated spill containment platform, with a drain, which will be placed under the polymer tote. This spill containment platform will be able to contain the contents of a 330 gallon tote. The platform shall be of polyethylene construction.

2.9 POLYMER DOSING SYSTEM FOR LIQUID POLYMER

A. System shall be designed for the preparation, aging and dosing of up to 10 GPM of polymer solution having an active polymer concentration between 0.05 and 0.25 %. The

actual size of the polymer system depends on the specified type of sludge, maximum capacity and polymer consumption.

B. The polymer station shall be self-contained with pumps, piping, fittings, and accessories, and shall be factory assembled and tested to eliminate field assembly work and therefore to minimize installation and start up time. The frame shall be 304 stainless steel and the piping SCH.80 PVC and the top of the frame shall be 6 feet off the operating floor.

C. A polymer mixing chamber shall be provided. A high energy, multi zoned, hydro-mechanical mixing device shall be provided. The mixing chamber shall have a translucent front cover.

D. The hydro mechanical impeller shall be designed to produce variable intensity, back flow mixing action to optimize polymer performance without damaging polymer molecular structure.

E. The motors shall be 0.5hp, 1750rpm, 90 V, 60Hz, wash down duty with keyless shaft and left hand impeller mounting screw.

F. Materials: Impeller - PVC; body of mixing device – PVC; cover – clear Lexan; fastener – 316 SS; seals – Viton; pressure rating – maximum 150 PSI.

G. Contractor shall provide a drinking water connection for the dilution of the polymer in the polymer tank. The water piping to the polymer blend system shall include a minimum 1 in inlet (NPT female), an UL listed solenoid valve (rated IP65), and a flow meter with a rate adjusting valve and low pressure alarm switch.

H. A neat polymer metering pump with hose connector shall be provided and connected through a 1/2 in barbed hose to the polymer mixing device. The neat polymer pump shall be a progressive cavity type pump.

I. Control Panel: NEMA 4X FRP enclosure, 120 VAC, 60 Hz, 1 PH service.

J. Operator interface – discrete selector switch (system ON/OFF/REMOTE); mechanical mixer speed adjust potentiometer; stroke length / stroke speed adjustment at metering pump

K. Status / Alarm indicators: system running indication; LCD display of metering pump rate (on metering pump); low pressure switch alarm

L. Inputs: remote start / stop (discrete dry contact); pacing signal from main control panel (4-20mA)

M. Outputs: system running (discrete dry contact); remote mode (discrete dry contact); low pressure alarm (discrete dry contact) ; low flow alarm (discrete dry contact)

N. The pressure side of the polymer system shall be connected through a minimum 1 in diameter PVC pipeline and a magnetic inductive flow meter to the inline polymer mixer as described above.

O. The inline motorized polymer mixer is the place where the polymer is added to the sludge. The retention time between the polymer mixer and the dewatering machine shall be a minimum of 30 seconds at maximum flow.

P. The flow meter shall be a 8750WD series as manufactured by Rosemount, or approved equal, and provided by the dewatering system manufacturer. The flow meter is to be installed by the contractor on the polymer line to the polymer injection ring.

2.10 CONTROLS AND INSTRUMENTATION

A. The entire control system shall be provided by the Manufacturer of the Screw Press.

B. The contractor shall provide wiring between all system components as required.

C. The contractor shall provide separate power supplies as followed:

1. 460 V, 60 Hz, 3 phase power supply to the main control panel
2. 460 V, 60 Hz, 3 phase power supply to inline polymer mixer (IPM)
3. 120 V, 60 Hz, single phase power supply to the air compressor
4. 120 V, 60 Hz, single phase power supply to polymer dosing system

D. The dewatering system shall be full-automatic and shall include the following:

1. Main control panel for screw press
2. Magnetic-inductive flow meter for thin sludge feed
3. Automatic control for the pneumatic pressure cone

E. A 460-V main control panel shall be provided in a NEMA 4X rated 304 Stainless Steel Enclosure for each screw press. The enclosure shall be suitable for wall mounting in climate controlled room, shall have hinged covers which swing horizontally and shall be held closed with 3-Point Latch , and shall include the following:

1. Main power disconnect switch (pad-lockable)
2. Control power transformer
3. Surge arrester
4. Door Mounted Operators:
   a. Press HOA
   b. Press FOR (Spring Return from Reverse to Off)
   c. Wash Water SOV HOA
   d. System Reset
   e. E-Stop
5. Door Mounted Status and Warning Lights for the following:

a. Power on
b. Dewatering system in operation
c. System Disturbance
d. Lights to be incandescent type, 30.5mm from Allen-Bradley or equal

6. 3.0 hp Allen-Bradley PowerFlex 525 VFD, with Ethernet, shall be provided to control the screw press main drive.
7. 0.25 hp reversing motor starter including over-current and over-heat protection for the wash water spray drive.
8. 5.0 hp Allen-Bradley PowerFlex 525 VFD, with Ethernet, shall be provided to control the thin sludge pump.
9. 5.0 hp Allen-Bradley PowerFlex 525 VFD, with Ethernet, shall be provided to control the motorized polymer mixer.
10. Programmable logic controller (PLC) Allen Bradley CompactLogix with on-board Ethernet.
11. Operator Interface (OIU), Allen Bradley PanelView Series 7, 12" with color touch screen. OIU shall have Ethernet and be protected with hinged window.
12. Unmanaged Ethernet switch, 5-Port Phoenix or equal
13. The OIU shall have the capability to work as a data logger. The data logger shall document all important process parameter but not limited to the following list:
    a. Operation mode: OFF, dewatering, back wash, shutdown
    b. Drive operation: forward, reverse
    c. Sludge flow (GPM)
    d. Screw Speed
    e. Polymer pacing signal
    f. Pressure screw press inlet
    g. Press Motor amperage draw
    h. Set points: feed solids, polymer consumption, solid loading
14. The OIU shall provide maintenance reminder alarms for mechanical components which require replacement over-time. The OIU shall have a maintenance summary screen that displays the remaining hours of runtime until each mechanical component is recommended to be replaced. The OIU should produce an alarm banner for the specific component that needs replacement once the system has operated for the amount of hours the equipment manufacturer recommends. The maintenance summary screen shall also include the option to reset the alarm banner once the component has been replaced. Manufacturers not providing this functionality shall provide service trips every two years for maintenance operations.
15. Text messages displayed on touch screen:
    a. Over-current indications
    b. Spray bar washing system on
    c. Polymer dosing station status
    d. Running time meter for screw press and spray drive
16. Door mounted nametags shall be provided for the name of the control panel and all disconnects, switches, lights, and meters.
17. Terminal connections for interfacing with remote systems, shall include the following:

a. Remote Polymer Injection System:
   1) Inputs to Dewatering Control Panel:
      a) Dry 120VAC Rated, 2 amp Minimum
         * Polymer System In Remote
         * Polymer System Running
         * Polymer System Common Fault
   2) Outputs from Dewatering Control Panel:
      a) Dry 120VAC Rated, 2 amp Minimum
         * Polymer System Call to Run
      b) 4 – 20 mA Analog Output
         * Polymer Pacing Signal

b. SCADA Status:
   1) Inputs to Dewatering Control Panel:
      a) Dry 120VAC Rated, 2 amp Minimum
         * Remote Dewatering System Start Command
   2) Outputs from Dewatering Control Panel:
      a) Dry 120VAC Rated, 2 amp Minimum
         * Press Running
         * Press Fault
         * Dewatering Mode
         * System Disturbance

PART 3 - EXECUTION

3.1 INSTALLATION, START-UP AND OPERATOR TRAINING

A. Contractor shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings. Contractor shall notify engineer of significant deviations.

B. Installation of the equipment shall be in strict accordance with the contract documents and the manufacturer's instructions and shop drawings. Manufacturer shall supply anchor bolts for the equipment. Contractors shall install the anchor bolts in accordance with the manufacturer's recommendations.

C. After installation, touch-up paint shall be applied to all scratched, abraded and damaged shop painted surfaces. Coating type and color shall match shop painting. Contractor shall passivate all field welds.

D. Supplier shall furnish the services of a factory-trained service technician for three (3) trips including a total of ten (10) workdays to inspect the installation, observe start up, and provide operator training.

   1. Equipment shall not be energized, or "bumped" to check the electrical connection for motor rotation without the service technician present.

2. The service technician shall make all necessary adjustments and settings to the controls.
3. The service technician shall demonstrate proper and sequential operation of the dewatering system. The dewatering system shall be able to operate fully automatically.

3.2 WARRANTY

A. All equipment supplied under this specification section shall be supplied with a one (1) year warranty from the screw press manufacturer. Additionally, the manufacturer will warrant against any defects in material or workmanship to the screw press, including the screw core and baskets, the frame and frame coating, the inlet and outlet boxes. This additional warranty will commence upon delivery of the products and will expire on the earlier to occur of ten (10) year from initial operation of the product or 11 years from delivery thereof (the "Warranty Period").

B. The manufacturer shall provide all wiper changes for the first 15 years of installation at no cost to the owner. The manufacturer shall cover all costs for parts, travel and labor to perform the wiper changes. The wiper changes shall be as requested by the owner, at the complete discretion of the owner, but not to occur within 1,500 hours of the previous wiper change for each screw press.

END OF SECTION 11295

SECTION 11305 - FIBERGLASS MANHOLE FOR WASTEWATER

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required to supply and install water tight fiberglass manholes.

B. Manholes shall be constructed from commercial grade polyester resin or other suitable polyester or vinyl ester resins with fiberglass reinforcements. Manhole shall be a one piece unit manufactured to meet or exceed all specifications of A.S.T.M. F-3753 latest edition.

C. Omission of a specific item or component obviously necessary for the proper functioning of the system shall not relieve the Contractor from the responsibility of supplying that specific item or component at no additional expense to the Owner.

1.2 QUALITY ASSURANCE

A. Manholes shall be as manufactured by:
   1. **L.F. Manufacturing, Inc. or approved equal.**

B. Reference to industry standard specifications herein shall be construed to be in reference to the latest revision or edition.

C. Each completed manhole shall be examined by the manufacturer for dimensional requirements, hardness, and workmanship. All required A.S.T.M. D-3753 testing shall be completed and records of all testing shall be kept and copies of test records shall be presented to customer upon formal written request within a reasonable time period.

1.3 SUBMITTALS

A. The Contractor shall submit for review, complete detailed shop drawings and schedule for all materials furnished under this section.

B. The Contractor shall submit for approval all manufacturer warranties for all materials furnished under this section. The Contractor shall submit for approval all manufacturer certifications for all applicators and welders furnished under this section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. Resin: The resins used shall be a commercial grade unsaturated polyester resin or other suitable polyester or vinyl ester resin.

2. Reinforcing Materials: The reinforcing materials shall be commercial Grade "E" type glass in the form of continuous roving and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.

3. Interior Surfacing Material: The inner surface exposed to the chemical environment shall be a resin-rich layer of 0.010 to 0.020 inch thick. The inner surface layer exposed to the corrosive environment shall be followed with a minimum of two passes or chopped roving of minimum length 0.5 inch to maximum length of 2.0 inch and shall be applied uniformly to an equivalent weight of 3 oz/ft. Each pass of chopped roving shall be well rolled prior to the application of additional reinforcement. The combined thickness of the inner surface and interior layer shall not be less than 0.10 inch.

4. Wall Construction Procedure: After the inner layer has bee applied the manhole wall shall be constructed with chop and continuous strand filament wound manufacturing process, which insures continuous reinforcement and uniform strength and composition The cone section, if produce separately, shall be affixed to the barrel section at the factory with resin-glass reinforced joint resulting in a one-piece unit. Seams shall be fiberglassed on the inside and the outside using the same glass-resin jointing procedure. Field joints shall not be acceptable by anyone other than the manufacturer supply the material.

5. Exterior Surface: For a UV inhibitor the resin on the exterior surface of the manhole shall have gray pigment added to a minimum thickness 0.125 inches.

6. Stubouts and Connections: Upon request stubouts may be installed. Installation of SDR, PVC or sewer pipe must be performed by sanding, priming, and using resin fiber-reinforced hand lay-up. The resin and fiberglass shall be the same type and grade as used in the fabrication of the fiberglass manhole. Kor-N-Seal boots may be installed by the manhole manufacturer using fiberglass reinforced pipe stubouts for the Kor-N-Seal boot sealing surface.

7. Manhole Bottom: Fiberglass manholes will be required to have resin fiber-reinforced bottom. Deeper manholes may require a minimum of two fiberglass channel stiffening supports. All fiberglass manholes manufactured with a fiberglass bottom will have a minimum 3-inch wide anti-flotation ring. The

manhole bottom shall be a minimum of ½ inch thick.

8. Fiberglass enclosed invert and bench area: A fiberglass enclosed invert and bench area shall be installed in the manhole by the manufacturer. The invert will be formed using a non-corrosive material and completely enclosed in a minimum ¼-inch layer of fiberglass chop.

9. Height Adjustment: Fiberglass manholes must have the ability to be height adjustable with the use of a height adjustment ring. Height adjustment can be made as a field operation without the use of uncured resins or fiberglass lay-ups. Fiberglass manholes must maintain all load and soundness characteristics required by A.S.T.M. D-3753 after height adjustment has occurred.

10. Fillers and Additives: Fillers, when used, shall be inert to the environment and manhole construction. Sand shall not be accepted as an approved filler. Additives, such as thixotropic agents, catalysts, promoter, etc., may be added as required by the specific manufacturing process to be used to meet the requirements of the A.S.T.M. D-3753 standard. The resulting reinforced-plastic material must meet the requirements of this specification.

B. Manufacture: Manhole cylinders, manway reducers, and connectors shall be produced from fiberglass-reinforced polyester resin using a combination of chop and continuous filament wound process.

1. Interior Access: All manholes shall be designed so that a ladder or step system can be supported by the installed manhole.

2. Manway Reducer: Manway reducers will be concentric with respect to the larger portion of the manhole diameters through 60 inches. Larger manholes may have concentric or eccentric manway reducer openings.

3. Cover and Ring Support: The manhole shall provide an area from which a grade ring or brick can be installed to accept a typical metal ring and cover and have the strength to support a traffic load without damage to the manhole.

C. Requirements:

1. Exterior Surface: The exterior surface shall be relatively smooth with no sharp projections. Handwork finish is acceptable if enough resin is present to eliminate fiber show. The exterior surface shall be free of blisters larger than 0.5 inch in diameter, de-lamination or fiber show.

2. Interior Surface: The interior surface shall be resin rich with no exposed fibers. The surface shall be free of crazing, de-lamination, blisters larger than 0.5 inch in diameter, and wrinkles of 0.125 inch or greater in depth. Surface pits shall be permitted if they are less than 0.75 inch in diameter and less than

0.0625 inch deep. Voids that cannot be broken with finger pressure and are entirely below the resin surface shall be permitted if they are less than 0.5 inch in diameter and less than 0.0625 inch thick.

3. Wall Thickness: Fiberglass manholes 48" in diameter and up to 20 feet in depth will have a minimum wall thickness of 0.3125 inches. Fiberglass manholes 48" in diameter and 20 feet to 30 feet in depth will have a minimum wall thickness of 0.5 inches.

4. Repairs: Any manhole repairs are subject to meet all requirements of this specification.

5. Manhole length: Manhole lengths shall be as shown on the drawings.

6. Diameter Tolerance: Tolerances of inside diameter shall be +/- 1% of required manhole diameter.

7. Load Rating: The complete manhole shall have a minimum dynamic-load rating of 16,000 lbs. when tested in accordance with A.S.T.M. D-3735 8.4 (note 1). To establish this rating the complete manhole shall not leak, crack or suffer other damage when load tested to 40,000 lbs. and shall not deflect vertically downward more than 0.25 inch at the point of load application when loaded to 24,000 lbs.

8. Stiffness: The manholes cylinder shall have the minimum pipe-stiffness values shown in the table below when tested in accordance with A.S.T.M. D 3753 8.5 (note 1).

