

St. Johns County Board of County Commissioners

Purchasing Division

August 23, 2019

ADDENDUM #2

To: Prospective Bidders
From: St. Johns County Purchasing Department
Subject: BID NO.: 19-83 Northwest WTP Phase 1 (6 to 9 MGD) Expansion

This Addendum #2 is issued for further bidder's information and is hereby incorporated into the bid documents. Each bidder will ascertain before submitting a proposal that he/she has received all Addenda. *Please return a signed copy of this Addendum with Bid Proposal (1 original).*

ADDENDUM #2 SHALL BE INCORPORATED INTO THE AGREEMENT DOCUMENTS, PROPOSAL REQUIREMENTS, AGREEMENT FORMS, CONDITIONS OF THE AGREEMENT, AND TECHNICAL SPECIFICATIONS
DATED August 2019

FRONT END DOCUMENTS (Replace)

1. The Bid Form has been revised to include a line item for "Disposal of Excess Soil (per cubic yard)". Please refer to 19-83 Bid Form Rev 082119 attached.

IN THE TECHNICAL SPECIFICATIONS (Added)

2. Table of Contents
 - a. Add to Division 26 Electrical: Section 260150 – Electrical Motors
 - b. Add to Division 31 Earthwork: Section 312223 – Ground Improvement Systems
 - c. Add to Division 40 Process Interconnections: Section 400562 – Plug Valves
3. Specification Section 260150 Electric Motors has been added (attached) (6 pages).
4. Specification Section 312223 Ground Improvement Systems has been added (attached) (10 pages).
5. Specification Section 400562 Plug Valves has been added (attached) (4 pages).
6. Specification Section 407506:
Revise Paragraph 2.1.A.1.a. from "ProMinent D1C Series" to "Hach sc200 Series".
7. Specification Section 407513:
Revise Paragraph 2.1.A.1.a. from "ProMinent PHEX 112 SE Sensor" to "Hach DPD2P1 Digital Differential pH Sensor".

ON THE DRAWINGS

1. **Sheet S-1, Foundation Notes: Modify paragraph to read;**

“-Ground improvement shall be designed and installed by a specialty subcontractor engaged by the contractor in accordance with Section 312223, Ground Improvement Systems to reduce total and differential settlements within specified limits for the net allowable bearing pressure indicated for the following mat foundations:

Clearwell No. 2 1400 psf

-Net allowable bearing pressure for slab and mat foundations over subsurface prepared as per specifications:

All other structures 1000 psf”.

2. **Sheet S-4, Clearwell No. 2. Degasifier, Odor Control and Transfer Pumps Top Plan and Section, Notes:**

Add Note 4: “Ground improvement shall be designed and installed by a specialty subcontractor engaged by the contractor in accordance with Section 312223 Ground Improvement Systems to reduce total and differential settlements within specified limits for Clearwell No. 2.”

3. **Sheet E-11, Clearwell Complex 2 – Electrical Plan, New Degasifier/Clearwell Instrumentation Panel 2 (DCIP2)**

Revise the conduit numbers from “(P390, C390, S390)” to “(P580, C580, S580)”.

4. **Sheet E-11, Clearwell Complex 2 – Electrical Plan, NEMA 4X Aluminum Terminal Box**

Revise the conduit numbers from “(C395, S395)” to “(C585, S585)”.

ANSWERS/QUESTIONS:

Questions 1 – 11 pertain to the vertical turbines specified in section 432516

1. Please confirm that the pumps are to be NSF 61 certified.

Answer: The pumps are not required to be NSF 61 certified. Per Section 432516, Paragraph 2.3.A, the pump “shall conform to AWWA E 103, Horizontal and Vertical Line-Shaft Pumps, and ANSI/NSF 61 and ANSI/NSF 372 where not in conflict with the requirements contained herein.”

2. There are references in this section to additional motor requirements in Division 26. I am unable to locate those additional motor specifications. Please advise.

Answer: See attached specification Section 260150 Electric Motors.

3. Are insulated bearings and a shaft grounding ring required on the motors?

Answer: Per Section 26150, Paragraph 2.01.C.2, “Pumps and motors shall be designed and manufactured to operate on VFD systems and to eliminate stray current electrolysis of all components including pump and motor bearings and shafts.” Per Section 26150, insulated bearings and shaft grounding rings are required for the motors.

4. Paragraph 2.1.C makes reference to vibration monitoring equipment, but no other details are provided. Please clarify if vibration monitoring equipment is required, and if so, please provide appropriate details.

Answer: Section 432516, Paragraph 2.1.C: Revise “pumps, motors, and vibration and temperature monitoring equipment” to “pumps and motors”.

5. The pump selection discussed during design (curve attached) deviates slightly from the specifications for the secondary duty point and BEP acceptable range. Please confirm that these minor deviations are acceptable.

Answer: The pump selection will not be changed. Minor revisions will be made to the pump specification Table 432516-1.

6. Our standard impeller material is Aluminum Bronze, not Nickel Aluminum Bronze as specified. Is this deviation acceptable? We use the Aluminum Bronze impellers regularly in potable, chlorinated water applications.

Answer: Impellers shall be provided as specified.

7. Our standard shaft material is 416SS with 410SS couplings. Is this an acceptable alternative?

Answer: Shafts shall be provided as specified.

8. Paragraph 2.3.G .1 makes reference to pump cans, which are not utilized for this project. Please confirm that each pump is to use a fabricated steel discharge head, along with a steel sole plate.

Answer: Section 432516, Paragraph 2.3.G.1, revise “can top flange or adaptor flange if can is oversized as selected by the Manufacturer or as shown on the Drawings complete” to “sole plate”. Remove “The pump shall be equipped with a 1 inch (25 mm) tapped vent in the pump baseplate with a 1 inch (25 mm) 316 stainless steel nipple, 316 stainless steel ball valve, and J-tube for the removal of air from the can. A can top flange shall be welded to the suction can at the location shown on the Drawings and as specified below.”

9. Paragraph 2.3.K makes reference to vertical hollow shaft design. I believe this is incorrect, based on the adjustable spacer coupling specified in 2.4.A and the VSS motor specified in 2.5.A. Please confirm VSS is desired, not VHS.

Answer: Section 432516, Paragraph 2.3.K, remove “vertical hollow shaft”. Add “replace with vertical solid shaft”.

10. The material of construction for the vortex suppressor is not specified. Please advise. We recommend 316SS.

Answer: Section 432516, Paragraph 2.3.I, insert “Type 316 stainless steel” after “pump suction bell mounted”.

11. With regards to the field vibration testing required by 3.2.D.2, we use a local Florida company for 3rd party vibration analysis. Please confirm this is an acceptable alternative to the companies listed.

Answer: Proposed 3rd party for vibration analysis must be pre-qualified through the shop drawing submittal process as a “pre-approved equal”. Any submittal other than what is specified is submitted at the Contractor’s assumed liability for approval.

Questions 12 – 19 Pertaining to the split case pumps in spec section 432359:

12. Has the County pre-negotiated the price for the sole-sourced pumps in Section 432359? If so we request the value be published to allow for competitive bidding.

Answer: No, the County has not pre-negotiated the price for the pumps in Section 432359.

13. Please confirm that the pumps are to be NSF 61 certified. Add note per spec requirements.

Answer: The pumps are not required to be NSF 61 certified. Per Section 432359, Paragraph 2.1.E “the pumps shall conform to AWWA E-103, Horizontal and Vertical Line-Shaft Pumps Standard and ANSI/NSF 61 Annex G and/or ANSI/NSF 372 where not in conflict with the requirements specified herein.”

14. Please review the spare parts that are required by paragraph 1.9.C, keeping in mind that these are split case pumps which use (2) mechanical seals per pump. We would recommend revising this spare parts requirement to (1) set of mechanical seals, (1) set of bearings, and (1) set of O-rings & gaskets per pump.

Answer: The spare parts will be revised to include a total of (1) set of mechanical seals, (1) set of bearings, and (1) set of O-rings & gaskets.

15. With regards to paragraph 2.1.A, please confirm that the controls are not being provided by the pump supplier.

Answer: Controls are not provided by the pump supplier. Pump supplier will coordinate with the system controller for the pumps to operate per the Contract requirements.

16. Paragraph 2.3.E specifies a pressure device for the grease lubricated bearings. This is not a standard Peerless offering; our grease lubricated bearings are typically manually lubricated. Is this acceptable?

Answer: Manually lubricated bearings are acceptable.

17. With regards to paragraph 2.5, is it the engineer's intent for the pump supplier is to provide the variable frequency drives for the high service pumps in order to provide unit responsibility?

Answer: Pump manufacturer will not be providing VFDs but will coordinate with the VFD manufacturer for the pumps to operate per the Contract requirements.

18. Paragraph 2.4 makes reference to additional motor requirements in Division 26. I am unable to locate additional motor specifications in Division 26. Please advise.

