

TECHNICAL SPECIFICATIONS ISSUED FOR BID

Greenland Water Treatment Plant Backup Well (Well No. 3) Well Construction

JEA

NOVEMBER 2018

Issued for Bid (IFB)



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SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The project consists of the construction of one new raw water backup well, designated Well Number (No.) 3, located along the JEA-owned parcel north of the Greenland Water Treatment Plant (WTP), located at 6850 Energy Center Drive, Jacksonville, Florida. The well shall have a nominal production capacity of 2,000 gallons per minute (gpm). The new production well will be an emergency backup well to meet peak demand at the Greenland WTP. Contractor shall also clear the majority of the well facility parcel (clearing, stripping, grubbing and disposal), an area of approximately 200 feet by 130 feet and leave a 10-foot tree buffer inside the parcel perimeter, as noted in the Contract Drawings.
- B. The Work includes, but not limited to the following:
 - 1. Backup Well - Well No. 3 shall be drilled into the Upper Floridan aquifer containing fresh water under pressure. Requirements are set forth in these specifications regarding the handling of artesian discharge water, drilling fluids, discharge waters from pump testing, and drill cuttings. Requirements also are set forth for controlling the flow of the well during construction to retain water from drilling and related operations. Drilling fluids shall be managed. All drilling or pumping fluids shall have solids including sand settled out prior to discharging to a nearby stormwater ditch that leads to a regional stormwater retention area. This fluid management system will consist of a series of settling tanks and possible flocculants to aid in settlement.
 - 2. Clear the majority of the well facility parcel (clearing stripping, grubbing and disposal), an area of approximately 200 feet by 130 feet and leave a 10-foot tree buffer inside the parcel perimeter, as noted in the Contract Drawings (Tree Mitigation Plan).
 - 3. Temporary fencing (to remain) as required to secure the well site. Area of temporary fencing shall be coordinated with the Owner.
- C. The Owner reserves the right to delete any and all parts of the Work described in this Section at their own discretion.
- D. The Work to be performed under this contract consists of furnishing all tools, equipment, materials, supplies, and manufactured articles as well as for furnishing all transportation and services including fuel, power, water, and essential communications and for the performance of all labor, work, and other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials and services not expressly shown or called for in the Contract Documents, which may be necessary for the complete and proper construction of the Work in good faith shall be performed, furnished, and installed by the Contractor as though originally so specified or shown, at no increase in cost to the Owner.
- E. The Contractor shall obtain the appropriate well construction permits from the St. Johns River Water Management District (SJRWMD) and shall comply with all permit conditions and reporting requirements.

- F. Wherever the Contract Documents address a third party, i.e., Subcontractor, Manufacturer, etc., it is to be considered the Contractor through a third party.
- G. Within these Specifications, information is often required to be submitted to “Engineer and Owner” At the Pre-Construction Meeting, Owner reserves the right to specify a different communications protocol, e.g. communication to Owner who will distribute to Owner or vice versa.

1.02 OUTLINE SPECIFICATIONS OF BACKUP WELL- (WELL NO. 3)

- A. The Contractor must recognize and accept totally that Well No. 3 anticipated construction is dependent on site-specific hydrogeologic conditions and that the depths shown or specified are approximate. Also, the Contractor shall be aware that the sequence of testing such as geophysical logging and water sampling described in these specifications may be changed in order of occurrence or deleted, and additional testing may be added. The construction sequence may also be changed.
- B. The Well No. 3 installation shall include pilot boring to determine casing seat depths as well as length and depth of the open hole interval. The well shall be completed in the following described general sequence.
- C. Part 1- Construction and Testing of Backup Well (Well No. 3)
 - 1. Submit application and procure well construction permit from SJRWMD.
 - 2. Mobilize on site as well as establish temporary power and water supply for drilling.
 - a. Mobilize on-site and install any appropriate measures (as necessary for equipment traffic) for temporary site access for clearing and drilling equipment along the easement to access the parcel for Backup Well – (Well No. 3).
 - b. Clear site completely (clearing, stripping, grubbing and disposal) for Backup Well - Well No. 3. The limits of the clearing area shall be within approximately 180 feet by 110 feet of the Owner’s parcel (leaving a 10-foot undisturbed vegetative buffer inside the parcel perimeter). See Contract Drawing Civil Sheet C-2.
 - c. Establish vertical and horizontal control with reference to NAVD 1988 and NAD 1983, respectively. The Contractor shall have the well location staked in accordance with Contract Drawings prior to construction.
 - d. Protect existing facilities, install temporary utilities, and install temporary environmental controls including erosion and sedimentation control based on approved the Contractor Site Plan.
 - e. Mobilize drilling rig and provide temporary piping for water supply and disposal of fluids based on the approved fluid management plan by the Contractor in accordance with Section 02855.
 - f. Install appropriate security fencing and barriers to prevent public access to the site and to ensure public health and safety.
 - 3. Drill a 12.25-inch diameter pilot hole to a depth of approximately 120 feet bls into the Hawthorn Group using mud rotary drilling techniques. Collect lithological samples at 10-foot intervals and label sample bags.
 - 4. Perform geophysical logging in accordance with Section 02853 in the mud-drilled pilot hole.
 - 5. Ream a nominal 36-inch pilot hole to target depth of surface casing of $120 \pm$ feet bls.

6. Perform geophysical logging as per Section 02853 of these Specifications.
7. Furnish and install 30-inch outside diameter (OD), 0.375-inch wall thickness steel surface casing using the mud-rotary techniques to approximately 120 feet below land surface (bls) and cement in place. Contractor shall perform deviation survey in accordance to Section 02851.
8. Drill out cement plug and drill a 12.25-inch diameter pilot hole using mud-rotary techniques centered at the bottom of the 30-inch diameter OD steel surface casing to a depth of approximately 360± feet bls into the Upper Floridan aquifer using mud rotary drilling techniques. Collect lithological samples at 10-foot intervals and label sample bags.
9. Perform geophysical logging in accordance with Section 02853 in the mud-drilled pilot hole.
10. Ream a nominal 29-inch diameter borehole using the mud-rotary method to approximately 360± feet bls. Contractor shall perform deviation survey in accordance to Section 02851.
11. Perform geophysical logging as per Section 02853 of these Specifications.
12. Furnish and install approximately 360 feet of 20-inch OD, 0.375-inch wall thickness steel final casing and cement in place. The Contractor shall account for a continuous well casing that extends above grade. Refer to the Contract Drawings.
13. Drill out cement plug and drill a nominal 12.25-inch diameter pilot hole centered at the bottom of the 20-inch OD steel final casing to a depth of 700 feet bls using reverse air circulation drilling techniques. Collect lithological samples at 10-foot intervals and label sample bags. Collect water quality samples approximately every 30 feet or at the end of each drill rod depth. Contractor shall perform deviation survey in accordance to Section 02851.
14. Develop and perform geophysical logging under static and dynamic conditions in the pilot hole in accordance with Section 02853 of these specifications.
15. Ream a nominal 18-inch diameter borehole using reverse air drilling techniques to approximately 700 feet bls. Contractor shall perform deviation survey in accordance to Section 02851.
16. Perform geophysical and video logging as per Section 02853 of these Specifications.
17. Perform plumbness and alignment test on 20-inch OD final steel casing, in accordance to Section 02851.
18. Develop the well utilizing temporary pump capable of pumping up to 3,000 gpm. Develop until well acceptance criteria is met in accordance with Section 02672.
19. Perform step drawdown testing in accordance with Section 02864. Collect groundwater samples and have analyzed in accordance with Section 02863.

20. Demobilize drilling equipment, install secure temporary water tight wellhead and piping, in accordance to Section 02852.
21. Clean and restore disturbed areas around the drilling site.

1.03 NOTIFICATIONS BY CONTRACTOR

- A. Supply to the Owner and Engineer at the pre-construction conference, the proposed work schedule in writing. The proposed work schedule shall include the following:
 1. The starting date of the well construction.
 2. Proposed daily and weekly work schedule.
 3. Any anticipated work stoppage greater than 24 hours, except for legal holidays and weekends.
- B. Notify the Owner and Engineer in writing at the pre-construction conference, as to the type of well drilling rig and personnel to be used on the project. Any change in the number of rigs and personnel shall require written notification to the Owner and Engineer, 48 hours prior to the change.
- C. Notify the Owner and Engineer, in writing, ten days prior to the commencement of drilling activities.
- D. No work shall be performed without completing the notification requirements specified above.
- E. Notify the Owner and Engineer of any anticipated temporary shutdowns.
- F. Notify the Owner and Engineer of any proposed changes in daily and weekly work schedule, a minimum of 72 hours prior to the change. Changes in the work schedule are subject to the approval of the Engineer.

1.04 SUBMITTALS BY CONTRACTOR

- A. Submit to the Owner and Engineer shop drawing submittals in accordance to Section 01300 for review and approval prior to related drilling activity. A complete list of construction materials and supplies including the name of the manufacturer, technical data, mill certificates, etc.
- B. The shop drawings to be provided by the Contractor include and are not limited to the following:
 1. Fluid Management Plan with Detailed Drawings
 - a. Closed circulation system (mud rotary drilling)
 - b. Open circulation system (reverse air drilling)
 2. Straightness and Hole Deviation Equipment
 3. Drill Rig, Drill Rods and Compressor
 4. Down Hold Drilling Assemblies

5. Geophysical Logging
 6. Centralizers
 7. Geolograph
 8. Pressure Regulation (Gauges)
 9. Well Casings (mill certs and tallies)
 10. Cement Mix
 11. Cement Plans for each Grout Stage
 12. State Certified Laboratory (Drinking Water Parameters)
 13. Plumbness and Alignment Test Equipment
 14. Step Drawdown Equipment
 15. Flow control header
- C. During drilling of the well, a daily detailed driller's report shall be maintained and submitted as requested by the Engineer. The report shall give a complete description of all formations encountered, number of feet drilled, number of hours on the job, shutdown due to breakdown, feet of casing set, depth and amount of fluid loss or gain and other pertinent data requested by the Engineer.
- D. Submit well cutting and water samples and analytical results as specified in Sections 02851, 02853, and 02863 of these Specifications.

1.05 PERMITS

- A. It shall be the Contractor's responsibility to secure all permits of every description required to initiate and complete the Work under this contract, except permits specifically stated to be obtained by the Owner.
- B. The Contractor must obtain written permission from the FDEP for the disposal of its drill cuttings and drilling fluid as well as any other permit required by any other regulatory agency. The Contractor shall also be responsible to call for inspections required by the City and/or the Florida Building Code.
- C. No separate or direct payment will be made to the Contractor for permits and inspection requirements, but all such costs shall be included in the applicable items in the Schedule of Values.
- D. The Contractor shall furnish to the Owner and Engineer copies of all permits prior to commencement of Work requiring permits.
- E. A tree clearing permit shall be pulled by the Owner and provided to the Contractor for reference at the commencement of the project.

1.06 FIELD ENGINEERING

- A. The Contractor shall employ a Professional Surveyor and Mapper registered in the State of Florida and acceptable to the Owner and Engineer. The Contractor shall locate and protect survey control and reference points.
- B. Provide Field Engineering Services: Establish elevations, lines and levels, utilizing recognized Engineering survey practices.
- C. Submit a copy of registered site drawing and certificate signed by the Professional Surveyor and Mapper that the elevation and locations of the Work are in conformance with the Contract Documents.
- D. Contractor shall provide Project Record Drawings in accordance to Section 01720.

1.07 SUBSURFACE CONDITIONS

- A. The Contractor acknowledges that they have investigated prior to bidding and satisfied their selves as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, tides, water tables, or similar conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the Work. The Contractor further acknowledges that they have satisfied themselves as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonable ascertainable from an inspection of the site, or any contiguous site, as well as from information presented by the Drawings and Specifications made a part of this Contract, or any other information made available to him prior to receipt of bids.

It is anticipated that the boreholes will encounter beds of limestone, sandstone, clay, and various amounts of unconsolidated shell and sand to a depth of approximately 120 feet bls. Underlying these sediments are limestones and clayey limestones of the Hawthorn Group making up the Intermediate Confining Unit (ICU) of the Floridan aquifer system (FAS) down to a depth of about 360 feet bls.

Below approximately 360 feet, interbedded layers of limestone and dolomite may be found and cavities, fractured rock, and high permeability zones may be encountered. Permeable zones contain fresh water under pressure and flowing conditions may be present.

Difficult drilling conditions may be encountered including the presence of fractures and cavernous intervals and collapse of borehole walls. The Contractor shall thoroughly familiarize themselves through personnel investigation of the drilling conditions that might be encountered at the Well No. 3 site.

Any failure by the Contractor to acquaint themselves with the available information will not relieve the Contractor from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Owner.

1.08 CONTRACTOR AND SUBCONTRACTOR EQUIPMENT REQUIREMENTS

- A. Furnish equipment in first class working order able to do the described work.
- B. Furnish and operate equipment capable of handling the largest load that will be placed upon the drilling rig during the construction. A minimum of 5.5-inch OD drill rods with a 400 cfm and 200 psi compressors are required for reverse-air drilling.
- C. Be required to furnish a larger drilling rig with the necessary capacity, if conditions develop in the field that prove the rig supplied is incapable of completing the well.
- D. No unnecessary delays or work stoppages will be tolerated because of equipment failures or delay caused by equipment failure will not be considered as a valid reason for extension of the contract time.
- E. Be held responsible and payment withheld for damages to the well or other near-by property due to any cause of negligence, faulty operation, or equipment failure.

1.09 CREW REQUIREMENTS

- A. The Contractor shall employ only competent work persons for the execution of this work and all such work shall be performed under the direct supervision of an experienced well superintendent-tool pusher, who shall be available to the job at all times. The crew and job superintendent shall be in the employ of the Contractor.
- B. The Engineer and Owner reserve the right to have any member of the Contractor's crew removed from the site and project, with or without cause.
- C. The well driller shall be capable of identifying geologic formations, maintaining complete and current well logs and daily notes for the well completion report and developing and testing the wells.
- D. The Owner may make any other investigations deemed necessary to determine the ability of the Contractor to perform the work. The Contractor shall furnish to the Owner all such information and data for this purpose as the Owner may request.
- E. Complete the work described in these Specifications in accordance with (a) AWWA A100 and (b) applicable portions of the Rules of the FDEP and SJRWMD, Chapters 62-532 and Chapter 40C-3 of F.A.C.

1.10 OPERATING REQUIREMENTS

- A. Storage and Construction Areas - Storage areas shall be provided within the designated construction and staging area. Responsibility for protection and safekeeping of equipment and materials at or near the sites will be solely that of the Contractor and no claim shall be made against the Owner by reasons of any act of an employee or trespasser. The Contractor shall coordinate with the Owner in selection of storage areas not likely to impede other activities on the site. Should an occasion arise necessitating access to an area occupied by stored equipment and/or materials, the Contractor shall immediately move the stored material. No equipment or materials shall be placed upon the Owner's property until approval has been received from the Owner. Upon completion of the Contract, the Contractor shall remove from the storage areas

all of their equipment, temporary fencing, surplus materials, rubbish, etc., and restore the area as designated by the Consultant.

- B. Erosion Abatement and Water Pollution - It is imperative that any Contractor activities, including tests requiring the pumping of water, do not contaminate or disturb the environment of the properties adjacent to the work. The Contractor shall, therefore, schedule and control their operations to confine all runoff water from disturbed surfaces. Water from pumping operations that becomes contaminated with lime silt, muck, and other deleterious matter, fuels, oils, bitumens, chemicals, and other polluting materials shall be disposed of in an environmentally safe manner.
- C. Security - The Contractor shall care for and protect against loss or damage of all material to be incorporated in the construction for the duration of the Project and shall repair or replace damaged or lost materials and damage to structures and equipment. The Contractor is responsible for the security of their personnel and equipment.

1.11 WELL ACCEPTANCE CRITERIA

- A. All casing installed shall be plumb and true to line, in accordance to Sections 02851 and 02852. The deepest anticipated finished well depth is 700 bls.
- B. All boreholes shall be constructed so they are straight. No doglegs will be permitted. Reamed holes shall continuously track pilot holes, in accordance to Section 02851.
- C. All casing and grout shall be set to the depths directed by the Owner and Engineer. Alternative depths suggested by the Contractor because of alignment, equipment problems or failure to set the casing to the depth selected by the Owner and Engineer will not be given consideration.
- D. The well must be developed to meet a turbidity of ≤ 1 Nephelometric Turbidity Units (NTU), with a sand content of ≤ 5 part per million (ppm) per AWWA A100-06 using the Rossum Sand Tester.
- E. No payment for the well will be due if the Contractor fails to meet all of the above requirements.