Length – ft.	F/AY – PSI
3 – 6.5	0.75
7 – 12.5	1.26
13 – 20.5	2.01
21 – 25.5	3.02
26 – 35	5.24

9. Soundness: In order to determine soundness, the manufacturer shall apply an air or water pressure test to the manhole test sample. Test pressure shall not be less than 3 psig or greater than 5 psig. While holding at the established pressure, inspect the entire manhole for leaks. Any leakage through the laminate is cause for failure of the test. Refer to A.S.T.M. D-3735 8.6.

10. Chemical Resistance: The fiberglass manhole and all related components shall be fabricated from corrosion proof material suitable for atmospheres containing hydrogen sulfide an dilute sulfuric acid as well as other gasses associated with the wastewater collection system.

D. Physical Properties:

	Hoop Direction	Axial Direction
a. Tensile Strength (psi)	18,000	5,000
b. Tensile Modules (psi)	0.6×10^6	0.7×10^6
c. Flexural Strength (psi)	26,000	4,500
d. Flexural Modules (psi)	1.4×10^6	0.7×10^6
e. Compressive (psi)	18,000	10,000

E. Test Methods: All test shall be performed as specified in A.S.T.M. D-3753 latest edition, section 8. Test method D-790 (see note 5) and test method D-695.

F. Certifications: As a basis of acceptance the manufacturer shall provide an independent certification which consists of a copy of the manufacturer's test report and accompanied by a copy of the test results stating the manhole has been sampled, tested, and inspected in accordance with the provisions of this specification and meets all requirements.

G. Shipping and Handling: Do not drop or impact the fiberglass manhole. Fiberglass manhole may be lifted by inserting a 4" x 4" x 30" timber into the top of manhole with cable attached or by a sling or "choker" connection around the center of manhole, lift as required. Use of chains or cables in contact with the manhole surface is prohibited.

PART 3 – EXECUTION

3.1 Closed Bottom Manhole Installation: Bottom of excavation should be compacted to 95% Standard Proctor Density. Manholes with diameters less than 60 inches and depths less than 12 feet, require a base of 6 inches of crushed stone. Manholes with depths of 10 feet and greater, and diameters of at least 48 inches should have a poured reinforced concrete base at least on foot deep and at least two feet larger than fiberglass manhole outside diameter. The fiberglass manhole shall be lowered into the wet concrete and brought to plumb. Pour reinforced concrete over the anti-flotation flange. The concrete shall be a minimum of one foot deep and two feet from outside wall of the manhole. More concrete may be required in high water table areas. In high water table areas the contractor shall consult the engineer for backfill requirements.

3.2 Internal Bottom Channel Stiffening Supports: Manholes with internal bottom FRP Channel stiffening supports will require that concrete be poured on the inside of the manhole to a depth equal to that of the stiffening support. This is typically 4 – 6 inches. This is **NOT** required on manholes that have a factory installed integral fiberglass bench and invert area.

3.3 Backfill:

1. Backfill Material: Unless shown otherwise on drawings and approved by the engineer,

sand, crushed stone, or pea gravel shall be used for backfill around the manhole for a minimum distance of one foot from the outside surface and extending from the bottom of the excavation to the top of the reducer section. Suitable material chosen from the excavation may be used for the remainder of the backfill. The material chosen shall be free of large lumps of clods, which will not readily break down under compaction. This material will be subject to approval by the engineer.

2. Backfill Procedure: Backfill shall be placed in layers of not more than 12 loose measure inches and mechanically tamped to 95% Standard Proctor Density, unless otherwise approved by the engineer. Flooding will not be permitted. Backfill shall be placed in such a manner as to prevent any wedging action against the fiberglass manhole structure.

3.4 Marking and Identification: Each manhole shall be marked on the inside and outside with the following information:

1. Manufacturer's name or trademark

2. Manufacturer's factory location

3. Manufacturer's serial number

4. Total Manhole depth

3.5 TESTING AND INSPECTION REQUIREMENTS

A. Other than those testing requirements in this section, refer to Section 02620.

END OF SECTION 11305

SECTION 11320 – BIOLOGICAL TREATMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The WWTP shall use the SEQUOX activated sludge process, along with the DO2ptimizerTM D.O. control process. Design parameters are as follows:

Average Design Flow:	2.00 MGD
Maximum Daily Flow:	6.00 MGD
Peak Hour Flow:	7.00 MGD

Influent

	Design Average	Design Peak
BOD_5:	7,506 lbs/day	9,007 lbs/day
TSS:	6,672 lbs/day	
TKN:	834 lbs/day	1,001 lbs/day

Effluent Required (Post Filtration)

BOD_5:	5 mg/l
TSS:	5 mg/l
NH_3-N:	1 mg/l
Phos.-P:	NA

B. The footprint of the plant shall be as shown on the contract drawings. It shall include: one selector tank, two ClarAtor clarifier tanks, two (2) first stage aeration basins, two (2) second stage aeration basins, and two (2) aerobic digesters.

C. All equipment in this section shall be supplied by a single manufacturer as a total system. Equipment to be supplied shall be furnished by Aero-Mod, Inc. Items to be supplied are as follows:

1. Aeration drop pipes with diffusers in various tanks
2. Pneumatically-actuated and electrically-actuated valves
3. WAS airlift pump equipment
4. Clarifier/RAS equipment
5. PLC-based and timer-based process control & D.O. control
6. Probe module and DO probes
7. Compressed air pneumatic system
8. Concrete tank mounted aluminum walkway & handrail
9. Aeration blower VFD control panels
10. Submersible mixer control panel

PART 2 - PRODUCTS

2.1 SPLIT-CLARATOR CLARIFIER

A. The supplier of the Split-ClarAtor clarifier equipment shall have a minimum of 40 operating installations. The Split-ClarAtor clarifier equipment shall be supplied by Aero-Mod, Inc.

B. Split Clarator Clarifier Construction
   1. The Split ClarAtor clarifier shall consist of:
      a. structural support frame with handrails and aluminum grating
      b. coarse screening
      c. a hydraulic suction hood for sludge removal
      d. sludge return air lifts and MLSS return trough
      e. floating skimmers
      f. 3-weir level and rate control device
      g. associated plumbing, equipment and accessories as noted herein or on the drawings.
   2. The structural support frame shall be constructed of 3"x3" 304 SS rectangular tubing. The support frames will be placed into notches in the clarifier tank walls. The frame will have the MLSS return trough attached to its underside. The trough shall also be fabricated of 304 SS.
   3. The hydraulic suction hood and structural support fins shall be of fiberglass. The hydraulic suction hoods will set over concrete suction hood bases on the floor of the clarifier tank.
   4. For this project, ten (10) Split ClarAtor clarifier modules, Model 28616 shall be provided, installed and arranged within the clarifier tankage as shown on the drawings.

C. Inlet Coarse Screens
   1. Telene circular inlet screens shall be provided. For this project, a total of twenty-two (22) are required. Each inlet screen shall provide 4 linear feet of screen. The coarse screens shall consist of 1/2" wide slots on 2" centers. These screens have an 8" flange for connecting to the 8" PVC distribution piping. They are installed in the aeration tanks as per the drawings.

D. Walkways and Handrails
   1. A walkway shall be provided across the entire support frame consisting of banded aluminum grating, 1" I-Bar, set into a frame made of SS.
   2. A two-rail handrail system shall be supplied. Handrails shall be of 1-1/2" aluminum tubing with NU-RAIL aluminum handrail fittings (or equal). The handrail risers shall be securely mounted to the support frame and of proper length to place the top-rail 42" above the walkway.

E. Skimmers

1. Specially designed floating-skimmer assemblies shall be located in the clarifier chamber as per the detail drawing. Each skimmer shall consist of a formed floating head with a telescoping pipe. This assembly will insert into union and discharge up into the MLSS return trough. Air is supplied from 2" SS air pipes located on the support frame. The telescoping section shall allow unrestricted level adjustment to accommodate the rising and falling clarifier levels caused by the surge control system. The skimmers consist of a SS union and ell for connection to the RAS trough and PVC fittings and material sized to remove any floatables that enter into the clarifier chamber.

F. Clarifier Chamber
1. The clarifier chamber shall be designed such that PVC pipe distribution headers are located along both sides of the outer edge of each hydraulic suction hood. These inlet headers have ports provided. The inlet headers and ports are sized to provide even distribution across the entire settling area to prevent inlet turbulence during surge flows. There shall be two (2) rectangular clarifiers, and each clarifier shall provide 3,080 square feet of surface area, for a total of 6,160 sf.

G. Sludge Returns
1. Return sludge airlifts made of 4 inch Schedule 40 PVC pipe shall be located every four feet along the apex of the hydraulic suction hoods. Each airlift rate shall be controlled by a 3/4" ball valve. A pneumatic valve on the 1-1/2" SS air supply pipe will control the air supply to the airlifts. The flow rate for each air lift can be adjusted from zero to 100 gpm and can be operated continuously or intermittently by a timer device located in the plant process control panel.

H. Effluent Collector
1. Two (2) SS triangular effluent collection pipes with 5/8" holes spaced at 8" CC shall be furnished along the entire support frame length for effluent withdrawal. The apex of each triangular pipe shall be located approximately 1 inch below the minimum water level within the clarifier. This submerged orifice collection pipe shall provide uniform effluent withdrawal across the entire length without regards to leveling, will not pass surface scum or floatables, and will not be adversely affected by either algae accumulation or icing.

I. Level and Rate Control
1. Two (2) effluent boxes with adjustable low and high level weirs and a submerged orifice for surge control shall be furnished on the effluent withdrawal end of each triangular collection pipe. The low level weir will set the minimum operating level, passing flow directly to an orifice plate for surge protection. The orifice shall be sized to limit the maximum effluent rate, keeping the clarifier surface settling rates below maximum

design standards. The upper edge of the orifice plate shall serve as the high level by-pass weir to limit the maximum water level within the plant. The distance between the low and high level weirs shall provide 5" surge storage within the freeboard across the entire mixed liquor aeration tank. A manual swing gate valve with the orifice located on the paddle portion will allow the operator to shut off effluent from each effluent box. This allows for effluent shut off during periods of cleaning and maintenance.

PART 3 - WALL MOUNTED AERATORS

3.1 AERATORS

A. The basins requiring aeration shall have wall-mounted aerators as shown on the plans. These aerators shall provide the necessary air required to maintain proper operation. The diffusers shall be set at a submergence depth in the aeration tank as shown on the plans. As shown on the plans, the air manifolds (drop pipes) shall be wall mounted with a SS support system. Easy diffuser removal from above the water line shall be by lightweight PVC drop pipes. Removal and replacement shall be assisted by a 1 ½" Schedule 5 SS guide rail system. The guide rail shall be bolted to the SS wall mounting support system in the field. No field welding shall be required.

B. Aeration Basin – First Stage
   1. The drop pipes used in the first stage aeration basin shall be 2" sch. 40 PVC pipe. A 2" SS throttling ball valve along with a SS union and ell shall be supplied in each aerator upper assembly. A single 2” connection from the air header to the flex connector on the aerator assembly is required for each aerator. EPDM fine bubble diffusers shall be used for air transfer, which shall thread into the header for each aerator. One hundred thirty-two (132) model WA-PF6-2 aerators with six (6) 0.5m tubular diffusers per drop pipe are required for these tanks.

C. Aeration Basin – Second Stage
   1. The drop pipes used in the second stage aeration basin shall be 2" Schedule 40 PVC pipe. A 2" SS throttling ball valve along with a SS union and ell shall be supplied in each aerator upper assembly. A single 2” connection from the air header to the flex connector on the aerator assembly is required for each aerator. SS coarse bubble diffusers shall be used for air transfer, which shall thread into the diffuser header for each aerator. Eighty (80) Model WA-HS2-2 aerators with four (4) 24" SS diffusers per drop pipe are required for these tanks.

D. Aerobic Digester Tank
   1. The drop pipes used in the digester tank shall be 2" Schedule 40 PVC pipe. A 2" SS throttling ball valve along with a SS union and ell shall be

supplied in each aerator upper assembly. A single 2" connection from the air header to the flex connector on the aerator assembly is required for each aerator. SS coarse bubble diffusers shall be used for air transfer, which shall thread into the diffuser header for each aerator. Seventy-two (72) Model WAD-HS2-2 aerators with two (2) 24" SS diffusers per drop pipe are required for these tanks.

PART 4 - SLUDGE WAS PUMP

4.1 Solids Wasting (WAS) Air Lift Pump – Aeration Basins to Digesters

A. The sludge wasting airlift shall be sized for a running time at design loading of approximately 30-90 minutes per day. All components below the water line shall be of SS. A pneumatically controlled automatic valve and a manual throttling and shut-off valve shall be supplied in the air feed line. The entire assembly shall be provided with anchor bolts. The digester shall be constructed with a notch over which a supernatant weir & baffle will be placed to control the digester water level and return displaced supernatant back to the aeration basin. For this project, two (2) AL-600 airlift pumps are required to waste mixed liquor from the aeration basin to the aerobic digester.

4.2 Supernatant Weir & Baffle

A. The digester shall be constructed with a notch over which a supernatant weir & baffle will be placed to control the digester water level and return displaced supernatant back to the aeration basin. For this project, two (2) supernatant weir & baffle assemblies are required.

PART 5 - PLANT CONTROLS

5.1 Plant Process Control Panel

A. Plant Process Control Panel. This panel shall utilize a NEMA type 12 enclosure with an Allen-Bradley PanelViewPlus7 12" Touch Screen Color Terminal, an Allen-Bradley CompactLogix PLC controller model number 5069-L310ER. For backup, the panel will include an Allen-Bradley model Micro 850 and a PanelView 800 4" touchscreen. This panel shall include a Secure VPN module for remote connectivity. This panel shall operate using 115-V, 15-amp service. Pneumatic solenoid valves shall be used to transmit the operational signal to the various valves in the tankage. This panel shall provide the control for the four (4) main process functions required for the AERO-MOD provided treatment equipment. This panel shall be located as shown on the plans.

1. Function 1 - RAS Timer
   a. The timer function shall control the operation of the RAS airlift pumps in the clarifier. The control logic shall be xx minutes of operation followed by xx minutes of standby (time 'xx' to be determined at time of startup). The operation shall then index to the next set of RAS banks.
   b. An electric signal shall be sent to activate the 1/8" solenoid valves that shall be used to activate the pneumatically actuated ball valves on the clarifier RAS air supply.
2. Function 2 – SEQUOX/Digester Alternating Air Timers
   a. These timer functions shall control the operation of the SEQUOX alternating aeration in the first and second stage aeration basins and the alternating aeration in the digester tanks. The control logic shall be xx hours of aeration valve closure in one aeration basin, followed by xx hours of aeration valve closure in the corresponding aeration basin. An overlap timer function of xx minutes shall keep both aeration valves open during the transition. The same logic will be used for all of the aeration basin stages and the digesters.
   b. An electric signal shall be sent to activate the 1/8" solenoid valve that shall be used to activate the pneumatically actuated butterfly valves in the air headers for the first and second stage aeration basins and the digester tanks.
3. Function 3 – WAS Timer, Aeration Basin to Digester Tank
   a. These timer functions shall control the automatic solids wasting system that shall transfer solids from the aeration basins by a WAS pump system. The control logic shall include the ability to set on which days the solids wasting will occur, and the time of day the solids wasting will occur. The timer function shall control the aeration in each of the digester tanks and the operation of an airlift pump located in one of the aeration basins. For the days that the wasting function operates, at the user-defined time(s) of day, the timer function shall close the butterfly valve in the air header for each digester and shall operate the airlift pumps, which shall pump the WAS at a set rate to the digesters. At the end of the timer function, the WAS airlift pump shall be turned off and the aeration butterfly valves shall be opened.
   b. An electric signal shall be sent to activate the 1/8" solenoid valves that shall be used to activate the pneumatically actuated butterfly valves in the air headers for the digester tanks and the pneumatically actuated diaphragm valves on the WAS airlift pumps.
4. Function 4 – Speed Control of Aeration Blowers for D.O. Range Control
   a. The DO2ptimizerTM D.O. control process shall include a series of operator-established settings shall be incorporated to allow multiple adjustments in order to maintain a D.O. range within the aerated aeration basins. Timer functions shall be included that allow for

blower shutdown, blower startup, and blower speed changes relative to the specified D.O. range that is set.