Answer: See attached specification Section 260150 Electric Motors.

19. Are insulated bearings and a shaft grounding ring required on the motors? This is recommended for motors of this size on variable frequency drives.

Answer: Per Section 260150, Paragraph 2.01.C.2, "Pumps and motors shall be designed and manufactured to operate on VFD systems and to eliminate stray current electrolysis of all components including pump and motor bearings and shafts." Therefore, insulated bearings and shaft grounding rings are required for the motors.

20. Sheet C-2 indicates that the contractor is to provide temporary fencing "as needed" after the removal of the existing fence. Please define "as needed". Will it be a requirement to secure this site at all times? So if the new fencing is not installed, will it be a requirement to install temporary fence?

Answer: "As needed", is as required to secure the facility in a manner equivalent to the existing fence security. The site is to be secured at all times.

21. Based on our early take-off of the excavation quantities, it appears we will have a substantial amount of soil to dispose of. Does the county have a location on site or close to this project site to dispose of 8,000-10,000 CY?

Answer: A line item has been added to the Bid Form for "Disposal of Excess Soil (per cubic yard)". The contractor shall be responsible for hauling any excess soil offsite at the price per cubic yard listed on the Bid Form.

22. In the Vertical Turbine pump specification, 432516, Section 1.6J, indicates a dynamic vibration analysis to be performed prior to manufacturing by an independent company and two specified companies are listed in the spec. Then in Section 3.2D, this vibration analysis is required in the field after the pumps are installed. Is this two different testing requirements? Is this testing required by the manufacturer and/or by the contractor? Note that this testing is very expensive (i.e. it could exceed the cost of a pump or two). This also will likely extend the project.

Answer: The testing requirements are as specified.

23. Liquidated damages are shown in the Instruction to Bidders section and calculated via the table provided. Please confirm that this is the only way liquidated damages will be calculated as opposed to the Agreement, Sections 4.03 Liquidated Damages and 4.04 Special Damages.

Answer: The table provided in the Instructions to Bidders is correct.

24. Drawing S-1, Foundations and note 1 of Deferred Submittals states soil improvements for the Clearwell No 2 have not been included. The detailed structural sheets provided do not indicate any soil improvements are needed, however, the geotechnical report indicates the need for "Rigid Inclusions" or "Stone Columns. Please advise if the contractor is responsible for the design and installation of a soil improvements for the Clearwell No 2. Are we required to follow the recommendations of this report provided by ECS Florida or will we be required to hire an independent civil and structural Engineer and will we be required to perform our own geotechnical investigations?

Answer: See comments and revisions attached to this addendum

25. Does Clearwell No 1 have any soil improvements that could affect the construction (excavation and dewatering) of Clearwell No 2 including working room of 3ft around the base slab?

Answer: See comments and revisions attached to this addendum.

26. Deferred Submittals requires pipe supports to be designed. Pipe supports have already been designed and are shown on MD-x sheets. If Contractor designs them, they will not necessarily conform to these details. Please advise which one is preferred. Furthermore, the specification calls out pre-engineered standard supports and no mention of design requirements.

Answer: Pipe supports shall meet the requirements of the specification and drawings.

27. Clearwell No. 2 is also listed as a deferred submittal for soil stabilization, please confirm that any soil improvements for the future ground storage tank is not included in this contract.

Answer: There is no stabilization work required for the future ground storage tank, but there is soil stabilization work required for Clearwell No. 2.

28. Will the Owner consider extending the question deadline?

Answer: Per Addendum 1, the County has extended the bid opening (September 4, 2019) and deadline for questions (August 21, 2019).

29. Will the Owner consider an extension of the bid date? We have no lead times from manufactures as of yet and with the pump vibration analysis and all the sequencing, the scheduled duration may not be adequate. We need more time to analyze the schedule.

Answer: Per Addendum 1 (September 4, 2019), the County has extended the bid opening and deadline for questions.

30. Spec section 033500-Concrete Finishing, page 4, item 3.2.D is the rubbed finish for exposed concrete and concrete to be painted related to the Clearwell per the Finish Schedule. The rubbing procedure is very labor intensive (6 passes over the same area). This is not typical and not representative of what is currently onsite. This would be significantly cost prohibitive for a municipal facility. We suggest more standard rubbing that will produce a typical finish capable of receiving the scheduled paint.

Answer: Concrete finishes are to comply with the requirements of Section 033500 Concrete Finishes. Clearwell No 2 shall have a finish similar in appearance to Clearwell No 1.

31. Sheet M-8 indicates that the above grade piping, upstream of the degasification tower, shall be stainless steel. Please provide a specification for this fabricated stainless steel pipe. Note that if seamless pipe is specified it is typically ~200% of the cost of more standard (i.e. ERW), and is NOT available in compliance with AIS. Existing piping is not seamless.

Answer: Yes, a stainless steel piping specification 400522 was added via Addendum 1.

32. Will the (2) 16" bypass wall pipes as detail per A/MD-1, be a typical DIP fabricated wall pipe or will they be required to be Stainless?

Answer: The 16" degasifier piping and bypass is all 316L stainless steel.

33. Please provide durations for the Owner-furnished programming in the sequence of construction in 011011 for any items in sections 1.4 D through I (critical path). Note that programming can be done ahead of time and should have minimal effect on construction. (i.e. less than 1 day on each sequence). If longer than 1 day per item please add same time to contract, cumulatively, for all programming.

Answer: The owner provided programming will be coordinated with the contractor's construction schedule, to provide the programming required by the contractor's milestone dates, to allow for the sequence of construction and startup as outlined Section 011011. Claims related to programming delays will be evaluated on a case by case basis.

34. Do the proposed Liquidated Damages in the Instructions to Bidders (based upon contract award amount) apply to this project?

Answer: Yes, Liquidated Damages shall be as noted in the Instructions to Bidders.

35. Are the proposed Liquidated Damages the same rate for Substantial Completion and Final Completion?

Answer: Yes.

36. Article 3 of the proposed Form of Agreement states the Engineer will act as the "Owner's Representative". SC 9.13 states the Project Director will be the "Owner's Representative". The Project Director is apparently performing many of the tasks assigned to the Engineer in the General Conditions (Submittal review, review of Pay Applications, interpreter of the Contract Documents, inspections for Substantial and Final Completion, etc.). This is confusing; there cannot be two Owner's representatives. Who is the Owner's representative? Please clarify the roles and responsibilities of both the Engineer and the Project Director.

Answer: The Project Director is the Engineer for this project and will act as the Owner's Representative.

37. SC 4.05.b. implies that rainfall must exceed 1 inch/day to be considered adverse. This is a particularly high standard. Is this correct?

Answer: Yes, this is correct. The SC 4.05.b will remain as is. Contract time will be increased for a rainfall event that exceeds 1 inch/day no matter the circumstance. Multiple rainfall events that exceed 0.1 inches in a given month will be looked at versus the average number of rainfall events for that month and additional time will be granted for the number of events that exceed the average.

38. Will the Owner adhere to Florida Statute 218.70-218.80, Local Government Prompt Payment Act, concerning contractor payments and retainage?

Answer: The Owner will comply with Florida Statutes 218.70 through 218.80 concerning contractor payments. The Owner will comply with Florida Statute 255.078 concerning retainage.

39. SC 18.09, Contractor's Employment Opportunity, does not comply with Executive Order 11246, as amended. Please revise the provision to comply with the current Executive Order.

Answer: SC18.09 has been revised to read "Equal Employment Opportunity requirements shall be as described in Section 00801 - FDEP Supplementary Conditions, Article 12."

40. Manufacturer's warranties are called for in several specifications to be concurrent with Contractor's warranty. The listed manufacturers will not agree to this. Manufacturers' warranties are based on commissioning of the equipment. With a multi-staged project please confirm warranties will start when Owner has the use of the equipment.

Answer: Warranties will go into effect upon start-up/commissioning of each piece of equipment in accordance with the terms of the Contract.

41. Several specifications list performance requirements but also list a model number. Please either provide prescriptive specifications or performance specifications but not a combination. We cannot comment on performance if we are prescribed exactly what model to provide.

Answer: The overall project and equipment items listed are intended and required to meet the project requirements and performance conditions. The scope of work, is based upon the contract

specifications, drawings and the contract documents. The model numbers provide the characteristics that a proposed alternate or or-equal will be compared to in addition to the performance requirements.

42. Have any equals been approved per the prescribed methods?

Answer: No equals have been approved to date. The equipment and products are as listed in the specifications, as shown on the drawings or as noted in any addenda issued.

Questions 43 - 45 pertain specification 443133.

43. 2.4.A.3, state that the WCP needs to be C1, D2 rated. It is typical to locate the panel outside of the classified area. Please confirm if the Water Control Panel can be moved outside the hazardous and avoid the C1, D2 rating. The WCP is currently shown mounted next to the LCP >4' from the vessels on the plan drawing and the LCP does not require a C1, D2 rating.