1.12 REMEDIAL WORK

- A. If remedial work proves to be necessary to make a well acceptable and come within the governing regulations and/or Contract Documents because of accident, loss of tools, defective material or for any other cause, the Contractor shall propose a method of correcting the problem, in writing. Suggested methods shall be reviewed and accepted by the Owner and Engineer before work proceeds. Such work shall be performed at no additional cost to the Owner and it shall not extend the length of the Contract. The Contractor is notified that all requirements of the Contract Documents shall be met, including hole straightness and setting of casings to the points designated by the Owner and Engineer.

1.13 ABANDONMENT OF WELL BY CONTRACTOR

- A. Any hole in which the Contractor voluntarily stops work and/or fails to complete in a satisfactory manner, in accordance with the governing regulations and/or Contract Documents shall be considered as abandoned by him. If the Owner declares the hole abandoned by the Contractor, then no payment will be made for the abandoned hole. All abandoned holes shall be

properly plugged and sealed by the Contractor at their own cost in accordance with federal, state and local regulations. All salvageable material furnished by the Contractor may be removed and remain their property. The Contractor shall submit, in writing their plan of action for abandonment and plugging. Casings may be removed only with the permission and acceptance of the Owner and Engineer.

1.14 WARRANTY

- A. The Contractor warrants that the work and service to be performed under the Contract and all workmanship, materials, and equipment performed, furnished, used, or installed in the work shall be free from defects and flaws, and shall be performed and furnished in strict accordance with the Contract Documents; that the strength of all parts of all manufactured equipment shall be adequate and as specified; and that performance test requirements of the Contract Documents shall be fulfilled. The Contractor shall repair, correct, or replace all damage to the work resulting from failures covered by the warranty. The warranty shall remain in effect for one year from the date of final acceptance by the Owner.

1.15 STANDBY TIME

- A. The Owner or Engineer may order the Contractor to stop their operations so that extra work not included in the Contract Documents such as testing and additional data collection can be performed. The Owner or Engineer will advise the Contractor when they propose to do this and will schedule their request so it causes a minimum of delay. All extra work must be accepted by the Owner, in writing, in advance.

PART 2 PRODUCTS

	Casing Diameter (inches)		Casing Wall Thickness (inches)	Casing Depth (Feet bls)
	Inside	Outside		
Surface Steel Casing	29.25	30.00	0.375	120
Final Steel Casing	19.25	20.00	0.375	360

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes specification for the measurement and payment of the various elements of the Work; with provisions specifically applicable to lump sum prices and unit prices, if applicable.
- B. In the case of conflict between this Section and the measurement methods specified in the individual technical Sections, the measurement methods in the technical specifications shall govern.
- C. The Contractor shall receive no payment for any portion of the work until it is installed. The only exception to this provision is payment for stored materials on site if the Contract provides for the payment of stored materials. Partial payment may be requested for items partially installed.

1.02 RELATED WORK

- A. Schedule of Values is included in Section 01370.
- B. Applications for Payment are included in Section 01152.
- C. General Conditions

1.03 LUMP SUM ITEMS

- A. Lump Sum measurement will be for the entire item, unit of work, structure, or combination thereof, as specified and as indicated in the Bid Form. Measurement and payment for all bid items indicated as Lump Sums shall include the cost of all labor, materials, and equipment necessary to furnish, install, clean, test, and place each bid item into operation; including permitting, general conditions, overhead and profit.
- B. Progress payments will be based on the Schedule of Values prepared by the Contractor and approved by the Engineer and Owner before acceptance of the first Application for Payment.
- C. In order for the Contractor to request progress payments against Lump Sum items, Contractor shall provide a disaggregation or breakdown in sufficient measureable detail that is acceptable to the Owner and Engineer.
- D. Measurement
 - 1. Measurement shall be based on the estimated percent complete of each item of the Schedule of Values, as determined by the Engineer.
- E. Payment

1. Payment will be made at the lump sum price proportional to the completion percentages approved by the Engineer and reviewed by Owner.

1.04 UNIT PRICE ITEMS

- A. Quantity and measurement estimates stated in the Schedule of Cost for Changes in Quantities are estimates for bidding purposes only. Actual payments shall be based on actual quantities installed, in-place, as measured and/or verified by the Owner and/or Engineer.
- B. Unless otherwise provided in the General Conditions, the bid unit prices shall be in effect throughout the contract duration, regardless of variances between the estimated quantities and the actual installed quantities.
- C. The Contractor shall make no claim, nor receive any compensation, for anticipated profits, loss of profit, damages, or any extra payment due to any difference between the amounts of work actually completed, or materials or equipment furnished, and the estimated quantities.
- D. Unless otherwise approved by the Owner, any unit quantities exceeded may not be invoiced until the estimated quantity is increased by contract change order.
- E. Contractor shall assist Owner and/or Engineer by providing necessary equipment, workers, and survey personnel as required to measure quantities.
- F. Measured quantities shall be rounded to the nearest whole integer, unless the value of the unit price exceeds \$100, in which case measured quantities shall be rounded to the nearest half unit.
- G. Measurement:
 1. Measurement for progress payment shall be made by, or approved by, the Owner and/or Engineer based on the estimated effective quantity installed. The effective quantity installed represents the actual units or quantities installed, adjusted for incomplete elements or components.
 2. Unless otherwise provided for in the Bid Form unit price items are all-inclusive of all related work, direct and indirect, to provide a complete and functional item. For example, underground pipe installation would include trenching, shoring, dewatering, bedding, installation, backfill, testing, flushing, disinfection, and commissioning; including all labor, materials, and equipment necessary to furnish, install, clean, test, and place into operation; including permitting, general conditions, overhead and profit.
 3. The final measurement shall be based on actual quantities, jointly measured by Contractor and Owner and/or Engineer, complete, fully, tested and placed into service.
- H. Payment:
 1. Progress payments shall be in accordance with the contract documents based on estimated effective quantities installed, paid at the bid unit price.
 2. The final payment shall be based on actual quantities, fully installed, tested, and placed into service, paid at the bid unit price.

1.05 SCHEDULE OF VALUES

- A. See Section 01152 for detail of submission requirements.
- B. Lump Sum Work:
 - 1. List bonds and insurance premiums, mobilization, demobilization, facility startup, and contract closeout separately.
 - 2. Break down by Division 2 through 16 with appropriate subdivision of each Specification.
- C. An unbalanced or front-end loaded schedule of values will not be acceptable.
- D. Summation of the complete schedule of values representing all the Work shall equal the Contract Price.
- E. Submit schedule of values on compact disks, in a spreadsheet format compatible with latest version of Excel.

1.06 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for the following:
 - 1. Loading, hauling, and disposing of rejected material.
 - 2. Quantities of material wasted or disposed of in a manner not called for under Contract Documents.
 - 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of the Contractor to confirm to provisions of Contract Documents.
 - 4. Material not unloaded from transporting vehicle.
 - 5. Defective work not accepted by the Owner and/or Engineer.
 - 6. Material remaining on hand after completion of Work.

1.07 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings or preliminary operation and maintenance manuals are acceptable to the Owner and/or Engineer.
- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to the Contractor unless otherwise agreed, and partial payments made for those items will be deducted for final payment.

PART 2 PRODUCTS LUMP SUM PAY ITEMS

- 2.01 Upper Floridan Back Well (Well No. 3) - Bid Items 1a, 2a, 2b, 2c, 2d, 3a, 3c, 3e, 3h, 3j, 3m, 3o, 3p, 3r, 3s and 4c. – Payment will be made based as a percentage of completion of the unit

quantities to furnish all labor, material and equipment necessary for the complete drilling and installation of the Floridan Backup Well, as required within the contract documents.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01152
APPLICATION FOR PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit Applications for Payment to the Owner and/or Engineer in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.
- B. The accepted Schedule of Values shall be used as the basis for the Contractor's Application for Payment.
- C. The Contractor shall maintain a copy of all books, records, and documents pertinent to the performance under this agreement for a period of five (5) years following completion of the contract.

1.02 RELATED WORK

- A. Agreement between Owner and Contractor.
- B. Standard General Conditions of the Construction Contract.
- C. Schedule of Values is included in Section 01370.

1.03 SUBMITTALS

- A. Submit to the Owner and/or Engineer, applications typed on forms provided by the Owner, Application for Payment, with itemized data typed on 8-1/2-inch by 11-inch or 8-1/2-inch by 14-inch white paper continuation sheets.
- B. Provide itemized data on continuation sheet.
 - 1. Format, schedules, line items and values: Those of the Schedule of Values accepted by the Owner and/or Engineer.
- C. Provide project record drawings.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form
 - 1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
 - 2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
 - 3. Execute certification with signature of a responsible officer of Contract firm.
- B. Continuation Sheets

1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
 - a. Round off values to nearest dollar, or as specified for Schedule of Values.
3. List each Change Order executed prior to date of submission, at the end of the continuation sheets.
 - a. List by Change Order Number and description, as for an original component item of work.
4. To receive approval for payment on component material stored on site, submit copies of the original paid invoices with the application for payment.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner and/or Engineer requires substantiating data, submit suitable information, with a cover letter identifying.
 1. Project.
 2. Application number and date.
 3. Detailed list of enclosures.
 4. For stored products:
 - a. Item number and identification as shown on application.
 - b. Description of specific material.
 5. Record drawings must be up to date (red-lined set at construction trailer).
- B. Submit one copy of data and cover letter for each copy of application.
- C. As a prerequisite for payment, submit a "Surety Acknowledgement of Payment Request" letter showing amount of progress payment which the Contractor is requesting.
- D. Maintain an updated set of drawings to be used as record drawings. As a prerequisite for monthly progress payments, exhibit the updated record drawings for review by the Owner and the Engineer.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in Application form as specified for progress payments.
- B. Use continuation sheet for presenting the final statement of accounting.
- C. Submit all Project Record Documents in accordance with Sections 01050 and 01720.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01300
SUBMITTALS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes the requirements for compiling, processing and transmitting submittals applicable to shop drawings, product data and samples, required for execution of the project. Detailed submittal requirements are specified in the Technical Sections.
- B. All JEA Water & Wastewater Standards (latest edition) equipment, other equipment specified herein, and materials/manufactured products shown and/or specified in these contract documents shall be submitted for review in accordance with this Section.
- C. Submittals are categorized into two types: Action Submittals and Informational Submittals, as follows:
 - 1. Action Submittal: Written and graphic information submitted by the Contractor that requires the Engineer's approval. The following are examples of action submittals:
 - a. Shop drawings (including working drawings and product data);
 - b. Samples;
 - c. Site Usage Plan (Contractor's staging- including trailer sitting and material laydown area);
 - d. Schedule of values; and
 - e. Payment application format.
 - 2. Informational Submittal: Information submitted by the Contractor that is required to be reviewed by the Engineer prior to Work being completed. Engineer will provide review comments that may require revisions. Information submittals will be marked "REVIEWED" by the Engineer when submittal is considered acceptable. The following are examples of informational submittals:
 - a. Shop drawing schedule
 - b. Construction schedule
 - c. Statements of qualifications
 - d. Health and Safety Plans
 - e. Construction photography and videography
 - f. Work plans
 - g. Maintenance of traffic plans
 - h. Outage requests
 - i. Proposed testing procedures
 - j. Test records and reports
 - k. Vendor training outlines/plans
 - l. Test and start-up reports
 - m. Certifications
 - n. Record Drawings
 - o. Record Shop Drawings
 - p. Submittals required by laws, regulations and governing agencies
 - q. Submittals required by funding agencies
 - r. Other requirements found within the technical specifications
 - s. Warranties and bonds

- t. As-built surveys
- u. Contract close-out documents

D. All submittals shall be delivered directly to:

**Office of the Consulting Engineers
CDM Smith
8381 Dix Ellis Trail, Suite 400
Jacksonville, Florida, 32256
Attn: Cheryl Gullotto**

- E. All submittals shall be clearly identified by reference to section number, paragraph, drawings or detail as applicable.
- F. Submittals shall be clean and legible of sufficient size for presentation of data.

1.02 RELATED WORK

- A. Additional requirements may be specified in the Contract.
- B. Additional submittal requirements may be specified in the respective technical Specification Sections.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. All submittals shall be clearly identified as follows:
 - 1. Date of submission
 - 2. Project number
 - 3. Project name
 - 4. Contractor identification
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 - d. Manufacturer or supplier representative
 - 5. Identification of the product
 - 6. Reference to Contract drawing(s)
 - 7. Reference to specification section number, page and paragraph(s)
 - 8. Reference to applicable standards, such as ASTM or Federal Standards numbers
 - 9. Indication of Contractor's approval
 - 10. Contractor's Certification statement
 - 11. Identification of deviations from the Contract Documents, if any

12. Reference to previous submittal (for resubmittals)
- B. Submittals shall be clear and legible, and of sufficient size for legibility and clarity of the presented data.
- C. Submittal Log: Maintain a log of all submittals. The submittal log shall be kept accurate and up to date. This log should include the following items (as applicable):
 1. Description
 2. Submittal number
 3. Date transmitted to the Engineer
 4. Date returned to Contractor (from Engineer)
 5. Status of Submittal (Approved/Not Approved/etc.)
 6. Date of Resubmittal to Engineer and Return from Engineer (if applicable and repeat as necessary)
 7. Date material released for fabrication
 8. Projected (or actual) delivery date
- D. Numbering System: Utilize a 9-character submittal identification numbering system in the following manner:
 1. The first character shall be a D, S, M, or I, which represents Shop Drawing (including working drawings and product data), Sample, Manual (Operating & Maintenance), or Informational, respectively.
 2. The next five digits shall be the applicable Section Number.
 3. The next two digits shall be the numbers 01 to 99 to sequentially number each separate item or drawing submitted under each specific Specification Section, in the order submitted.
 4. The last character shall be a letter, A to Z, indicating the submission (or resubmission) of the same submittal, i.e., "A"=1st submission, "B"=2nd submission, "C"=3rd submission, etc. A typical submittal number would be as follows:
 - a. D-03300-008-B
 - b. D = Shop Drawing
 - c. 03300 = Section for Concrete
 - d. 08 = the eighth different submittal under this section
 - e. B = the second submission (first resubmission) of that particular shop drawing.
- E. Variances
 1. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

F. Action Submittals

1. Shop Drawings, Working Drawings, Product Data and Samples, and Professional Engineer (P.E.) Certification Form
 - a. Shop Drawings
 - 1) Shop drawings as defined in the General Conditions, and as specified in individual Sections include, but are not necessarily limited to, custom prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, wiring diagrams, coordination drawings, equipment inspection and test reports, including performance curves and certifications, as applicable to the Work.
 - 2) Contactor shall verify all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and coordinate each item with other related shop drawings and the Contract requirements.
 - 3) All details on shop drawings shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the Work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted.
 - 4) All shop drawings submitted by subcontractors and vendors shall be reviewed by the Contractor for field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and that it has been coordinated with other related shop drawings and the Contract requirements. Submittals directly from subcontractors or vendors will not be accepted by the Engineer.
 - 5) The Contractor shall be responsible the accuracy of the subcontractor's or vendor's submittal; and, for their submission in a timely manner to support the requirements of the Contractor's construction schedule. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractor or vendor to correct before submission to the Engineer. All shop drawings shall be approved by the Contractor.
 - 6) Delays to construction due to the untimely submission of submittals will constitute inexcusable delays, for which Contactor shall not be eligible for additional cost nor additional contract time. Inexcusable delays consist of any delay within the Contactor's control.
 - 7) Submittals for equipment specified under Divisions 11, 13, 14, 15, and 16 shall include a listing of installations where identical or similar equipment manufactured by that manufacturer has been installed and in operation for a period of at least five years.
 - b. Working Drawings
 - 1) Detailed installation drawings (sewers, equipment, piping, electrical conduits and controls, HVAC work, and plumbing, etc.) shall be prepared and submitted for review and approval by the Engineer prior to installing such Work. Installation drawings shall be to-scale and shall be fully dimensioned.
 - 2) Piping working drawings shall show the laying dimensions of all pipes, fittings, valves, as well as the equipment to which it is being connected. In addition, all pipe supports shall be shown.
 - 3) Equipment working drawings shall show all equipment dimensions, anchor bolts, support pads, piping connections and electrical connections. In addition, show clearances required around such equipment for maintenance of the equipment.
 - 4) Electrical working drawings shall show conduits, junction boxes, disconnects, control devices, lighting fixtures, support details, control panels, lighting and

power panels, and Motor Control Centers. Coordinate all locations with the Contract Documents and the Contractor's other working drawings.

c. Product Data

- 1) Product data, as specified in individual Specification Sections, include, but are not limited to, the manufacturer's standard prepared data for manufactured products (catalog data), such as the product specifications, installation instructions, availability of colors and patterns, rough-in diagrams and templates, product photographs (or diagrams), wiring diagrams, performance curves, quality control inspection and reports, certifications of compliance (as specified or otherwise required), mill reports, product operating and maintenance instructions, recommended spare parts and product warranties, as applicable.

d. Samples

- 1) Furnish, samples required by the Contract Documents for the Engineer's approval. Samples shall be delivered to the Engineer as specified or directed. Unless specified otherwise, provide at least two samples of each required item. Materials or equipment for which samples are required shall not be used in the Work unless and until approved by the Engineer.
- 2) Samples specified in individual Specification Sections, include, but are not limited to: physical examples of the Work (such as sections of manufactured or fabricated work), small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and other specified units of work.
- 3) Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify and Contract Requirements.
- 4) Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the Work. Approved samples of the hardware in good condition will be marked for identification and may be used in the Work. Materials and equipment incorporated in Work shall match the approved samples. Samples which fail testing or are not approved will be returned to the Contractor at his expense, if so requested at time of submission.

e. Professional Engineer (P.E.) Certification Form

- 1) If specifically required in any of the technical Specification Sections, submit a Professional Engineer (P.E.) Certification for each item required, using the form appended to this Section, signed and sealed by the P.E. licensed or registered in the state wherein the Work is located.