B. Pilot Air System

1. The pilot air system shall consist of an air compressor followed by an air drying system to provide a constant, dry source of pneumatic pressure to the pneumatic control system. The contractor shall run 3/8" nylon tubing from both air compressors to the Compressed Air Alternation Panel located on the regenerative desiccant dryer/dry storage tank, and from the regenerative desiccant dryer/dry storage tank to the Plant Process Control Panel.
    a. Air Compressor
        1. A Champion, or equal, 2.0 HP, 230/460 V/3 ph air compressor with an 80 gallon vertical air tank, pressure switches, and oil particulate filter shall be used to supply at least 70 psi pilot air to the pneumatic control system of the Plant Process Control Panel. Each compressor shall have an automatic drain attached to tank. For this project, two (2) units shall be supplied.
2. Regenerative Desiccant Dryer / Dry Storage Tank
    a. A PureGas model HR3, or equal, dual tower regenerative desiccant dryer shall be furnished to keep the pilot air dry and prevent moisture buildup in the pneumatic control system. This unit shall operate using 115-V, 15-amp service, and shall include a cord with plug. A NEMA 1 panel shall be supplied to house the timer and solenoids to alternate the air compressors discharge to the pneumatic system. The dryer will be pre-mounted to an 80 gallon dry air storage tank. For this project, one (1) unit shall be supplied.
3. Pneumatic System Air Tubing
    a. Pneumatic 3/8" nylon tubing (black) shall be supplied to run between the Air Compressors and the Air Alternation Panel on the Regenerative Dryer/Dry Storage Tank, and between the Regenerative Dryer/Dry Storage Tank and the Plant Process Control Panel. Pneumatic 1/4" nylon tubing (color coded) for pneumatic control signals shall be supplied to run between the Plant Process Control Panel and actuators within the process tankage

PART 6 - WALL MOUNTED WALKWAYS, HANDRAIL & LIGHT BRACKETS

6.1 Wall Mounted Walkway

A. Approximately 1,222 LF of aluminum walkway and handrail shall be provided for installation on top of the concrete walls of the plant tankage as per the drawings. The walkway frame shall consist of aluminum supports and channels to be either centered or cantilevered on top of the concrete walls. The walkway

shall consist of banded aluminum grating, 1" I-Bar, set into the aluminum frame. Grating on the walkway frame shall have a width of 25 inches.

B. A two-rail handrail system shall be supplied with the walkway. Handrails shall be of 1-1/2" aluminum tubing with NU-RAIL aluminum handrail fittings (or equal). The handrail risers shall be securely mounted to the support frame and of proper length to place the top-rail 42" above the walkway with a mid-rail 18" below the top-rail.

6.2 Entrance and Exit Bridge

A. Entrance/exit stairs and bridges shall be constructed to integrate with the dimensions and elevations as shown on the plans for all connecting walkways. Entrance/exit walkway with railing shall be provided by AeroMod for installation onto beam designed by Engineer.

6.3 Light Pole Brackets

A. For the light poles which will be placed along the walkways as shown on the plan set, Aero-Mod will provide brackets which will run underneath the walkways to attach the light poles to the concrete walls underneath the walkway. Aeromod will not provide the lighting fixtures for brackets for light poles not under the walkways. No light poles shall be attached directly to the walkways.

PART 7 - ACTUATED VALVES

7.1 SEQUOX Air Valves

A. First Stage Aeration Basin
1. The equipment supplier shall supply two (2) 14" Ultraflo series 399 butterfly air valves. The body shall be cast iron, the disc and stem shall be 316 SS, and the seat shall be EPDM. Each valve shall include an El-O-Matic double-acting actuator that is pneumatically controlled.
2. The equipment supplier shall supply two (2) 14" Ultraflo series 399 butterfly air valves. The body shall be cast iron, the disc and stem shall be 316 SS, and the seat shall be EPDM. Each valve shall include a gear-operator for manual valve control.

B. Second Stage Aeration Basin
1. The equipment supplier shall supply two (2) 14” flanged SS pipe spools that include 14”x12” reducers for installation of the following:
2. The equipment supplier shall supply two (2) 12" Ultraflo series 399 butterfly air valves. The body shall be cast iron, the disc and stem shall be

316 SS, and the seat shall be EPDM. Each valve shall include an El-O-Matic double-acting actuator that is pneumatically controlled.

3. The equipment supplier shall supply two (2) 12" Ultraflo series 399 butterfly air valves. The body shall be cast iron, the disc and stem shall be 316 SS, and the seat shall be EPDM. Each valve shall include a Rotork electric actuator, model IQT 250, or equal. Mounted downstream of each valve shall be one (1) VIP flow conditioner and one (1) flow sensor.

C. Aerobic Digester Tank

1. The equipment supplier shall supply two (2) 10” flanged SS pipe spools that include 10”x8” reducers for installation of the following:
2. The equipment supplier shall supply two (2) 8" Ultraflo series 399 butterfly air valves. The body shall be cast iron, the disc and stem shall be 316 SS, and the seat shall be EPDM. Each valve shall include an El-O-Matic double-acting actuator that is pneumatically controlled.
3. The equipment supplier shall supply two (2) 8" Ultraflo series 399 butterfly air valves. The body shall be cast iron, the disc and stem shall be 316 SS, and the seat shall be EPDM. Each valve shall include a Rotork electric actuator, model IQT 250, or equal. Mounted downstream of each valve shall be one (1) VIP flow conditioner and one (1) flow sensor.

D. Constant Air Valve (Clarifier)

1. The equipment supplier shall supply two (2) 6" Ultraflo series 399 butterfly air valve. The body shall be cast iron, the disc and stem shall be 316 SS, and the seat shall be EPDM. The valve shall include a gear-operator for manual valve control.

PART 8 - HAND LIFT STOP PLATES

8.1 Summary

A. Aluminum stop plates shall be used to direct and stop flow within the tankage. Stainless steel wall-mounted gate guides shall be used for the placement of the stop plates. A total of two (2) face-mounted guide frames and two (2) stop plates shall be supplied.

PART 9 - AERATION BLOWERS & CONTROLS

9.1 Aeration Blowers

A. The equipment supplier shall provide five (5) Kaeser ComPak model HB950C blower/sound enclosure packages for the aeration basins, clarifiers, and digesters. Engineer approved equals will be accepted. Excelsior has been

engineer pre-approved as an equal. The blowers shall be installed as shown on the contract drawings. Design conditions are as follows:

Air Volume:	2,425 icfm
Discharge Pressure:	8.1 psig
Motor HP:	150 HP
Inlet Temperature:	104^0 F
Relative Humidity:	90%
Elevation:	40 FASL

Each blower package shall include the following:

Qty.	
1	Positive displacement blower
1	V-belt drive with automatic belt tensioner
1	Inlet filter silencer with integral filter
1	Powder coated sound enclosure
1	Enclosure vent fan with 460 V/60 Hz/3 phase motor
1	Vibration pads
1	Panel mounted filter restriction gauge
1	Panel mounted discharge pressure gauge
1	Panel mounted discharge temperature gauge
1	Discharge temperature switch
1	Discharge silencer
1	Flexible connector(s)
1	Discharge check valve – 10”
1	Pressure relief valve
1	Oil drain manifold
1	TEFC premium efficiency motor, 460 V/60 Hz/3 phase
1	Motor PTC sensors
1	Ambient air inlet
1	Isolated motor bearing
1	SS weather hood for outdoor installation

B. Aeration Blower Isolation Valve

1. The equipment supplier shall supply five (5) 10" Ultraflo series 399 butterfly air valves for blower isolation. One valve shall be used for each blower and shall be mounted in the discharge header piping. The body shall be cast iron, the disc and stem shall be 316 SS, and the seat shall be EPDM. Each valve shall include a lever-operator for manual valve control.

C. Aeration Blower Controls

1. The equipment supplier shall supply five (5) blower control panels, one for each blower. These blower control panels shall include Allen-Bradley Powerflex 753 Variable Frequency Drive modules. Each blower control panel shall be rated NEMA 12. Each panel shall include:

a. Hand/Off/Auto Functionality
b. Circuit Protection (Fused Disconnect or Circuit Breaker)
c. Fault Indication
d. Power Indication
e. VFD Running Indication
f. Run Time Metering
g. Hand Mode Speed Control
h. Drive Enable Contact
i. Drive Fault Contact
j. Constant Torque
k. Run Permissive Feature
l. 3% Line Reactor
m. Ethernet IP Module
n. Blower Enclosure Cooling Contactor w/ Overload
o. Blower Motor Thermister Relay
p. Blower Discharge Temperature Switch Monitoring

Note:
Harmonic distortion is a by-product of VFD controlled motors. Additional input filters ahead of the VFD's may be required and would need to be supplied by others to dampen the impact of the VFD controls and meet the appropriate electrical code.

PART 10 - PROBE MODULE & SENSOR PROBES

10.1 EQUIPMENT

A. One (1) Insite model MPA-48 multi-channel sensor analyzer modules, 110V, with sunshield, or equal.

B. Four (4) Insite model 10 DO sensor probes, or equal.

C. Four (4) sensor handrail mounting kits.

PART 11 - CLARIFIER ALGAE CONTROL

11.1 CLARIFIER ALGAE CONTROL

A. The manufacturer shall provide an ultrasonic transducer for control of green, blue-green, and related algae. The transducer shall be submerged just beneath the surface in each clarifier and designed to generate ultrasonic waves that inhibit the growth and spread of algae. It shall also retard and inhibit the

formation of biofilm. The unit shall generate at least 75 ultrasonic frequencies for broad-range algae control.

B. The ultrasonic frequencies shall be generated in the transducer to prevent any degradation of the frequency strength. The unit shall possess a UL Listing Number and shall be suitable for outdoor service. The unit shall be provided with a control box suitable for outdoor service without additional protection and have external indicating lights identifying proper operation and malfunction of the unit. The unit shall operate on standard 105-120v, 60hz, single phase power and use fractional amperage. For this project, three (3) Sonic Solutions model Mezzo-DB power modules and six (6) transducers (three for each clarifier) shall be used in the clarifier tanks. Mounting handrail and a hanger shall be included for each unit.

PART 12 - SELECTOR TANK MIXING

12.1 Submersible Mixers

A. Supplied by others under a separate specification.

12.2 Submersible Mixer Control Panel

A. A NEMA 4X panel shall supply power and control to the mixers. The control panel face shall have the following: 1) run light, and 2) H-O-A switch. In remote, the panel shall be controlled and monitored by the Plant Process Control Panel.

PART 13 - INSTALLATION MATERIALS

13.1 Wall Inserts & Link-Seals

A. All PVC wall inserts and link-seals for concrete wall penetrations (for PVC pipe) in the selector tank, aeration basins, clarifiers, and digester tanks shall be supplied by the equipment manufacturer. These wall inserts are for PVC wall penetrations on interior tank walls.

13.2 Mounting Hardware

A. All required SS wall brackets, SS U-bolts, and SS anchor bolts for installation of the Aero-Mod supplied equipment and contractor supplied PVC piping (in the selector tank, aeration basins, clarifiers, and digester tanks).

PART 14 - SPARE PARTS

14.1 The equipment manufacturer shall supply the following spare parts in a protective container for storage:

A. One (1) clarifier skimmer head

B. Two (2) clarifier skimmer head guide rod

C. One (1) Compressor maintenance kit:

D. Compressor oil sufficient for the first change on both compressors,

E. Compressor inlet filter elements for the first change on both compressors.

F. Two (2) 91x502 EPDM fine bubble diffuser membrane sleeve w/ 2 clamps each

G. One (1) Aquamatic diaphragm actuator rebuild kit

H. Two (2) Prestolock union connectors

I. Two (2) four pole relay, 24VDC

J. Two (2) pilot lights of each color

K. Four (4) single pole relay, 24VDC

L. Four (4) solenoid valves

M. Eleven (11) inlet screen plug disks

PART 15 - WARRANTY

15.1 The equipment supplier shall warranty the Split-ClarAtor clarifier equipment for a period of five (5) years from the date of start-up. All other equipment shall have a warranty of one (1) year from date of start-up, or eighteen (18) months after ship date, whichever occurs first.

PART 16 - O & M MANUALS

16.1 The equipment supplier shall provide four (4) copies of complete operation and maintenance manuals. The O&M manuals shall be part hardcopy and part digital stored on a USB jump drive.

PART 17 - EQUIPMENT START-UP & OPERATOR TRAINING

17.1 MANUFACTURER

A. The manufacturer shall provide two (2) days of on-site dry equipment inspection and equipment start-up/training upon complete installation of equipment. A check-off sheet shall be completed and signed by the contractor prior to dry equipment inspection.

B. The manufacturer shall provide two (2) additional days of on-site equipment and process training after successful start-up of the plant.

C. The manufacturer shall provide two (2) days of operator school at the manufacturer's home office for two (2) operators after the treatment plant is operational. The operator school shall provide 10 hours to the attending operator, as recognized by the State of Kansas.

END OF SECTION 11320

SECTION 11441 – SUBMERSIBLE WET PIT SEWAGE PUMPS

PART 1 - GENERAL

1.1 SCOPE

A. On-Site Pump Station, 6 Pole, 3 Phase, PE4

1. Furnish Two (2) KSB KRT K 150-315/126XG-S submersible non-clog wastewater pump(s). The pump(s) shall be supplied with a mating cast iron six inch discharge connection and be capable of delivering 700 U.S. GPM at a total dynamic head of 40 feet. An additional point on the same curve shall be 200 U.S. GPM at a total dynamic head of 29 feet. Shut off head shall be 50.9 feet (minimum). The Premium Efficiency motor shall be an integral part of the pump unit. The motor shall be 15 HP connected for operation on a 460 volt, 3 phase, 60 hertz electrical supply service. Pumps intended for wet pit installation shall be supplied with a 2" 316L Sch 40 stainless steel guide rail system with an integrated six inch discharge base elbow. Each pump unit shall be fitted with a stainless steel chain lifting assembly, depth of wet well plus five feet long for lifting the pump. The working load rating of the lifting system shall be a minimum of 50% greater than the pump weight. Each pump motor shall be equipped with 50 feet of power and control cable sized in accordance with NEC and CSA standards. ABS/Sulzer has been pre-approved by the engineer as an equivalent. Other engineer approved equivalents shall be considered.

B. Influent Equalization Pump Station, 6 Pole, 3 Phase, PE4

1. Furnish Three (3) KSB _____ submersible non-clog wastewater pump(s). The pump(s) shall be supplied with a mating cast iron ___ inch discharge connection. When two pumps are operational, their combined flowrate shall and be capable of delivering 6,542 U.S. GPM at a total dynamic head of 55 feet. An additional point on the same curve shall be ____ U.S. GPM at a total dynamic head of ___ feet. Shut off head shall be ____ feet (minimum). The Premium Efficiency motor shall be an integral part of the pump unit. The motor shall be ___ HP connected for operation on a 460 volt, 3 phase, 60 hertz electrical supply service. Pumps intended for wet pit installation shall be supplied with a 2" 316L Sch 40 stainless steel guide rail system with an integrated eight inch discharge base elbow. Each pump unit shall be fitted with a stainless steel chain lifting assembly, depth of wet well plus five feet long for lifting the pump. The working load rating of the lifting system shall be a minimum of 50% greater than the pump weight. Each pump motor shall be equipped with 50 feet of power and control cable sized in accordance with NEC and CSA

standards. ABS/Sulzer has been pre-approved by the engineer as an equivalent. Other engineer approved equivalents shall be considered.