Answer: The areas within 3 feet of leakage sources (dampers, flexible connections, odor control vessels, etc.) would be C1D1 classified areas. The LCP and the WCP need to be located outside the classified areas.

44. If the WCP can be mounted outside the classified area, can the explosion proof and NEMA 4X requirements for the pressure transmitter inside the WCP also be removed since it will be in a non-hazardous rated area and enclosed in a NEMA 4X WCP?

Answer: Yes, if mounted inside the WCP and outside the envelope for C1, D2, the pressure transmitter does not need to be explosion proof or NEMA 4X.

45. 3.3.D.3.a.8), for the Mechanical commissioning states to verify operation of the sump level indicator. The spec's and P&ID show a sump level switch. Please confirm if the sump has a level switch (as specified and shown on the P&ID) or a level indicator.

Answer: A level switch is required.

46. Perry Fiberglass Products, Inc., worked with CDM Smith on the design of the biological odor control system for the Northwest Water Treatment Plant (WTP) Phase 1 project. Email string and specification given to CDM Smith is attached. Can you please add Perry Fiberglass Products, Inc., to 443133 part 2.1.A.?

Answer: No, will not be added.

47. Drawing ED1: Cable schedule shows conduit P371 feeding BTF Drain Panel with 7 #12AWG fed by 100A circuit breaker. Please clarify.

On E-5, the Single Line Diagram, change the feeder to the BTF Drain PS Control Panel from "P371" to "P380".

48. Who is installing new gate access system?

The new gate access system is to be provided and installed by the Contractor.

49. Camera system: Who is responsible for wiring new cameras to existing system? Cable schedule shows empty conduit.

On ED-1, the Contractor shall install two shielded Cat6 power over Ethernet cables in conduit S570.

50. DWG E9 Note 9: Locate Well #1 and Well #2. Neither well is shown on any drawings.

Please refer to the attached scaled map that shows the locations of Well #1 and Well #2.

51. Is there a possibility of getting a detail drawing of Well #1 and Well #2?

There are no detail drawings available for Well #1 and Well #2.

52. Utility conflict DWG E9 Note 14. Please clarify electrical requirement.

The Contractor shall install the new conflict manhole. The existing electrical ducts must pass through the conflict manhole. The existing electrical ducts must be protected and adequately supported during construction and within the final installation.

53. DWG E 9 new fixtures indicated as "T" fixtures. Please list "T" fixture.

On ED-2, Lighting Fixture Schedule, change "Type R" to "Type T".

54. Who is the contractor maintaining SJCUD camera system?

After installation and commissioning of the gate camera security system the County will assume maintenance.

55. Sheet C-4 - Biotrickling connection point 4" HDPE RCWM not shown clearly.

Connection to the Biotrickling Filter Water Panel is as shown on M-7, grid line A/2.

56. No specs provided for PVDF piping.

As specified in the Biotrickling Filter specification provide PVDF or PE for the flow meter.

57. Biotrickling Filter PS check valve & gate valve are shown as t/u PVC yet specs call for iron body flanged.

Provide PVC check valves and ball valves. All BF PS piping to be PVC Schedule 40 and coated per specification Section 099100, Paragraph 3.6.F.2.

58. HDPE 4"> called out to be DR11 (3/4") no clarification on 4" HDPE DIPS or IPS.

All HDPE pipe to be DIPS, DR-11.

59. Sheet C-4 at 4" HDPE tie-in calls for a new plug valve, however no plug valve spec was provided. Also, a check valve called out. Is check valve buried MJ?

See attached specification Section 400562 Plug Valves. Also, the reference to the 4" check valve at the tie-in will be removed from the callout on Sheet C-4.

60. No pipe schedule with class of DIP.

DIP shall be as follows per the SJCUD "Manual of Water, Wastewater, and Reuse Design Standards & Specifications":

**4" through 12": PC 350
16" through 20": PC 250
24": PC 200
30" through 64": PC 150**

ATTACHMENTS TO ADDENDUM #2

- 19-83 Bid Form Rev 082119
- Section 312223 Ground Improvement Systems
- Section 260150 Electric Motors
- Section 400562 Plug Valves
- NW Well #1 and Well #2 Location Map

THE BID DUE DATE IS CURRENTLY September 4, 2019 by 2:00 P.M.

Acknowledgment

Sincerely,

Signature and Date

**David E. Pyle, SJC Purchasing Dept.
Procurement Coordinator
Purchasing Department**

Printed Name and Title

Company Name (Print)

END OF ADDENDUM #2

BID NO: 19-83

**SECTION 00300
OFFICIAL COUNTY BID FORM
ST. JOHNS COUNTY, FLORIDA**

PROJECT: Northwest WTP Phase 1 (6 to 9 MGD) Expansion

TO: THE BOARD OF COUNTY COMMISSIONERS OF ST. JOHNS COUNTY, FLORIDA

DATE SUBMITTED: _____

BID PROPOSAL OF

Full Legal Company Name

Mailing Address

Telephone Number

Fax Number

Bidders: Having become familiar with requirements of the project, and having carefully examined the Bidding Documents and Specifications entitled for Bid No: 19-83, Northwest WTP Phase 1 (6 to 9 MGD) Expansion in St. Johns County, Florida, the undersigned proposes to furnish all materials, labor and equipment, supervision and all other requirements necessary to comply with the Contract Documents to submit the following Bid Proposal summarized as follows:

BASE BID

FOR: Northwest WTP Phase 1 (6 to 9 MGD) Expansion as per plans and specifications.

Schedule of Prices

Item No.	Estimated Quantity	Brief Description of Item	Bid Amount in Figures
1.	Lump Sum	All costs for all labor, materials equipment, supplies, taxes, other miscellaneous costs, profit, and overhead, both direct and indirect, for completion of all Work except for those Bid Items hereinafter listed separately	
		<u>Lump Sum</u>	\$ _____
Item No.	Estimated Quantity	Brief Description of Item with Unit Price in Words	Bid Amount in Figures
2.		Allowance for Materials Testing	
		<u>Ten thousand dollars</u>	\$ <u>10,000.00</u>

3. Allowance for Permitting
Five thousand dollars \$ 5,000.00
4. Allowance for FPL
Fifteen thousand dollars \$ 15,000.00
5. Disposal of Excess Soil (per cubic yard)
8,000 cubic yards x \$ _____ /cubic yard =
_____ \$ _____

TOTAL LUMP SUM BID PRICE: (Summation of Items 1 through 5)

\$ _____
 Total Lump Sum Bid Price (Numerical)

_____/100 Dollars
 Total Lump Sum Bid Price (Amount written or typed in words)

Bidder shall insert the Total Bid Price in numerals and in words. Any discrepancy between the two submitted amounts shall be determined by the amount written in words.

During the preparation of the Bid, the following addenda, if any, were received:

- No.: _____ Date Received:
 No.: _____ Date Received:
 No.: _____ Date Received:

We, the undersigned, hereby declare that no person or persons, firm or corporation, other than the undersigned are interested, in this proposal, as principals, and that this proposal is made without collusion with any person, firm or corporation, and we have carefully and to our satisfaction examined the Bid Documents and Project Specifications.

We have made a full examination of the location of the proposed work and the sources of supply of materials, and we hereby agree to furnish all necessary labor, equipment and materials, fully understanding that any quantities shown therewith are approximate only, and that we will fully complete all requirements therein as prepared by the Owner, within the same time limit specified in the Bid Documents as indicated above.

If the Undersigned is notified of the acceptance of this Bid Proposal by the Board within ninety (90) calendar days for the time set for the opening of Bids, the Undersigned further agrees, to execute a contract for the above work within ten (10) days after notice that his Bid has been accepted for the above stated compensation in the form of a Contract presented by the Owner.

The Undersigned further agrees that security in the form of a Bid Bond, certified or cashier's check in the amount of not

less than five percent (5%) of Total Bid Price, payable to the Owner, accompanies this Bid; that the amount is not to be construed as a penalty, but as liquidated damages which said Owner will sustain by failure of the Undersigned to execute and deliver the Contract and Bond within ten (10) days of the written notification of the Award of the Contract to him; thereupon, the security shall become the property of the Owner, but if this Bid is not accepted within ninety (90) days of the time set for the submission of Bids, or if the Undersigned delivers the executed Contract upon receipt, the Security shall be returned to the Bidder within seven (7) working days.

