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ORANGE COUNTY

SOUTH WATER RECLAMATION FACILITY
SUPPLEMENTAL WELL SW-5R

TECHNICAL SPECIFICATIONS
BID SET
NOVEMBER 2019

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SOUTH WATER RECLAMATION FACILITY
SUPPLEMENTAL WELL SW-5R

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>
DIVISION 1 – GENERAL REQUIREMENTS	
01010	Summary of Work
01015	Project Requirements
01026	Measurement and Payment, Bid Form
01060	Permit and Regulatory Requirements
01380	Construction Photographs
01500	Temporary Facilities
01614	Handling and Storage
DIVISION 2 – SITEWORK	
02050	South Water Reclamation Facility Supplemental Well SW-5R
DIVISIONS 3-16 – NOT USED	
FIGURES	
Figure 1	South Water Reclamation Facility Location Map
Figure 2	Proposed Supplemental Well Location
Figure 3	Proposed Well SW-5R Construction Details
APPENDIX	Deep Wastewater Disposal Well Lithologic Log

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DIVISION 1
GENERAL REQUIREMENTS

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SECTION 01010
SUMMARY OF WORK

1.0 GENERAL

1.01 WORK INCLUDED

- A. All of the work under this contract is located within the areas shown on the Figures.
- B. The CONTRACTOR shall furnish all labor, materials, equipment, tools, services and incidentals to meet project requirements and complete all work required by these Specifications and as shown on the Figures.
- C. The CONTRACTOR shall perform the work complete, in place, and ready for continuous service, and include repairs, testing, permits, cleanup, replacements and restoration required as a result of damages caused during this construction.
- D. All materials, equipment, skills, tools and labor which are reasonably and properly inferable and necessary for the proper completion of the work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or Figures shall be furnished and installed by the CONTRACTOR whether specifically indicated in the contract documents or not.
- E. The CONTRACTOR shall comply with all Municipal, County, State, Federal, and other codes which are applicable to the proposed construction work.

1.02 GENERAL DESCRIPTION OF WORK

- A. The project consists of the construction and development one (1) upper Floridan aquifer (UFA) supplemental well at the South Water Reclamation Facility (SWRF) for Orange County Utilities (OCU) as shown on Figure 1 and Figure 2. A lithologic log for the Sand Lake Road Injection Well, drilled in 1977, is included in Appendix A. The work shall be performed by a licensed Florida Water Well Contractor with equipment which is adequate to complete all phases of well construction. All work shall be performed under the direct supervision of an experienced well driller and an adequate number of competent helpers. If the CONTRACTOR's equipment is not capable of satisfactorily performing the work provided for in these Specifications, the CONTRACTOR at his own expense shall substitute equipment satisfactory to the OWNER. All work shall be completed in full conformance with South Florida Water Management District (SFWMD) and Florida Department of Environmental Protection (FDEP) rules and regulations for water wells, or this Specification, whichever is more stringent.

1.03 DETAILED DESCRIPTION OF COMPONENTS

The CONTRACTOR shall install and test one (1) UFA supplemental well. A typical well construction drawing is provided as Figure 3. The construction of the supplemental well will include the following work components:

- A. After mobilization drill an ± 8 -inch diameter pilot hole from land surface to approximately 100 feet below land surface (bls) using mud rotary.

- B. Vibrate, drive, or install by rotary method a 24-inch diameter steel surface casing to approximately ± 75 feet bls into the Hawthorn Formation. Driven casing shall meet SFWMD regulation 40E-3.502 F.A.C. and FDEP regulations 62-532.500 F.A.C. If the casing is installed by rotary method, drill a nominal 30-inch diameter borehole prior to installation of surface casing by pressure grouting. If the casing is vibrated or driven a drive shoe must be installed at the bottom of the casing string. Final casing setting depth shall be approved by the ENGINEER/GEOLOGIST based on drill cuttings.
- C. Drill a nominal ± 8 -inch pilot hole from approximately 100 feet bls using mud rotary, reverse or direct circulation rotary methods to ± 550 feet, bls.
- D. Perform geophysical logging from ± 550 feet to land surface. Geophysical logs will include: caliper, gamma, dual induction, sonic porosity, static and dynamic fluid conductivity, static and dynamic flow meter, and video.
- E. Drill a nominal 24-inch diameter borehole using mud rotary, reverse or direct circulation rotary methods to ± 275 feet, bls.
- F. Perform geophysical logging from ± 275 feet to land surface. Geophysical logs will include: caliper and gamma to work up a grout plan.
- G. Set an 18-inch diameter steel casing from ground surface to ± 275 feet bls. Final casing setting depth shall be determined by the ENGINEER/GEOLOGIST based on drill cuttings and review of the geophysical logs. Cement will be placed using a pressure grouting method from the bottom up to land surface.
- H. Drill a nominal 18-inch borehole from approximately 275 to ± 550 feet bls using reverse air circulation drilling methods.
- I. Perform plumbness and alignment test from 40 feet bls to approximately 200 feet bls as specified in Section 2050, paragraph 3.10.
- J. Install temporary wellhead assembly, set up pump testing equipment and discharge piping, and develop the well, as specified in Section 2050, paragraph 3.08.
- K. Collect background water level data and perform step drawdown pumping test (SDT), as specified as in Section 2050, paragraph 3.11 and assist OCU staff to collect samples for primary and secondary analyses near conclusion of the test, while the well is being pumped at the design rate of 3,500 gpm.
- L. Perform final geophysical and video log from land surface to total depth on the newly installed well. Geophysical logs will include: caliper, gamma and video.
- M. Perform well disinfection and bacteriological testing.
- N. Cap wellhead and install concrete well pad.
- O. Demobilize from site.

2.0 PRODUCTS
Not Used.

3.0 EXECUTION
Not Used.

END OF SECTION

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SECTION 01015

PROJECT REQUIREMENTS

1.0 GENERAL DESCRIPTION OF WORK.

The work described herein consists of constructing one backup public supply well to the upper Floridan Aquifer (UFA) in accordance with Section 02050 of the Specifications and as shown in Figures 1 through 3. The work shall be performed by a licensed Florida Water Well CONTRACTOR with equipment which is adequate to complete all phases of well construction. All work shall be completed in full conformance with South Florida Water Management District (SFWMD) and Florida Department of Environmental Protection (FDEP) rules and regulations for water wells, or this Specification, whichever is greater or more restrictive.