1.2 PUMP DESIGN

A. The heavy duty submersible wastewater pump(s) shall be capable of handling raw unscreened sewage, storm water, and other similar solids-laden fluids without clogging. The pump shall be driven by a Premium Efficiency motor, providing the highest levels of operational reliability and energy efficiency

1.3 GUIDE RAIL BASE ASSEMBLY

A. There shall be no need for personnel to enter the wet well to remove or reinstall the pump(s). In a wet pit installation, the discharge base & elbow assembly shall be permanently installed in the wet well and connected to the discharge piping. In order to prevent binding or separation of the pump from the guide rail system, the pump(s) shall connect to the guide rail base automatically and firmly, guided by one 2 inch guide pipe (two 2 inch pipes optional) extending from the base elbow to the top of the station. Systems using guide cable in lieu of rigid guide bars or pipes shall not be considered acceptable. The sliding guide bracket shall be a separate part of the pumping unit, capable of being attached to standard 6 inch ANSI class 125 or metric DN150 pump flanges, so that the pump mounting is nonproprietary, and any pump with a standard discharge flange can be mounted on the base assembly. Base or bracket assemblies with proprietary or nonstandard flange dimensions shall not be considered acceptable.

B. A field replaceable Nitrile (Buna-N) rubber profile gasket or o-ring shall accomplish positive sealing of the pump flange/guide rail bracket to the discharge elbow. Base assemblies which rely solely on metal to metal contact between the pump flange and discharge base elbow as a means of sealing are inherently leak prone, and shall not be considered equal. No portion of the pump shall bear directly on the floor of the sump. The guide rail system shall be available in an optional non-sparking version, approved by Factory Mutual for use in NEC Class 1, Division 1, Group C&D hazardous locations.

1.4 PUMP CONSTRUCTION

A. The pump shall be of submersible centrifugal, non-clog, single stage, volute casing, end suction type capable of satisfying the specified performance requirements. The pump shall be designed as "back pull-out" such that the entire rotating assembly can be removed from the casing. The pump shall be suited for continuous operation in a submerged condition driven directly by a fully submersible dry squirrel cage induction motor. The impeller shall be fitted directly to the motor shaft.

B. The head-capacity curve shall have a single flow rate for each pumping head value and have a continuously rising head characteristic from the specified design point to shut-off so as to ensure stability and control in both individual and/or parallel operation. The operating range of the pump, as specified, is defined by the maximum and minimum operating heads against which the pump will be required to operate. At no point on the pump's power demand curve between shut-off and the minimum operating head shall the pump's power demand exceed the rated power of the motor.

PART 2 - PRODUCTS

2.1 IMPELLER

A. The impeller shall be of a centrifugal, closed, non-clogging design for high efficiency pumping of industrial and municipal wastewater. It shall have 2 vanes and be capable of handling solids of at minimum 3 inch size, long fibres, sludge and other materials as may normally be found in wastewater. Back vanes shall be provided to minimize axial loads and to propel solids away from the seal area.

B. The impellers lateral cavities shall be of ample size to protect against wear and clogging. The impeller shall be a one piece casting of the material as specified. It shall be smooth, well finished, free from blowholes and imperfections, and be dynamically balanced. The impeller shall be securely fitted to the pump shaft in such a manner that it does not loosen or become detached if the pump is operated in the wrong direction as may happen by reversed flow or reversed motor connections

2.2 PUMP VOLUTE

A. The pump volute shall be single piece gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B) non-concentric design with centerline discharge. Passages shall be smooth and large enough to pass any solids which may enter the impeller. Discharge size shall be as specified on the pump performance curve. The discharge flange design shall permit attachment to standard ANSI or metric flanges/appurtenances. The discharge flange shall be drilled to accept ANSI class 125 flanged fittings. Proprietary or nonstandard flange dimensions shall not be considered acceptable. The maximum working pressure of the volute and pump assembly shall be 10 bar (145 psi).

2.3 PREMIUM EFFIENCY MOTOR

A. The Premium Efficiency motor shall meet efficiency standards in accordance with IEC 60034-30, level IE3 and NEMA Premium*. Motor rating tests shall be conducted in accordance with IEC 60034-2-1 requirements and shall be certified accurate and correct by a third party certifying agency. A certificate shall be available upon request.

* IE3 and NEMA Premium efficiency levels are equivalent, however the NEMA Premium standard is intended to cover dry installed motors only, not integrated submersible motors.

B. The Premium Efficiency motor shall be housed in a water tight gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B) enclosure capable of continuous submerged operation underwater to a depth of 20 meters (65 feet), and shall have an IP68 protection rating. The motor shall be of the squirrel-cage induction design, NEMA type B, Premium Efficiency. The copper stator windings shall be insulated with moisture resistant Class H insulation material, rated for 180oC (356oF). The stator shall be press fitted into the stator housing. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is unacceptable. The rotor bars and short circuit rings shall be made of cast aluminum.

C. The motor shall be designed for continuous duty. The maximum continuous temperature of the pumped liquid shall be 40°C (104°F), and intermittently up to 50°C (122°F). The motor shall be capable of handling up to 15 evenly spaced starts per hour without overheating. The service factor (as defined by the NEMA MG1 standard) shall be 1.3. The motor shall have a voltage tolerance of +/- 10% from nominal, and a phase to phase voltage imbalance tolerance of 1%. The motor shall have a NEMA Class A temperature rise, providing cool operation under all operating conditions. The Premium Efficiency Motor shall be FM and CSA approved for use in NEC Class I, Division I, Groups C & D hazardous locations. The surface temperature rating shall be T3C. The motor shall meet the requirements of NEMA MG1 Part 30 and 31 for operation on PWM type Variable Frequency Drives.

D. The motor shall be capable of operating, completely submerged, partially submerged, or unsubmerged. For submerged (wet pit) applications, the motor shall be self cooling via the process fluid surrounding the motor.

2.4 THERMAL PROTECTION

A. Temperature monitors shall be embedded in the motor windings for use in conjunction with and supplemental to external motor overload protection. These temperature sensitive switches shall allow for direct integration with the motor control circuit to shut down the pump if high temperatures are detected. The

switches shall be normally closed rated for 250 V AC and a current of not less than 2 A. The temperature monitors shall automatically reset once motor temperature returns to normal.

2.5 SHAFT SEALS

A. Each pump shall be provided with two totally independent, mechanical seals, installed in tandem, each with its own independent single spring system acting in a common direction. The sealing shall not depend on the direction of rotation.

B. The primary, impeller-side seal shall operate in a large flooded chamber formed by cast recesses in the impeller and backplate. The impeller-side seal shall be of bellows type mechanical seal. The primary and the secondary seal faces shall operate in a generously proportioned lubricant chamber that hydrodynamically lubricates the seal faces to allow for extended periods of dryrunning operation without the need for external seal lubrication or cooling systems.

C. The lubricant chamber liquid shall be an environmentally friendly and nontoxic.

D. The seal face material of the primary seal shall be of at minimum Silicon Carbide versus Silicon Carbide (SiC/SiC) for excellent hardness and chemical resistance across the entire "pH" range.

E. The secondary seal shall be of Carbon versus Silicon Carbide (Carbon/SiC). The seal faces must be of a solid material capable of being re-lapped. The seals shall require neither routine maintenance nor adjustment, but capable of being easily inspected and replaced. Mechanical seal metal parts shall be of CrNiMo-stainless steel. Seals shall be non-proprietary in design, and shall be available from another vendor in addition to the pump manufacturer.

F. Conventional double mechanical seals with a single or multiple springs acting in opposed direction, cartridge-type mechanical seals; seals with materials other than those specified; shall not be considered as adequate for this critical sealing area.

2.6 SHAFT

A. The common pump/motor shaft shall be of sufficient size to transmit full driver output with a maximum deflection of 0,05 mm (0.002 inches) measured at the lower mechanical seal. The pump/motor shaft shall be of stainless steel or be completely isolated form the pumped media through the use of a stainless steel shaft sleeve. Do not use carbon steel as a shaft material without using a stainless steel shaft sleeve.

2.7 BEARINGS

A. The shaft shall rotate on at minimum 1/1 antifriction bearings. The bearing system shall be adequately designed so as to be capable of handling all axial thrust loads plus any and all radial loads. The bearings shall be sealed and lubricated for lifetime.

2.8 POWER CABLE

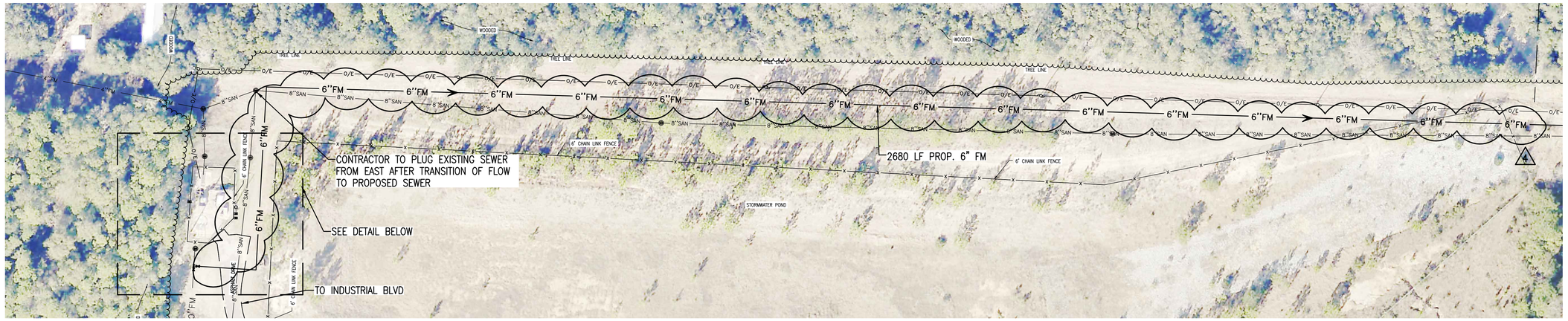
A. The power cables shall be sized according to NEC and CSA standards and shall be of sufficient length to reach the junction box without requiring splices. The outer jacket of the cable shall be oil, water, and UV resistant, and shall be capable of continuous submerged operation underwater to a depth of 65 feet.

B. Provide motors which are FM listed for use in Class I Division 1 Groups C&D hazardous locations as defined by the National Electric Code.

2.9 CABLE ENTRY/JUNCTION CHAMBER

A. The cable entry design shall not require a specific torque to insure a watertight seal. The cable entry shall consist of cylindrical elastomer grommets, flanked by stainless steel washers. A cable cap incorporating a strain relief and bend radius limiter shall mount to the cable entry boss, compressing the grommet ID to the cable while the grommet OD seals against the bore of the cable entry. The junction chamber shall be isolated and sealed from the motor by means of sealing glands. Electrical connections between the power cables and motor leads shall be made via a compression or post type terminal board, allowing for easy disconnection and maintenance.

END OF SECTION 11441

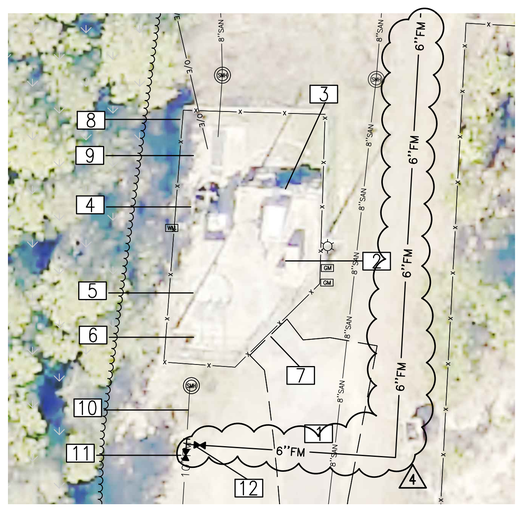


0 25' 50' 100'
SCALE: 1" = 50'

NOTES:

1. IN THE AREA BETWEEN THE EXISTING PRISON LS AND THE ENTRANCE TO THE SRSO SHOOTING RANGE IS AN EXISTING STORMWATER CONVEYANCE SYSTEM. ALL IMPROVEMENTS, INCLUDING GRASS SURFACE AND GRADED TERRACES, SHALL BE MAINTAINED DURING CONSTRUCTION AND SHALL BE RESTORED TO EXISTING OR BETTER CONDITION UPON COMPLETION OF WORK IN THE AREA.

2. CONTRACTOR TO REDIRECT 4" LATERAL CONNECTION FROM EXISTING BUILDING FROM EXISTING MH TO PROPOSED SSMH-1.



DETAIL
SCALE: 1" = 20' 0 10' 20' 40'

EXISTING CONDITIONS

1. COMPACTED MILLED ASPHALT DRIVE
2. GENERATOR
3. ELECTRICAL PANELS
4. MACH. BAR SCREEN & DUMPSTER
5. TRI-PLEX SUBM. PUMP STA.
6. VALVE BOX & LID
7. DOUBLE GATE
8. CHAINLINK FENCE
9. CONC. CHANNEL
10. EXISTING 10" PVC FORCE MAIN

NEW CONSTRUCTION

11. 10" GATE VALVE & BOX
12. 10"x6" TEE W/GATE VALVE & BOX

3 ENTIRE SHEET

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JAMES ERIC ANDERSON, P.E.
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NORTH SANTA ROSA REGIONAL WATER RECLAMATION FACILITY

NO.	DATE	APPR.	REVISION/ACTION TAKEN
1	06/2020	JEA	100% SUBMITTAL
2	09/2020	JEA	RELEASED FOR BID
3	11/2020	JEA	ADDENDUM 2
4	12/2020	JEA	ADDENDUM 3
5	01/2021	JEA	ADDENDUM 6

NOT RELEASED FOR CONSTRUCTION BY ___ DATE __/__/____

PROJECT NO: 25527.11
DESIGNED BY: JA
DRAWN BY: RG
CHK'D BY: RWD
PROJ. MGR: RWD
DATE: SEPT 2020

6" FM CONNECTION FROM PRISON

C-110

STORMWATER STRUCTURES

STORMWATER STRUCTURE INFORMATION (ACCESS DRIVEWAY ALIGNMENT)

S-1
STA 26+75, 29' R
CONC. ENDWALL
INV EL 125.00

S-2
STA 26+75, 23' L
CONC. ENDWALL
INV EL 124.86

STORMWATER STRUCTURE INFORMATION (LOOP ROAD ALIGNMENT)

S-3
STA 24+00, 18' R
TYPE C INLET
TOP EL 82.65
INV EL 71.00

S-3A
STA 24+00, 17' L
TYPE C INLET
TOP EL= 84.10
INV EL= 70.65 N
INV EL= 68.32 W

S-4
STA 26+00, 18' R
TYPE C INLET
TOP EL 74.00
INV EL 65.68

S-5
STA 26+00, 0' L/R
TYPE C INLET
TOP EL 75.30
INV EL 65.33 N
INV EL 65.33 W
INV EL 65.33 E

S-6
STA 26+98.4, 58.2' L
JUNCTION BOX
TOP EL 77.10
INV EL 64.00 E
INV EL 62.52 N

S-7
STA 27+45.2, 18' L
TYPE C INLET
TOP EL 66.30
INV EL 61.80 S
INV EL 59.74 N, E

S-8
STA 27+45.2, 18' R
TYPE C INLET
TOP EL 66.30
INV EL 60.10 N, W
INV EL 62.50 E

S-8A
STA 27+58.1, 30.5' R
TYPE C INLET
TOP EL 74.00
INV EL 62.66

S-9
STA 28+55, 18' L
TYPE C INLET
TOP EL 63.10
INV EL 58.79 S
INV EL 57.47 N

S-10
STA 27+98.7, 16.9' R
TYPE C INLET
TOP EL 64.50
INV EL 60.55

S-11
STA 29+50, 18' L
TYPE C INLET
TOP EL 61.55
INV EL 56.52 S
INV EL 53.56 NE
INV EL 51.52 W

S-12
STA 29+50, 103.8' L
JUNCTION BOX
TOP EL 55.56
INV EL 50.66 E
INV EL 45.66 SW

S-13
STA 29+11.6, 157.6' L
24" MES
INV EL 45.00

STORMWATER STRUCTURE INFORMATION (LOOP ROAD ALIGNMENT)