CORPORATE/COMPANY

Full Legal Company Name: _____(Seal)

By: _____
Signature of Authorized Representative (Name & Title typed or printed)

By: _____
Signature of Authorized Representative (Name & Title typed or printed)

Address: _____

Telephone No.: (____) _____ Fax No.: (____) _____

Email Address for Authorized Company Representative: _____

Federal I.D. Tax Number: _____ DUNS #: _____
(If applicable)

INDIVIDUAL

Name: _____
(Signature) (Name typed or printed) (Title)

Address: _____

Telephone No.: (____) _____ Fax No.: _____

Email Address: _____

Federal I.D. Tax Number: _____

- Submittal Requirements:
- Official County Bid Form
 - Attachment "A" – St Johns County Board of County Commissioners Affidavit
 - Attachment "B" – Certificate as to Corporate Principal
 - Attachment "C" – License / Certification List
 - Attachment "D" – List of Proposed Sub-Contractors / Suppliers
 - Attachment "E" – Conflict of Interest Disclosure Form
 - Attachment "F" – Certificate of Compliance with Florida Trench Safety Act
 - Attachment "G" – Proof of Insurance
 - Attachment "H" – Contractor's Qualifications Form
 - Attachment "I" – Appendix A to the FDEP Supplementary Conditions Certification of Compliance with FDEP Environmental Protection Supplementary Conditions
 - Bid Bond Form
 - Fully Acknowledged Addenda Applicable to this bid

Official County Bid Form, Attachments "A", "B", "C", "D", "E", "F", "G", "H", "I" and Bid Bond must be completed, along with a fully acknowledged copy of each Addendum applicable to this Bid and submitted with each copy of the Bid Proposal. One (1) original and two (2) copies of all required forms must be submitted.

SECTION 260150

ELECTRIC MOTORS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. In general, the Work specified in this section of the Specifications includes the furnishing of all labor, material, and services necessary for the installation and placing in operation of all electric motors indicated or required for the proper operation of all mechanical equipment installed.

1.02 SUBMITTALS

- A. Motor manufacturers' product literature, nameplate data, and outline drawings shall be incorporated into the appropriate shop drawing submittals of all associated equipment. Additionally, manufacturers' test reports shall be provided for each motor 100 HP and above.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. All electric motors shall be built in accordance with current NEMA, IEEE, ANSI, and AFBMA Standards where applicable. Each motor shall be of the type and quality described by these specifications and/or as indicated on the drawings, fully capable of performing in accordance with the manufacturer's nameplate rating and free from defective material and workmanship.
- B. Electric motors shall be of sufficient capacity to operate the driven equipment, under all load and operating conditions, without exceeding 85% of the motor's nameplate horsepower rating with service factor, and without exceeding its rated temperature limits.
- C. Electric motors for variable speed applications shall be designed for operation at the rated maximum speed and at reduced speeds throughout the variable range, without overloading. Each variable speed motor shall be compatible with all associated control equipment and operating conditions including increased electromagnetic noise (harmonics).
 - 1. Electric motors for variable frequency drive applications shall be inverter duty rated in accordance with NEMA MG1 Part 31, and shall be capable of being continuously pulsed at the motor terminals with a voltage of 1600 VAC.
 - 2. Electric motors for variable frequency drive applications shall be designed and manufactured to operate on VFD systems and to eliminate stray current electrolysis of all components including motor bearings and shafts.
 - 3. Each motor for variable speed operation shall be equipped with internal temperature detectors, in addition to all accessory equipment recommended by the variable speed equipment manufacturer.

SECTION 260150

ELECTRIC MOTORS

- D. Unless indicated otherwise or required by the specific application, all electric motors shall be suitable for continuous operation at maximum load and required starting duty, in a 40°C ambient temperature, at an altitude not to exceed 3,300', in a moist and corrosive atmosphere.
- E. Where indicated, or necessary to meet noise level requirements, electric motors shall be designed for quiet operation. Unless indicated otherwise, when operated at nameplate voltage and frequency the average overall sound pressure level on the A scale shall not exceed 85 ±3 decibels 5' from the motor, as measured in accordance with NEMA Standards.
- F. All motors shall be furnished with permanent, highly visible stainless steel nameplates. Nameplates shall include all motor ratings, special features, and accessories.
- G. All motors shall be furnished with oversize main terminal boxes. Motor terminal boxes shall be gasketed and shall allow rotation to accommodate conduit entrance. Motor terminal boxes shall be equipped with grounding lugs.
- H. All motors shall be equipped with lifting lugs. All motor enclosures shall be equipped with stainless steel screens for all openings in accordance with NEMA Standards for guarded construction.
- I. Motor output shafts shall be suitable for connection as required. Vertical hollow-shaft motors shall be equipped with non-reverse ratchets to prevent backspin.
- J. Unless indicated otherwise, AC induction motors shall be manufactured by GE, Nidec, TECO-Westinghouse, Toshiba, U.S. Motors, or pre-approved equal.

2.02 SQUIRREL-CAGE INDUCTION MOTORS

- A. General:
 - 1. These specifications are intended to cover the functional requirements, features, and general construction of induction motors of the squirrel-cage, horizontal, vertical solid-shaft, vertical hollow-shaft, normal thrust, and high thrust type.
 - 2. Each motor shall be IEEE-tested, NEMA-rated, premium efficiency energy-saving design, incorporating increased active electrical material and optimum electrical and mechanical design, to provide maximum operating efficiency and power factor. All motors shall be premium efficiency.
- B. Rating:
 - 1. When operated at nameplate voltage and frequency, squirrel-cage induction motors shall be rated normal or high starting torque, as required, low starting current not to exceed 600% full load current, low slip, 1.15 service factor, premium efficiency, and continuous duty at rated

SECTION 260150

ELECTRIC MOTORS

horsepower and rpm, with open drip-proof, weather-protected Type 1, totally-enclosed, fan-cooled, or explosion-proof construction, as indicated.

Temperature rise shall be in accordance with NEMA Standards for the design employed.

2. Unless otherwise indicated, single speed, three phase squirrel-cage induction motors less than 50 HP shall be 200-230/460 volt, 3 phase, 60 hertz. Multi-speed motors, and motors 50 HP and larger shall be single voltage, as required.
3. Single phase squirrel-cage induction motors shall be split-phase or capacitor-start, rated 115/230-208 volt, 1 phase, 60 hertz.

C. Electrical Characteristics:

1. Each motor shall be suitable for full voltage starting and non-injurious heating when operated on power systems with a variation in voltage of not more than $\pm 10\%$ nameplate rating and a variation in frequency of not more than $\pm 5\%$ nameplate rating.
2. Locked rotor torque shall be at least 125% full load torque at 100% rated voltage. Output torque shall exceed the maximum full load torque requirements of the driven equipment by at least 20% throughout the full operating range of the driven equipment, from start to full load. Locked rotor torque, breakdown torque, and locked rotor currents shall be in accordance with NEMA Standards for the design employed.
3. Open drip-proof and WP-1 motors shall have a non-hydroscopic Class B insulation system treated with a minimum of 2 extra dips and bakes using 100% solid epoxy varnish.
4. TEFC and explosion-proof motors shall have a non-hydroscopic Class F insulation system and shall operate with a Class B temperature rise.

D. Mechanical Characteristics:

1. Motors, frames, and end shields shall be cast iron or heavy fabricated steel of such design and proportions as to hold all motor components rigidly in proper position and provide adequate protection for the type of enclosure employed. TEFC and explosion-proof motors shall be severe duty, all cast iron construction.
2. Windings shall be adequately insulated and securely braced to resist failure due to electrical stresses and vibrations. Winding and insulating materials shall consist of one or more of the following as dictated by the motor design: silicone rubber, polyester film, synthetic varnish, or glass cloth.
3. The shaft shall be made of high grade machine steel, or steel forging, of size and design adequate to withstand the load stresses normally encountered in motors of the particular rating. Bearing journals shall be ground and polished.
4. Rotors shall be made from high grade steel laminations adequately fastened together and to the shaft. Rotor squirrel-cage windings may be cast aluminum or bar type construction with brazed end rings.
5. Motors shall be equipped with vacuum degassed anti-friction bearings made to AFBMA Standards and be of ample capacity for the motor

SECTION 260150

ELECTRIC MOTORS

rating. The bearing housing shall be large enough to hold sufficient lubricant to minimize the need for frequent lubrication, but facilities shall be provided for adding new lubricant and draining out old lubricant without motor disassembly. The bearing housing shall have long, tight running fits, or rotating seals to protect against the entrance of foreign matter into the bearings or leakage of lubricant out of the bearing cavity. Thrust bearings shall be of ample capacity to carry the maximum thrust load of the driven equipment and the total weight of all revolving parts. Bearings of high thrust motors will be locked for momentary upthrust of 30% downthrust. All bearings shall have a minimum life rating of 5 years in accordance with AFBMA life and thrust values.

- a. For motor speeds 1800 rpm and below, double sealed bearings shall be used. The grease fitting shall be removed, and a plug inserted so that the motor does not get inadvertently greased.
- b. For motor speeds above 1800 rpm, single shielded bearings shall be installed with the shields facing the outboard (grease supply) side and open on the inboard (stator) side. Zert fittings shall be installed at the 12 o'clock position when viewed axially. Grease escape valve or purge plug shall be installed at the 6 o'clock position.
- c. The entry and exit paths for new and purged grease, respectively, shall enter and leave the bearing cavity on the outboard (shielded) side of the bearing (termed *conventional* grease flow design).
- d. The motor manufacturer shall provide a procedure for initial greasing and for re-greasing the motor bearings. Specific intervals with a specified quantity of grease per the bearing manufacturer's recommendations are required.