2.0 UNITS OF MEASUREMENT

- A. Both inch-pound (English) and SI (metric) units of measurement are specified herein; the values expressed in inch-pound units shall govern.
- B. The CONTRACTOR shall submit a Construction Assistance Request form (enclosed) at least 72 hours in advance of requiring the above activities to be performed.

3.0 WORK BY PUBLIC UTILITIES

None.

4.0 WORK BY COUNTY

None.

5.0 OFFSITE STORAGE

Offsite storage arrangements shall be approved by COUNTY for all materials and equipment not incorporated into the Work but included in Applications for Payment. Such offsite storage arrangements shall be presented in writing and shall afford adequate and satisfactory security and protection. Offsite storage facilities shall be accessible to COUNTY and Engineer.

6.0 SUBSTITUTES AND "OR-EQUAL" ITEMS

Whenever a material or article is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, the specified item shall be understood as establishing the type, function, and quality desired. Requests for review of equivalency will not be accepted from anyone except CONTRACTOR, and such requests will not be considered until after the Contract has been awarded. Other manufacturers' products may be accepted, provided sufficient information is submitted to allow Engineer to determine that

the products proposed are equivalent to those named. Such items shall be submitted for review by the procedure set forth in the Submittals section.

7.0 PREPARATION FOR SHIPMENT

All materials shall be suitably packaged to facilitate handling and protect against damage during transit and storage. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Engineer. Each item, package, or bundle of material shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment

8.0 LAND FOR CONSTRUCTION PURPOSES

- A. CONTRACTOR will be permitted to use available land belonging to COUNTY, on or near the Site, for construction purposes and for storage of materials and equipment.
- B. The locations and extent of the areas to be used shall be directed and approved by the County or as shown on the drawings.
- C. CONTRACTOR shall immediately move stored materials or equipment if any occasion arises, as determined by COUNTY, requiring access to the storage area. Materials or equipment shall not be placed on the property of COUNTY until COUNTY has agreed to the location to be used for storage.
- D. The approximate coordinates of SW-5R are *latitude 28°26'49.155"N* and *longitude 81°26'23.479"W*. (Northing 1,495,474/Easting 514,819 FL-E). Orange County will stake the approximate proposed location prior to installation. The CONTRACTOR shall obtain approval of the proposed staked location from the SFWMD prior to installation. The CONTRACTOR will coordinate with Orange County staff regarding how to access the site.
- E. Refer to item 22 of this section for restoration guidelines.

10.0 OPERATIONS OF EXSITING FACILITIES

The existing treatment plant must be kept in continuous operation throughout the construction period. The Contractor shall submit a Contractor's Assistance Request for Access to County Facilities at least 72 hours in advance for entering buildings or other restricted areas or equipment.

11.0 NOTICES TO COUNTIES AND AUTHORITIES

- A. CONTRACTOR shall, as provided in the General Conditions, notify Counties of adjacent property and utilities when prosecution of the Work may affect them.
- B. When it is necessary to temporarily deny access to property, or when any utility service connection must be interrupted, CONTRACTOR shall give notices sufficiently in advance to

enable the affected persons to provide for their needs. Notices shall conform to any applicable local ordinance and, whether delivered orally or in writing, shall include appropriate information concerning the interruption and instructions on how to limit inconvenience caused thereby.

- C. Utilities and other concerned agencies shall be notified at least 24 hours prior to cutting or closing streets or other traffic areas or excavating near underground utilities or pole lines.

12.0 UNFAVORABLE CONSTRUCTION CONDITIONS

During unfavorable weather, wet ground, or other unsuitable construction conditions, CONTRACTOR shall confine its operations to work which will not be affected adversely by such conditions. No portion of the Work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by CONTRACTOR to perform the Work in a proper and satisfactory manner.

13.0 HAZARDOUS ENVIRONMENTAL

No Hazardous Environmental Conditions at the Site in areas that will be affected by the Work are known to the COUNTY.

14.0 CLEANING UP

- A. CONTRACTOR shall keep the premises free at all times from accumulations of waste materials and rubbish. CONTRACTOR shall provide adequate trash receptacles about the Site and shall promptly empty the containers when filled.
- B. Construction materials, such as concrete forms and scaffolding, shall be neatly stacked by CONTRACTOR when not in use. CONTRACTOR shall promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.
- C. Volatile wastes shall be properly stored in covered metal containers and removed daily.
- D. Wastes shall not be buried or burned on the Site or disposed of into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the Site and disposed of in a manner complying with local ordinances and antipollution laws.
- E. Adequate cleanup will be a condition for recommendation of progress payment applications.

15.0 APPLICABLE CODES

References in the Contract Documents to local codes mean the following:

- a. 2017 Florida Building Code

Other standard codes which apply to the Work are designated in the Specifications.

16.0 REFERENCE STANDARDS

Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or laws or regulations in effect at the time of opening of Bids (or on the effective date of the Contract or Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents. However, no provision of any referenced standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of COUNTY, CONTRACTOR, or Engineer, or any of their SUBCONTRACTORS, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to COUNTY, Engineer, or any of Engineer's CONSULTANTS, agents, or employees, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

17.0 PRECONSTRUCTION CONFERENCE

Prior to the commencement of Work at the Site, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by:

- a. CONTRACTOR and its superintendent.
- b. Principal Subcontractor's.
- c. Representatives of principal Suppliers and manufacturers as appropriate. Engineer.
- d. Representatives of COUNTY.
- e. Government representatives as appropriate.

Others as requested by CONTRACTOR, COUNTY, or Engineer.

Unless previously submitted to Engineer, CONTRACTOR shall bring to the conference a preliminary schedule for each of the following:

- a. Progress Schedule.
- b. Procurement Schedule.
- c. Schedule of Values for progress payment purposes.
- d. Schedule of Shop Drawings and other submittals.