2. Contractor's Certification

- a. Each shop drawing, working drawings, product data, and sample shall have affixed to it the following Certification Statement:
 - 1) "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements."
- b. Shop drawings, working drawings, and product data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The transmittal cover sheet for each identified shop drawing shall fully describe the packaged data and include a listing of all items within the package.

3. The review and approval of shop drawings, working drawings, product data, or samples by the Engineer shall not relieve the Contractor from the responsibility for the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefore.
4. Project Work, materials, fabrication, and installation shall conform to approved shop drawings (including working drawings and product data) and applicable samples.
5. No portion of the Work requiring a shop drawing (including working drawings and product data) or sample shall be started, nor shall any materials be fabricated or installed before approval of such item. Procurement, fabrication, delivery or installation of products or materials that do not conform to approved shop drawings shall be at the Contractor's risk. Furthermore, such products or materials delivered or installed without approved shop drawings, or in non-conformance with the approved shop drawings will not be eligible for progress payment until such time as the product or material is approved or brought into compliance with approved shop drawings. Neither the Owner nor Engineer will be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
6. Schedule of Values
 - a. On projects consisting of lump sums (in whole or in part) submit a proposed schedule of values providing a breakdown of lump sum items in to reasonably small components – generally disaggregated by building, area, and/or discipline. The purpose of the schedule of values is for processing partial payment applications. If requested by the Engineer, provide sufficient substantiation for all or some items as necessary to determine the proposed schedule of values is a reasonable representation of the true cost breakdown of the Work. The schedule of values shall not be unbalanced to achieve early payment or over-payment in excess of the value of Work or any other mis-distribution of the costs. If, in the opinion of the Owner and/or Engineer, the schedule of values is unbalanced, Contractor shall reallocate components to achieve a balanced schedule acceptable to Engineer.
7. Payment Application Format
 - a. If an application form is included in the Contract Documents, use that form unless otherwise approved by the Engineer and Owner. If an application form is not included in the Contract Documents, Contractor may propose a form for approval.
8. Site Usage
 - a. Submit a proposed site staging plan, including but not limited to the location of office trailers, storage trailers and material laydown. Such plan shall be a graphic presentation (drawing) of the proposed locations; and, shall include on-site traffic modifications, and temporary utilities, as may be applicable.

G. Informational Submittals

1. Shop Drawing Schedule
 - a. Prepare and submit a schedule indicating when shop drawings are required to be submitted to support the as-planned construction schedule. The submittal schedule shall allow sufficient time for preparation and submittal, review and approval, and fabrication and delivery to support the construction schedule.
2. Construction Schedule

- a. Prepare and submit construction schedules and monthly status reports as specified.
3. Statements of Qualifications
 - a. Provide evidence of qualification, certification, or registration, as required in the Contract Documents, to verify qualifications of licensed land surveyor, professional engineer, materials testing laboratory, specialty subcontractor, technical specialist, consultant, specialty installer, and other professionals.
4. Health and Safety Plans
 - a. When specified, prepare and submit a general company Health and Safety Plan (HSP), modified or supplemented to include job-specific considerations.
5. Construction Photography and Videography
 - a. Provide periodic construction photographs and videography as specified– including but not limited to preconstruction photographs and/or video, monthly progress photos and/or video and post-construction photographs and/or video.
6. Work Plans
 - a. Prepare and submit copies of all work plans needed to demonstrate to the Owner that Contractor has adequately thought-out the means and methods of construction and their interface with existing facilities.
7. Maintenance of Traffic Plans
 - a. Prepare maintenance of traffic plans where and when required by the Contract Documents and by local ordinances or regulations. If Contractor is not already knowledgeable about local ordinances and regulations regarding maintenance of traffic requirements, become familiar with such requirements and include all costs for preparation and submittal of traffic management plans and all associated costs for permits and fees to implement the traffic management plan, in the bid amount. In addition, unless a supplemental payment provision is provided in the bid form, include the cost of police attendance, when required.
8. Outage Requests
 - a. Provide sufficient notification of any outages required (electrical, flow processes, etc.) as may be required to tie-in new work into existing facilities. Unless specified otherwise elsewhere, a minimum of seven calendar days' notice shall be provided.
9. Proposed Testing Procedures
 - a. Prepare and submit testing procedures it proposes to use to perform testing required by the various technical specifications.
10. Test Records and Reports
 - a. Provide copies of all test records and reports as specified in the various technical specifications.
11. Vendor Training Outlines/Plans
 - a. At least two weeks before scheduled training of Owner's personnel, provide lesson plans for vendor training in accordance with the specification for O&M manuals.

12. Test and Start-Up Reports
 - a. Manufacture shall perform all pre-start-up installation inspection, calibrations, alignments, and performance testing as specified in the respective Specification Section. Provide copies of all such test and start-up reports.
13. Certifications
 - a. Provide various certifications as required by the technical specifications. Such certifications shall be signed by an officer (of the firm) or other individual authorized to sign documents on behalf of that entity.
 - b. Certifications may include, but are not limited to:
 - 1) Welding certifications and welders' qualifications
 - 2) Certifications of Installation, Testing and Training for all equipment;
 - 3) Material Testing reports furnished by an independent testing firm
 - 4) Certifications from manufacturer(s) for specified factory testing
 - 5) Certifications required to indicate compliance with any sustainability or LEEDS accreditation requirements indicated in the Contract Documents
14. Record Drawings
 - a. No later than Substantial Completion, submit a record of all changes during construction not already incorporated into drawings – in accordance with Section 01700 and Section 01720. Contractor shall submit minimum 5 draft and final hard copies as-built drawings and corresponding AutoCAD file.
15. Record Shop Drawings
 - a. Before final payment is made, furnish one set of record shop drawings to the Engineer. These record shop drawings shall be in conformance with the approved documents and should show any field conditions which may affect their accuracy.
16. Submittals Required By Laws, Regulations And Governing Agencies
 - a. Prepare and submit all documentation required by state or local law, regulation or government agency directly to the applicable agency. This includes, but is not limited to, notifications, reports, certifications, certified payroll (for projects subject to wage requirements) and other documentation required to satisfy all requirements. Provide to Engineer one copy of each submittal made in accordance with this paragraph.
17. Submittals Required by Funding Agencies
 - a. Prepare and submit all documentation required by funding agencies. This includes, but is not limited to segregated pay applications and change orders when required to properly allocate funds to different funding sources; and certified payrolls for projects subject to wage requirements. Provide one copy of each submittal made in accordance with this paragraph to the Engineer.
18. Other Requirements of the Technical Specification Sections
 - a. Comply with all other requirements of the technical specifications.
19. Warranties and Bonds
 - a. Assemble a book(let) of all warranties and bonds as specified in the various technical specifications and in accordance with the specification on Warranties and Bonds and provide to the Engineer.

20. As-Built Surveys

- a. Engage the services of a licensed land surveyor in accordance with the Project Controls specification. Prior to Final Completion, provide an as-built survey of the constructed facility, as specified.

21. Contract Close-Out Documents

- a. Submit Contract documentation as indicated in the specification for Contract Close-out.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SUBMITTAL SCHEDULE

- A. Provide an initial submittal schedule at the pre-construction meeting for review by Owner and Engineer. Incorporate comments from Owner or Engineer into a revised submittal schedule.
- B. Maintain the submittal schedule and provide sufficient copies for review by Owner and Engineer. An up-to-date submittal schedule shall be provided at each project progress meeting.

3.02 TRANSMITTALS

- A. Prepare separate transmittal sheets for each submittal. Each transmittal sheet shall include at least the following: Contractor's name and address, Owner's name, project name, project number, submittal number, description of submittal and number of copies submitted.
- B. Submittals shall be transmitted or delivered directly to the office of the Engineer, as indicated in the Contact Documents or as otherwise directed by the Engineer.
- C. Provide copies of transmittals (only, i.e., without copies of the respective submittal) directly to the Owner's representative, if so requested.

3.03 PROCEDURES

A. Action Submittals

1. Contractor's Responsibilities

- a. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related Work or other applicable activities, or within the time specified in the individual Work of other related Sections, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required). Coordinate with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. Extensions to the Contract Time will not be approved for the Contractor's failure to transmit submittals sufficiently in advance of the Work.
- b. The submittals of all shop drawings (including working drawings and product data) shall be sufficiently in advance of construction requirements to allow for possible need of re-submittals, including the specified review time for the Engineer.
- c. No less than 30 calendar days will be required for Engineer's review time for shop drawings and O&M manuals involving only one engineering discipline. No less than 45 calendar days will be required for Engineer's review time for shop drawings and

O&M manuals that require review by more than one engineering discipline.
Resubmittals will be subject to the same review time.

- d. Before submission to the Engineer, review shop drawings as follows:
 - 1) Make corrections and add field measurements, as required;
 - 2) Use any color for its notations except red (reserved for the Engineer's notations) and black (to be able to distinguish notations on black and white documents);
 - 3) Identify and describe each deviation or variation from Contract documents;
 - 4) Include the required Contractor's Certification statement;
 - 5) Provide field measurements (as needed);
 - 6) Coordinate with other submittals;
 - 7) Indicate relationships to other features of the Work; and
 - 8) Highlight information applicable to the Work and/or delete information not applicable to the Work.
 - e. Submit the following number of copies:
 - 1) Shop drawings (including working drawings and product data) – Submit eight;
 - 2) Samples – three copies;
 - 3) Site Usage Plan – three copies;
 - 4) Product Data –three copies;
 - 5) Schedule of values – four copies; and
 - 6) Payment application format – four copies.
 - f. If Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, provide written notice thereof to the Engineer immediately; and do not release for manufacture before such notice has been received by the Engineer.
 - g. When the shop drawings have been completed to the satisfaction of the Engineer, carry out the construction in accordance therewith; and make no further changes therein except upon written instructions from the Engineer.
2. Engineer's Responsibilities
- a. Engineer will not review shop drawings (including working drawings and product data) that do not include the Contractor's approval stamp. Such submittals will be returned to the Contractor, without action, for correction.
 - b. Partial shop drawings (including working drawings and product data) will not be reviewed. If, in the opinion of the Engineer, a submittal is incomplete, that submittal will be returned to the Contractor for completion. Such submittals may be returned with comments from Engineer indicating the deficiencies requiring correction.
 - c. If shop drawings (including working drawings and product data) meet the submittal requirements, Engineer will forward copies to appropriate reviewer(s). Otherwise, noncompliant submittals will be returned to the Contractor without action - with the Engineer retaining one copy.
 - d. Submittals which are transmitted in accordance with the specified requirements will be reviewed by the Engineer within the time specified herein. The time for review will commence upon receipt of submittal by Engineer.
3. Review of Shop Drawings (Including Working Drawings and Product Data) and Samples
- a. The review of shop drawings, working drawings, data and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:
 - 1) as permitting any departure from the Contract requirements;
 - 2) as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials; and

- 3) As approving departures from details furnished by the Engineer, except as otherwise provided herein.
- b. The Contractor remains responsible for details and accuracy, for coordinating the Work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- c. If the shop drawings (including working drawings and product data) or samples as submitted describe variations and indicate a deviation from the Contract requirements that, in the opinion of the Engineer are in the interest of the Owner and are so minor as not to involve a change in Contract Price or Contract Time, the Engineer may return the reviewed drawings without noting an exception.
- d. Only the Engineer will utilize the color “RED” in marking submittals.
- e. Shop drawings will be returned to the Contractor with one of the following codes.
 - 1) Code 1 – “APPROVED” – This code is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
 - 2) Code 2 - "APPROVED AS NOTED" - This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
 - 3) Code 3 - "APPROVED AS NOTED/CONFIRM" - This combination of codes is assigned when a confirmation of the notations and comments is required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.
 - 4) Code 4 - "APPROVED AS NOTED/RESUBMIT" - This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the entire package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 30 calendar days of the date of the Engineer's transmittal requiring the resubmittal.
 - 5) Code 5 – “NOT APPROVED” – This code is assigned when the submittal does not meet the intent of the contract documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the contract documents.
 - 6) Code 6 – “COMMENTS ATTACHED” – This code is assigned where there are comments attached to the returned submittal, which provide additional data to aid the Contractor.
 - 7) Code 7 – “RECEIPT ACKNOWLEDGED (Not subject to Engineer’s Review or Approval)” – This code is assigned to acknowledge receipt of a submittal that is not subject to the Engineer’s review and approval, and is being filed for informational purposes only. This code is generally used in acknowledging receipt of means and methods of construction work plans, field conformance test reports, and health and safety plans.
 - 8) Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.
- f. Repetitive Reviews: Shop drawings, O&M manuals and other submittals will be reviewed no more than twice at the Owner’s expense. All subsequent reviews will be

performed at the Contractor's expense. Reimburse the Owner for all costs invoiced by Owner for the third and subsequent reviews.

4. Electronic Transmission
 - a. Action Submittals may be transmitted by electronic means provided the following conditions are met:
 - 1) The above-specified transmittal form is included;
 - 2) All other requirements specified above have been met including, but not limited to, coordination by the Contractor, review and approval by the Contractor, and the Contractor's Certification;
 - 3) The submittal contains no pages or sheets large than 11 x 17 inches;
 - 4) With the exception of the transmittal sheet, the entire submittal is included in a single file;
 - 5) The electronic files are PDF format (with printing enabled);
 - 6) In addition, transmit three hard-copy (paper) originals to the Engineer;
 - 7) The Engineer's review time will commence upon receipt of the hard copies of the submittal; and
 - 8) For Submittals that require certification, corporate seal, or professional embossment (i.e., P.E.s, Surveyors, etc.) transmit at least two hard-copy originals to the Engineer. In addition, provide additional photocopied or scanned copies, as specified above, showing the required certification, corporate seal, or professional seal.

B. Informational Submittals

1. Contractor's Responsibilities
 - a. Number of copies: Submit three copies, unless otherwise indicated in individual Specification sections.
 - b. Refer to individual technical Specification Sections for specific submittal requirements.
2. Engineers' Responsibilities
 - a. The Engineer will review each informational submittal within 15 days. If the informational submittal complies with the Contract requirements, Engineer will file for the project record and transmit a copy to the Owner. Engineer may elect not to respond to Contractor regarding informational submittals meeting the Contract requirements.
 - b. If an informational submittal does not comply with the Contract requirements, Engineer will respond accordingly to the Contractor within 15 days. Thereafter, the Contractor shall perform the required corrective action, including retesting, if needed, until the submittal, in the opinion of the Engineer, is in conformance with the Contract Documents.
3. Electronic Transmission
 - a. Informational Submittals may be transmitted by electronic means providing all of the following conditions are met:
 - 1) The above-specified transmittal form is included.
 - 2) The submittal contains no pages or sheets large than 11 x 17 inches.
 - 3) With the exception of the transmittal sheet, the entire submittal is included in a single file.
 - 4) The electronic files are PDF format (printing enabled).

- 5) For Submittals that require certification, corporate seal, or professional embossment (i.e., P.E.s, Surveyors, etc.), transmit two hard-copy originals to the Engineer.

END OF SECTION

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a professional engineer registered in the State of Florida and that he/she has been employed by

_____ to design
(Name of Contractor)

(Insert P.E. Responsibilities)

In accordance with Specification Section _____ for the

(Name of Project)

The undersigned further certifies that he/she has performed the said design in conformance with all applicable local, state and federal codes, rules and regulations; and, that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the

(Insert Name of Owner)

or Owner's representative within seven days following written request therefore by the Owner.

P.E. Name

Contractor's Name

Signature

Signature

Address

Title

Address

SECTION 01370
SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit a Schedule of Values allocated to the various portions of the work, within 21 days after the effective date of the Agreement.
- B. Upon request of the Engineer, support the values with data which will substantiate their correctness.
- C. The accepted Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.