E. Accessories:

1. Each motor shall be equipped with all necessary accessories as recommended by the manufacturer for the intended service.
2. Where indicated or required, motors shall be equipped with space heaters. Each motor 25 HP and larger shall be equipped with space heaters. Space heaters shall be low voltage, 120 volt, single phase, with the leads brought out to the motor conduit box.
3. Where indicated or required, motors shall be equipped with thermal winding protection. All motors shall be equipped with two normally closed automatic reset thermostats imbedded in the stator winding, between phases, and connected in series. The two leads shall be brought to the motor conduit box.

PART 3 - EXECUTION

3.01 GENERAL

- A. Electric motors shall be supplied with the driven equipment, unless specified otherwise.

SECTION 260150

ELECTRIC MOTORS

- B. All fittings, bolts, nuts, and screws shall be plated to resist corrosion. Bolts and nuts shall have hex heads. All machined surfaces shall be coated with rust-inhibitor for easy disassembly.
- C. The entire surface of each motor shall be treated with a final coating of chemical-resistant, corrosion- and fungus-protective epoxy enamel, over a red primer.

3.02 INSTALLATION

- A. Motor Connections:
 - 1. All motors shall be connected to the conduit system by means of a short section (18" minimum) of liquid tight flexible metallic conduit.
 - 2. All motor feeders shall include a grounding conductor installed within the motor feeder conductor raceway, continuous from the motor starter to the motor conduit box. The motor feeder grounding conductors shall be properly terminated on each end with approved ground lugs and clamps.
 - 3. Insulated mechanical polaris connectors shall be used for all motor feeder conductor connections to the motor leads. Connectors shall be UV rated, abrasion and chemical resistant, and specifically designed for the conductor material, stranding, etc.

3.03 TESTING

- A. All motors shall be tested prior to shipment in accordance with the standard short commercial test procedures to include the following: no-load current, check-current balance, winding resistance, measure air gap, high potential, and bearing inspections.
- B. Upon completion, the CONTRACTOR shall provide all necessary instruments and special apparatus to thoroughly test the complete installation and shall conduct all tests that may be required to ensure system is free of all improper grounds and short circuits. All electrical equipment shall be tested to determine proper polarity, phasing, relay settings, and operation.
- C. Prior to energization, the insulation resistance of each motor shall be tested in accordance with the motor manufacturer's recommendations. Upon completion of all corrective measures required, certified acceptance reports, including tabulations of all initial and final resistance measurements, shall be submitted for approval.
- D. Each motor starter overload element, and each motor circuit protector, shall be selected and adjusted to coordinate with the nameplate full-load current and service factor of the actual motors installed. Improper units shall be replaced. Upon completion of all corrective measures required, certified compliance reports, including tabulation of the actual full load current and voltage measurements for each phase of each motor, together with the nameplate current rating, overload element rating, and motor circuit protector setting, shall be submitted for approval.

SECTION 260150
ELECTRIC MOTORS

END OF SECTION 260150

SECTION 312223

GROUND IMPROVEMENT SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work shall consist of designing, furnishing and installing a ground improvement system, such as but not limited to, rammed aggregate pier foundations and rigid inclusions piers (also known as controlled-modulus columns) to the lines and grades designated on the project drawings and as specified herein. The Work shall be for the New Transfer Pumps and Clearwell No.2. The design of the ground improvement system shall satisfy the settlement requirements pertaining to the New Transfer Pumps and Clearwell No.2 foundation.
- B. The piers shall be constructed by either augering a shaft or driving a hollow mandrel to the design depth and vertically ramming lifts of aggregate or an aggregate/cement mixture using the specially-designed tamper head and high-energy impact densification equipment to create the compacted aggregate pier or rigid-inclusion pier.
- C. The pier elements shall be in a columnar-type configuration and shall be used to produce an intermediate foundation system. In this section, a “pier” means a vertical rigid inclusion composed of aggregate, sand-cement mixture, plain concrete, or similar materials.

1.02 WORK INCLUDED

- A. Provide all equipment, material, labor, testing, and supervision to design and install pier elements (rigid-inclusion foundations). The Contractor shall hire a Soil Improvement Specialty Subcontractor. Design shall be performed by the Soil Improvement Specialty Contractor and shall rely on subsurface information collected during the project design phase and supplemented by performing a new site-exploration program. The new site-exploration program shall be performed by the Soil Improvement Specialty Subcontractor.
- B. The design and installation of the rigid-inclusion foundations shall adhere to all methods and standards described in this Specification.
- C. Drawings and General Provisions of the Contract, including General and Supplemental Conditions, and Division 01 Specifications, apply to the work in this specification.
- D. Approved Soil Improvement Specialty Subcontractors: The Soil Improvement Specialty

1.03 REFERENCE STANDARDS

- A. Modulus Testing
 - 1. ASTM D1143-07 - Pile Load Test Procedures
 - 2. ASTM D7383-19 – Axial Compressive Force Pulse (Rapid) testing of Deep Foundations (Statnamic Testing)
- B. Materials and Inspection
 - 1. ASTM C31 Standard Practice for Making and Curing Cement Test Specimens in the Field
 - 2. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 3. ASTM D422 – Standard Test Method for Particle-Size Analysis of Soils

4. ASTM D1241 – Standard Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses
- C. Where specifications and reference documents conflict, the Soil Improvement Specialty Subcontractor shall make the final determination of the applicable document.
- D. The Soil Improvement Specialty Subcontractor may use material and/or load-test standards other than ASTM standards cited here, after review and approval by the Engineer.

1.04 DESIGN QUALIFICATIONS AND REQUIREMENTS

- A. The design of rammed aggregate piers and/or rigid inclusions shall be performed by a Soil Improvement Specialty Subcontractor with the following minimum qualifications:
 1. A minimum of 5 years of experience with the installation of Rammed Aggregate Pier (RAP) or Rigid Inclusion (RI) Pier systems.
 2. Successfully completed at least 15 projects with RAP's or RI's.
- B. The ground improvement design shall be based upon the subsurface information obtained during the Soil Improvement Specialty Subcontractor's investigation program. The project geotechnical report, which contains interpretations and recommendations made by ECS Florida, LLC (ECS) of Jacksonville, Florida, is available to the Contractor and Soil Improvement Specialty Subcontractor for information only.
- C. The ground improvement system shall be designed and signed/sealed by a registered professional engineer licensed in Florida.

1.05 CERTIFICATIONS AND SUBMITTALS

- A. Design Calculations: The Soil Improvement Specialty Subcontractor shall submit design calculations and construction drawings prepared by the Soil Improvement Specialty Subcontractor's Designer for review by the Engineer. Settlement calculations shall be performed by using at least one software package such as PLAXIS 3D or FLAC 3D, in addition to any other calculation technique the Soil Improvement Specialty Subcontractor's Designer may choose. All plans and calculations shall be sealed by a the Specialty Subcontractors licensed engineer.
- B. Modulus Test Reports: A modulus test(s) shall be performed on a non-production rammed aggregate pier element and/or rigid inclusion pier as required by the Soil Improvement Specialty Subcontractor's Designer to verify the design assumptions and document the performance of the soil improvement system. The Soil Improvement Specialty Subcontractor shall submit details of equipment and materials to be used in the modulus test the Engineer, for review and approval, before the modulus test can be commenced. The Soil Improvement Specialty Subcontractor shall furnish to the Contractor: Installation records, test data, analysis of the test data, and verification of the design parameter values based on the modulus test results. The report shall be prepared under direction of a professional engineer, or chartered engineer whose license is active and is accepted by the Engineer. The Contractor shall submit to the Engineer installation records, test data, analysis of the test data, and verification of the design parameter values based on the modulus test results, for review and approval.
- C. The test plans and procedures and results of load tests shall be submitted to the Engineer for review, approval, and comments on load-test interpretations.
- D. Daily Pier Progress Reports: The Soil Improvement Specialty Subcontractor shall furnish complete and accurate records of pier installation to the Engineer. For rammed aggregate pier

work, the records shall indicate the pier location, length, volume of aggregate used or number of lifts, densification forces during installation, and final elevations or depths of the base and top of piers. For rigid inclusions, the records shall indicate the pier location, length, volume of cement grout (or concrete) injected, injection pressure, and final elevations or depths of the base and top of rigid inclusions. The records shall also indicate the type and size of the installation equipment used, the type of aggregate used, type of cement used, and testing and material sampling that was performed. The Soil Improvement Specialty Subcontractor shall immediately report any unusual conditions encountered during installation to the Contractor, to the Soil Improvement Specialty Subcontractor's Designer, to the Engineer, and to the Testing Agency.