The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include:

- a. CONTRACTOR's preliminary schedules.
- b. Transmittal, review, and distribution of CONTRACTOR's submittals.
- c. Processing Applications for Payment.
- d. Maintaining record documents.
- e. Critical Work sequencing.
- f. Field decisions and Change Orders.
- g. Use of premises, office and storage areas, security, housekeeping, and COUNTY's needs.
- h. Major equipment deliveries and priorities.
- i. CONTRACTOR's assignments for safety and first aid.

Engineer will preside at the conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

18.0 PROGRESS MEETINGS

- A. COUNTY shall schedule and hold regular progress meetings at least monthly and at other times as required by progress of the Work. CONTRACTOR, Engineer, and all SubContractors active on the Site shall be represented at each meeting. CONTRACTOR may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other SubContractors.
- B. Regular Progress meetings will be held at the South Water Reclamation Facility (SWRF) at 4760 Sand Lake Road - Orlando, FL 32819.
- C. COUNTY shall preside at the meetings. Meeting minutes shall be prepared and distributed by the Engineer. The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.
- D. Each week, on the same day of the week as the monthly meeting, when there is no monthly meeting, the CONTRACTOR will hold a coordination meeting to discuss planned work for that week and for periods of two additional weeks. CONTRACTOR and CONTRACTOR's Superintendent, foreman, and SubContractors that are involved with the planned work, should be in attendance with the COUNTY's RPR. CONTRACTOR will provide a planned work Schedule for each meeting and make necessary corrections and changes after the meeting and distributed to attendees.

19.0 SITE ADMINISTRATION

- A. CONTRACTOR shall be responsible for all areas of the Site used by it and by all SubContractors in the performance of the Work. CONTRACTOR shall exert full control over the actions of all employees and other persons with respect to the use and preservation of property and existing facilities, except such controls as may be specifically reserved to COUNTY or others. CONTRACTOR shall have the right to exclude from the Site all persons who have no purpose related to the Work or its inspection, and may require all persons on the Site (except COUNTY's employees) to observe the same regulations as CONTRACTOR requires of its employees.
- B. Access to the Site will be limited to the main entrance off Sand Lake Road unless specific alternate arrangements are made with the Owner. CONTRACTOR shall supply a list, and periodically update it, that contains the names of all personnel with driver licenses numbers and license plate numbers of all vehicles that will be on-site during construction. CONTRACTOR shall also supply COUNTY's RPR a daily list of any scheduled visitors. Only scheduled visitors will be permitted to enter upon verification of identity.
- C. COUNTY reserves the right to direct CONTRACTOR to permanently remove any SubContractor or subcontracted employee from the site for breach of security, policy, unsafe working practice, unprofessional behavior, or failure to comply with access restrictions.

20.0 SECURITY

- A. CONTRACTOR shall be responsible for protection of the Site, and all Work, materials, equipment, and existing facilities thereon, against vandals and other unauthorized persons. CONTRACTOR shall comply with Orange COUNTY's security requirements to protect the site.
- B. The COUNTY has special security measures to protect the SWRF well site and the CONTRACTOR shall provide the same level of security. The CONTRACTOR shall provide the following security measures:
 - a. CONTRACTOR will supply list of all personnel that will work on the SWRF well site each morning to COUNTY's RPR.
 - b. All personnel, employees and or SubContractors and suppliers that pass through the security perimeter shall wear CONTRACTOR issued photo identification badges.
 - c. CONTRACTOR will supply list with names, driver license, and license plate numbers of all personnel and update the list monthly or as requested by the OWNER.
 - d. All CONTRACTOR's and SubContractor's personnel passing through the security perimeter shall have background checks at the cost of the CONTRACTOR and before entering Orange COUNTY Utilities' Site. Proof of background checks shall be submitted to COUNTY within 20 days after the effective date of the contract and before CONTRACTOR starts work at the site.

- e. All project deliveries shall be inspected prior to entering the security perimeter of the Facility in order to verify contents. All delivery personnel and delivery vehicles shall be under supervision while within the security perimeter of the Facility in lieu of issuance of photo identification badges. The CONTRACTOR shall maintain staff to accept all deliveries to the site, the COUNTY will not be responsible for receipt of any deliveries. CONTRACTOR shall notify the RPR 24 hours prior to any delivery to the site.
 - f. Access to the site is through the main entrance off Sand Lake Road. The gate is guarded, access to contract employees will only be granted to those persons that have been authorized (Personnel List from item c). The gate is manned during normal business hours. Work outside normal business hours must be coordinated with Orange County in 48 hours in advance to provide monitored access to the site. During after-hours work, the Orange County Water Production SCADA group must be notified to gain access and must be notified when all employees have completed the work shift and have left the facility. The SCADA contact number 407-254-9531.
- C. No Claim shall be made against COUNTY by reason of any act of an employee or trespasser, and CONTRACTOR shall make good all damage to COUNTY's property resulting from CONTRACTOR's failure to provide security measures as specified.

21.0 CONSTRUCTION ASSISTANCE REQUEST (CAR) FORM

The Contractor shall submit CAR to the Owner's Representative for any interaction requiring the involvement of the Owner's Operational Staff at SWRF, including but not limited to the following examples; existing valve actuation, process interruptions, equipment operation interruption, power interruption, flow diversions, spare parts transfers, and training. The Contractor shall not have contact with the Operations Staff without the knowledge of the Owner's Representative. The Owner's Representative reserves the right to direct the Contractor to provide a CAR at his discretion. Unless otherwise noted by the Owner's Representative, a CAR shall be submitted a minimum of seven (7) calendar days in advance of the intended operation noted within the CAR. Unless otherwise noted in the Contract Documents, for all activities affecting treatment process operation, a CAR shall be submitted a minimum of thirty (30) days in advance of the scheduled activity. Unless otherwise noted in the Contract Documents, the schedule for performing work which will require shutting down a unit process must be coordinated with the Owner by CAR submittal a minimum of sixty (60) days in advance of the scheduled activity. Reference a blank copy of the form within this section.