S-14
STA 35+60.3, 0' L/R
TYPE C INLET
TOP EL 77.15
INV EL 72.89

S-15
STA 34+60.1, 0' L/R
TYPE C INLET
TOP EL 77.15
INV EL 71.89 E, S, N
INV EL 68.18 W

S-16
STA 34+55, 35' L
CLEANOUT
TOP EL 77.66
INV EL 72.66

S-17
STA 34+60.1, 54' R
TYPE C INLET
TOP EL 76.93
INV EL 72.43

S-18
STA 32+85.8, 0' L/R
JUNCTION BOX
TOP EL 70.48
INV EL 66.44 E
INV EL 64.76 S, W

S-19
STA 32+85.8, 54' R
TYPE C INLET
TOP EL 70.26
INV EL 65.30

S-20
STA 32+45, 0' L/R
JUNCTION BOX
TOP EL 68.35
INV EL 64.35 E
INV EL 64.76 S
INV EL 62.80 N
INV EL 58.02 W

S-21
STA 32+45, 20' L
TYPE C INLET
TOP EL 67.00
INV EL 63.00

S-22
STA 30+93.7, 6' L
JUNCTION BOX
TOP EL 60.88
INV EL 56.50

S-23
STA 30+54.5, 19.1' R
TYPE C INLET
TOP EL 59.75
INV EL 56.09 NE
INV EL 54.56 NW, SW

S-24
STA 30+53.3, 19.3' L
TYPE C INLET
TOP EL 59.75
INV EL 54.95

STORMWATER STRUCTURE INFORMATION (ACCESS DRIVEWAY ALIGNMENT)

S-28
STA 33+50, 24' L
TYPE C INLET
TOP EL 83.70
INV EL 76.76

S-29
STA 34+87.6' 24.3' L
TYPE C INLET
TOP EL 78.20
INV EL 74.76

S-30
STA 35+64.8, 23.1' L
JUNCTION BOX
TOP EL 77.40
INV EL 73.60

S-31
STA 35+75.3, 58' L
CLEANOUT
TOP EL 77.74
INV EL 74.50

S-32
STA 35+64.8, 13.5' L
TYPE V INLET
TOP EL 77.14
INV EL 73.75

S-33
STA 36+98, 25.7' L
JUNCTION BOX
TOP EL 77.36
INV EL 71.60 N, S
INV EL 74.69 E

S-34
STA 37+90, 20' L
TYPE C INLET
TOP EL 75.80
SLOT EL 75.30 S
INV EL 70.50 S, SW
INV EL 69.14 N

S-35
STA 37+26.4, 136.7' L
CLEANOUT
TOP EL 77.58
INV EL 74.50

S-36
STA 39+25, 20' L
TYPE C INLET
TOP EL 71.30
INV EL 67.79

S-37
STA 39+88, 132.7' L
TYPE C INLET
TOP EL 70.00
INV EL 66.50 SE
INV EL 63.94 NW

S-38
STA 40+15.5, 157.4' L
JUNCTION BOX
TOP EL 67.50
INV EL 63.50 SE
INV EL 59.43 NW

STORMWATER STRUCTURE INFORMATION (ACCESS DRIVEWAY ALIGNMENT)

S-39
STA 40+42.2, 181.5' L
JUNCTION BOX
TOP EL 63.00
INV EL 59.00 SE
INV EL 52.98 SW

S-40
STA 40+39.5, 221.4' L
JUNCTION BOX
TOP EL 57.00
INV EL 52.50 NE
INV EL 46.48 SW

S-41
STA 40+36.7, 262.3' L
JUNCTION BOX
TOP EL 50.00
INV EL 46.00 NE
INV EL 42.98 SW

S-42
STA 40+33.9, 303.3' L
JUNCTION BOX
TOP EL 46.50
INV EL 42.50 NE
INV EL 41.38 W

S-43
STA 40+41.7, 321.4' L
JUNCTION BOX
TOP EL 46.00
INV EL 41.24

S-44
STA 40+56.9, 299.5' L
18" MES
INV EL 41.00

S-A1
STA 16+40.1, 40.9' L
TYPE C INLET
TOP EL 123.00
INV EL 118.75

S-B1
STA 17+11.2, 41.7' L
TYPE C INLET
TOP EL 123.00
INV EL 118.75

S-B2
STA 19+68.8, 35.8' L
TYPE C INLET
TOP EL 124.15
INV EL 119.75

S-B3
STA 20+90.3, 40.0' L
TYPE C INLET
TOP EL 129.00
INV EL 119.25

S-C1
STA 28+62.3, 53.0' L
TYPE D INLET
TOP EL 99.15
INV EL 94.50

S-C2
STA 29+12.2, 49.6' L
TYPE D INLET
TOP EL 98.00
INV EL 94.00

SANITARY SEWER STRUCTURES

SANITARY SEWER STRUCTURE INFORMATION (SANITARY SEWER CONNECTION ALIGNMENT)

SSMH 1 – SEE NOTE 6
STA 13+87.1, 5.1' R
TOP EL 122.10
INV EL 114.82 S 3
INV EL 114.72 E

SSMH 1A
STA 16+85.1, 5.1' R
TOP EL 124.81
INV EL 114.06 W 3
INV EL 113.96 E

SSMH 2
STA 19+84.2, 4.3' R
TOP EL 126.65
INV EL 113.31 W 3
INV EL 115.81 S
INV EL 113.21 E

SSMH 3 – SEE NOTE 5
STA 22+68.9, 3' R
TOP EL 132.16
INV EL 112.58 W 3
INV EL 112.58 E
INV EL 112.48 N

SANITARY SEWER STRUCTURE INFORMATION (ACCESS DRIVEWAY ALIGNMENT)

SSMH 4
STA 7+17.6, 6' R
TOP EL 128.00
INV EL 111.60 S 3
INV EL 111.50 N

SSMH 5
STA 11+17.6, 6' R 4
TOP EL 125.60
INV EL 110.62 S 3
INV EL 110.52 N

SSMH 6
STA 15+17.6, 6' R
TOP EL 127.53
INV EL 109.64 S 3
INV EL 109.54 N

SSMH 7
STA 19+17.6, 6' R
TOP EL 127.80
INV EL 108.66 S 3
INV EL 108.56 N

SSMH 8
STA 23+17.6, 6' R
TOP EL 122.30
INV EL 107.68 S 3
INV EL 107.58 N

SSMH 9
STA 27+16.8, 7.1' R
TOP EL 108.60
INV EL 103.58 S 3
INV EL 103.48 NW

SSMH 9A
STA 29+39.6, 0.9' R
TOP EL 97.51
INV EL 90.12 SE
INV EL 90.02 NW
3

SANITARY SEWER STRUCTURE INFORMATION (LOOP ROAD ALIGNMENT)

SSMH 10 – SEE NOTE 6
STA 22+18.0, 0' L/R
TOP EL 88.88
INV EL 84.47 SE
INV EL 84.37 W
INV EL 84.47 (12"FM) NE 3

SSMH 11
STA 26+13.2, 1.6'L
TOP EL 74.50
INV EL 70.46 E
INV EL 70.45 S

SSMH 12
STA 26+21.4, 35.7' R
TOP EL 75.00
INV EL 70.42 S
INV EL 70.41 NW

SSMH 13
STA 27+31.8, 35.1' R
TOP EL 74.50
INV EL 70.35 SE
INV EL 70.34 N

SSMH 14
STA 31+55.3, 41.4' L
TOP EL 64.00
INV EL 44.38 SW
INV EL 60.33 S
INV EL 44.28 E

SSMH 14A 4
STA 30+48.4, 13.5' R
TOP EL 63.60
INV EL 44.94 S
INV EL 44.84 NE

SSMH 15
STA 28+77.1, 19.8' R
TOP EL 63.50
INV EL 59.66 S
INV EL 45.72 E
INV EL= 45.62 N

SSMH 16
STA 33+44.1, 40.9' L
TOP EL 72.10
INV EL 61.58 N
INV EL 70.66 NE
INV EL 61.48 W

SSMH 18
STA 34+47.8, 108.7' L
TOP EL 77.00
INV EL 71.90 W
INV EL 71.80 E

SSMH 19
STA 34+44.4, 163.4' L
TOP EL 72.10
INV EL 61.95 N 4
INV EL 63.63 E
INV EL 61.85 S

SSMH 20
STA 33+49.4, 398.6' L
TOP EL 71.10
INV EL 62.66 NE
INV EL 62.68 E
INV EL 62.56 S

SSMH 21
STA 26+54.6, 87.1' R 4
TOP EL 66.00
INV EL 62.00 E

SSMH 22
STA 31+54.7, 105.8' R
TOP EL 64.00
INV EL 61.08 S
INV EL 60.98 N

NOTE: SSMH 1, 3 AND 10 SHALL BE FIBERGLASS
6 5

BASKERVILLE-DONOVAN, INC.
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FL Reg. Engineer #49463
STATE OF FLORIDA
PROFESSIONAL ENGINEER
MICHAEL D. LINKSTON LICENSE No.49463

NORTH SANTA ROSA
REGIONAL WATER
RECLAMATION FACILITY

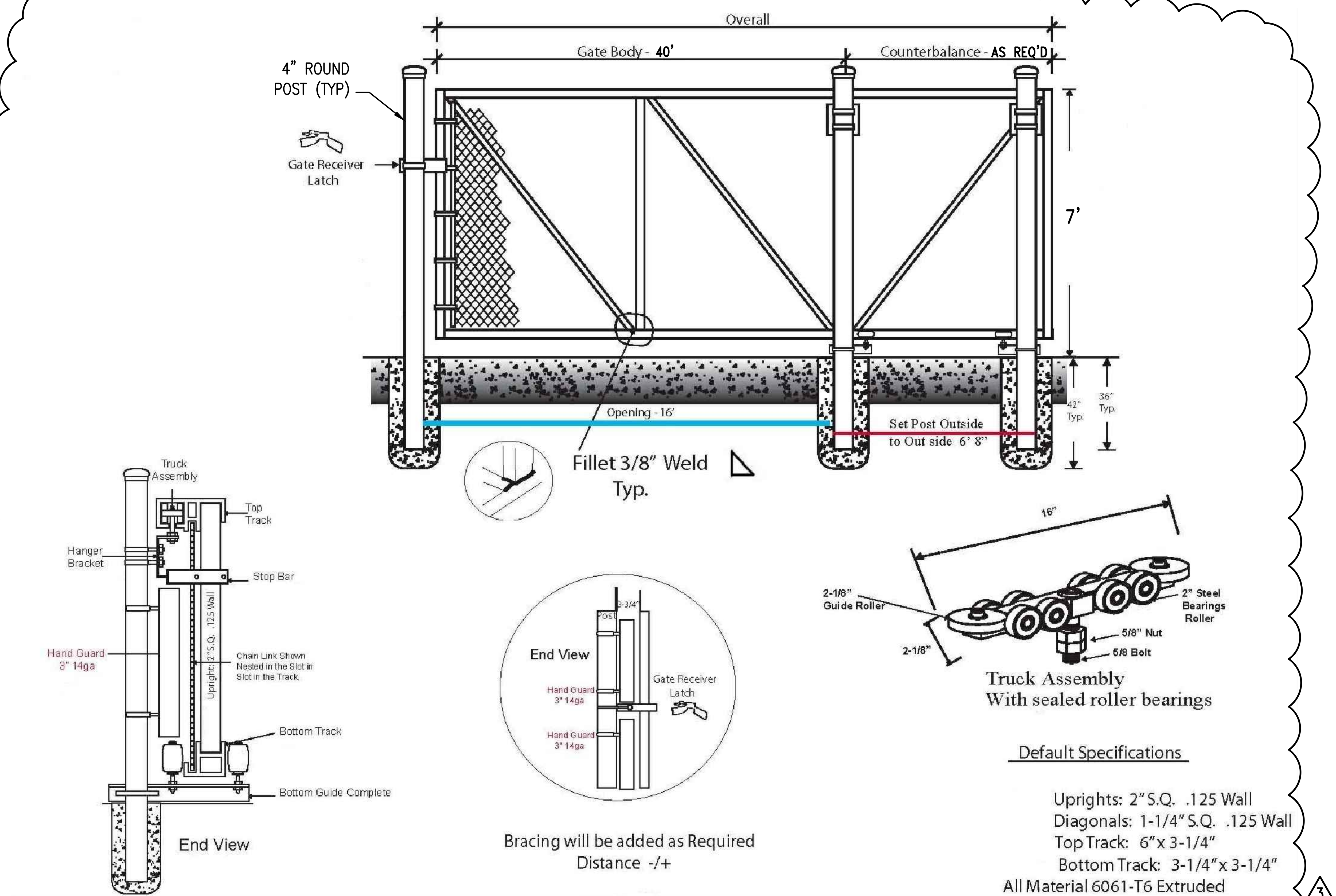
NO.	DATE	APPR.	REVISION/ACTION TAKEN
2	09/2020	JEA	RELEASED FOR BID
3	11/2020	JEA	ADDENDUM 2
4	12/2020	JEA	ADDENDUM 3
5	12/2020	JEA	ADDENDUM 4
6	01/2021	JEA	ADDENDUM 6