- E. The Soil Improvement Specialty Subcontractor shall submit to the Contractor and the Engineer a summary of the properties of aggregate, cement, and water that shall be specified by the Soil Improvement Specialty Subcontractor's Designer for use in soil-improvement work. Such submittal is for the project records only.
- F. The Soil Improvement Specialty Subcontractor shall submit to the Contractor and the Engineer the quality-control test program for rammed aggregate pier system and/or rigid inclusion system, meeting the design requirements. All computer-generated calculations and drawings shall be prepared and sealed by a professional engineer, whose active license is acceptable to the Owner. Submittals will be submitted electronically only unless otherwise required by specific submittal instructions.
- G. For any type of installation, whether it is rammed aggregate piers or rigid inclusions, the Soil Improvement Specialty Subcontractor shall submit to the Contractor and the Owner results of tests on samples taken from the materials that will be used in soil-improvement work. The Soil Improvement Specialty Subcontractor shall demonstrate that the materials to be used in soil-improvement work satisfy the standards referenced in the design prepared by the Soil Improvement Specialty Subcontractor's Designer.
- H. The test plans and procedures and results of load tests shall be submitted to the Engineer for review, approval, and comments on load-test interpretations.

1.06 INDEPENDENT ENGINEERING TESTING AGENCY (OWNER'S QUALITY ASSURANCE)

- A. The Contractor shall provide full-time Quality Control monitoring of pier, or rigid inclusion, construction activities. The Owner is responsible for retaining an independent engineering testing agency (or firm) to provide Quality Assurance services.

PART 2 MATERIALSAGGREGATE

- A. Aggregate used by the Soil Improvement Specialty Subcontractor for rammed aggregate pier construction shall be pre-approved by the Soil Improvement Specialty Subcontractor's Designer and shall demonstrate suitable performance during modulus testing. Typical aggregate consists of Type 1 Grade B in accordance with ASTM D1241-15, recycled concrete, or other graded aggregate approved by the Soil Improvement Specialty Subcontractor's Designer.
- B. For sand-cement mixes, sand used by the Soil Improvement Specialty Subcontractor shall be pre-approved by the Soil Improvement Specialty Subcontractor's Designer.

2.02 WATER

- A. Potable water or other suitable water source shall be used to increase aggregate moisture content where required.

2.03 CEMENT

- A. Cement used in rigid inclusions shall meet the requirements of ASTM C150. The Soil

Improvement Specialty Subcontractor's Designer shall select a type of Portland cement based on level of sulphate in soils and groundwater, and other considerations as needed.

2.04 DESIGN REQUIREMENTS - DESIGN OF RAMMED AGGREGATE PIERS

- A. The design of the rammed aggregate pier elements shall be based on the service load contact pressure and the allowable total and differential settlement criteria as indicated by the Engineer (design team) for support by the rammed aggregate pier elements. The rammed aggregate pier elements shall be designed in accordance with generally-accepted engineering practice and the methods described in Section 1 of these Specifications.
- B. "Footing" referenced here may include mat foundations (also known as rafts) and slab footings. The long-term settlement means the settlement measured at the end of the design life of the new Pump Stations and Clearwell No.2.
- C. Load Transfer Platform Design: If a load transfer platform is required for the rammed aggregate pier system, the design calculations and design details shall be provided to determine the thickness and lateral extent needed for an aggregate load-transfer layer to transfer the load from the concrete mat foundations, or slabs, to the elements.
- D. The design shall meet the following criteria:

Minimum Allowable Bearing Pressure (Contact Pressure)

for Mat Foundation(s) supported by

Rammed-Aggregate-Pier-Reinforced Soils 1400 psf

Estimated Total Long-Term Settlement of Each Mat Foundation

(of the new Pump Stations and Clearwell No.2 shown on the Drawings) ≤ 1
inch

Estimated Long-Term Differential Settlement between Center of Each

Mat and Any of Its Corners ≤ 0.5 inch

- E. The rammed aggregate pier elements shall be designed using a rammed aggregate pier stiffness modulus to be verified by the results of the modulus test described in Section 3.02 of these specifications.

2.05 DESIGN REQUIREMENTS - RIGID INCLUSIONS

- A. Design Capacity of Rigid Inclusions: The capacity of individual rigid inclusions shall be the lesser of the geotechnical and structural capacity as defined below:

3. Geotechnical Requirements: The geotechnical capacity shall be calculated using Meyerhof bearing capacity method or another engineering analysis method accepted by the Engineer. Shaft capacity shall not be considered in fill materials. Shaft resistance may be considered when the pier extends a minimum 5 feet into a competent soil stratum. For piers where the shaft extends a minimum of 5 feet mm into the bearing stratum or extends through multiple soil strata below an unsuitable layer, a unit friction value should be computed for each layer and the total shaft resistance should be taken as the summation of the individual layers.

4. Structural Requirements: The structural capacity of the pier used for design shall not exceed $0.3 \times f'_c$, where f'_c equals the 28-day unconfined compressive strength of

the cement/aggregate mixture as sampled on site and confirmed by quality-control compressive strength testing per ASTM C39.

5. Load Transfer Platform Design: Where rigid inclusions are utilized, design calculations and design details shall be provided to determine the thickness and lateral extent needed for an aggregate load-transfer layer to transfer the load from the concrete mat foundations, or slabs, to the rigid inclusion elements.

- B. The design of Rigid Inclusion Piers shall meet the following criteria:

Minimum Allowable Bearing Pressure (Contact Pressure)

for Mat Foundation(s) supported by

Rigid-Inclusion-Reinforced Soils 1400 psf

Estimated Total Long-Term Settlement of Each Mat Foundation

(of the new Transfer Pumps and Clearwell No.2 shown on the Drawings) ≤ 1 inch

Estimated Long-Term Differential Settlement between Center of Each

Mat and Any of Its Corners ≤ 0.5 inch

- C. The rigid inclusion elements (also known as piers) shall be designed using a pier stiffness and capacity to be verified by the results of the modulus test described in Section 3.02 of these specifications.

2.06 DESIGN SUBMITTAL

- A. Adjacent Footings and New Fill Placement: Settlement calculations for mat foundations shall consider loading from adjacent footings and any new fill placed on the site to meet grades. Calculations showing that these conditions have been accounted for in the design shall be provided in the submittal.
- B. Definition of Long-Term: The Soil Improvement Specialty Subcontractor shall calculate and submit the number of years, from the date on which the new Transfer Pumps and Clearwell No.2 is completed and ready to store water, to the time when the estimated rate of settlement is less than one (1) millimeter per year. The Engineer will review and approve, or reject, such calculations. After final approval, by the Engineer, of the Soil Improvement Specialty Subcontractor's calculation of the number of years that would constitute "Long Term," in the sense this term is used in this specification section, the Engineer may direct the Soil Improvement Specialty Subcontractor to revise his settlement calculations.
- C. Utility Conflicts: The Soil Improvement Specialty Subcontractor shall consider, in his design, conflicts with new and existing utilities. The Soil Improvement Specialty Subcontractor shall provide drawings and specific recommendations for no-dig zones or site/civil design modifications to prevent excavations from undermining ground improvement already in place, and to prevent damage to existing utilities during placement of ground-improvement elements.
- D. Design Calculations: The Soil Improvement Specialty Subcontractor shall submit detailed design calculations, construction drawings, and shop drawings, (the Design Submittal), to the Owner for approval at least three weeks prior to the beginning of construction. A detailed explanation of the design parameters for settlement calculations shall be included in the Design Submittal.

3.01 INSTALLATION PROCEDURES

- A. The following sections provide general criteria for the construction of the rammed aggregate pier elements and rigid inclusion elements. Unless otherwise approved by the Soil Improvement Specialty Subcontractor's Designer, the installation method used for pier construction shall be the same as that used in the construction of elements on which successful modulus test(s) was/were performed.
- B. Augered Rammed Aggregate Pier or Rigid Inclusion Elements:
1. Augered rammed aggregate pier system shall be installed using mechanical drilling equipment.
 2. If cave-ins exceeding 10 percent of the lift volume occur during excavation such that the sidewalls of the borehole are deemed to be unstable, steel casing shall be used to stabilize the borehole (shaft), or a displacement rammed aggregate pier system may be used.
 3. Aggregate shall be placed in the augered shaft in lift thicknesses as determined by the Soil Improvement Specialty Subcontractor's Designer.
 4. A specially-designed beveled tamper and high-energy impact densification apparatus shall be employed to densify lifts of aggregate during installation. The apparatus shall apply direct downward impact energy to each lift of aggregate. Compaction equipment that induces horizontal vibratory energy (such as Vibro-flotation equipment) is not permitted.
 5. For rigid inclusion elements using cement-treated aggregate (CTA) the same procedures (1 through 4 apply). The CTA materials that are mixed or delivered on site shall be mixed dry and shall all be used within 8 hours of mixing.
- C. Displacement Rammed Aggregate Pier and Rigid Inclusions:
1. Displacement rammed aggregate pier systems shall be constructed by advancing a specially designed mandrel with a minimum 134 kN (30,000 ft-pound) static force augmented by dynamic vertical ramming energy to the full design depth. The hollow-shaft mandrel, filled with aggregate, is incrementally raised, permitting the aggregate to be released into the shaft, and then lowered by vertically advancing and/or ramming to densify the aggregate and force it laterally into the adjacent soil. The cycle of raising and lowering the mandrel is repeated to the top of pier elevation. The cycle distance shall be determined by the Soil Improvement Specialty Subcontractor's Designer.
 2. Special high-energy impact densification apparatus shall be employed to vertically densify the rammed aggregate pier elements during installation of each constructed lift of aggregate.
 3. Densification shall be performed using a mandrel/tamper. The mandrel/tamper foot is required to adequately increase the lateral earth pressure in the matrix soil during

installation. Compaction equipment that induces horizontal vibratory energy (such as “Vibro-flotation equipment”) is not permitted.