22.0 SMOKING POLICY – TOBACCO FREE CAMPUS

- A. Consistent with Section 386.204, Florida Statutes, tobacco use is prohibited in any workplace or public area within a County-owned or leased building. Additionally, the use of a nicotine dispensing device is prohibited in any workplace or public area within a County-owned or leased building. Tobacco use and the use of a nicotine dispensing device for persons employed

directly or indirectly by Orange County is prohibited during such person s' working hours on County-owned or County's leased property, except where specifically allowed by a collective bargained agreement. This requirement shall be enforced from the beginning of construction and violators will be removed from the property.

- B. Tobacco use shall be defined as the use of tobacco products including, but not limited to, cigars, cigarettes, pipes, chewing tobacco, snuff, herbal tobacco products, and other smoking material.
- C. Smoking - shall be defined as inhaling, exhaling, burning, carrying, or possessing any lighted tobacco product, including cigarette s, cigars, pipe tobacco, and any other lighted tobacco product.
- D. Nicotine dispensing device shall be defined as any product that employs an electronic, chemical or mechanical means to produce vapor from a nicotine product, including, but not limited to, an electronic cigarette, electronic pipe, or other similar device or product.

23.0 COUNTY'S WORK SCHEDULE

- A. The COUNTY reserves the right to have their Resident Project Representative (RPR) present to witness and inspect all Work performed by the CONTRACTOR. Working hours for the RPR are a 10-hour period between the hours of 6:00 a.m. and 6:00 p.m., Monday through Friday. Any Work beyond the 10-hour period shall be considered overtime and shall be requested in writing 24 hours prior. CONTRACTOR, with verbal permission of the RPR, may work 24 hours a day to provide clean-up, maintenance of vehicles and equipment, and other such items without the RPR present.
- B. Any Work required on Saturday or Sunday shall be considered overtime and shall be requested in writing 48 hours in advance. All requests must be approved by COUNTY in advance. Under emergency situations a verbal request may be made with a follow-up written request.
- C. COUNTY observes the following holidays: New Year's Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving Day, Christmas Eve and Christmas Day
- D. CONTRACTOR shall pay for the RPR's overtime. Overtime shall be defined as time beyond the 10-hour working period between 6:00 a.m. and 6:00 p.m. on Monday through Friday, and all time on Saturdays, Sundays, and on holidays observed by the COUNTY. Hourly rates for the Resident Project Representatives shall be \$50 per hour.

24.0 PERMITS

The CONTRACTOR shall comply with all laws, rules, regulations, and ordinances of any authority having jurisdiction over the work as required by the General Conditions. Permits obtained by the COUNTY are appended to this section. The term "Engineer" in the building department permit holds refers to the CONTRACTOR's Engineer.

25.0 UTILITY LOCATES

The CONTRACTOR shall:

- A. Comply with Chapter 556 of Florida Statutes, "UNDERGROUND FACILITY DAMAGE PREVENTION AND SAFETY" as required.
- B. Coordinate utility locates within the SWRF with OCU at no cost to the COUNTY.

26.0 RESTORATION

The CONTRACTOR shall:

- A. Restore road surfaces in public rights-of-way in accordance with the permits issued by the jurisdictional authority. The Contractor shall obtain all appropriate City, County, and/or State permits prior to construction that affects their right-of-ways. At a minimum, roads shall be restored to as good or better condition than existed prior to commencing construction.
- B. Access roads shall be restored to as good or better condition than existed prior to commencing construction.
- C. Replace all damaged items with new items of equivalent type, size, etc., as approved by the Owner or Owner's Representative.
- D. Removed shrubs and trees within the work areas and/or limits of clearing and grubbing, do not require replacing unless specifically noted in the Drawings and/or specified herein.
- E. All vegetation and ground cover (trees, shrubs, lawns, etc.) outside the work limits removed or damaged by the Contractors operations shall be restored at the Contractor's expense and to the satisfaction of the Owner or Owner's Representative.

CONTRACTOR'S ASSISTANCE REQUEST
FOR ACCESS TO COUNTY FACILITIES

PROJECT: SOUTH WATER RECLAMATION FACILITY - REROOFING OF THE SOUTH PLANT ELECTRICAL
BUILDING AND THE REROOFING AND REPLACEMENT OF ROOF MOUNTED EQUIPMENT OF THE
INFLUENT PUMP STATION.

DATE: _____ NUMBER: _____

LOCATION/STRUCTURE: _____

PURPOSE: _____

ADDITIONAL ASSISTANCE REQUESTED: _____

DATE ACCESS NEEDED: _____

DURATION OF WORK: _____

CONTRACTOR _____ OCU CONSTRUCTION
COMMENTS/RESTRICTIONS: _____

PLANT SUPERVISOR

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SECTION 01026

MEASUREMENT AND PAYMENT

1.0 SCOPE

This section covers methods of measurement and payment for items of Work under this Contract.

2.0 GENERAL

- A. The total Contract Amount shall cover all Work required by the Contract Documents. All costs in connection with the proper and successful completion of the Work, including permit fees; furnishing all materials, equipment, supplies, and appurtenances; providing all construction equipment and tools; providing all necessary temporary facilities; and performing all necessary labor and supervision to fully complete the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of the CONTRACTOR and all costs in connection therewith shall be included in the prices bid.
- B. The CONTRACTOR shall receive and accept the compensation per quantity provided in the Proposal and the Contract as full payment for furnishing all materials, labor, tools and equipment, for performing all operations necessary to complete the work under the Contract, and also in full payment for all loss or damages arising from the nature of the work, or from the action of the elements or from any unforeseen difficulties which may be encountered during the execution of the work until the final acceptance by the OWNER.
- C. The prices stated in the Proposal include all costs and expenses for taxes, labor, equipment, materials, permits, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the Drawings and as specified herein. The basis of payment for an item at the price shown in the Proposal shall be in accordance with the description of that item in this Section.
- D. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the OWNER, in accordance with the applicable method of measurement therefore contained herein and the unit prices indicated on the Bid Form, as described below under 5. BID FORM PAYMENT ITEMS FOR THE WELL.
- E. The quantities included in the Bid Form are the line item quantities required for the bidding of the well. Total Contract Amount will be the sum of the itemized totals for one (1) upper Floridan aquifer supplemental well.
- F. The contractor shall be liable for any and all sanitary sewer overflows associated with the Contract, regardless of fault. The Contractor shall be liable for all County personnel labor and equipment costs, penalties and fines resulting from sanitary sewer overflows. Such occurrences

may be considered violations of Florida Statutes or administrative rules and may result in additional liability beyond that outlined below for damages and restoration, and the judicial imposition of civil penalties, pursuant to Sections 403.121 and 403.161 Fla Stat. Contractor will be assessed the following penalties for any and each Sanitary Sewer Overflow:

a. For a domestic or industrial wastewater violation not involving a surface water or groundwater quality violation, OCU shall assess a penalty of \$2,000 for each unpermitted or unauthorized event or occurrence.