1.02 RELATED REQUIREMENTS

- A. Standard General Conditions of the Construction Contract are included in Division E.
- B. Application for Payment is included in Section 01152.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Type schedule on an 8-1/2-inch by 11-inch or 8-1/2-inch by 14-inch white paper furnished by the Owner; Contractor's standard forms and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:
 - 1. Title of Project and location.
 - 2. Engineer and Project number.
 - 3. Name and Address of Contractor.
 - 4. Contract designation.
 - 5. Date of submission.
- B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. Identify each line item with the number and title of the respective Section.
- D. For each major line item list sub-values of major products or operations under the item.
- E. For the various portions of the work:
 - 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2. For items on which progress payments will be requested for stored materials, break down the value into:
 - a. The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials upon request by the Engineer.
 - b. The total installed value.

F. The sum of all values listed in the schedule shall equal the total Contract Sum.

1.04 SUBSCHEDULE OF UNIT MATERIAL VALUES

- A. Submit a sub-schedule of unit costs and quantities for:
 1. Products on which progress payments will be requested for stored products.
- B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.
- C. The unit quantity for bulk materials shall include an allowance for normal waste.
- D. The unit values for the materials shall be broken down into:
 1. Cost of the material, delivered and unloaded at the site, with taxes paid.
 2. Copies of invoices for component material shall be included with the payment request in which the material first appears.
 3. Paid invoices shall be provided with the second payment request in which the material appears or no payment shall be allowed and/or may be deleted from the request.
- E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall keep and maintain, at the job site, a copy of contract documents marked up to indicate all changes made during the course of the Project, as specified herein, and as specified in the JEA Water & Wastewater Standards (January 2018 or latest), As-Built Drawings – Section 501.

1.02 RELATED REQUIREMENTS

- A. Record shop drawings are included in Section 01300.

1.03 REQUIREMENTS INCLUDED

- A. Contractor shall maintain a record copy of the following documents, marked up to indicate all changes made during the course of a project:

- 1. Contract Drawings
- 2. Record Drawings
- 3. Specifications
- 4. Addenda
- 5. Change orders and other modifications to the contract
- 6. Engineer's and Owner's field orders or written instructions
- 7. Approved shop drawings, working drawings, and samples
- 8. Field test records
- 9. Construction photographs

- B. Contractor shall assemble copies of the following documents for turnover to the Owner and/or Engineer at the end of the project, as specified.

- 1. Field Orders, Change Orders, Design Modifications, and RFIs
- 2. Field Test records
- 3. Permits and permit close-outs (final approvals)
- 4. Certificate of Occupancy or Certificate of Completion, as applicable
- 5. Laboratory test reports
- 6. Certificates of Compliance for materials and equipment

7. Record Shop Drawings (includes certified As-Built Survey)
8. Samples

C. Record Drawings

1. The Contractor shall annotate (mark-up) the Contract Drawings to indicate all project conditions, locations, configurations, and any other changes or deviations that vary from the original Contract Drawings. The record information added to the drawings may be supplemented by detailed sketches, if necessary, clearly indicating, the Work, as constructed.
2. These annotated Contract Drawings constitute The Contractor's Record Drawings and are actual representations of as-built conditions, including all revisions made necessary by change orders, design modifications, requests for information and field orders.
3. Record drawings shall be accessible to the Owner and Engineer at all times during the construction period.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's field office apart from documents used for construction.
 1. Provide files and racks for storage of the record documents.
 2. Provide locked cabinet(s) or secure storage space for storage of samples.
- B. File documents and samples in accordance with Construction Specifications Institute (CSI) format.
- C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and sample available for inspection by the Engineer or Owner at all times.
- E. As a prerequisite for monthly progress payments, the Contractor is to exhibit the currently updated "Record Documents" for review by the Engineer and Owner.

3.02 MARKING METHOD

- A. Use the color Red (indelible ink) to record information on the Drawings and Specifications,
- B. Label each document "PROJECT RECORD" in neat large printed letters.
- C. Unless otherwise specified elsewhere, notations shall be affixed to hardcopies of documents.
- D. Record information contemporaneously with construction progress.

E. Legibly mark drawings with as-built information:

1. Elevations and dimensions of structures and structural elements.
2. All underground utilities (piping and electrical), structures, and appurtenances
 - a. Changes to existing structure, piping, and appurtenance locations.
 - b. Record horizontal and vertical locations of underground structures, piping, utilities, and appurtenances, referenced to permanent surface improvements.
 - c. Record actual installed pipe material, class, size, joint type, etc

3.03 RECORD INFORMATION COMPILATION

A. Do not conceal any work until the required information is acquired.

B. Drawings: Legibly mark to record actual construction:

C. Do not conceal any work until the required information is acquired.

D. Items to be recorded include, but are not limited to:

1. Location and descriptions of distinct changes in geological/lithology and/or aquifer units.
2. Field changes of dimensions and/or details
3. Changes made by field order, change order, design modification, and RFI, and approved shop drawings.
4. Details not indicated on the original contract drawings.
5. Specifications - legibly mark each section to record: Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed, and changes made by Field Order, Change Order, RFI, and approved shop drawings.
6. Actual installed temporary wellhead mechanical and instrumentation equipment.
7. Coordinates, elevation, and bolt hole centerline orientations of the wellhead base flange.
8. All underground casing with elevations and dimensions. Actual installed casing material, class, etc.
9. Location, elevation, and datum of Benchmark used.

E. Specifications and Addenda; legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or by Change Order.

F. Shop Drawings (after final review and approval):

1. Five sets of record drawings for each process equipment, piping, electrical system, and instrumentation system.

3.04 SUBMITTAL

- A. As specified under the section for progress payments, monthly applications for payment will be contingent upon up-to-date Record Drawings. If requested by the Engineer or Owner, Contractor shall provide a copy of the Record Drawings, or present them for review prior to processing monthly applications for payment.
- B. Upon substantial completion of the Work and prior to final acceptance, the Contractor shall finalize and deliver a complete set of Record Drawings to the Owner and/or Engineer conforming to the construction records of the Contractor. The set of drawings shall consist of corrected and annotated drawings showing the recorded location(s) of the Work. Unless specified otherwise elsewhere, Record Drawings shall be in the form of a set of prints with annotations carefully and neatly superimposed on the drawings in red.
- C. Upon substantial completion of the Work and prior to final acceptance, the Contractor shall finalize and deliver a complete set of Record Documents to the Owner and/or Engineer conforming to the construction records of the Contractor. The set of documents shall consist of corrected and annotated documents showing the as-installed equipment and all other as-built conditions not indicated on the Record Drawings.
- D. The information submitted by the Contractor into the Record Drawings and Record Documents will be assumed to be correct, and the Contractor shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data.
- E. Delivery of Record Drawings and Record Documents to the Owner and/or Engineer will be a prerequisite to Final payment.
- F. The Contractor shall maintain a copy of all books, records, and documents pertinent to the performance under this Agreement for a period of five years following completion of the contract.

END OF SECTION

SECTION 02100
SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials and equipment required and perform all site preparation, complete as specified in the JEA Water and Wastewater Standards (January 2018 or latest), Site Preparation, Cleanup & Restoration – Section 406, and as specified herein. The Contractor may provide this Work through a qualified Subcontractor who specializes in site preparation including land clearing. The Contractor shall clear, strip, grub and dispose the area of approximately 180 feet by 110 feet and leave a 10-foot tree buffer inside the parcel perimeter, as noted in the Contract Drawings. All site work shall conform to the JEA Water and Wastewater Standards (January 2018 or latest), Site Preparation, Cleanup & Restoration – Section 406.
- B. The Contractor shall obtain all permits required for site preparation work prior to proceeding with the Work, including clearing and tree removal.

1.02 RELATED WORK

- A. Final Geotechnical Report for JEA Greenland Water Treatment Plant, dated October 2018 (Included with Contract Documents).
- B. JEA Water and Wastewater Standards (January 2018) – Section 406.
- C. Earthwork is included in Section 02200, and Section 408 in JEA's Water and Wastewater Standards Manual.
- D. Erosion and Sedimentation Control in Section 02270.
- E. Temporary Erosion and Sedimentation Control in Section 02270.

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, copies of all permits required prior to clearing, grubbing, and stripping work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEARING

- A. The clearing area shall be approximately 180 feet by 110 feet and leave a 10-foot tree buffer inside the parcel perimeter, as noted in the Contract Drawings, on the Owner's parcel, which is 200-feet by 130-feet. A 10-foot buffer shall remain undisturbed around the perimeter of the site, except the entrance to the site from the JEA Easement (See Contract Drawing Civil Sheet C-2). Contractor shall remove trees shown along the JEA easement necessary for site accessibility, but maintain tree protection in areas not designated as clearing and grubbing areas.

- B. The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, trees, stumps, brush, shrubs, roots, grass, weeds, rubbish and any other objectionable material resting on or protruding through the surface of the ground. Clearing operations shall be conducted so as to prevent damage to existing structures and utilities and to structures and utilities under construction, and also to provide for the safety of employees and others.
- C. Preserve and protect trees and other vegetation designated on the Drawings and in Paragraph 3.05 or as directed by the Owner to remain.

3.02 GRUBBING

- A. Grub and remove all stumps, roots in excess of 1-1/2-inches in diameter, matted roots, brush, timber, logs, concrete rubble and other debris encountered to a depth of 18-inches below original grade or 18-inches beneath the bottom of foundations, whichever is deeper.
- B. Refill all grubbing holes and depressions excavated below the original ground surface with suitable materials and compact to a density conforming to the surrounding ground surface in accordance with JEA Standard Water and Wastewater Section 406.

3.03 STRIPPING

- A. Topsoil shall be free from brush, trash, large stones and other extraneous material. Avoid mixing topsoil with subsoil.
- B. Stockpile and protect topsoil until it is used in landscaping, loaming and seeding operations. Dispose of surplus topsoil after all work is completed.

3.04 DISPOSAL

- A. Dispose of material and debris from site preparation operations by hauling such materials and debris to an approved offsite disposal area. No rubbish or debris of any kind shall be buried on the site.

3.05 PROTECTION AND CONTROL

- A. Trees and other vegetation designated on the Drawings or directed by the Owner to remain shall be protected from damage by all construction operations by erecting suitable barriers, guards and enclosures, or by other approved means. Conduct clearing operations in a manner to prevent falling trees from damaging trees and vegetation designated to remain and to the work being constructed and so as to provide for the safety of employees and others.
- B. Maintain protection until all work in the vicinity of the work being protected has been completed.
- C. Do not operate heavy equipment or stockpile materials within the branch spread of existing trees.
- D. Immediately repair any damage to existing tree crowns, trunks, or root systems. Roots exposed and/or damaged during the work shall immediately be cut off cleanly inside the exposed or damaged area. Treat cut surfaces with an acceptable tree wound paint and topsoil spread over the exposed root area.

- E. Restrict construction activities to those areas within the limits of construction designated on the Drawings, within easements provided by the Owner. Adjacent properties and improvements thereon, public or private, which become damaged by construction operations, shall be promptly restored to their original condition, to the full satisfaction of the property owner.

END OF SECTION

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SECTION 02270
TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

- A. The work specified in this Section consists of designing, providing, maintaining, and removing temporary erosion and sedimentation controls as necessary.
- B. Temporary erosion controls include, but are not limited to, sodding, grassing, mulching, setting, watering, and reseeding on-site surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the Owner.
- C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Owner.
- D. Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.02 REFERENCE DOCUMENTS

- A. Florida Building Code 2010 edition.

PART 2 PRODUCTS

2.01 EROSION CONTROL

- A. Seed to be Scarified Argentine Bahia, if required.
- B. Netting - fabricated of material acceptable to the Owner.

2.02 SEDIMENTATION CONTROL

- A. Bales - clean, seed-free, cereal hay type.
- B. Netting - fabricated of material acceptable to the Owner.
- C. Filter stone - crushed stone conforming to Florida Department of Transportation specifications.
- D. Concrete block - hollow, non-load-bearing type.
- E. Concrete - exterior grade not less than one inch thick.

PART 3 EXECUTION

3.01 EROSION CONTROL

- A. Minimum procedures for grassing are:
 - 1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2-inch in diameter and debris.
 - 2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
 - 3. Apply mulch loosely and to a thickness of between 3/4-inch and 1-1/2 inches.
 - 4. Apply netting over mulched areas on sloped surfaces.
 - 5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

- A. Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings. Hay bales which deteriorate and filter stone which is dislodged shall be replaced.

3.03 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results which comply with the requirements of the State of Florida, Contractor shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

END OF SECTION

SECTION 02850
WELL MOBILIZATION AND CLEANUP

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. This Section includes the work necessary to move in and move out personnel and equipment, set up, and removal of drill rigs and temporary facilities and clean up the site, complete. Included in this work: construction and maintenance of well drilling pad; contamination precautions; erosion control; protection of nearby canals, land resources, and air quality; noise control; and hurricane preparedness.
- B. The Contractor is responsible to repair or restore any damage caused by the Contractor to the Project site, including vegetation.

1.02 RELATED WORK

- A. General Requirements – Division 1.
- B. Drilling is included in Section 02851.
- C. Grouting is included in Section 02854.
- D. Fluid Management is included in Section 02855.
- E. Water Quality Analysis is included in Section 02862.

1.03 REFERENCE TO STANDARDS AND REGULATIONS

- A. The Contractor shall construct the well in strict conformance with all laws, rules, regulations and standards related to the construction of wells in the State of Florida; St. Johns River Water Management District; and local, municipal, and county regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, ANSI, and API shall apply, except as referenced herein.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Construct temporary well drilling pad and set up well drilling equipment within the area designated by the Owner and/or Engineer. All drilling fluids and cuttings shall be managed in accordance with Specifications 02851 and 02855. Accomplish all work in accordance with applicable portions of these Specifications.
- B. No equipment shall be moved onto the project site until the Contractor is authorized to do so by the Owner and/or Engineer.

3.02 WELL DRILLING PAD

- A. The Contractor shall install a suitable pad to serve as a work floor for the drill rig and associated equipment capable of retaining all drilling fluids in the vertical and horizontal directions.
- B. The Contractor shall submit complete construction plans and details for the drilling pad and associated equipment and receive review before beginning construction.
- C. The drilling equipment shall have dimensions to hold adequate volume of water and drilling fluids including a method of returning them to the required fluid management system.
- D. Contractor shall design a fluids management system to dispose of drilling, development, and test water drilling fluids in accordance with Section 02855. The Contractor shall submit plans for the fluid management system to the Owner and/or Engineer for review. The Contractor shall not proceed until the review process has been completed.

3.03 CONTAMINATION PRECAUTIONS

- A. Avoid contamination of project area. Do not dump waste oil, rubbish, or other similar materials on the ground. Contractor shall provide secondary containment for petroleum-based fluid storage areas and conveyances. Any leaks identified will require prompt attention by the Contractor to mitigate. The Contractor shall be responsible for the remediation of any contamination caused by activities related to the Work. Any remediation activities shall be conducted in accordance with applicable federal, state, and local rules and regulations.

3.04 CLEANUP OF CONSTRUCTION AREAS

- A. Upon completion and acceptance of Well No. 3, remove from the site the drill rig and equipment, complete, and all debris, unused materials, temporary construction, and other miscellaneous items resulting from or used in the operations within 30 days of well completion. Replace or repair any facility, which has been damaged during construction work. Restore the site as nearly as possible to its original condition.

3.05 EROSION CONTROL AND PROTECTION OF CANALS

- A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, silt fencing, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. At the completion of the work the ground surface restored to original condition.
- B. The Contractor shall not discharge water from operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from operation shall be treated by filtration, settling basins or other approved method to reduce the amount of sediment contained in the water to allowable levels.
- C. All preventive measure shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by local ordinances, as applicable.

3.06 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.
- B. Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Owner and/or Engineer. Where such special emergency use is permitted, first wrap the trunk with sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment, dumping or other operations, protect such trees by placing boards, planks, or poles around them. Monument and markers shall be protected similarly before beginning operations near them.
- D. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition. The Engineer will decide what method of restoration shall be used and weather damaged trees shall be treated and healed or removed and disposed of.
 - 1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

3.07 PROTECTION OF AIR QUALITY

- A. Burning: The use of burning at the Project site for the disposal of refuse and debris will not be permitted.
- B. Dust Control: The Contractor shall be required to maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.
- C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with approval from the Owner and/or Engineer.
- D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the Owner and/or Engineer.

3.08 NOISE CONTROL

- A. The Contractor shall make every effort to minimize noise caused by his operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Local, State and Federal regulations.

3.09 RELOCATIONS

- A. The Contractor shall be responsible for the relocation of structures, including but not limited to light poles, control panels, signs, sign poles, fences, piping, irrigation, conduits and drains that interfere with the positioning of the work as set out in the Drawings. The cost of all such relocations shall be included in the Project and shall not result in any additional cost to the Owner.