4. Downward crowd pressure shall be applied to the mandrel during installation.
 5. For rammed aggregate pier elements using crushed stone and neat cement or sand-cement grout mixtures a minimum of three (3) 150 mm cubes shall be taken daily in accordance with ASTM C31 to perform compressive strength testing of the stone-cement, or sand-cement, mixture to show it is in accordance with the project strength requirements.
 6. For controlled modulus columns (CMC) using structural concrete, three (3) 150 mm cubes of the concrete shall be taken daily per ASTM C31 to confirm the 28-day unconfined compressive strength of the concrete.
 7. CMC elements shall be installed using the displacement pier method as described above; however, the compacted pier shall be restricted to the lower 5 feet of the pier and concrete shall be extruded under pressure to assure a uniform diameter of pier is built above the lower bulb.
 8. Note that unconfined compressive strength testing of rigid inclusion elements may be limited to initial testing of the design mix to confirm that the design strength is met, if the structural design requirements are not controlling the rigid inclusion design as approved by the Soil Improvement Specialty Subcontractor’s Designer.
- D. Plan Location and Elevation of Pier Elements (rammed auger piers or rigid inclusions):
The as-built center of each pier shall be within 6 inches of the locations indicated on the plans.
- E. Rejected Pier Elements:
Pier elements installed beyond the maximum allowable tolerances shall be abandoned and replaced with new piers, unless the Soil Improvement Specialty Subcontractor’s Designer approves the condition or provides other remedial measures. All material and labor required to replace rejected piers shall be provided at no additional cost to the Owner, unless the cause of rejection is due to an obstruction or mis-location.

3.02 QUALITY CONTROL

- A. Quality Control Technician: The Contractor shall retain and pay for a full-time, on-site Quality Control Technician to verify and report all installation procedures. The Quality Control Technician shall immediately report any unusual conditions encountered during installation to the Engineer, the Soil Improvement Specialty Subcontractor, the Soil Improvement Specialty Subcontractor’s Designer, the Contractor, and to the Testing Agency.
- B. Rammed Aggregate Pier Modulus and Rigid Inclusion Load Testing
 1. As required, rammed aggregate pier modulus test(s) and rigid inclusion load test(s) will be performed at locations agreed upon by the Soil Improvement Specialty Subcontractor’s Designer and the Testing Agency to verify or modify rammed aggregate pier or rigid inclusion designs. Test Procedures shall use appropriate portions of ASTM D 1143, or ASTM D7383-08 as outlined in the design submittal.
- C. Bottom Stabilization Testing (BSTs) / Crowd Stabilization Testing(CSTs)
 1. Bottom stabilization testing (BSTs) shall be performed by the Quality Control Technician

during the installation of the modulus test pier. Additional testing as required by the Soil Improvement Specialty Subcontractor's Designer shall be performed on selected production pier, or rigid inclusion elements to compare results with the modulus of load-test pier. The Soil Improvement Specialty Subcontractor shall pay for such additional testing.

3.03 QUALITY ASSURANCE

A. Responsibilities of the Independent Engineering Testing Agency

1. The Testing Agency shall monitor the modulus test pier installation and testing. The Soil Improvement Specialty Subcontractor shall provide and install all dial indicators and other measuring devices.
2. The Testing Agency shall monitor the installation of pier elements to verify that the production installation practices are like those used during the installation of the modulus test elements.
3. The Testing Agency shall report any discrepancies to the Engineer, the Employer, the Soil Improvement Specialty Subcontractor, and the Contractor, immediately.
4. The Testing Agency shall observe the excavation, compaction and placement of the foundations as described in Section 3.08. Dynamic Cone Penetration testing may be performed to evaluate the footing bottom condition as determined by the Testing Agency.

3.04 SITE PREPARATION AND CONDITIONS

- A. The Contractor shall locate and protect underground and above ground utilities and other structures from damage during installation of the pier elements.
- B. Site grades for pier installation shall be within 12 inches of the top of footing elevation or finished grade elevation to minimize pier installation depths. Ground elevations and bottom of footing elevations shall be provided to the Soil Improvement Specialty Subcontractor in sufficient detail to estimate installation depth elevations to within 3 inches.
- C. The Contractor will provide site access to the Soil Improvement Specialty Subcontractor, after earthwork in the area has been completed. A working surface shall be established and maintained by the Contractor to provide wet weather protection of the subgrade and to provide access for efficient operation of the pier installation.
- D. Prior to, during and following pier installation, the Contractor shall provide positive drainage to protect the site from wet weather and surface ponding of water.
- E. If spoils are generated by pier installation, spoil removal, from the pier work area, in a timely manner to prevent interruption of pier installation is required.
- F. For rigid inclusions a minimum of 12 inches mm of aggregate or granular soil shall separate the rigid inclusion from the bottom of mat foundations, and footings, if any. The thickness and type of granular soil shall be as specified in the rigid inclusion design, which shall be

prepared by the Soil Improvement Specialty Subcontractor's Designer and shall be the responsibility of the Contractor for placement.

3.05 PIER LAYOUT

- A. The location of pier-supported foundations for this project, including layout of individual pier elements, shall be marked in the field using survey stakes or similar means at locations shown on the drawings.

3.06 EXCAVATIONS OF OBSTRUCTIONS

- A. Should any obstruction, within the top 6 feet of subgrade soils, be encountered during pier installation, the Contractor shall be responsible for promptly removing such obstruction or the pier shall be relocated or abandoned. Obstructions include, but are not limited to, boulders, timbers, concrete, bricks, utility lines, etc., which shall prevent placing the piers to the required depth or shall cause the pier to drift from the required location.
- B. Dense natural rock or weathered rock layers shall not be deemed obstructions, and piers may be terminated short of design lengths on such materials. The Soil Improvement Specialty Subcontractor shall document such shorter than design piers and submit those records to the Contractor and the Engineer for review and approval.

3.07 UTILITY EXCAVATIONS

- A. The Contractor shall coordinate all excavations made after pier installations so that excavations do not encroach on the piers as shown in the pier construction drawings. Protection of completed pier elements is the responsibility of the Contractor. If utility excavations are required near the installed pier elements, the Contractor shall contact the Soil Improvement Specialty Subcontractor's Designer immediately to develop construction solutions to minimize impacts on the installed pier elements.

3.08 FOOTING/FOUNDATION BOTTOMS

- A. Excavation and surface compaction of all footings shall be the responsibility of the Contractor.
- B. Foundation excavations to expose the tops of pier elements shall be made in a workman-like manner, and shall be protected until concrete placement, with procedures and equipment best suited to avoid exposure to water, prevent softening of the matrix soil between and around the rammed aggregate pier elements before pouring structural concrete, and achieve direct and firm contact between the dense, undisturbed rammed aggregate pier elements and the concrete footing.
- C. All excavations and preparation for footing bottoms and mats, which are supported by rammed aggregate pier foundations, shall be performed by the Contractor in accordance with the design

which the Soil Improvement Specialty Subcontractor's Designer will prepare subject to approval by the Engineer

- D. The following criteria shall apply, and a written inspection report sealed by the project Testing Agency shall be furnished to the Soil Improvement Specialty Subcontractor to confirm:
- a. That all rammed-aggregate pier and rigid inclusion elements designed for each footing have been exposed in the footing excavation.
 - b. That immediately before footing construction, the tops of rammed aggregate pier elements and the un-grouted tops of rigid inclusion piers exposed in each footing excavation have been inspected and recompact as necessary with mechanical compaction equipment.
 - c. That no excavations have been made after installation of aggregate pier elements within the excavation limits described in the rammed aggregate pier construction drawings, without the written approval of the Soil Improvement Specialty Subcontractor's Designer.
 - d. Failure to provide the above inspection and certification by the Testing Agency, which is beyond the responsibility of the Soil Improvement Specialty Subcontractor, may void any written or implied warranty on the performance of the rammed aggregate pier and rigid inclusion pier system.