b. For an unpermitted or unauthorized discharge that resulted in a surface water or groundwater quality violation, OCU shall assess a penalty of \$5,000 for each unpermitted or unauthorized event or occurrence.

c. In addition, for any and all unpermitted or unauthorized discharge, OCU shall assess a penalty in the amount of \$1.00 per gallon of sanitary sewer overflow, up to a maximum amount of \$100,000 per each Sanitary Sewer Overflow.

3.0 ESTIMATED QUANTITIES FOR THE WELL

All estimated quantities stipulated in the Bid Form or other Contract Documents for construction of the well are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work and (b) for the purpose of comparing the bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items for construction of the well may differ from the estimated quantities. The quantities indicate the OWNER'S expectations for how the well will be constructed and variations from the expected quantities should be formally addressed during construction via a Request for Information (RFI) form from the CONTRACTOR. The basis of payment for work and materials for the well will be the actual amount of work done and materials furnished for the well ready for service and accepted by the OWNER. The CONTRACTOR agrees that it will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished for the well and the estimated amounts therefore.

4.0 WELL WORK FAILURE

- A. If evidence indicates that the casing in a well is broken or that the well is not constructed in accordance with the Specifications to the satisfaction of the ENGINEER/GEOLOGIST or the OWNER'S REPRESENTATIVE, the ENGINEER/GEOLOGIST or the OWNER'S REPRESENTATIVE may order repairs or alterations to be made by the CONTRACTOR to bring the well into compliance with the Specifications. In the event that repairs or alterations cannot be made to bring the well into compliance with the Specifications, the ENGINEER/GEOLOGIST and the OWNER'S REPRESENTATIVE may order the CONTRACTOR to plug and abandon such well and to construct a new well without additional cost to the OWNER. If such well failure should occur before a well is completed, the CONTRACTOR shall plug the abandoned well and construct the new well to the same state of completion at no cost to the OWNER; and the OWNER shall pay the CONTRACTOR for Work performed to complete the construction, in accordance with the amounts indicated in the Bid Form.
- B. If the ENGINEER/GEOLOGIST or the OWNER'S REPRESENTATIVE determines that a well must be abandoned due to circumstances beyond the CONTRACTOR'S control, then payment will be

made for all work and materials incorporated into the abandoned well based on the units completed in accordance with contract unit rates. Such circumstances would include, but not necessarily be limited to, unacceptable subsurface geologic or hydrologic conditions. Additionally, the CONTRACTOR will be paid for grout required to plug the abandoned well at the unit price for cement grouting indicated in the Bid Form.

- C. If it is determined by the ENGINEER/GEOLOGIST or the OWNER's REPRESENTATIVE that the CONTRACTOR is at fault for an interruption causing a pumping test to be terminated, no payment shall be made for test pumping for the hours expended during the terminated test. If a pumping test is interrupted and the CONTRACTOR is not at fault, then payment for the test pumping for the terminated test will be made on the basis of the unit price for test pumping as indicated on the Bid Form.

5.0 BID FORM PAYMENT ITEMS FOR THE WELL

A. BASE BID

Item 1. MOBILIZATION & DEMOBILIZATION. Payment for Mobilization/Demobilization will be made at the Contract lump sum price for the item, which price and payment shall be full compensation for the Work consisting of the preparatory Work and operations in mobilizing for beginning Work on the Contract, including, but not limited to, furnishing those supplies and incidentals to the project site, preparation of submittals, safety equipment and first aid supplies, project signs, field surveys, and other facilities required by these specifications, and State and local laws and regulations. The costs of bonds and any required insurance and any other preconstruction expense necessary for the start of the work, excluding the cost of construction materials, shall also be included. This Work also consist of the general project management of the Work including, but not limited to, field supervision and office management, as well as other incidental cost for management of the Work during the duration of the Contract. This Work also includes maintenance of the field offices for the duration of the Contract which includes a generator for temporary utility service. The Work specified in this item also consists of demobilization or the operations normally involved in ending Work on the project including, but not limited to, termination and removal of temporary utility service; demolition and removal of temporary structures and facilities; restoration of Contractor storage areas; disposal of trash and rubbish, and any other post-construction work necessary for the proper conclusion of the Work. This pay item may not exceed 5% of the Total Base Bid amount.

Item 2. INDEMNIFICATION. In consideration of the CONTRACTOR's Indemnity Agreement as set out in the Contract Documents, the OWNER specifically agrees to give the Contractor \$100.00 and other good and valuable consideration, receipt of which is acknowledged upon signing of the Agreement. To the fullest extent permitted by law, the CONTRACTOR shall indemnify, hold harmless and defend the OWNER, its agents, servants, and employees from and against all claims, damages, losses and expenses including, but not limited to, attorney's fees and other legal costs such as those for paralegal, investigative and legal support services and the actual cost incurred for expert witness testimony, arising out of or resulting from the performance of services required under this Agreement, provided that same is caused in whole or part by error, omission, negligent act, conduct or misconduct of the CONTRACTOR, its agents, servants, employees, or subcontractors. In accordance with Section 725.06, Florida Statutes, adequate

consideration has been provided to the CONTRACTOR for this obligation, the receipt and sufficiency of which is hereby specifically acknowledged.