END OF SECTION

SECTION 02851
DRILLING

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide the work, materials, and equipment necessary for drilling Well No. 3, a double-cased larger diameter (20-inch outside diameter (OD) Upper Floridan Aquifer backup well, complete. The well is to be of the general type and characteristics described in the Contract Documents. The exact depth of well and length of casings will be determined in the field by the Engineer. Well No. 3 will be constructed with a surface (steel) and final casing (steel). The surface casing will seal off the surficial aquifer system. The final casing will be set into the Upper Floridan aquifer sealing off the Hawthorn Group. Casing depth seating will be determined by review of cuttings and geophysical logs from pilot boring. The open hole interval will be open to water production zones of the Upper Floridan aquifer. Mud rotary techniques are anticipated for drilling through the Hawthorn Group. Upon setting of the final casing through the Hawthorn Group, a 12 ¼-inch diameter (dia.) pilot boring will be drilled using reverse air rotary drilling to target depth as determined by Engineer (anticipated depth of 700 ± feet bls). The reaming completion of the wells to total depth will be using the reverse air rotary drilling method.
- B. The wells shall be drilled into aquifers containing fresh water under pressure. The site is located and surrounded by urban environment. Requirements will be set forth in these specifications regarding the handling of discharge water, drilling fluids, and cuttings. Requirements also are set forth for controlling the flow of the well during construction and providing a fluid management system for all drilling operations.
- C. At the completion of drilling, the Contractor shall remove all equipment, which are not part of the completed well and leave the site in as good as or better than original condition, acceptable to the Owner and/or Engineer.
- D. The Contractor shall not proceed until the Engineer's and/or Owner's drilling/testing fluid discharge review process has been completed.

1.02 RELATED WORK

- A. General Requirements – Division 1.
- B. Well Mobilization and Cleanup is included in Section 02850.
- C. Casing and Temporary Wellhead is included in Section 02852.
- D. Geophysical and Color Video Logging is included in Section 02853.
- E. Grouting is included in Section 02854.
- F. Fluid Management is included in Section 02855.
- G. Water Quality Analyses is included in Section 02863.
- H. Well Step Drawdown Testing is included in Section 02864.

1.03 REFERENCE TO STANDARDS AND REGULATIONS

- A. The Contractor shall construct the well in strict conformance with all laws, rules, regulations, and standards related to the construction of wells in the State of Florida, St. Johns River Water Management District (SJRWMD), and local municipal and county regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, AWS, ANSI, API and ASME Boiler and Pressure Vessel Code shall apply, except as referenced herein.
- C. American Society of Testing and Materials (ASTM)
 - 1. ASTM C150 – Standard Specification for Portland Cement
 - 2. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
- D. American Water Works Association (AWWA)
 - 1. AWWA A100 – Water Wells
 - 2. AWWA C654 - Disinfection of Wells
- E. The latest revisions of Chapters 62-4, 62-520, 62-531, 62-532, 62-550, and 62-555 of the Florida Administrative Code (FAC), shall apply as referenced herein.
- F. The latest revisions of the Rules of the SJRWMD Chapters 40C-3, FAC shall apply as referenced herein.

1.04 CONTRACTOR'S RESPONSIBILITY

- A. All work shall be performed by a certified water well driller, licensed by the State of Florida pursuant to Chapter 62-531, FAC.
- B. The Contractor shall provide all necessary equipment to perform specified work. The Contractor's and/or their Subcontractor's equipment shall be in first class working order and shall be suitable for completing work described in these Specifications. Equipment including, but not limited to,; Top-head rotary drive drilling rig, drilling rods, drilling bits (steel tricone, button bit, cutting bits), mud circulation system, sand separating system, centrifugal and submersible pumps, motors, welders, generators, cranes/boom trucks, tanks, hoses (lay flat and rigid), ancillary equipment for site work.
- C. The Contractor shall provide and operate equipment capable of handling the largest load that will be placed upon the rigs drilling and supporting equipment. If conditions develop in the field that prove the rigs and supporting equipment that had been supplied by the Contractor are incapable of completing the well as specified, the Contractor shall provide a larger rig with the necessary capacity at their own cost. A minimum of 4-inch inner diameter (ID) drill rods with a 400 cfm and 200 psi compressor are required for reverse-air drilling.
- D. The Contractor's and/or his Subcontractor's equipment shall be operated and maintained in conformance with manufacturer's recommendations.

- E. The Contractor shall be responsible for obtaining all necessary local, state and agency permits associated with well construction and fluid management.
- F. The Contractor shall employ only competent workers for the execution of the work. All work shall be under the direct supervision of an experienced drilling superintendent (tool-pusher), and the tool-pusher must be on-site at least 8 hours per day throughout the course of the project with the exception of development pumping and pumping tests. The competency of the workers and superintendent shall be subject to the discretion of the Owner and/or Engineer.
- G. A minimum personnel crew of two (2) workers is required for all work associated with this project. No work shall be performed unless the minimum crew is present.
- H. No unnecessary delays or work stoppages will be tolerated because of equipment failure, which will not be considered a valid reason for extending the length of the Contract. The Contractor shall be held responsible, and payment will be withheld for damages to the well due to any act of omission, error, or faulty operation by the Contractor or his employees or agents, or equipment failure. Resulting repairs shall be completed by the Contractor to the satisfaction of the Owner and/or Engineer or a replacement well drilled by the Contractor at no additional cost to the Owner and without claim against the Owner and/or Engineer or agents.
- I. The Contractor is solely responsible for site security and the Contractor's equipment.

1.05 LOCAL GEOLOGIC CONDITIONS

- A. Information regarding subsurface conditions is intended to assist the Contractor in establishing a price for the Work. The Owner does not guarantee its accuracy or that it is necessarily indicative of conditions to be encountered in drilling the well. The Contractor shall satisfy themselves regarding all local conditions affecting work by personal investigation and neither the information on local geology, nor that derived from maps or plans, nor information from the Owner or their agents or employees shall act to relieve the Contractor of any responsibility hereunder or from fulfilling any and all of the terms and requirements of the Contract Documents. In particular, the Contractor shall familiarize themselves through their own investigations of the difficulties that may be encountered when drilling through the formations that are anticipated to be penetrated during the drilling of the test wells including those that make up the surficial aquifer, Hawthorn Group, and Floridan Aquifer. The Contractor shall be advised and be aware of difficult drilling conditions and problems that may be encountered during the drilling, construction, and testing of the wells. Typical examples may include, but are not limited to, lost circulation, cavities and fractured zones in the Floridan aquifer; clay squeezing zones and potential sand intervals in the Hawthorn Group, with attendant caving problems. These and other pertinent factors shall be taken into consideration by the Contractor in planning and executing the work. There will be no additional compensation for unforeseen conditions.

1.06 UNDERGROUND AND OVERHEAD UTILITIES

- A. The Contractor shall secure information concerning the location of underground and overhead utilities at the well site, prior to the start of well construction.
- B. Damage to underground and overhead utilities resulting from the actions of the Contractor are the sole responsibility of the Contractor. All damage to underground and/or above -grade utilities shall be reported immediately to the affected utility, Engineer, and Owner. Contractor

shall be solely responsible for payment to any affected party for repair and/or replacement of said damaged utilities.

PART 2 PRODUCTS

2.01 WATER SUPPLY

- A. The Contractor shall be responsible for obtaining, transporting, and/or hauling the water required for drilling-fluid makeup, disinfection, flushing activities, and dust control (if needed). The Owner shall supply the water needed for the project, but it is the Contractor's responsibility to transport the water from the Owner's point of supply to the work site, and it is the Contractor's responsibility to supply all appurtenances needed for connection to the water supply. Cost of water from any other source shall be borne by the Contractor. In any case, only potable water shall be used for drilling. The Contractor shall provide, install, and maintain, at his expense, all water-supply connections and piping for construction use. Upon completion, all temporary connections and piping installed by the Contractor shall be removed. Contractor is advised that a potable water main exist adjacent to the well site that JEA could provide a tap for to access. The Contractor is responsible to coordinate with JEA for access to potable water supply.

2.02 CIRCULATING MEDIA

- A. When circulating media is required for mud rotary drilling in a freshwater aquifer, drilling fluid shall be Quik-Gel by N.L. Baroid, or Engineer approved equal.
- B. The Contractor shall provide equipment for measuring weight and viscosity of drilling fluid.

2.03 CONTROL OF FREE FLOWING CONDITIONS

- A. The Contractor shall provide a Washington Rotating Control Head or Engineer-approved comparable flow prevention device in the well. The flow prevention device to be provided shall be a commercially available, hydraulically operated, single annular preventer, or acceptable equivalent as approved by the Engineer.
- B. Salt and naturally occurring brines or drilling mud may be used as a drilling fluid additive or weighting material with approved by the Engineer and SJRWMD. If salt is to be used to control free flowing artesian conditions, the Contractor shall use 2,000 lbs. bags of Morton mixing salt.

2.04 CASINGS

- A. Casings used shall be as listed in Section 02852, Part 2 Products.

2.05 CEMENT GROUT SEALS

- A. Neat Cement Grout used shall be as listed in Section 02854, Part 2 Products.

2.06 MONITORING OF DRILLING OPERATIONS

- A. Contractor shall provide an Engineer-approved digital geolograph for measuring and recording the penetration rate of the bit during the drilling of the wells.

2.07 WATER QUALITY SAMPLING

- A. Sample bottles shall be new, one-liter plastic bottles with screw caps provided by a state certified laboratory.

PART 3 EXECUTION

3.01 DRILLING

- A. Flowing conditions in the well shall be kept under control at all times. Salt or naturally occurring brines may be used as weight material to control flow upon SJRWMD and Engineer's approval. As flowing conditions are anticipated during the drilling of the well, the Contractor shall furnish and install a suitable flow prevention device for the well. Manufacturer's specifications pertaining to the type of preventer proposed for use by the Contractor shall be submitted to the Engineer for review before the drilling of the well commences and shall be used during drilling operations below the final casing. When no work is being done on a well, a preventer shall be put in place. The Contractor is responsible for the removal and disposal of any weight material used for flow suppression.
- B. Drill cuttings and drilling fluid shall be removed from the drilling site and disposed of at a suitable location. The Contractor shall furnish to the Owner and/or Engineer, prior to beginning construction, the name and location of his disposal site along with documentation that the site has been approved by the appropriate regulatory agencies. The Contractor shall provide the Owner and/or Engineer with an original letter showing acceptance of above materials by the landfill or other disposal location prior to construction. The fluid displaced from the borehole during cementing operations shall be considered excess drilling fluid and shall be disposed of in the accepted manner. The Contractor shall submit plans to contain and remove all cuttings and drilling mud for the Engineer's approval at the preconstruction meeting.
- C. When all casings are being set and cemented in place, it is the Contractor's responsibility to ensure that these operations are conducted in such a manner that the casing collapse and burst strengths (with safety factor) are not exceeded and the casings are not caused to fail. In the event that a casing collapse, burst or deform to such a manner that prevents successful well construction completion, the Contractor shall abandon and replace the well at no costs to the Owner.
- D. All wells through surficial aquifer and Hawthorn Group shall be drilled by the mud rotary or other appropriate techniques to meet the project depth and diameter requirements consistent with water well construction regulations (Chapter 40C-3, FAC). The reverse air drilling method shall be used when drilling in the Floridan aquifer.
- E. The Contractor shall drill the well at the approximate location shown on the Drawing.
- F. The Contractor shall drill a borehole at each well location so that the casing is installed straight and plumb as described in Section 02851 3.04.
- G. Upon completion and testing of Well No. 3, a water tight temporary well head shall be installed procuring well access security, in accordance to Section 02852. Refer to the contract drawings (Contract Civil Sheet CD-1) for the temporary well head detail.

3.02 FLUID MANAGEMENT

- A. The Contractor shall maintain the Fluid Management System, in accordance to Section 02855.

3.03 WELL DEVELOPMENT

- A. Upon construction completion, the well will be developed using a temporary pump supplied by the drilling contractor. The well will be developed at a pumping rate of 2,000 gpm to 3,000 gpm to meet the following criteria:
 - 1. Substantially free of all drilling fluids.
 - 2. The water exhibits a field-tested turbidity of ≤ 1 NTU.
 - 3. The well exhibits a sand content of ≤ 5 mg/L as determined by using a Rossum Sand Tester in accordance with the manufacturer's specifications.
 - 4. Ambient water quality parameters such as pH, specific conductance, and temperature stabilize within acceptable FDEP SOP criteria listed in FS 2212, section 3 (pH: + **0.2 units** Temperature: + **0.2°C** Specific Conductance: + **5%**).
- B. Engineer will confirm the Contractor has met these criteria on a consistent basis.
- C. The Contractor shall maintain the Fluid Management System during well development.

3.04 STRAIGHTNESS AND PLUMBNESS TEST

- A. Priority requirements of these Specifications is the drilling of straight holes, positive documentable proof that all pilot holes have been plugged up with cement and casing set to the required depths. The Contractor will be required to drill straight holes which will allow setting the casing at the required depths, provide room for proper cementing, and allow for pump setting to be installed in the center of the casing without leaning and touching one side. These straightness and plumbness requirements shall not be sacrificed for drilling speed or any other reason.
- B. During all drilling, the Contractor shall perform inclination surveys at intervals of 90 feet as the drilling and reaming progresses. These surveys shall be performed using a wire line instrument equipped with an inclination unit having a range of from 0 to 1.5 degrees of inclination from the vertical and the survey record shall be capable of being read to the nearest one tenth of one degree of angle. The maximum allowable inclination from the vertical at any portion of a hole or survey point shall be one degree; the maximum allowable difference between any two successive survey points shall be 0.5 degree (30 minutes). Any deviation greater than one degree or difference greater than 0.5 degree (30 minutes) between two surveys shall be corrected by the Contractor at their own expense. If instrument is indicating that the hole is not meeting the specified limits, then the Contractor shall re-ream the hole and repeat the survey. This process will be repeated or other actions taken by the Contractor to meet the specified limits.
- C. All holes for all wells shall be round, straight, and true to line. No doglegs or departures from a straight line shall be permitted, which will interfere or prevent casings from being set to their required depths. The drilled hole shall be constructed plumb and true to line as defined in

AWWA A100-15. A plumbness test shall be conducted in accordance with AWWA A100-15. The maximum allowable horizontal deviation (drift) of the well from the vertical shall not exceed 0.0067 times the smallest inside diameter of that part of the well being tested per foot of depth. The maximum misalignment permissible is one that will allow a 40-foot long section of pipe, or a dummy, to pass freely through it. The outside diameter of the pipe or dummy should be no smaller than ½-inch less than the inside diameter of the casing or hole being tested. If a dummy is used to test, it should have a minimum of three rings 12-inches wide, located at the top, bottom, and center on a rigid frame. A report documenting the well plumbness test shall be provided to the Engineer upon completion of the test.

- D. Should the results of the drilling of any of the pilot and/or reamed holes indicate that conditions have been or are being created that would prevent the casings from being set to their prescribed depths and properly cemented or prevent the well from being properly and successfully completed, the Contractor shall take steps to straighten the hole or correct the drift or deviation at his own expense so that casings can be installed to the prescribed depths and allow for proper cementing.

3.05 FORMATION AND WATER SAMPLE DATA COLLECTION

- A. The Contractor shall be responsible for collection of formation samples. Each sample shall be approximately one pint in volume, and placed in a container labeled using indelible ink with the date, well identification, and depth from which the sample was taken.
- B. The Contractor shall collect two sets of representative formation samples between 10 feet bbls to the full depth of the borehole. Samples shall be taken every ten feet and each change in formation or material type. The method must yield samples that are representative of the actual depth to which drilling has progressed.
- C. Samples shall be kept in containers acceptable to the Engineer. One set of samples shall be submitted to the Owner and/or Engineer. The second set shall be delivered by the Contractor to the Florida Geologic Survey, upon completion of each well to the address provided below:

Florida Geological Survey
Annex and Warehouse
3915 Commonwealth Blvd.
Tallahassee, Florida 32399-3000
Tel: (850) 245-3124

Written confirmation of delivery shall be provided to the Owner and/or Engineer.

- D. The Contractor shall also collect water samples during reverse air drilling at 30-foot intervals. The Contractor shall collect water quality samples for chloride, total dissolved solids, sulfate and specific conductance and submitted to the Owner and/or Engineer for analysis immediately after collection. Water sampling shall be performed in accordance with Section 02863.

3.06 RECORD KEEPING

- A. The Contractor shall submit to the Owner and/or Engineer a daily drilling log describing the activities performed during the reference period. The logs shall be on International Association of Drilling Contractors (IADC) Forms and shall give a complete description of equipment used, geologic materials and depths encountered; depths of lost circulation zones and methods of

regaining circulation; drilling rates; time, depth and description of any unusual occurrences or problems during drilling; and diameters and lengths of casing installed, fluid and water-level changes and the depths at which they occurred, gravel and cementing operations, repair time and other such pertinent data as may be required by the Engineer. Two copies of each daily log shall be submitted to the Owner and/or Engineer on a daily basis. The Contractor shall also provide a tabulation of all quantities for pay items and a description of all decisions made by the Contractor.