END OF SECTION

SECTION 400562 - PLUG VALVES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes: Eccentric plug valves.
- B. Related Requirements:
 - 1. Section 400551 "Common Requirements for Process Valves" for basic materials and methods related to valves commonly used for process systems.

1.3 SUBMITTALS

- A. As specified in Section 400551 "Common Requirements for Process Valves" for submittal requirements for compliance with this Section.

1.4 QUALITY ASSURANCE

- A. Test valves in accordance with AWWA C517.
- B. Provide Installation Inspection and Operator Training per Section 400551.
- C. Provide testing and inspection certificates.

PART 2 - PRODUCTS

2.1 ECCENTRIC PLUG VALVES – Tag Type PVI

- A. Manufacturers:
 - 1. PEF 100% Port Eccentric Plug Valve by DeZurik
 - 2. Substitutions: approved equal.
- B. Description:
 - 1. As specified in Section 400551 "Common Requirements for Process Valves."
 - 2. Type:

- a. Offset disc type
 - b. Non-lubricated
 - c. Serviceable (able to be repacked) under full line pressure
 - d. Eccentric.
 - e. Capable of sealing in both directions at the rated pressure
 - f. Unobstructed flow path when open
 - g. Drop tight shut-off to the full valve rating with pressure on either side of the plug.
3. Body:
- a. ASTM A126, Class B semi-steel
 - b. 31,000-psi tensile strength minimum, in compliance with AWWA C507 and C504
 - c. Top entry, bolted bonnet
 - d. Body shall be cast with integral piping connections
4. Plug:
- a. To be removable without removing the valve from the line.
 - b. To have an integral upper and lower shaft:
 - 1) seals on the upper and lower journals to prevent entrance of solids into the journals.
 - c. one piece for all valves.
5. Bearings:
- a. Permanently lubricated
6. Minimum Working Pressure: 175 psi at 90 deg. F
- a. At the above rated minimum working pressures, certified by the manufacturer as permitting zero leakage for a 5-minute duration with full pressure applied in either direction.
7. Maximum Process Fluid Temperature: 90 deg. F
8. Ports:
- a. Configuration: Rectangular
 - b. Minimum Port Area: 80 percent of nominal pipe area for valves.
9. Seats:
- a. Full 360-degree seating by contact of a resilient seating material on the plug mating with welded-in high nickel content overlay seating surface in the body.
 - b. Screw in body seats not acceptable.
 - c. Resilient and of the continuous interface type having consistent opening and closing torques.
 - d. Non-jamming in the closed position.
 - e. Plugs shall have a full resilient facing of neoprene or Buna-N.

- f. Seats in 4-inch and larger valves shall have a welded-in overlay of a high-nickel content on all surfaces contacting the plug face, which comply with AWWA C507 and C504.
- 10. Stem Bearings: Self-lubricating.
- 11. Stem Seals:
 - a. Type: V-ring.
 - b. Externally adjustable and repackable without removing the bonnet from the valve, or self-adjusting.
- 12. Packing and Gland: Accessible and externally adjustable.
- 13. End Connections:
 - a. Flanged: Comply with ASME B16.1 and B16.42, ANSI 125/150 lb. standard.
- C. Operation:
 - 1. As specified in Section 400551 "Common Requirements for Process Valves."
 - 2. A suitably sized steel actuator mounting bracket shall be provided to provide an air gap between the actuator and the valve stem seal. Under no circumstance shall the gear box be mounted directly to the top body flange such that leakage could directly enter the gear box.
 - 3. Provide adjustable limit stops for both opening and closing and a clearly marked position indicator.
 - 4. Manual, half-turn, provided with its own securely attached lever.
- D. Materials:
 - 1. Body:
 - a. Cast iron, ASTM A126, Grade B, or Ductile iron, ASTM A536.
 - b. Lining: Elastomer, as recommended by valve manufacturer for wastewater service conditions.
 - 2. Plug:
 - a. Ductile iron, ASTM A536, Grade 65-45-12, or cast iron ASTM A126, Grade B
 - b. Lining: Resilient coating, as recommended by valve manufacturer for wastewater service conditions
 - 3. Seats: High Nickel.
 - 4. Stem: Type 316 stainless steel
 - 5. Stem Bearings: Stainless steel.
 - 6. Seals: Neoprene or Buna-N.
 - 7. Connecting Hardware: Zinc or cadmium-plated or Type 316 Stainless steel
- E. Finishes: As specified in Section 400551 "Common Requirements for Process Valves."

PART 3 - EXECUTION

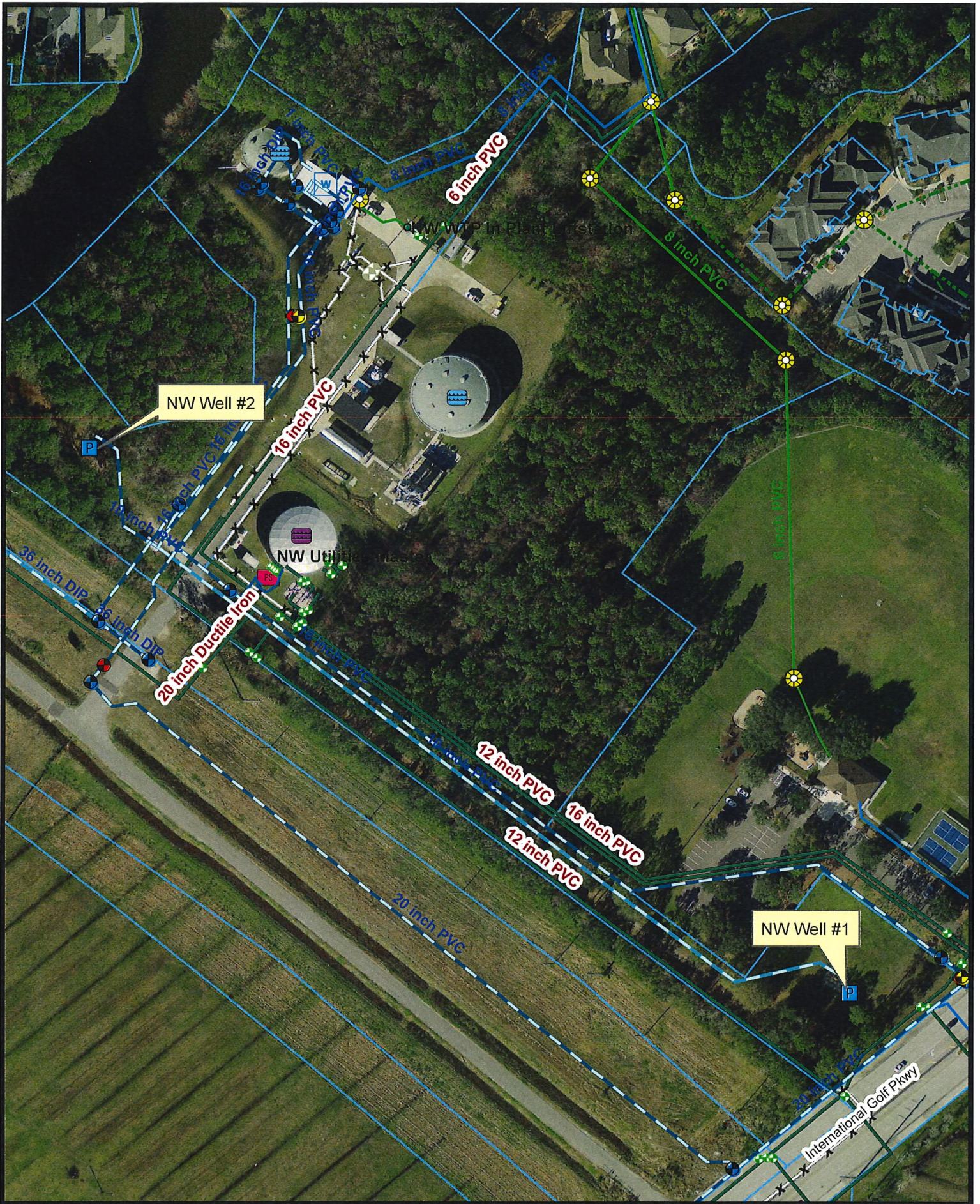
3.1 EXAMINATION

- A. As specified in Section 400551 “Common Requirements for Process Valves”: Submittal requirements for compliance with this Section.

3.2 INSTALLATION

- A. According to AWWA C517.
- B. Horizontal Piping: Stem horizontal, Plug opening to crown of body.
- C. Vertical Piping: Plug at top when closed.
- D. Plugs: On top when open and on pressure side when closed.

END OF SECTION 400562



**Northwest WTP Well #1 and Well #2
Location Map**

0 37.5 75 150
Feet