Item 3. DRILL 8-inch PILOT HOLE. The cost for drilling shall include all equipment and labor necessary for drilling the pilot hole as described in the Specifications. Payment will be made on the basis of the unit price identified on the Bid Form.

Item 4. DRILL NOMINAL 30-inch BOREHOLE. The cost for drilling shall include all equipment and labor necessary for drilling the borehole as described in the Specifications. Payment will be made on the basis of the unit price identified on the Bid Form.

Item 5. FURNISH AND INSTALL 24-inch SURFACE CASING. The cost of furnishing and installing the surface casing and furnishing all accessories required for grouting shall be included in the unit price for this item. Payment will be made on the basis of the unit price indicated on the Bid Form.

Item 6. CEMENT GROUTING OF 24-inch CASING. Payment for cement grout will be made on the basis of the unit price as indicated on the Bid Form.

Item 7. DRILL 8-inch PILOT HOLE. The cost for drilling shall include all equipment and labor necessary for drilling the borehole as described in the Specifications. Payment will be made on the basis of the unit price identified on the Bid Form.

Item 8. GEOPHYSICAL LOGS 8-inch PILOT HOLE. The CONTRACTOR shall take full suite of geophysical logs of the borehole as described in the Specifications to determine the depth at which to set the 24-inch casing. Payment will be made on the basis of the lump sum price indicated on the Bid Form and shall include all equipment and labor necessary to provide the information identified in the Specifications. The cost of the test pumping (including the setting and removing of the test pump) for geophysical logging under dynamic conditions is to be included in this lump sum price.

Item 9. DRILL NOMINAL 24-inch BOREHOLE. The cost for drilling shall include all equipment and labor necessary for drilling the borehole as described in the Specifications. Payment will be made on the basis of the unit price identified on the Bid Form.

Item 10. GEOPHYSICAL LOGS 24-inch BOREHOLE. The CONTRACTOR shall take caliper and gamma geophysical logs of the borehole as described in the Specifications to determine borehole volume as the basis for calculating grout quantities. Payment will be made on the basis of the lump sum price indicated on the Bid Form and shall include all equipment and labor necessary to provide the information identified in the Specifications.

Item 11. FURNISH AND INSTALL 18-inch INNER CASING. The cost of furnishing and installing the intermediate casing and furnishing all accessories required for grouting shall be included in the unit price for this item. Payment will be made on the basis of the unit price indicated on the Bid Form.

Item 12. CEMENT GROUTING OF 18-inch INNER CASING. Payment for cement grout will be made

on the basis of the unit price as indicated on the Bid Form.

Item 13. DRILL NOMINAL 18-inch BOREHOLE. The cost for drilling shall include all equipment and labor necessary for drilling the borehole as described in the Specifications. Payment will be made on the basis of the unit price identified on the Bid Form.

Item 14. PLUMBNESS AND ALIGNMENT TESTING. The CONTRACTOR shall perform the plumbness and alignment tests as described in the Specifications. Payment will be made on the basis of the unit price indicated on the Bid Form and shall include all equipment, material, and labor necessary for the plumbness and alignment tests as specified.

Item 15. SET TEST PUMP AND DISCHARGE LINE. After the plumbness and alignment tests is complete, the CONTRACTOR shall set a pump so as to develop and test the well along with discharge line to direct flows away from the well. The CONTRACTOR will be paid the lump sum price on the Bid Form for this item.

Item 16. WELL DEVELOPMENT. After the supplemental well has been completed, the CONTRACTOR shall develop the well by over pumping and surging. The CONTRACTOR will be paid for the well development according to the duration of development at unit prices indicated on the Bid Form for this item.

Item 17. PERFORM STEP DRAWDOWN TEST. Following the installation of a test pump, and well development, the CONTRACTOR may be directed to provide preliminary pumping tests to determine the appropriate pumping rates for the detailed tests. The CONTRACTOR will be paid for the preliminary pumping tests according to the duration of the tests at unit prices indicated on the Bid Form for performing pumping tests.

Item 18. FINAL GEOPHYSICAL LOGGING AND VIDEO LOG. The CONTRACTOR shall take caliper, gamma and a video recording of the full depth of the well, as described in the Specifications. Payment will be made on the basis of the lump sum price indicated on the Bid Form and shall include all equipment and labor necessary to provide the information identified in the Specifications.

Item 19. WELL DISINFECTION AND WATER QUALITY TESTING. The OWNER shall pay the CONTRACTOR for disinfection of the well the amount included in the Bid Form for disinfection. If the first samples tested for bacteriological quality are found to be unacceptable, the costs of all additional actions necessary to produce water of acceptable bacteriological quality, including additional disinfection, will be paid by the CONTRACTOR, at no expense to the OWNER.

Item 20. INSTALL WELL CAP AND PAD. The CONTRACTOR shall install well head, locking well cap, guard posts (bollards), well pad and appurtenances as described in the Specifications and Figures. Payment will be made on the basis of the unit price indicated on the Bid Form and shall include all equipment, material, and labor necessary.

Item 21. WELLHEAD AND PAD SURVEY. The CONTRACTOR shall establish a survey measuring point and shall have a survey monument set as described in the Specifications. Payment will be made on the basis of the unit price indicated on the Bid Form and shall include all equipment,

material, and labor necessary for the surveying services as specified.

Item 22. SAND/PEA GRAVEL WELL CAVITY FILL. Payment for this pay item will be made at the contract unit price bid per cubic yard. This payment will be full compensation for furnishing and placing sand and/or pea gravel to fill large cavities encountered during the grouting process if necessary. This pay item also includes delays incurred by CONTRACTOR between installing grout and sand or gravel.

Item 23. DREDGING.