- B. The Contractor shall prepare and submit to the Owner and/or Engineer a final well log which shall include geologic log; borehole diameters; depth of the bottom of the casing and/or the bottom of the borehole; casing diameters and wall thickness; cemented zones; perforated or screened interval(s); amount of sand removed during development; and other information from the daily logs pertinent to the well construction. In addition, the Contractor shall file all records and reports with the proper agencies required by federal, state, and local codes or regulations.
- C. The Contractor shall furnish, maintain, and operate a continuous strip chart, drilling rate, bit weight, and footage recorder such as a geolograph recorder, or equal, on the drilling rig. The Contractor shall submit copies of the strip charts to the Owner and/or Engineer with the daily logs.

END OF SECTION

SECTION 02852
CASING AND TEMPORARY WELLHEAD

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide all the work, materials, and equipment necessary for furnishing, installing, and testing the straightness and plumbness of the well casing and temporary wellhead, complete in accordance with Section 02851 and Contract Drawings
- B. The Contractor shall provide all materials and equipment necessary for joining and installing the casing as specified.

1.02 RELATED WORK

- A. General Requirements – Division 1.
- B. Drilling is included in Section 02851.
- C. Geophysical and Color Video Logging is included in Section 02853.
- D. Grouting is included in Section 02854.

1.03 REFERENCE TO STANDARDS AND REGULATIONS

- A. The Contractor shall construct the well in strict conformance with all laws, rules, regulations, and standards related to the construction of wells in the State of Florida, St. Johns River Water Management District (SJRWMD) and local, municipal, and county regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, AWS, ANSI and API shall apply, except as referenced herein.
- C. American Society of Mechanical Engineers (ASME)
 - 1. ASME B36.10 – Welded and Seamless Wrought Steel Pipe
- D. American Society of Testing and Materials (ASTM)
 - 1. ASTM F480 - Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80
 - 2. ASTM C150 – Standard Specification for Portland Cement
 - 3. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 4. ASTM A106 - Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
 - 5. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

- E. American Water Works Association (AWWA)
 - 1. AWWA A100 – Water Wells
 - 2. AWWA C654 - Disinfection of Wells
- F. The latest revisions of Chapters 62-4, 62-520, 62-531, 62-532, 62-550, and 62-555 of the Florida Administrative Code (FAC), shall apply as referenced herein.
- G. The latest revisions of the Rules of the SJRWMD Chapters 40C-3, FAC shall apply as referenced herein.
- H. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply.

PART 2 PRODUCTS

2.01 STEEL CASING

- A. Steel casing shall be new and unused, and of the type, thickness, diameter, and weight specified herein. All casing shall be free of defects in workmanship and handling.

2.02 FLORIDAN AQUIFER WELL CASINGS

- A. Surface Casing: The surface casing shall be new, unused steel A106 Grade B or ASTM A53 Grade B welded or seamless steel pipe conforming to ANSI Standard ASME B36.10, Welded and Seamless Wrought Steel Pipe. Casing diameter shall be a minimum of 30-inch OD with a wall thickness of 0.375-inch. Casing segments shall have plain ends, beveled for welding.
- B. Final Casing: The final casing shall be new, unused steel A106 Grade B or ASTM A53 Grade B welded or seamless steel pipe conforming to ANSI Standard ASME B36.10, Welded and Seamless Wrought Steel Pipe. Casing diameter shall be 20-inch OD with a wall thickness of 0.375-inch. Casing segments shall have plain ends, beveled for welding.

2.03 CENTRALIZERS

- A. All casing centralizers shall be manufactured by a service company acceptable to the Engineer.
- B. Alternatively, the Contractor may propose fabrication of centralizers in the field provided they are constructed of a suitable material as determined by the Engineer.

2.04 TEMPORARY WELLHEAD

- A. Contractor shall furnish and install a temporary wellhead on the production well. The temporary wellhead shall extend above land surface having with a water tight steel blind flange.
- B. The temporary wellhead detail shall be constructed in accordance to Contract Civil Drawing, CD-1. The base flange shall be welded by a certified welder and shall be set such that the elevation of the four opposite points (spaced 90-degrees from each other) be at an elevation of 32.00 feet (NAVD 88) at each point. The flange elevations at the four points shall be verified by a certified surveyor and submitted to Engineer and Owner for review and approval.

- C. The base flange shall be two-holed in accordance to the Contract Document Civil Sheet CD-1, Detail E. Alignment of bolt patterns should be configured such that direction of pump discharge piping is as shown on the Contract Documents.
- D. The temporary wellhead completion will be performed by the Contractor after testing and confirmation of well production, water quality and sustainability by the Owner and/or Engineer. In order to control artesian flow for future permanent wellhead installation and allow for future access to apply brine solution (to kill artesian flow during final wellhead construction), the blind flange shall reduce to a 2-inch diameter threaded pipe with a ball valve with a ½-inch diameter tee for a sampling port and pressure gauge. All the fittings must be water tight and leak free. Refer to contract drawing for temporary wellhead completion.
- E. The Contractor is responsible for securing the temporary well head with locks or temporary cover to deter vandalism or unauthorized opening of valves on the well head. Security of the well head must be approved by the Owner and Engineer.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The Contractor shall install casing to the approximate depths as shown in the Drawings, or as instructed by the Engineer.
- B. The Contractor shall install the casing such that all joints are water tight. The method used to connect casing lengths shall be in accordance with the manufacturer's recommendations so that the resulting joint shall have the same structural integrity as the casing itself.
- C. If metallic casing is welded, the standards of the American Welding Society shall apply and as referenced in section 3.03.
- D. The Contractor shall remove and replace all casing, which fails, collapses, or separates during construction at his sole expense.

3.02 CENTRALIZERS

- A. The Contractor shall provide all fittings, drive shoes and centering guides necessary to complete the well as designed. All centralizers shall provide maximum clearance around the casing between the next outer casing or borehole wall, and shall be in a precise vertical alignment, one above the other, to allow for placement of tremie pipes in the annulus.
- B. Casing centralizers shall be installed at the approximate locations shown below:
 - 1. 20 feet above bottom of casing.
 - 2. 40 feet above bottom of casing.
 - 3. 100 feet above bottom of casing.
 - 4. At 100-foot intervals thereafter up to 100 feet from ground surface

- C. Alternative centralizer locations may be used with prior approval from the Engineer based on results of the caliper log.

3.03 WELDING

- A. The Contractor shall use certified welders on all welding operations. The Contractor shall pay for all testing requirements prior to acceptance of any welder. Welder's qualifications shall be in conformance with Section IX, Article III of the ASME Boiler and Pressure Vessel Code. The Contractor shall demonstrate that welder can make groove welds in carbon steel pipe in positions 2G and 5G for each welding process used.
- B. The Contractor shall provide welding certificates for all welders prior to any welding.
- C. The Contractor shall correct all welding deficiencies in materials and/or workmanship at their own expense.

END OF SECTION

SECTION 02853
GEOPHYSICAL AND COLOR VIDEO LOGGING

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide a qualified geophysical logger approved by the Engineer, and all materials, and equipment necessary to prepare the well for geophysical logging. The Contractor shall employ the services of a company acceptable to the Engineer to obtain geophysical and video logs of Backup Well No. 3. The Contractor shall supply well access and flow control (via stripper head or stand pipe if required) during logging. The Contractor shall prepare and condition each hole to insure it is open and can be logged with a minimum of delay. No payment will be made for logs which are unusable or inaccurate due to poor performance of the logging equipment. The Owner and/or Engineer reserve the right to add or take away geophysical logs.
- B. A schedule of proposed geophysical logs is provided in the table "Schedule of Proposed Geophysical Logs." Other geophysical logs may be required and/or scheduled by the Engineer.
- C. The Contractor shall assist the Owner and/or Engineer during geophysical logging and data collection and interpretation, as needed. The assistance will include the preparation of composite geophysical logs.
- D. The Contractor shall be responsible for the preparation of the pilot hole for geophysical logging. Preparation of the well shall include development and wiper trips if required and as requested by the Engineer. The sequencing of logs will be determined by the Engineer. The testing will be accomplished using systems designed and constructed so that under no conditions shall there be an overflow. The Contractor shall provide and use a stripper head assembly and any other equipment necessary to keep any flow under control at all times.
- E. The Contractor shall provide a 24-hour advance notice to the Engineer prior to running all geophysical logs.
- F. The Owner and/or Engineer shall have access to the logger van at all times, and logging areas will be witnessed at the Owner's and/or Engineer's discretion.
- G. The Contractor shall provide and operate pumps capable of adequately stressing the aquifer up to a rate of 1,500 gpm during dynamic logs (e.g., flow meter, temperature, fluid resistivity).
- H. In the event that a logging tool becomes stuck or is lost in the borehole/well, the Contractor is responsible for all costs associated with tool retrieval or replacement and the clearance of the borehole/well.

1.02 RELATED WORK

- A. General Requirements – Division 1.
- B. Drilling is included in Section 02851.
- C. Water Quality Analyses is included in Section 02863.

1.03 REFERENCE TO STANDARDS AND REGULATIONS

- A. The Contractor shall construct the well in strict conformance with all laws, rules, regulations, and standards related to the construction of wells in the State of Florida, St. Johns River Water Management District (SJRWMD), and local municipal and county regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, ANSI, and API shall apply, except as referenced herein.
- C. American Society of Testing and Materials (ASTM)
 - 1. ASTM D5753 - Standard Guide for Planning and Conducting Borehole Geophysical Logging
 - 2. ASTM D6167 - Standard Guide for Conducting Borehole Geophysical Logging: Mechanical Caliper
 - 3. ASTM D6274 - Standard Guide for Conducting Borehole Geophysical Logging: Gamma
 - 4. ASTM D6726 - Standard Guide for Conducting Borehole Geophysical Logging: Electromagnetic Induction.
- D. American Water Works Association (AWWA)
 - 1. AWWA A100 – Water Wells
- E. The latest revisions of Chapters 62-4, 62-520, 62-531, 62-532, 62-550, and 62-555 of the Florida Administrative Code (FAC), shall apply as referenced herein.
- F. The latest revisions of the Rules of the SJRWMD Chapters 40C-3 and 40C-30, FAC shall apply as referenced herein.
- G. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply.

1.04 SUBMITTALS

- A. At the Pre-Construction conference the Contractor shall submit the name of the company that will be providing Geophysical Logging services for the project, along with an example log format, to the Owner and/or Engineer for review and approval. If the Owner and/or Engineer rejects the logging company, the Contractor shall propose another service company for review and approval.
- B. The Contractor shall furnish 3 field copies of the various logs to the Owner and/or Engineer within 3 hours of the time when logging was complete. A written field evaluation of their quality shall be submitted within 2 days of completion. Three copies of the finished logs shall be provided to the Owner and/or Engineer as soon as possible after logging. Electronic copies of the logs in LAS format and PDF shall be provided to the Owner and/or Engineer within 72 hours of the cessation of logging activities at each well.

PART 2 PRODUCTS

2.01 GENERAL

- A. All data collected from geophysical logs, and television survey shall be depth referenced to pad level or to a common datum as specified by the Engineer. All logging and survey tools shall be equipped with a continuous depth recorder that shall be displayed on the log output.
- B. All geophysical logs shall be calibrated per Manufacturer's recommendations. Contractor to provide calibration records at the request of the Owner and/or Engineer.
- C. Geophysical logs to be run over the course of construction and testing include:
 - 1. Caliper
 - 2. Natural Gamma Ray
 - 3. Spontaneous Potential
 - 4. Electric (short and long normal)
 - 5. Static/Dynamic Temperature
 - 6. Borehole Compensated Sonic with VDL
 - 7. Static/Dynamic Flowmeter
 - 8. Static/Dynamic Fluid Resistivity
 - 9. Cement Bond Log
- D. Imaging logs to be run over the course of construction and testing include:
 - 1. Color Video Survey
- E. The Contractor shall provide all submersible pumps, stand-pipe/stripper, hoses for dynamic logging and flow control.

PART 3 EXECUTION

3.01 LOGGING

- A. Geophysical logging shall be done as soon as possible after drilling and preparation of the pilot hole. The logging interval shall be the total depth of the hole or as determined by the Engineer.
- B. The pilot holes and the wells shall be logged in stages as indicated in the table "Schedule of Proposed Geophysical Logs."
- C. The Contractor shall be responsible for preparing the open hole intervals for geophysical logging by removing all drill cuttings from the hole and by properly conditioning the well bore to prevent the formation from collapsing into the hole. The Contractor shall be responsible for keeping the borehole open and free from obstruction during geophysical logging and shall

remove any obstruction to the logging tools at his own expense. In the event that the logging tools do not reach to within five feet of the bottom of the hole, as measured by the length of drill pipe, the Contractor shall then clean the hole to the original drilled depth at their expense. The logs shall then be rerun at the Contractor's expense.

- D. Borehole geophysical surveys are performed by lowering sensing devices attached to a wireline into the borehole and recording various physical properties of the borehole. The geophysical logging program implemented during the construction and testing shall collect information on the hydrogeology of penetrated strata, data on borehole geometry and volume that would assist in the setting and cementing of casing strings and determining packer test intervals (if needed) and evaluating the integrity of the casing cements.
- E. Static logs shall be performed with no direct influence on the representative water column. Also, static logging shall be conducted without a pump in the well so that the logging tools can be centralized in the well and provide the most accurate logging.
- F. Dynamic logs shall be performed when pumping is introduced at a rate of approximately 1,500 gpm and the aquifer is stressed. The Contractor shall not install the pump until the dynamic logging tools are installed and centralized within the well. The Contractor shall be prepared to install and pull the pump for each dynamic logging tool to provide the most accurate logging by having the logging tools centralized and not pushed to one side of the well.
- G. Equipment, Logging Data, and log interpretation shall be in conformance with ASTM D5753: Standard Guide for Planning and Conducting Borehole Geophysical Logging.

3.02 CALIPER LOG

- A. The Contractor shall obtain x-y caliper measurements of the pilot hole or borehole. The Contractor shall calculate the volumetrics of the borehole with the x-y caliper measurement.

3.03 NATURAL GAMMA RAY LOG

- A. The Contractor shall obtain natural gamma ray readings recorded in API units in the pilot hole and borehole. Gamma logs provide a record of total gamma radiation detected.

3.04 SPONTANEOUS POTENTIAL LOG

- A. The Contractor shall provide a spontaneous potential log in all pilot hole loggings. The spontaneous potential shall be a function of the chemical activities of fluids in the borehole and adjacent rocks, the temperature, and the type and amount of clay present is directly related to porosity and permeability.

3.05 ELECTRIC LOG

- A. Resistivity logging measures the subsurface electrical resistivity of the formation, which is the ability to impede the flow of electrical current. The Contractor shall supply electric logs with short and long normal electrical field penetration.

3.06 TEMPERATURE LOG

- A. A differential and gradient temperature log shall be run from land surface to the total depth of the borehole under static and dynamic conditions.

3.07 BOREHOLE COMPENSATED SONIC WITH VARIABLE DENSITY LOG

- A. Contractor shall provide sonic logs or transmit-time logs that are a record of the travel time of the acoustic wave from one or more transmitters to receivers in the probe. The acoustic energy shall travel through the fluid in the well and through surrounding materials at a velocity that is related to the lithology and porosity of the rocks. A sonic log shall be conducted in all appropriate diameter pilot hole logging.

3.08 FLOW METER LOG

- A. Contractor shall provide flow analysis at up to four station points. Their primary application is to measure lateral flow out of the well, vertical flow within the well shall also be detected. A flow log shall be conducted in both static and dynamic logging of the completed pilot hole.

3.09 FLUID RESISTIVITY LOG

- A. Contractor shall provide fluid resistivity to measure the borehole fluid resistance to electronic conductance. The fluid resistance shall provide an indication of water quality in the borehole, and therefore the formation. The fluid resistance log shall measure and calculate the efficiency with which electric current transmits through the formation fluids. Static and dynamic fluid resistivity logs shall be conducted during the logging of the completed pilot hole.