NOT RELEASED FOR CONSTRUCTION BY ___ DATE __/__/____

PROJECT NO: 25527.11
DESIGNED BY:
DRAWN BY:
CHK'D BY:
PROJ. MGR: RWD
DATE: SEPT 2020

STRUCTURE INFORMATION

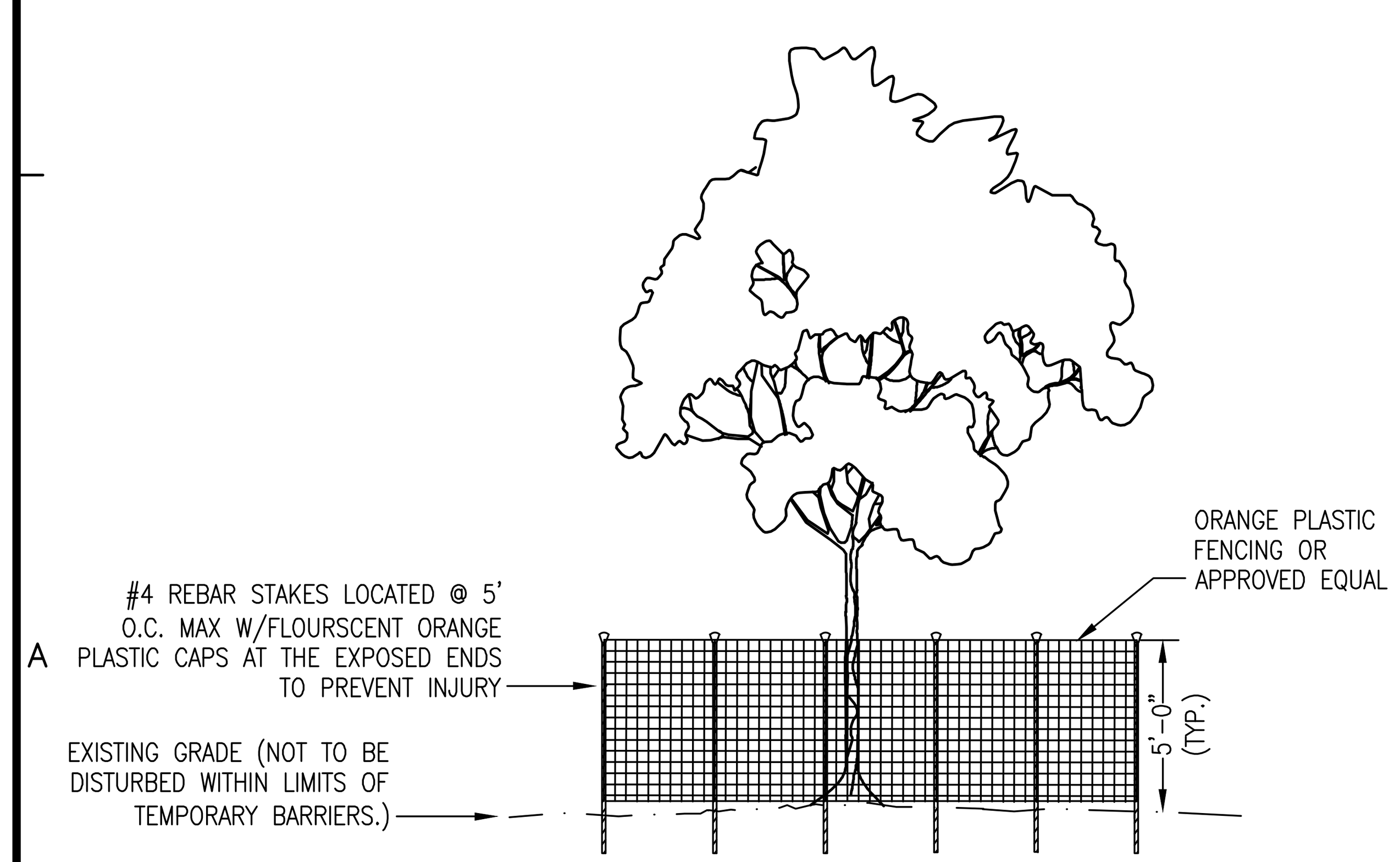
C-126

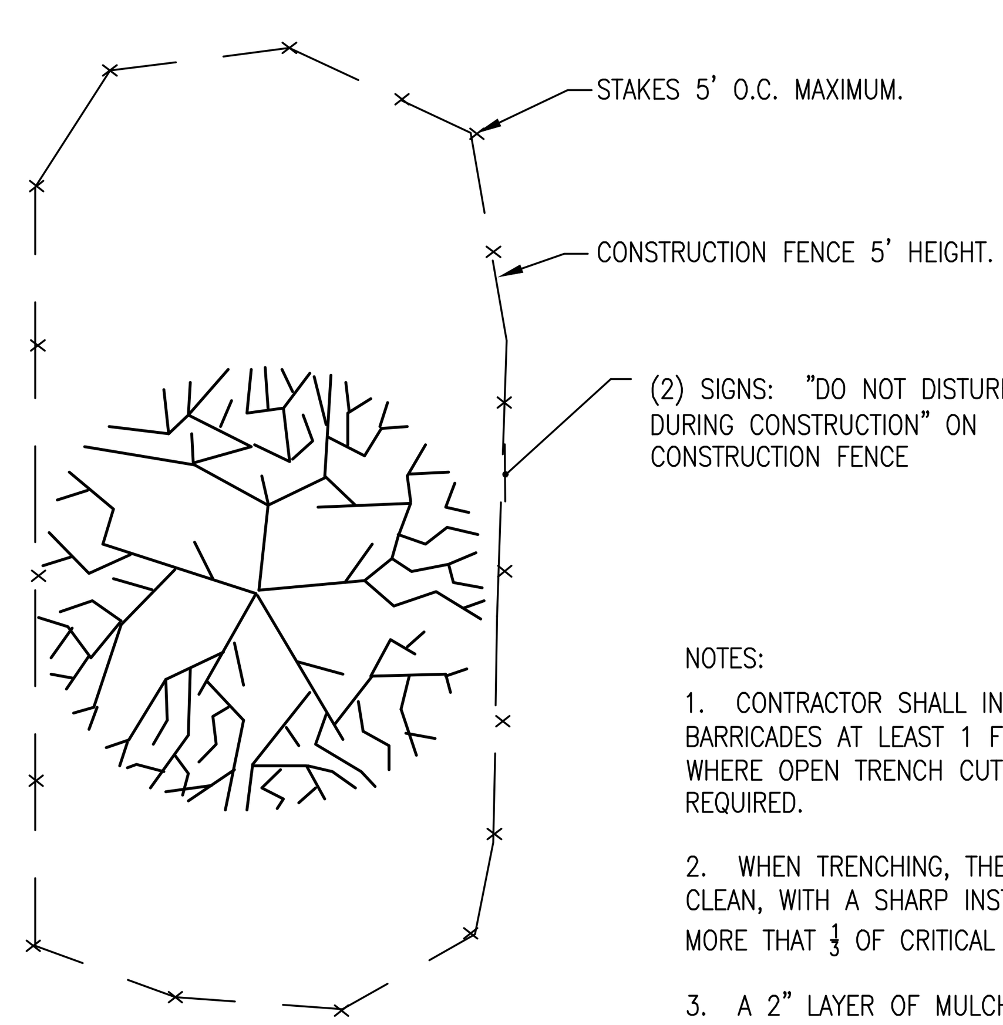


NOTE:

1. GATE SHALL BE SPS ONGUARD 16' ALUMINUM SLIDE GATE OR ENGINEER APPROVED EQUAL.

B1 ALUMINUM SLIDE GATE DETAIL
N.T.S.





NOTES:

1. CONTRACTOR SHALL INSTALL AND MAINTAIN TREE PROTECTION BARRICADES AT LEAST 1 FT. PER 1" OF TREE TRUNK, EXCEPT WHERE OPEN TRENCH CUTTING AND ROAD REPLACEMENT IS REQUIRED.

2. WHEN TRENCHING, THE CONTRACTOR SHALL SEVER ROOTS CLEAN, WITH A SHARP INSTRUMENT, TO A DEPTH OF 18". NO MORE THAT ⅓ OF CRITICAL ROOT ZONE SHALL BE IMPACTED.

3. A 2" LAYER OF MULCH SHALL BE IMMEDIATELY APPLIED OVER THE SURFACE OF EXPOSED ROOTS.

A1 TREE PROTECTION DETAIIL
NOT TO SCALE

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JAMES ERIC ANDERSON, P.E.
FL Reg. Engineer #67494

NORTH SANTA ROSA REGIONAL WATER RECLAMATION FACILITY

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1	06/2020	JEA	100% SUBMITTAL
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3	01/2021	JEA	ADDENDUM 6

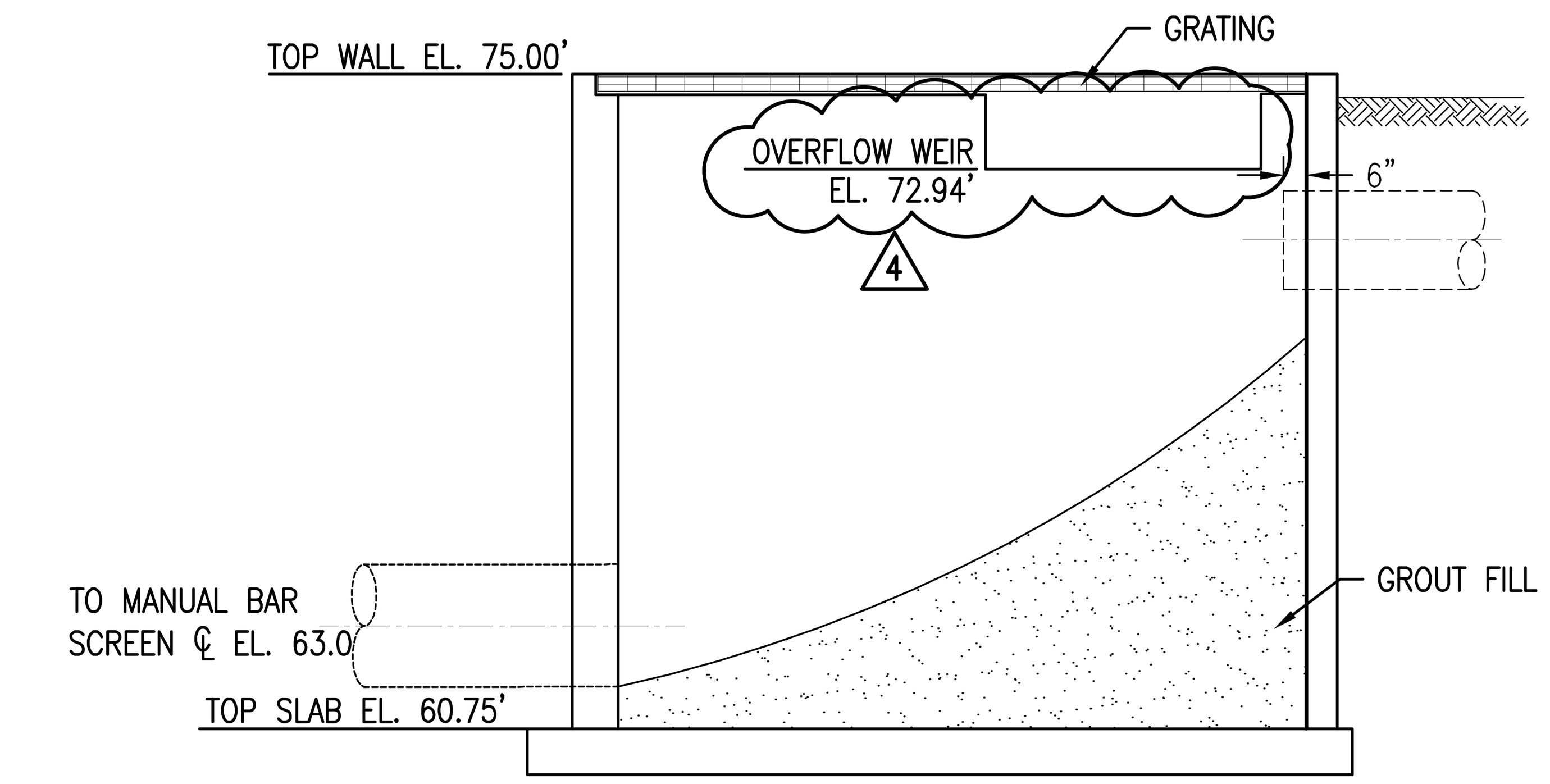
NOT RELEASED FOR CONSTRUCTION BY ___ DATE __/__/__

PROJECT NO: 25527.11
DESIGNED BY: JEA
DRAWN BY: THO
CHK'D BY: JEA
PROJ. MGR: RWD
DATE: SEPT 2020

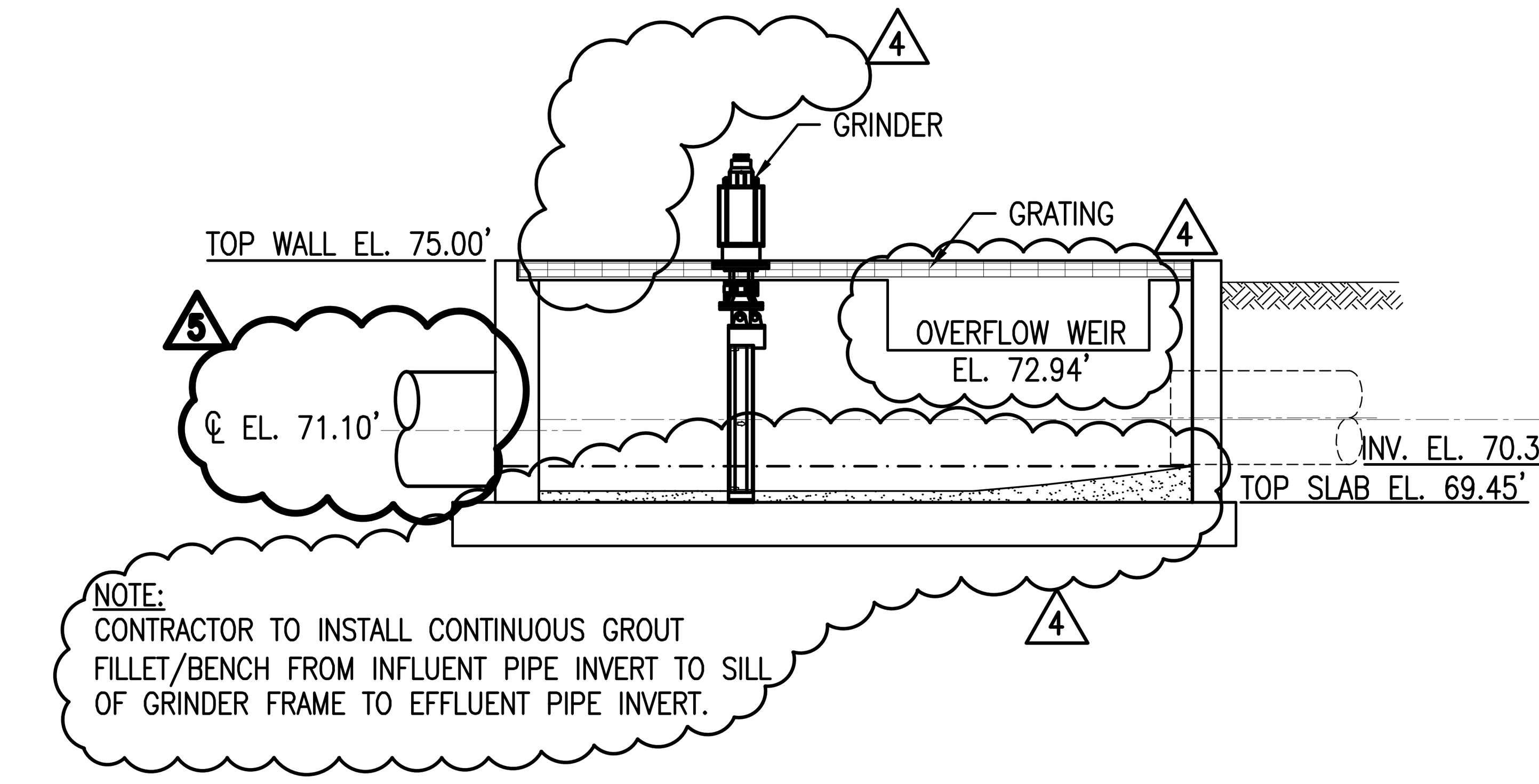
STANDARD DETAILS

C-905

K:\255 Milton\25527.11 NSRRWRF Plan Review\DWG\2020 UPDATE\C-905_C-906.dwg, Jan 06, 2021 - 11:45:36AM, toverton



D2 INFLUENT STRUCTURE SECTION
SCALE: 1/4" = 1'-0"

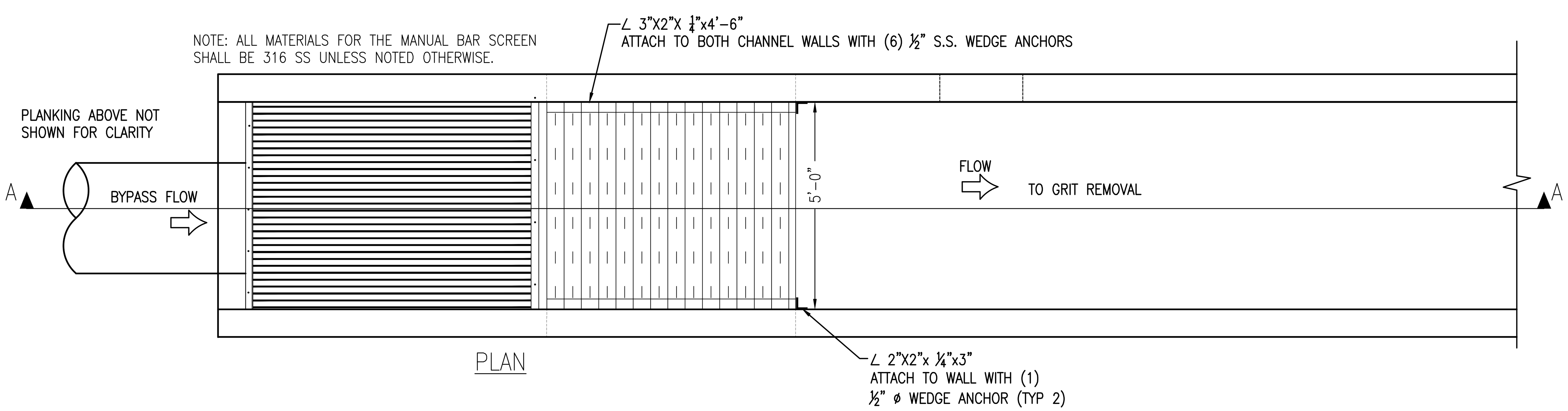


D4 INFLUENT STRUCTURE SECTION
SCALE: 1/4" = 1'-0"