- a. Payment for this pay item shall be made when the Contractor is drilling a borehole and formation material is falling into or infilling the borehole (unstable zone) and less than 10 feet of progress is made advancing the borehole after 10 hours of actively drilling.
- b. Based on that effort, the Contractor shall be paid the hourly rate in the Bid Form under dredging the first 10 hours drilling the borehole with no progress. Compensation for this "dredging time" continues when the Contractor is actively drilling and working to advance the borehole until the borehole is advanced more than 10 feet within 10 hours. No payment for dredging time is made if the borehole is advanced more than 10 feet within 10 hours, unless infilling of the borehole reoccurs.
- c. In the case when the Contractor cement plugs the borehole for stabilization purposes, payment shall be made based on unit price for cementing as indicated on the Bid Form. The effort associated with the preparation, re-drilling of the pilot hole and reaming the borehole to the bottom of the cement plug after the borehole is stabilized shall be compensated at the hourly rate in the Bid Form for dredging time. After the cement plug has been reamed out, compensation will resume under the normal Bid line items.
- d. The Contractor and Owner Representative shall agree, in the field, on the daily hours onsite and the borehole depth penetrated. All dredging work must be approved by OWNER.

Item 24. STAND-BY TIME. Stand-by time shall be as described in the Specifications. Payment for stand-by time shall be made at the hourly rate indicated on the Bid Form. Stand-by time shall include cost of personnel and shall not include the cost of the rig or equipment. All stand-by time must be approved by OWNER.

END OF SECTION

CONSTRUCTION OF UPPER FLORIDAN SUPPLEMENTAL WELL
UNIT PRICE SCHEDULE

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price (\$)</u>	<u>Item Total (\$)</u>
1	Mobilization and Demobilization	1	LS		
2	Indemnification	1	LS		
3	Drill 8-inch Pilot Hole	100	LF		
4	Drill Nominal Borehole 30-inch	75	LF		
5	Furnish and Install Surface Casing 24-inch	75	LF		
6	Cement Grout of 24-inch Surface Casing	187	94 lb. sack		
7	Drill 8-inch Pilot Hole	450	LF		
8	Geophysical Logs 8-inch Pilot Hole	1	EA		
9	Drill Nominal 24-inch Borehole	275	LF		
10	Geophysical Logs 24-inch Borehole	1	EA		
11	Furnish and Install 18-inch Inner Casing	275	LF		
12	Cement Grout of 18-inch Inner Casing	525	94 lb. sack		
13	Drill Nominal 18-inch Borehole	275	LF		
14	Perform Plumbness and Alignment Test	1	EA		
15	Set Test Pump, Discharge Line, and Equipment	1	EA		
16	Well Development	24	Hours		
17	Perform Step Drawdown Test	10	Hours		
18	Final Geophysical Logging and Video Log	1	EA		
19	Well Disinfection/Water Quality Testing	1	EA		
20	Install Protective Casing and Pad	1	EA		
21	Wellhead and Pad Survey	1	EA		
22	Sand/Pea Gravel Well Cavity Fill	10	CY		
23	Dredging	24	Hours		
24	Standby Time	12	Hours		

ITEMIZED TOTAL FOR WELL SW-5R

1 through 24

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SECTION 01060

PERMITS AND REGULATORY REQUIREMENTS

1.0 GENERAL

The Contractor shall;

- A. Obtain and pay for all permits and licenses as provided for in the General Conditions, except as otherwise specified herein.
- B. Schedule all inspections and obtain all written approvals of the agencies required by the permits and licenses.
- C. Comply with all conditions specified in each of the permits and licenses.
- D. A copy of the permits obtained by the County will be furnished to the Contractor upon request.

2.0 REFERENCE

Section 01015

3.0 PERMITS OBTAINED BY THE CONTRACTOR

The Contractor shall be responsible for obtaining the following permits when applicable:

- A. The Contractor shall be responsible for obtaining the applicable Orange County Permits, South Florida Water Management District (SFWMD) permits, and shall pay for all permits subsequent to the initial Permit as required.
- B. All other permits required for Contractor's operations or required elsewhere in Contract Documents and not included herein. Furnish three copies of permits to the County prior to performance of work authorized by permits.
- C. Contractor will be responsible for obtaining extensions to permits obtained by the County if construction authorized by permits has not been completed by expiration date noted on these permits.
- D. Permits may require that a representative of permitting agency be present at site during construction or prior to covering up of activity authorized by permit. Contractor will be responsible for notifying permitting agency in compliance with requirements of such permits.
- E. Contractor shall include time to obtain permits in his construction schedule.

END OF SECTION

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SECTION 01380

CONSTRUCTION PHOTOGRAPHS AND VIDEO

1.0 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Providing construction photographs and video pertinent to the Contract work during the Contract period as specified.
2. Non-applicable subsections with N/A designation.

1.02 SUBMITTALS

A. Product Data:

1. Submit to the County electronic images on DVD. A minimum of twelve photographs of the entire site, or pertinent features thereof, shall be taken before commencement of work and promptly submitted to the COUNTY's RPR. The same views shall be photographed upon completion of all construction activities and submitted with Contractor's application for final payment. Additional photographs shall be made each month throughout the progress of the work at such time as requested by the COUNTY and submitted with Contractor's application for progress payment.
 - a. Photographs shall be taken from a digital camera, image files shall be in a jpeg format, and stored on a writable DVD and provided to the COUNTY.
 - (1) Mark each DVD with name and number of Contract, name of Contractor and date photographed.
2. CONTRACTOR shall provide COUNTY with a video record of the existing conditions prior to construction. This video shall contain audio and shall be a standard DVD disk in standard mpeg 2 format. Audio portion shall describe the location of the video footage. The following features shall be shown in a clear manner, but not limited to the following:
 - a. All existing features and improvements within the site.
 - b. All existing features and improvements within the right-of- way.
 - c. All existing features and improvements within temporary construction easements.
 - d. All existing features and improvements within permanent easements.
 - e. All existing features and improvements adjacent to any construction.
3. Detail of the video shall be such that the following features and improvements shall be clear and visible:

- a. Condition of buildings and cracks in walls.
 - b. Condition of fencing.
 - c. Condition of planted areas and types of vegetation.
 - d. Condition of sodded areas.
 - e. Conditions of sprinkler systems and associated controls and wiring.
 - f. Condition of paved areas.
 - g. Condition of signs.
 - h. Conditions of lighting and associated wiring.
 - i. Condition of above ground storage tanks.
4. Sufficient detail of any preexisting damages to physical features and improvements shall be shown. The coverage of the video should include the limits of effects of the use of vibratory rollers. This video record shall be presented to the County within thirty (30) days of the Commencement Date specified in the Notice to Proceed.