3.10 CEMENT BOND LOGS

- A. The cement bond logs (CBL) shall be a type of geophysical log that is used to determine the quality of the cement bond between the casing and the cement grout, and between the cement and the formation, and to infer the presence of channels in the cement behind the casing. The cement bond logs shall be performed by lowering the logging tool down the hole while transmitting an acoustic signal outwards towards the casing wall.
- B. Travel time will be the time that it takes for the signal to travel from the transmitter, through the casing fluid, casing, and back to the receiver. Travel time shall be used to evaluating whether the logging tool was properly centered within the casing during the running of the CBL. Compression-wave velocity in water is much slower than in the steel casing. If the logging tool drifted closer to the casing, then the travel path will be reduced, and thus the transit time will also be reduced. Constant tool centralization is critical to the obtainment of an interpretable CBL because an un-centered tool will produce erratic responses. A properly centered tool will result in a relatively straight travel time log with only minor deviations at casing joint locations.
- C. The amplitude of the acoustic signal will be a measurement of the energy lost by the signal as it passes through the casing into the cement grout. The rate of this attenuation is dependent upon the percent of bonded cement, the casing diameter, and the thickness and material of the casing wall. A casing that is completely un-cemented and in contact with formation fluid or drilling mud will cause the attenuation rate to be very small and the returning amplitude will be relatively high. In a casing section that is well bonded to the cement grout, the wave velocity difference between the casing and cement grout will cause significant attenuation of the

acoustic signal and the returning amplitude will be relatively low. When the tool is properly centered, there will be a direct correlation between the amplitude response and the amount of cement bonded to the outer casing wall, as well as the quality of the bond.

- D. The total energy display is displayed as a variable density log (VDL). The VDL shall be produced from the arrivals of the acoustic waves at a receiver. The VDL shall be used to qualitatively assess the bond between the cement and formation and to detect the presence of channels in the cement grout, which might allow fluids to migrate behind the casing wall. Poorly cemented sections of casing generally have strong casing signals, whereas casing signals are absent or weak in well-cemented sections of casing. Casing joints, which normally appear as W-shaped “chevron” patterns, should be clearly visible in un-cemented well casings, whereas the pattern is usually barely discernible in cemented casing.
- E. The typical log responses for the four most common cement situations: (1) uncemented casing, (2) good casing bond and good formation bond, (3) good casing bond but poor formation bond, and (4) microannulus or channeling. A combination of good casing and formation bonding shall be characterized by low amplitude readings, weak casing arrivals on the VDL, and strong formation arrivals if formation attenuation is not high.

3.11 COLOR VIDEO (TELEVISION) SURVEY

- A. General: Video surveys shall be conducted by a qualified service company using equipment capable of surveying and recording the required depth. The Contractor may use their own equipment providing it is capable of surveying as required and the Contractor shall furnish proof of the capability of the equipment. The video camera shall be centralized within the borehole and have both side view (perpendicular to borehole) and down hole view with color capability and sufficient light source.
- B. The Contractor shall ensure that the well and borehole fluid is of sufficient clarity as determined by the Engineer to allow a video survey to be conducted. The Contractor shall pump into (or out of) the well a quantity of clear water not less than three volumes of the entire well and borehole until the well is sufficiently clear to discern casing integrity and identify formation features.
- C. While pumping in the water and during the video survey, the wells may be under artesian pressure and may flow. The Contractor shall provide and use a stripper head assembly and any other equipment necessary to keep any flow under control at all times.
- D. Costs for pumping clear water into or out of the borehole to achieve the desired level of clarity for the video surveys and tapes (including time spent waiting for the video equipment) and for rig and crew labor for all activities associated with preparing for performing and dismantling equipment related to the video survey shall be included with the Contractor’s testing costs for Well No. 3.
- E. The Contractor shall repeat the video survey at their own cost if water quality is inadequate or the borehole is not properly conditioned, as evaluated by the Engineer.

3.12 LOGGING SCHEDULES

- A. A Schedule of Proposed Geophysical Logs is presented below.

Well No. 3 Schedule of Proposed Geophysical Logs

Construction Phase	Approximate Depth (feet bls)	Geophysical logs
12 ¼-inch diameter pilot hole	0 – 120±	Caliper, gamma ray, electric (resistivity – short and long normal)
36-inch nominal diameter reamed hole into top of Hawthorn Group	0 – 120±	Caliper and gamma ray
12 ¼-inch diameter pilot hole in to top of UFA	120 – 360±	Caliper, gamma ray, electric
Reamed borehole to nominal 29-inch	120 – 360±	Caliper and gamma ray
20-inch casing to 360 feet ± and 12 ¼-inch diameter pilot hole from 360 feet ± to 700 feet ±	0 – 700	Caliper, gamma ray, borehole compensated sonic with VDL, cement bond, electric or dual induction. Static and dynamic temperature, fluid resistivity and flowmeter. Dynamic Borehole Color Video (Television) survey. Dynamic logs anticipated to be run at 1,500 gpm. Collect in-situ grab water quality samples for chloride, sulfate, pH, and conductivity from up to four depths in the open hole interval.
Completed well with final 20-inch casing set to 360 feet ± and 18-inch open borehole to 700 feet ±	0 – 700	Caliper, gamma ray, Borehole Color Video (Television) survey

END OF SECTION

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SECTION 02854
GROUTING

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide the work, materials, and equipment necessary for furnishing and installing the grout seal, complete.
- B. General: Grouting (cementing) shall be completed by the Contractor sufficient equipment and expertise to perform these operations.
- C. The Contractor shall submit a detailed grouting plan in writing (at least 24 hours, excluding weekends and holidays, before grouting starts) prior to each grout operation for review by the Engineer. The grouting plan shall include all calculations in detail showing quantities of grout needed and pressure calculations to avoid casing collapse during grouting. Also included shall be injection pump capacity, equipment used for mixing and grout mix, and monitoring equipment.

1.02 RELATED WORK

- A. Summary of Work is included in Section 01010.
- B. Drilling is included in Section 02851.
- C. Casing is included in Section 02852.
- D. Geophysical and Color Video Logging is included in Section 02853.

1.03 REFERENCE TO STANDARDS AND REGULATION

- A. The Contractor shall construct the well in strict conformance with all laws, rules, regulations, and standards related to the construction of wells in the State of Florida, St. Johns River Water Management District (SJRWMD), and local municipal and county regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, ANSI, and API shall apply, except as referenced herein.
- C. American Society of Testing and Materials (ASTM)
 - 1. ASTM C150 – Standard Specification for Portland Cement
- D. American Water Works Association (AWWA)
 - 1. AWWA A100 – Water Wells
- E. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply.

1.04 SUBMITTALS

- A. The Contractor shall submit to the Owner and/or Engineer mill certificates for all dry cement delivered to the site. The Contractor shall submit all cement mixtures to the Engineer prior to placement.

PART 2 PRODUCTS

2.01 GROUT INFORMATION

- A. The Contractor shall provide all grout, materials, collarless tremie pipe specifications, and equipment necessary for placement of the grout as specified.
- B. All cement for grout shall conform to ASTM C 150, Type II and be mixed with potable water. The amount of water added to cement shall be no greater than specified by the manufacturer unless approved by the Engineer.
- C. The Contractor shall provide other cementing additives formulated specifically for well cementing as provided by the Service Company, or equal and as acceptable to the Engineer.
- D. Grout can be used with additives and lost circulation materials (Flocele and/or gilsonite) as necessary and acceptable to the Engineer. Bentonite may be used in concentrations up to a maximum of 5 percent unless otherwise specified. Cement emplaced at the bottom 200 feet of the surface and final casings shall be neat. However, lost-circulation material such as Flocele and gilsonite may be used, as needed.
- E. Mixed cement shall include cement and all additives and lost circulation material acceptable to the Engineer.

PART 3 EXECUTION

3.01 GROUTING PROCEDURES

- A. Cementing will be accomplished in stages by mean of a collarless tremie pipe. The first cement stage for each casing stage shall be pressure grouted, tremie grouting will be employed thereafter. The method of cementing applies to all cementing procedures in all casings.
- B. Grouting shall be done in the presence of the Owner and/or Engineer, filling completely the annular space between the hole and casing from the bottom of the casing or the top of the previous cement stage, to the level shown on the Drawings, or as instructed by the Engineer. Contractor is responsible for defect in the cementing work due to improper or lack of equipment, personnel or experience. Contractor to shall pay all costs necessary to correct such defects. Should the Contractor fail to correct defects, Owner and/or Engineer may refuse to accept the well.
- C. Cementing procedures shall be continuous for each stage after cementing begins. If loss of circulation or no return of cement is encountered, the Owner and/or Engineer shall be notified immediately of what remedial measures are underway to reestablish the circulation and complete the cementing program according to the well design and Technical Specifications.

- D. During the cementing of all strings of casing, the Contractor shall be responsible for having a sample from each cement stage collected (both dry and mixed). Mixed cement sample shall include at least three, 2-inch cubes from each cement stage. Proper identification and labeling of each sample is mandatory.
- E. Before each cement stage, the Contractor shall tag the top of the cement with a collarless tremie pipe.
- F. When the casings are being set and cemented in place, it is the Contractor's responsibility to insure that these operations are conducted in such a manner that the casing collapse and burst strengths (with safety factor) are not exceeded and the casing is not caused to fail. Cement shall be pumped or placed so that excessive pressures will not result and affect the bond.

3.02 GROUT CURING

- A. The Contractor shall allow a minimum grout curing time of at least 12 hours between each grout stage.
- B. The Contractor shall not perform any work or any drilling operations until the grout has cured.
- C. The Contractor shall wait a minimum of 24 hours after the completion of the last grout stage prior to starting subsequent well construction or testing activities.
- D. The Contractor shall include waiting on grout time for each grout stage in the unit price of grout pumped in the provision and installation of casings listed in the Schedule of Values and Bid Form.

END OF SECTION

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SECTION 02855
FLUID MANAGEMENT

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide the labor, materials, and equipment necessary for drilling Well No. 3 a double-cased 20-inch outer diameter (OD) Upper Floridan aquifer backup well, complete. Mud rotary techniques are anticipated for drilling through the Hawthorn Group. Upon setting of the final casing through the Hawthorn Group, a 12-¼-inch diameter pilot boring will be drilled using reverse air rotary drilling to target depth as determined by Engineer (anticipated depth of 700 ± feet below land surface [bls]). The reaming completion of the wells to total depth will be using the reverse air rotary drilling method.
- B. The wells shall be drilled into aquifers containing fresh water under pressure. The site is located and surrounded by urban environment. Requirements will be set forth in these specifications regarding the handling of discharge water, drilling fluids, and cuttings. Requirements also are set forth for controlling the flow of the well during construction and providing a fluid management system for all drilling operations.
- C. At the completion of drilling, the Contractor shall remove all equipment, which are not part of the completed well and leave the site in as good as or better than original condition, acceptable to the Engineer.
- D. The Contractor shall not proceed until the Owner's drilling/testing fluid discharge review process has been completed.

1.02 RELATED WORK

- A. General Requirements – Division 1.
- B. Well Mobilization and Cleanup is included in Section 02850.
- C. Drilling is included in Section 02851.

1.03 REFERENCE TO STANDARDS AND REGULATIONS

- A. The Contractor shall construct the well in strict conformance with all laws, rules, regulations, and standards related to the construction of wells in the State of Florida, St. Johns River Water Management District (SJRWMD), and local municipal and county regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, AWS, ANSI, API and ASME Boiler and Pressure Vessel Code shall apply, except as referenced herein.
- C. American Society of Testing and Materials (ASTM)
 - 1. ASTM F480 - Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80
 - 2. ASTM C150 – Standard Specification for Portland Cement

3. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
- D. American Water Works Association (AWWA)
 1. AWWA A100 – Water Wells
 2. AWWA C654 - Disinfection of Wells
- E. The latest revisions of Chapters 62-4, 62-520, 62-531, 62-532, 62-550, and 62-555 of the Florida Administrative Code (FAC), shall apply as referenced herein.
- F. The latest revisions of the Rules of the SJRWMD Chapters 40C-3, FAC shall apply as referenced herein.

1.04 CONTRACTOR'S RESPONSIBILITY

- A. All work shall be performed by a certified water well driller, licensed by the State of Florida pursuant to Chapter 62-531, FAC.
- B. The Contractor shall provide all necessary equipment to perform specified work. The Contractor's and/or their Subcontractor's equipment shall be in first class working order and shall be suitable for completing work described in these Specifications. Equipment including but not limited to: mud circulation system, sand separating system, centrifugal and submersible pumps, motors, welders, generators, cranes/boom trucks, tanks, hoses (lay flat and rigid), road crossing equipment, ancillary equipment for site work.
- C. The Contractor's and/or his Subcontractor's equipment shall be operated and maintained in conformance with manufacturer's recommendations.
- D. The Contractor shall be responsible for obtaining all necessary local, state and agency permits associated with well construction and fluid management.
- E. No unnecessary delays or work stoppages will be tolerated because of equipment failure, which will not be considered a valid reason for extending the length of the Contract. The Contractor shall be held responsible, and payment will be withheld for damages to the well due to any act of omission, error, or faulty operation by the Contractor or his employees or agents, or equipment failure. Resulting repairs shall be completed by the Contractor to the satisfaction of the Owner and/or Engineer or a replacement well drilled by the Contractor at no additional cost to the Owner and without claim against the Owner and/or Engineer, or agents.
- F. The Contractor is responsible for site security and the Contractor's equipment.

PART 2 PRODUCTS

2.01 WATER SUPPLY

- A. The Contractor shall be responsible for obtaining, transporting, or hauling the water required for drilling-fluid makeup, disinfection, flushing activities, and dust control (if needed), in accordance to Section 02851.

2.02 CONTROL OF FREE FLOWING CONDITIONS

- A. The Contractor may utilize salt and naturally occurring brines as weighting material with approval by the Engineer and SJRWMD. If salt is to be used to control free flowing artesian conditions, the Contractor shall use 2,000 lbs. bags of Morton mixing salt or approved equal.

2.03 WATER TRANSFER ROAD CROSSING DEVICES

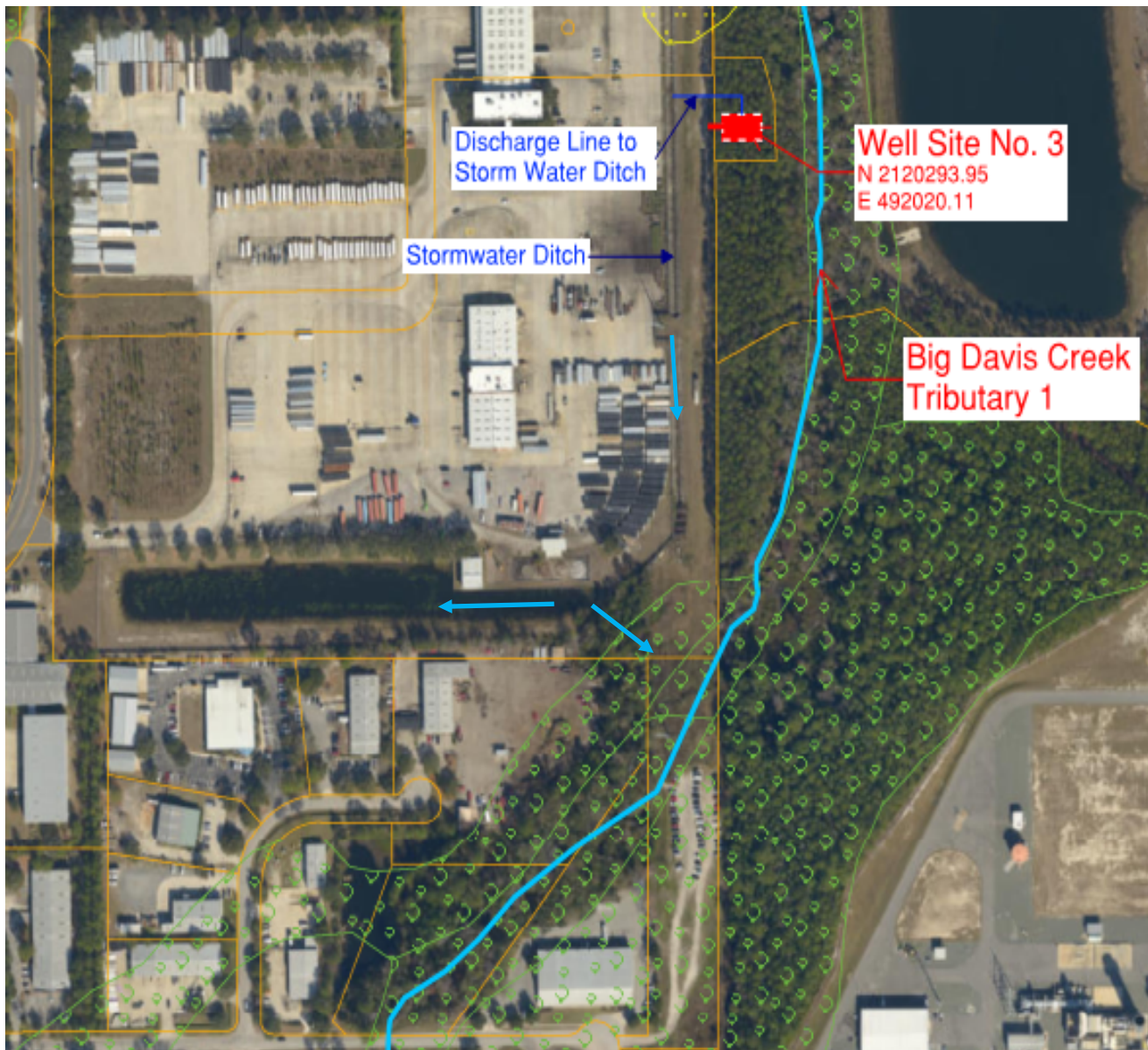
- A. The Contractor may utilize water transfer road crossing devices capable of transferring water up to a flow rate of 3,000 gpm. All proposed water bearing road crossing devices shall be submitted to Owner and/or Engineer for approval; all such submittals shall contain sufficient information to confirm the device is capable of fully conveying the intended flow without fluid backup, blockage, or other deleterious effects.