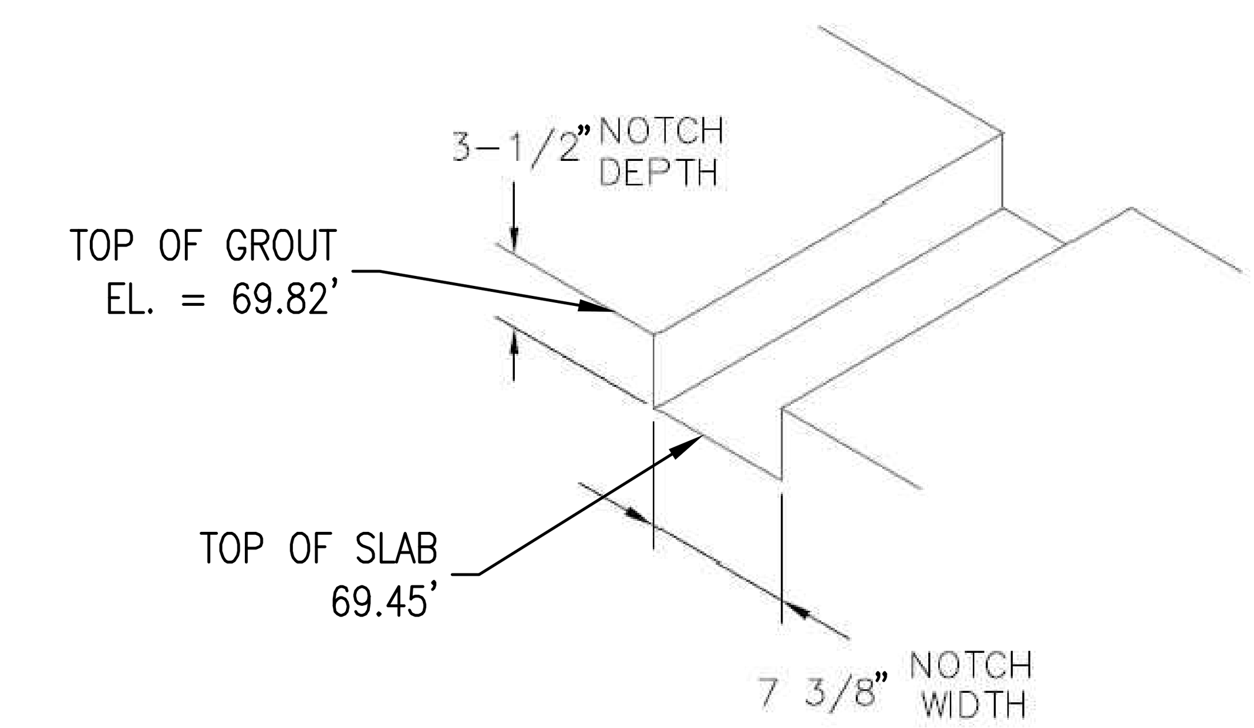
NOTES:

1. CONTRACTOR TO PROVIDE TWO (2) RAKES MATCHED TO SPACING AND THICKNESS OF BAR SCREEN.
2. CONTRACTOR TO SLOPE COMMON HEADWORKS CHANNEL FLOOR FROM THE 30" INFLUENT SPLITTER PIPE TO THE INVERT OF THE 20" GRIT KING PIPING.

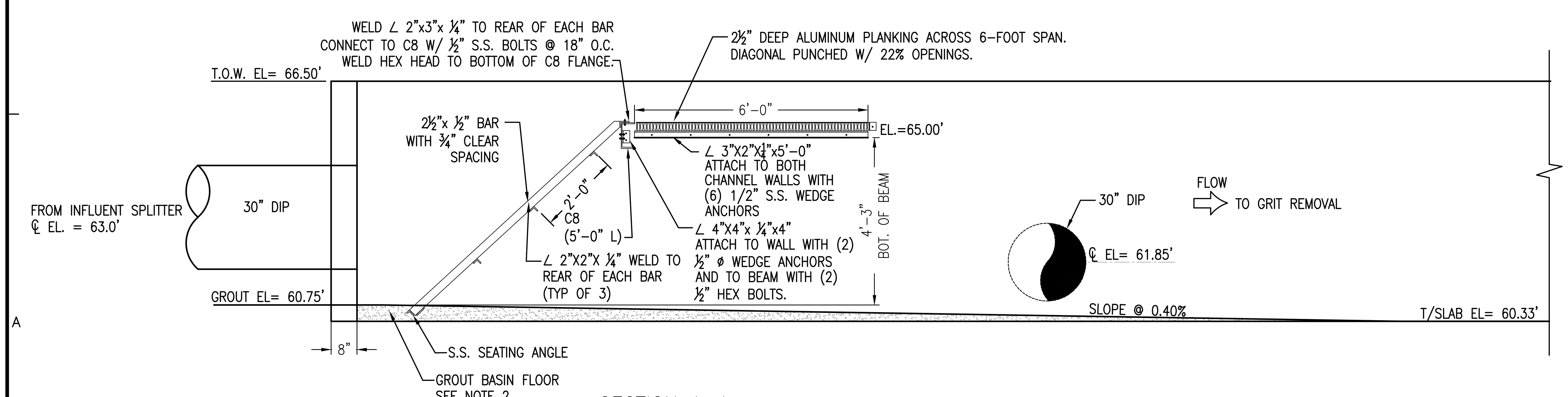
NOTE: ALL MATERIALS FOR THE MANUAL BAR SCREEN SHALL BE 316 SS UNLESS NOTED OTHERWISE.



PLAN

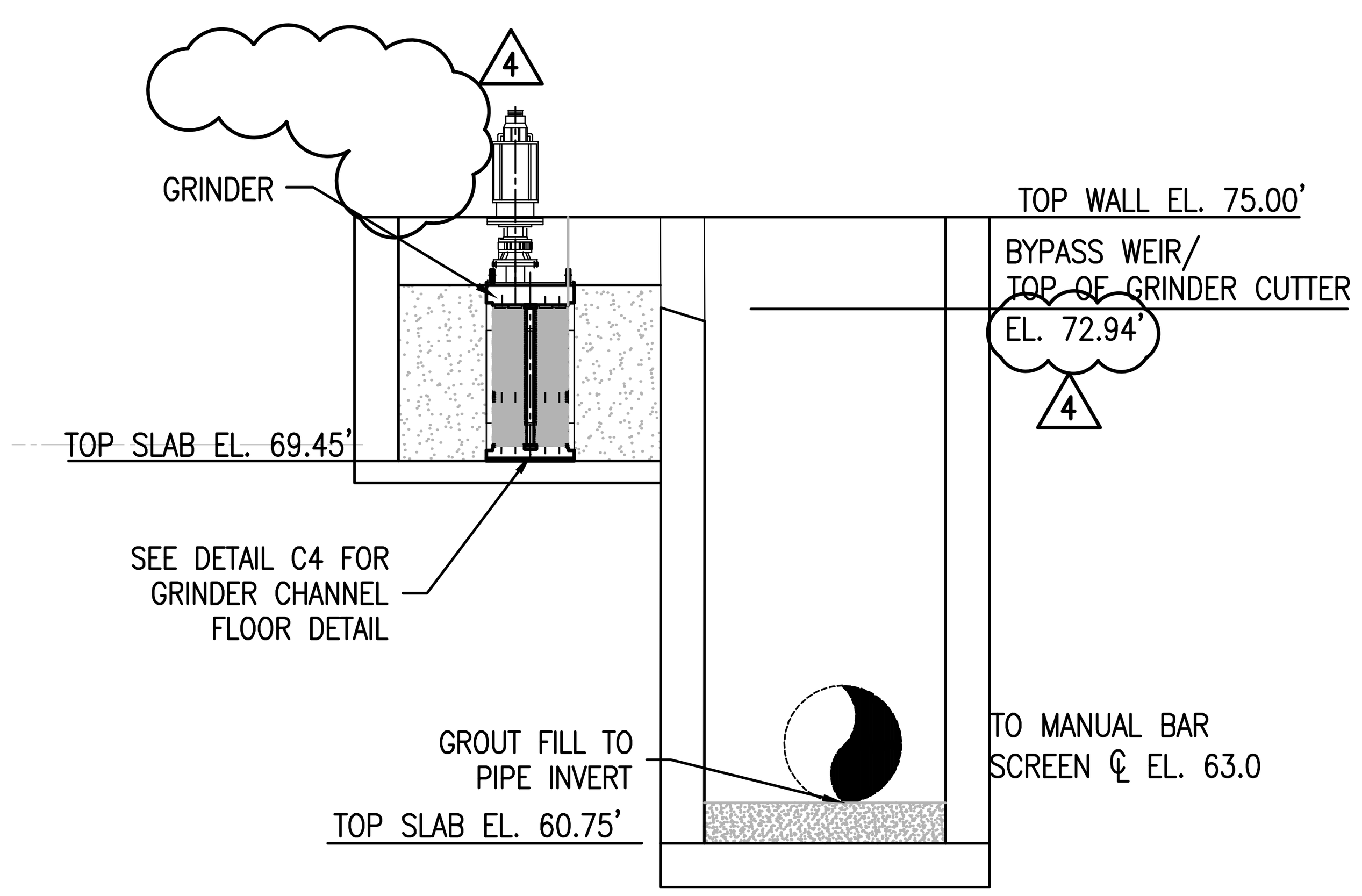


C4 CHANNEL FLOOR DETAIL FOR GRINDER FRAME
SCALE: N.T.S.



SECTION A-A

A1 MANUAL BAR SCREEN DETAIL
SCALE: ½" = 1'-0"



A4 GRINDER SECTION
SCALE: 1/4" = 1'-0"

ENTIRE SHEET 3

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ENGINEERING BUSINESS EB-0000340
Pensacola - Panama City Beach - Tallahassee - Mobile

JAMES ERIC ANDERSON, P.E.
FL Reg. Engineer #67494

NORTH SANTA ROSA
REGIONAL WATER
RECLAMATION FACILITY

NO.	DATE	APPR.	REVISION/ACTION TAKEN
1	06/2020	JEA	100% SUBMITTAL
2	09/2020	JEA	RELEASED FOR BID
3	11/2020	JEA	ADDENDUM 2
4	12/2020	JEA	ADDENDUM 3
5	01/2021	JEA	ADDENDUM 6

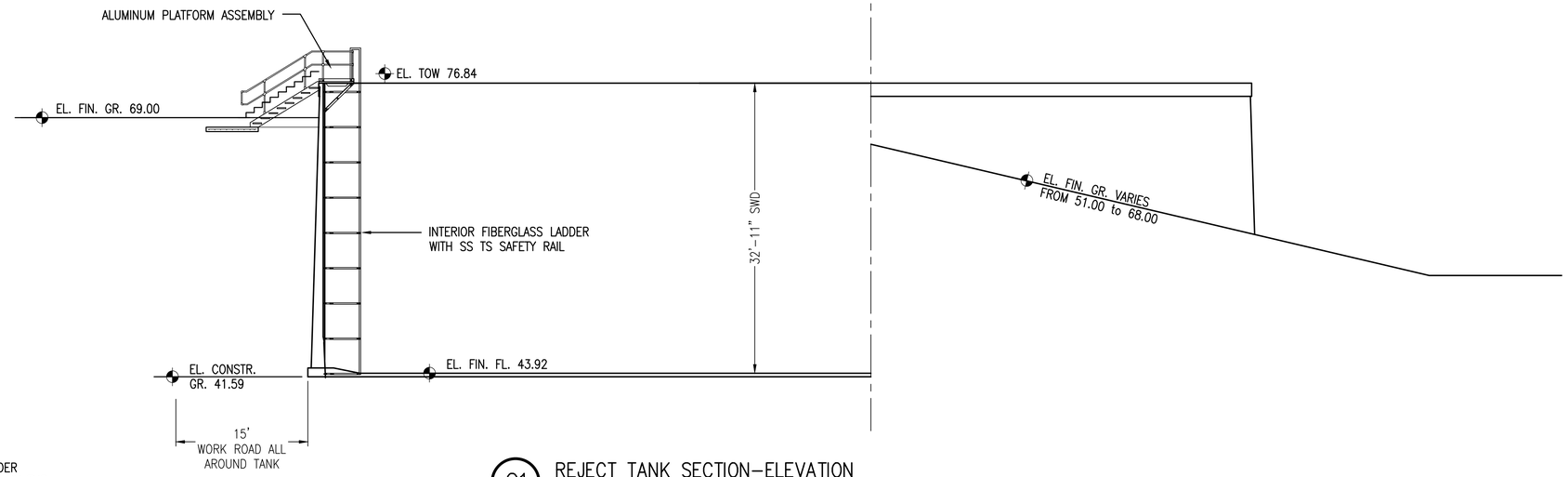
NOT RELEASED FOR CONSTRUCTION BY ___ DATE __/__/__

PROJECT NO: 25527.11
DESIGNED BY: RWD
DRAWN BY: THO
CHK'D BY: RWD
PROJ. MGR: RWD
DATE: SEPT 2020

SCREEN
SECTIONS & DETAILS

M-202

K:\255 Milton\25527.11 NSRRWRF Plan Review\DWG\2020 UPDATE\M-200-201.dwg, Jan 06, 2021 - 11:51:29AM, toverton

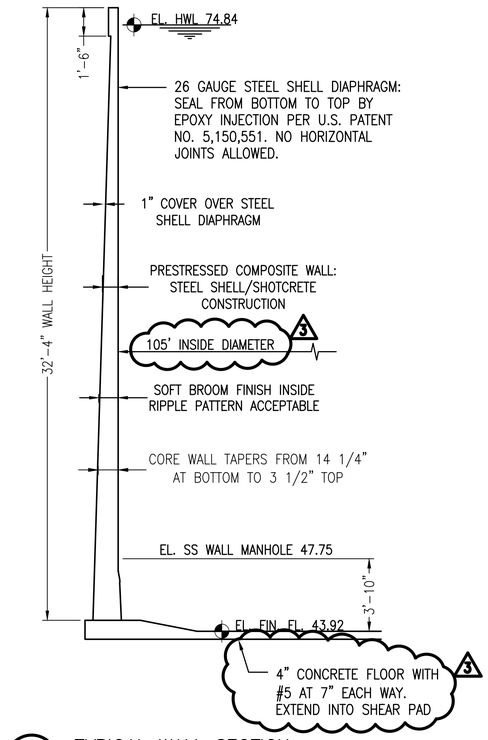


C1 REJECT TANK SECTION–ELEVATION
SCALE: 1/8" = 1'-0" 0 2' 4' 8' 16'

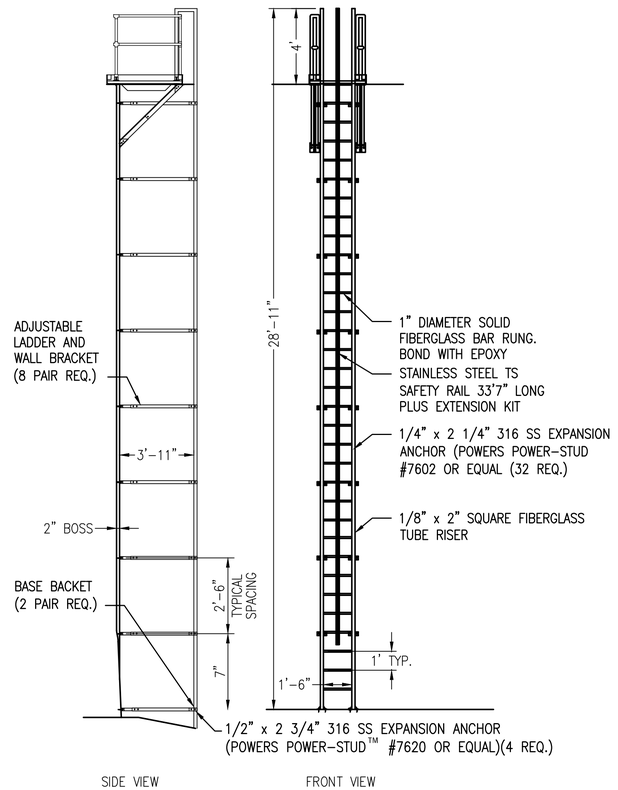
NOTES:

1. SHOTCRETE SHALL BE APPLIED BY OR UNDER DIRECT SUPERVISION OF NOZZLEMEN CERTIFIED BY THE AMERICAN CONCRETE INSTITUTE AS OUTLINED IN ACI CERTIFICATION PUBLICATION CP-60.