PART 3 EXECUTION

3.01 FLUID MANAGEMENT

- A. The drilling will be accomplished using circulation systems designed and constructed so that under no conditions shall there be an overflow. The Contractor is required to take all necessary steps to prevent accidental spillages from occurring. Frac tanks or other storage containers for the storage of fluids must be leak free. The Contractor shall submit plans for a fluid management system to the Engineer for review. This project will require decanting of and removal of solids of all drilling and testing fluids. After settling, the liquid portion of the fluids will be pumped from the settling tanks into a stormwater ditch located west of the well site. The referenced stormwater ditch drains south through a 6.2'-wide by 4'-tall elliptical RCP culvert before discharging into Big Davis Creek. The ultimate discharge location for the liquid portion of the fluids is Julington Creek at Old St. Augustine Road. Refer to the attached figure for the proposed temporary pipeline route. This fluids disposal method will require meeting the requirements of the Generic NPDES Permit pursuant to Section 62-621.300, FAC. The Owner will obtain authorization to discharge uncontaminated drilling fluids to the stormwater ditch from FDEP using the Generic permit process. . The Contractor shall meet water quality threshold for turbidity at no more than 29 NTUs above natural background of Big Davis Creek at the discharge point. The Contractor shall install best management practices onsite to prevent erosion, sedimentation and turbid water from discharging offsite.
- B. The Contractor shall provide the temporary transmission piping, fittings and pumps capable of transmitting the fluids to the stormwater ditch.
- C. The Contractor shall furnish and install an in-line flowmeter with a flow rate indicator and totalizer that has been calibrated within the last 60 days and capable of measuring discharge rates of 100 to 3,000 gallons per minute, being properly sized to the correct pipe diameter in accordance with manufacture's specifications.

END OF SECTION





Photos of Onsite Stormwater Ditch

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SECTION 02863
WATER QUALITY ANALYSES

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. This Section covers the water sampling and analyses required during the construction and testing of Well No. 3.
- B. The Contractor shall provide the name and address of a State of Florida certified offsite laboratory that will perform the analyses. The laboratory shall be acceptable to the Engineer and the Owner. Samples will not be collected by the Owner's laboratory personnel or analyzed by the Owner's laboratory.
- C. Water samples will be collected by offsite laboratory personnel or properly trained representatives of the Contractor using containers provided by the laboratory. Groundwater samples shall be collected in accordance with the FDEP standard operating procedures (SOP), FDEP-SOP-001/01, FDEP Quality Assurance Rule, 62-160, FAC. FDEP sampling requirements shall be followed.
- D. All water samples will be transported or shipped to the laboratory immediately upon collection. EPA method sampling protocols (e.g., holding times, preservatives) shall be followed.
- E. Standard laboratory turnaround times are acceptable unless otherwise requested below.

1.02 RELATED WORK

- A. General Requirements – Division 1.
- B. Summary of Work is included in Section 01010.
- C. Mobilization and Cleanup is included in Section 02850.
- D. Drilling is included in Section 02851.
- E. Geophysical and Color Video Logging is included in Section 02853.
- F. Well Step Drawdown Testing is included in Section 02864.

1.03 REFERENCE TO STANDARDS AND REGULATIONS

- A. The Contractor shall construct the well in strict conformance with all laws, rules, regulations, and standards related to the construction of wells in the State of Florida, St. Johns River Water Management District (SJRWMD) and local regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, ANSI, and API shall apply, except as referenced herein.
- C. American Water Works Association (AWWA)
 - 1. AWWA A100 – Water Wells

2. AWWA C654 – Disinfection of Wells

- D. The latest revisions of FDEP QA Rule, 62-160, Florida Administrative Code (FAC), shall apply.
- E. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply

1.04 CONTRACTOR'S RESPONSIBILITY

- A. All water sampling will be performed by a trained water sampling technician familiar with FDEP Standard Operating Procedures.
- B. Contractor shall be responsible for obtaining all necessary local, state and agency permits and completion of summary reports.

1.05 PURPOSE

- A. The purposes of the offsite laboratory analyses are to determine the background water quality in the potential production zones, water quality versus depth profiles, and water quality under stressed (pumped) conditions in the production well.

PART 2 PRODUCTS

2.01 SAMPLE BOTTLES

- A. Sample bottles shall be new with preservatives, if required, bottles with screw caps provided by a State of Florida-certified laboratory

PART 3 EXECUTION

3.01 REQUIRED WATER QUALITY ANALYSES

- A. Reverse Air-Drilling
 - 1. The Contractor shall collect water samples at 30-foot intervals during the drilling of the nominal 12-1/4-inch diameter pilot hole for all reverse-air drilling and have them field analyzed for chloride, total dissolved solids, sulfate, pH and specific conductance.
 - 2. Should chloride values exceed 200 milligrams per liter (mg/L) upon penetration of the top of the Upper Floridan aquifer until total depth is reached, a grab sample will be collected for major ion analysis via appropriate EPA methods at a certified laboratory for confirmation of the field-tested parameters listed above. The analytical laboratory shall be contracted by and paid for by the Contractor.
- B. Geophysical Logging In-Situ Grab Sampling
 - 1. The Contractor shall collect up to four in-situ grab groundwater samples from different depths throughout the open hole interval for water quality profiling under static conditions. Groundwater samples shall be collected and field analyzed for pH, conductivity, TDS and chloride.

C. Step Drawdown Testing

1. Upon completion of construction and development of Well No. 3, the Contractor shall collect water samples at the end of each step test prior to increasing pumping rate for the next step. The Contractor shall have the water samples field analyzed for chloride, total dissolved solids (TDS), sulfate, dissolved oxygen, pH, temperature and specific conductance. In addition, turbidity and sand content shall be measured in the field at the end of each step test. It is anticipated that there will be four steps in a drawdown test.
2. Drinking Water Standards and Additional Water Quality Parameters – At the end of the last step test, the Contractor shall collect water samples and have them analyzed for Florida primary and secondary drinking water standards (Sections 62-550.310 & 62.550.320, FAC and other parameters listed below). Refer to Table 1.
3. Table 1 outlines the parameters and is provided at the end of this Section. The most current version of the rule (Sections 62-550.310 & 62.550.320, FAC) shall apply should there be a discrepancy between the table and the rule.

TABLE 1
STEP DRAWDOWN WATER QUALITY PARAMETERS

Primary Drinking Water Standards	
Alachlor	Ethylene Dibromide
Aroclors (PCBs)	Di(2-ethylhexyl) adipate
Alpha, gross	Di(2-ethylhexyl) phthalate
Antimony	Fluoride
Arsenic	Glyphosate
Asbestos	Haloacetic Acids (HAA5)
Atrazine	Heptachlor
Barium	Heptachlor epoxide
Benzene	Hexachlorobenzene
Benzo(a)pyrene	Lindane
Beryllium	Hexachlorocyclopentadiene
Bis(2-ethylhexyl)adipate	Lead
Bis(2-ethylhexyl)phthalate	Mercury
Bromate	Methoxychlor
Cadmium	Nickel
Carbofuran	Nitrate (as N)
Carbon Tetrachloride	Total Nitrate & Nitrate (as N)
Chloramines	Oxamyl
Chlordane	Pentachlorophenol
Chlorine	Picloram
Chlorine dioxide	Radium-226
Chlorite	Radium-228
Chlorobenzene	Selenium
Chromium	2,4,5- TP (Silvex)
Coliforms, total	Simazine
Cyanide	Sodium
2,4-Dichlorophenoxyacetic Acid	Strontium-90
Dalapon	Styrene

Primary Drinking Water Standards	
Dibromochloropropane 1,2-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichloroethane 1,1-Dichloroethylene Cis-1,2-Dichloroethylene Dichloromethane 1,2-dichloropropane Diquat Dinoseb Endothall Endrin Ethylbenzene	Tetrachloroethylene Thallium Toluene Toxaphene 1,2,4-Trichlorobenzene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene (TCE) Trans-1,2-Dichloroethylene Trihalomethanes (total) Vinyl Chloride Xylenes (total)
Secondary Drinking Water Standards	
Aluminum Chloride Color Copper Corrosivity Ethylbenzene Fluoride Foaming agents (MBAS) Iron	Manganese Odor pH Silver Sulfate Toluene Total Dissolved Solids (TDS) Xylenes (total) Zinc
Other Constituents	
Bicarbonate Alkalinity Calcium Carbonate Alkalinity Hydrogen Sulfide (H ₂ S) Magnesium Potassium Sodium Specific Conductance Total Hardness Total Iron Total Organic Carbon Total Sulfide Dissolved iron	

END OF SECTION

SECTION 02864
STEP DRAWDOWN TESTING

PART 1 GENERAL

1.01 REQUIREMENT

- A. The Contractor shall provide all work, materials, and equipment necessary to perform an 8-hour step-drawdown test on Well No. 3 to be located along the JEA-owned parcel north of the Greenland Water Treatment Plant.
- B. The Contractor shall provide and operate a submersible pump and water and pressure monitoring equipment for the tests. The Contractor shall be responsible for installing the water level (pressure) measuring equipment in the wells, as directed by the Engineer. The pump shall be installed approximately 30 feet below the anticipated or actual maximum drawdown water level.
- C. The Contractor shall provide equipment for accurately measuring pumping rates. The equipment shall include a flow meter (calibrated within the past 60 days) with a range of 500 gpm to 3,000 gpm. The method of flow measurement is subject to the approval of the Engineer.
- D. Water produced during the test will be discharged in accordance with Specification 02855.
- E. Water quality sampling and field monitoring shall be conducted in accordance with Specification 02863.
- F. In the event of a failure of the pump or pressure monitoring equipment, the Contractor shall repeat the test at no additional cost to the Owner or Engineer.

1.02 RELATED WORK

- A. General Requirements – Division 1.
- B. Drilling is included in Section 02851.
- C. Water Quality Analyses is included in Section 02863.

1.03 REFERENCE TO STANDARDS AND REGULATIONS

- A. The Contractor shall execute the work and complete the project in strict conformance with all laws, rules, regulations, and standards related to the construction of wells in the State of Florida, St. Johns River Management District and local, municipal, and county regulatory agencies.
- B. The latest revisions of standards of AWWA, ASTM, ANSI, and API shall apply, except as referenced herein.
- C. American Water Works Association (AWWA)
 - 1. AWWA A100 – Water Wells
- D. St. Johns River Water Management District (SJRWMD)

1. Applicant's Handbook Consumptive Use Application, Appendix D – *Guidelines for Developing and Conducting an Aquifer Performance Testing Program*, August 14, 2014.

- E. Where reference is made to one of the above standards, the revisions in effect at the time of bid opening shall apply

1.04 CONTRACTOR'S RESPONSIBILITY

- A. All work shall be performed by a certified water well driller, licensed by the State of Florida.
- B. Contractor shall be responsible for obtaining the well construction permit from the SJRWMD.

PART 2 PRODUCTS

2.01 DATA LOGGER

- A. Contractor shall use In-Situ Level Troll 700 data loggers that has the appropriate pressure rating given the anticipated water level drawdown (anticipated to be 60 psi in the pumped wells). The data logger shall be capable of programming data collection tests in step series and at differing collection intervals. The data loggers shall be capable of providing the data in Microsoft Excel format.
- B. A pressure gauge shall be included at the wellhead for above ground measurement for artesian head pressure measurement.

2.02 FLOW METER

- A. A calibrated totalizing flow meter installed in accordance with manufacturers specifications capable of measuring flows from 500 gpm to 3,000 gpm shall be used for the step drawdown tests.

2.03 ELECTRIC TAPE

- A. The Contractor will provide an electric tape for manually measuring groundwater water levels in Well No. 3 during the step drawdown testing.
- B. The electric tape such as manufactured by Solinst or approved equal must be capable of measuring water levels to within 0.01 feet of actual groundwater levels.

2.04 PUMP AND APPURTENANCES FOR DEVELOPMENT AND PUMPING TESTS

- A. The Contractor shall provide and install a test pump and all appurtenances for performing development and pumping tests. The Contractor shall provide the test pump, flow meter, valve, discharge pipe, power supply (including fuel and maintenance), transducer and data logger, stilling wells for housing the data logger and collecting manual measurements and all appurtenances needed for performing the pumping tests. Contractor shall also provide a Rossum Sand Tester, or equal. Butterfly valves will not be allowed for controlling flow during pumping. Ball valves or gate valves may be used to control flow during pumping.
- B. The Contractor will provide a pump for conducting the step drawdown testing. The pump must be capable of producing up to 3,000 gpm from a pumping head of 150 feet with an estimated pump setting of approximately 60 feet bls.

2.05 ROSSUM SAND TESTER

- A. A Rossum Sand Tester manufactured by Roscoe Moss Company will be used to measure the sand content of the produced groundwater throughout the step drawdown test. The applicability and use of the sand tester is described in AWWA Standard A-100-15 – Water Wells.

2.06 STILLING WELLS

- A. The Contractor shall provide two PVC stilling wells provided for collecting water level measurements with the data logger and manual electric tape measurements. The stilling wells shall be large enough diameter for the instruments to fit inside without lodging or wedging. The stilling wells shall have a minimum of 20 feet of slotted screen and capped on the end. The depth of the stilling wells shall extend to five feet above the intake of the pump.

2.07 TURBIDIMETER

- A. The Contractor shall provide a Hach 2100Q Portable Turbidimeter or approved equal for measuring turbidity of produced groundwater from the step drawdown test.

PART 3 EXECUTION

3.01 STEP DRAWDOWN TESTING

- A. At the completion of well development, Well No. 3 shall be pump tested to determine well performance and aquifer properties. The tests will consist of an 8 hour step drawdown test at 50%, 85%, 100% and 125% of estimated capacity of the well (2,000 gpm). The pumping period for each step should be a minimum of 30 minutes and up to a maximum of 2 hours. Pumping rates shall be increased with each step. Drawdown of water levels shall be monitored to 0.01-foot accuracy with data logger as manufactured by In-Situ Level 700 Troll. Recovery of the final step test shall be monitored to 0.01-foot accuracy until the water level within the well has recovered within 0.1 foot of the initial static water level, but for no less than 4 hours.
- B. Prior to the start of any testing, the following equipment shall be installed:
 - 1. Two 1-½-inch nominal inner diameter flush threaded pipe, open only at the top and capped at the bottom, shall be installed as a stilling well. The stilling well shall contain at least 20 feet of slotted screen and suitable for water-level measurement with an In-Situ Level Troll data logger (0.72-in diameter) and electric tape. The top of the pipe shall be installed at or slightly above the top of casing as directed by the Engineer. The bottom of the pipe shall be set at approximately 5 feet ± above the intake of the temporary pump. The inside of the pipe shall be smooth and the pipe shall be sufficiently plumb and straight so that there will be no interference with measurement.
 - 2. A gate valve shall be installed in the discharge pipe near the pumping well.
 - 3. A calibrated flow meter capable of measuring flow rates from 500 gpm to 3,000 gpm shall be installed in the discharge pipe prior to the gate valve and according to manufacturer's specifications to ensure meter accuracy.
- C. During all testing, Contractor shall record discharge rates and water levels in wells at predetermined times. The frequency of measurement will meet or exceed the SJRWMD's

suggested schedule for conducting APTs (SJRWMD Applicant's Handbook Consumptive Use Applications, Appendix D). For this purpose, the pump shall be operated without interruption, at no more than 5 percent fluctuation in the designated rate of discharge, during the full period of the step tests as directed by the Engineer.

- D. Sand content shall be determined from a pumping and sampling procedure conducted during the pump test. It is the responsibility of the Contractor to secure prior written approval from the Engineer of any changes in the sand content testing method.
- E. The Contractor shall provide continuous oversight during the 8 hour to 10 hour step drawdown tests to ensure continuous operation of the pump.
- F. Water quality samples will be collected during the step test as described in the Water Quality Sampling Section 02863.

END OF SECTION