2. TENSION IN PRESTRESSING WIRE SHALL BE MEASURED BY AN ELECTRONIC DIRECT-READING STRESSOMETER ACCURATE TO WITHIN 2%.



A1 TYPICAL WALL SECTION
SCALE: 1/4" = 1'-0" 0 1' 2' 4' 8'



A3 INTERIOR FIBERGLASS LADDER WITH SS TS SAFETY RAIL
SCALE: 1/4" = 1'-0" 0 1' 2' 4' 8'

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ERIC ANDERSON 67494 STATE OF FLORIDA PROFESSIONAL ENGINEER
ERIC R. ANDERSON, P.E.
FL REG. LICENSE NO. 67494

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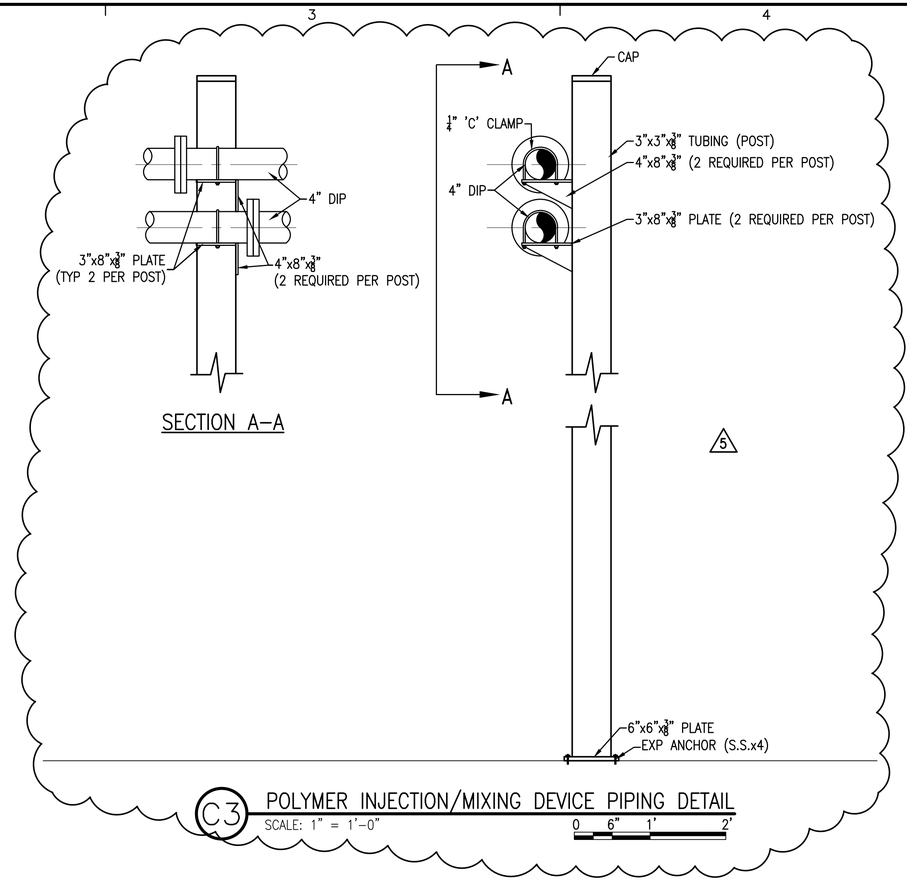
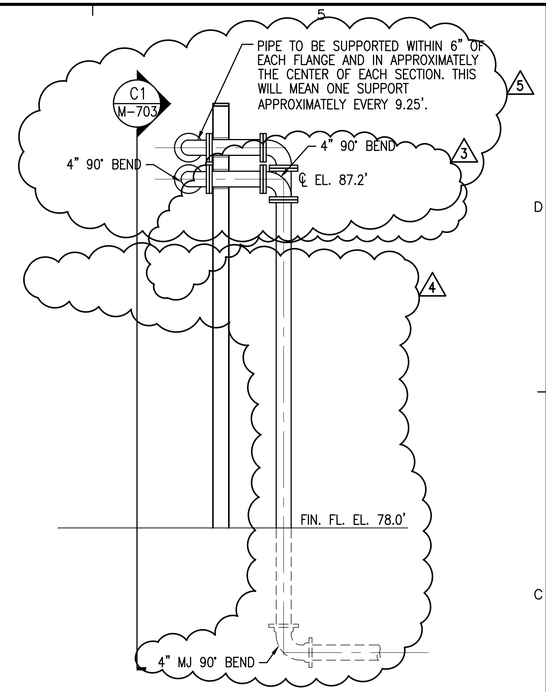
REJECT
TANK SECTIONS

M-641

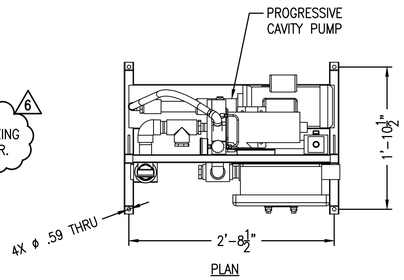


C3 POLYMER INJECTION/MIXING DEVICE PIPING DETAIL
SCALE: 1" = 1'-0" 0 6" 1' 2'

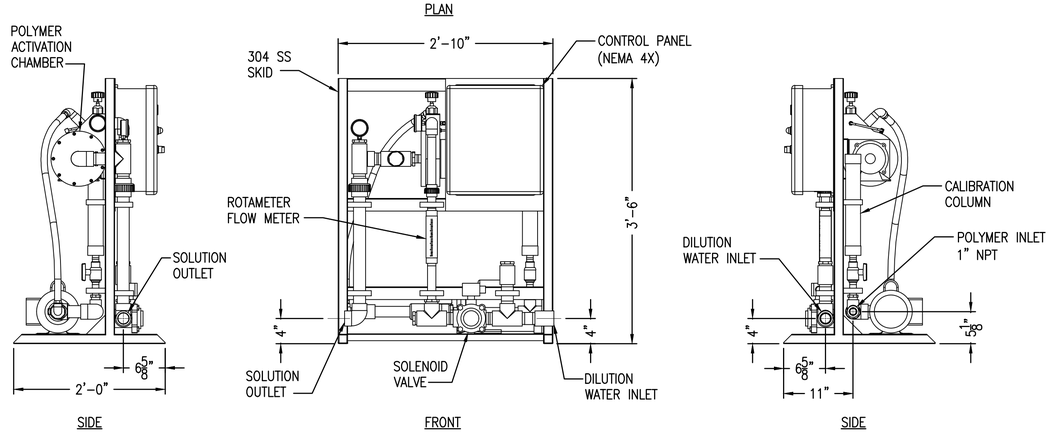


C4 POLYMER INJECTION/MIXING DEVICE PIPING DETAIL
SCALE: 1/2" = 1'-0" 0 1' 2' 4'

NOTE:
TOP OF POLYMER CONTROL PANEL SHALL BE 72" ABOVE FLOOR UTILIZING FRAME PROVIDED BY MANUFACTURER. 6



PLAN



A1 POLYMER INJECTION SYSTEM
SCALE: 1" = 1'-0" 0 6" 1' 2'

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ERIC ANDERSON * LICENSED * No 67184 * STATE OF FLORIDA * PROFESSIONAL ENGINEER
ERIC D. ANDERSON, P.E.
FLORIDA LICENSE NO. 67184

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SLUDGE DEWATERING POLYMER SYSTEM DETAILS

M-703

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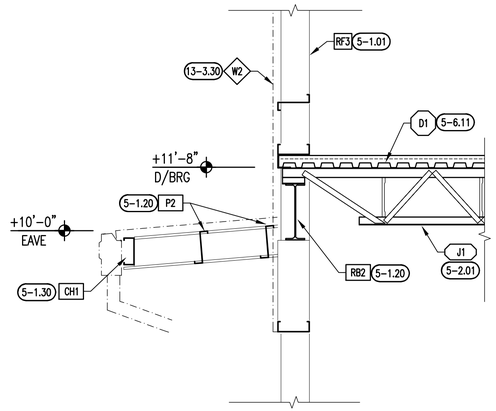
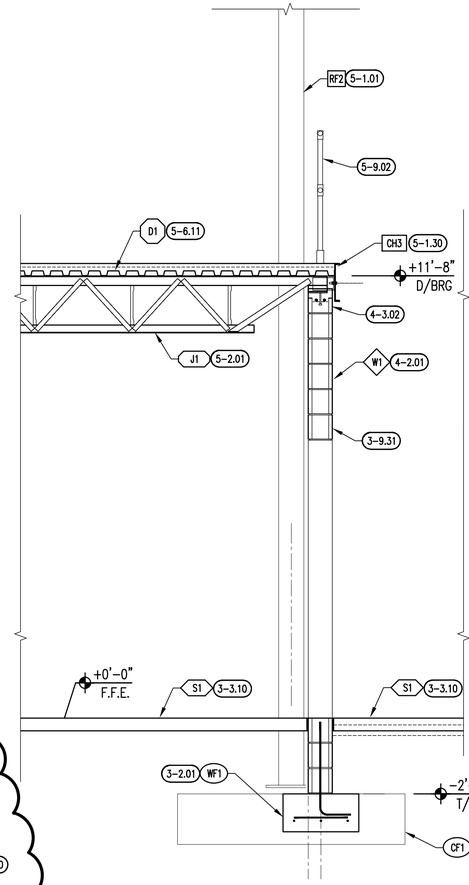
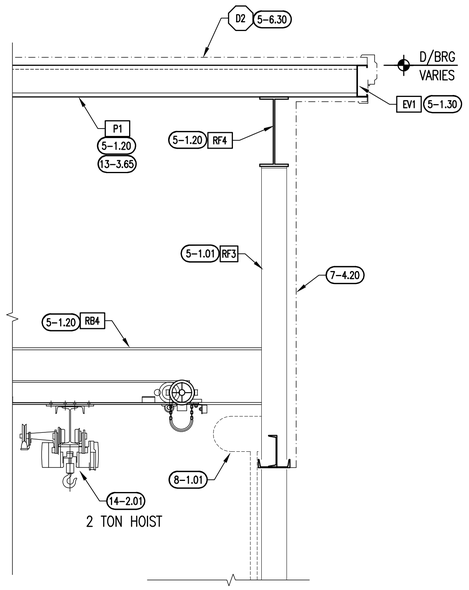


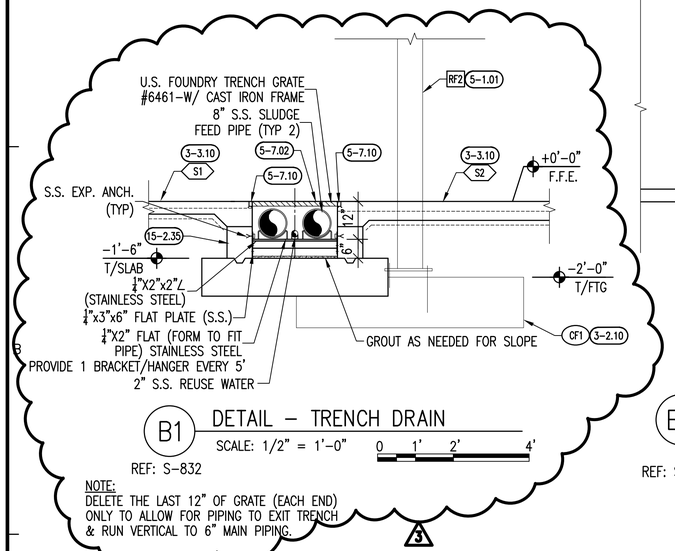
C1 DETAIL – OVERHANG
SCALE: 1/2" = 1'-0" 0 1' 2' 4'
REF: S-832



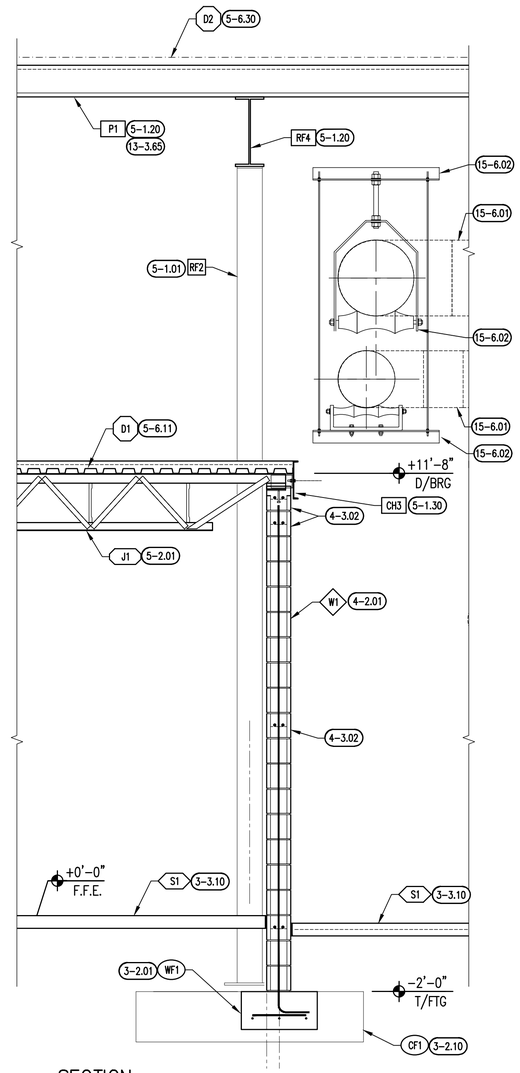
B2 DETAIL – TYPICAL DOOR OPENING
SCALE: 1/2" = 1'-0" 0 1' 2' 4'
REF: S-832



C3 ROLL UP DOOR FRAMING & CRANE CONNECTION
SCALE: 1/2" = 1'-0" 0 1' 2' 4'
REF: S-832



B1 DETAIL – TRENCH DRAIN
SCALE: 1/2" = 1'-0" 0 1' 2' 4'
REF: S-832



B5 SECTION – MASONRY WALL w/ METAL WALL CONNECTION
SCALE: 1/2" = 1'-0" 0 1' 2' 4'
REF: S-832

LEGEND

- Cx COLUMN; SEE SCHEDULE SHEET S-002
- RBx FRAMING MEMBER; SEE SCHEDULE SHEET S-002
- Wx WALL MARK; SEE SCHEDULE SHEET S-002
- WFx FOOTING; SEE SCHEDULE SHEET S-002
- Dx DECK MARK; SEE SCHEDULE SHEET S-002
- Sx SLAB; SEE SCHEDULE SHEET S-002
- CFx COLUMN FOOTING; SEE SCHEDULE SHEET S-002
- Jx OPEN WEB STEEL JOISTS; SEE SCHEDULE SHEET S-002

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ANTONIO J. BURTON, P.E.
FL. REG. ENGINEER #67072

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OPERATIONS/PROCESS BUILDING STRUCTURAL SECTIONS

S-837

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