2.0 EXECUTION

2.01 COORDINATION

Contractor shall coordinate with the RPR prior to video and photo documentation of the site. RPR must be present during video recording session.

2.02 APPLICATION

A. Special Techniques:

1. General:
 - a. All views to contain a relative dimension reference that is recognizable. In views where dimensions are critical use a recognizable measuring devices such as folding ruler, measuring tape in a manner the markings are clear and sharp in the photograph and the device located in close relationship with subject of photograph.
2. Site photography required:
 - a. Provide photographs at following stages of construction:
 - (1) Site before commencement of any construction at the facility.
 - (2) At 1-month intervals, progress photography during construction of facilities. Photos of any month need show only new work performed during month.
 - (3) Upon completion of all Contract work, overall site photography.
 - (4) Consult with COUNTY's RPR for instructions concerning views required at each specified visit to site.
 - (5) Photograph from locations to adequately illustrate state of project, or condition of construction.
 - (6) Take photographs from as close to the same position each time as practical.
 - (7) In addition, provide photographs prior to, at critical stages of, and at the end of construction, when they do not coincide with scheduled times.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

1.0 UNITS OF MEASUREMENT

When both inch-pound (English) and SI (metric) units of measurement are specified herein, the values expressed in inch-pound units shall govern.

2.0 COUNTY INSPECTOR'S FIELD OFFICE

The CONTRACTOR shall coordinate with the COUNTY for the use of temporary office space at the South Water Reclamation Facility (SWRF) for the sole purpose of holding meetings.

- A. The CONTRACTOR shall provide and coordinate with the COUNTY necessary space for CONTRACTOR's personnel on site with the COUNTY's approval.

3.0 MAINTENANCE

CONTRACTOR to maintain and prevent damage to COUNTY's designated temporary field office space for the duration of the Work.

4.0 WATER

- A. All water required for and in connection with the Work to be performed shall be furnished by and at the expense of CONTRACTOR through meters and backflow preventers installed on hydrants or existing piping. CONTRACTOR shall supply all necessary tools, hose, and pipe, or otherwise transport the water to the point of use, and shall make its own arrangements with OCU as to the amount of water required and the time when the water will be needed. Indiscriminate use of water furnished will not be permitted. Special hydrant wrenches shall be used for opening and closing fire hydrants. In no case shall pipe wrenches be used for this purpose.
- B. All water connections to COUNTY shall include a meter and backflow preventer. CONTRACTOR shall coordinate water connection with the COUNTY.
- C. The CONTRACTOR may use available water and/or water from the plant for filling basins and testing as approved by the COUNTY.
- C. Furnish potable drinking water in suitable dispensers and with cups for use of all employees at the job site during the entire construction period.

5.0 POWER

Purchase electric power or provide portable electric power for the construction of the project. Provide for the extension of utility lines to the point of usage. The CONTRACTOR is responsible

for the permitting and the provisions required in order to provide temporary power for construction facilities. There is no excess electrical power available at plant site.

6.0. SANITARY FACILITIES

CONTRACTOR shall furnish temporary sanitary facilities at the Site, as provided herein, for the needs of all construction workers and others performing work or furnishing services on the Project. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 20 persons. CONTRACTOR shall enforce the use of such sanitary facilities by all personnel at the Site.

7.0. MAINTENANCE OF TRAFFIC

CONTRACTOR shall conduct its work to interfere as little as possible with SWRF operations on site, whether vehicular or pedestrian. Maintenance of Traffic will be confined to SWRF site and should address issues that may arise within that environment. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, CONTRACTOR shall provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of the SWRF site operators, and shall give a minimum of seven (7) days notice to the County before interfering with the SWRF facility operators. CONTRACTOR shall coordinate with the SWRF Facility operators to facilitate traffic flow and minimize interference.

8.0. FENCES

All existing fences affected by the Work shall be maintained by CONTRACTOR until completion of the Work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the COUNTY of the fence, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use. CONTRACTOR shall maintain the integrity of the fenced facility during the entire construction phase.

On completion of the Work across any tract of land, CONTRACTOR shall restore all fences to their original or to a better condition and to their original locations.

9.0. DAMAGE TO EXISTING PROPERTY

CONTRACTOR will be held responsible for any damage to existing structures, Work, materials, or equipment because of his operations and shall repair or replace any damaged structures, Work, materials, or equipment to the satisfaction of, and at no additional cost to, COUNTY.

CONTRACTOR shall protect all existing structures and property from damage and shall provide bracing, shoring, or other work necessary for such protection.

10.0. DUST CONTROL

CONTRACTOR shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water. When practicable, dusty materials in piles or in transit shall be covered to prevent blowing dust.

Buildings or operating facilities which may be affected adversely by dust shall be adequately protected from dust. Existing or new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

11.0. TEMPORARY DRAINAGE PROVISIONS

CONTRACTOR shall provide for the drainage of storm water and such water as may be applied or discharged on the Site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the Work, the Site, and adjacent property.

Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff attributable to CONTRACTOR's operations. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect COUNTY's facilities and the Work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

12.0. POLLUTION CONTROL

CONTRACTOR shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes shall be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance shall be permitted to enter sanitary sewers, and reasonable measures shall be taken to prevent such materials from entering any drain or watercourse.

13.0. TREE AND PLANT PROTECTION

All trees and other vegetation which must be removed to perform the Work shall be removed and disposed of by CONTRACTOR; however, no trees or cultured plants shall be unnecessarily removed unless their removal is indicated on the Drawings. All trees and plants not removed shall be protected against injury from construction operations.

14.0. SECURITY

- A. Refer to Section 01015 item 17.0.
- B. CONTRACTOR shall be responsible for protection of the Site, and all Work, materials, equipment, and existing facilities thereon, against vandals and other unauthorized persons.

- C. No Claim shall be made against COUNTY by reason of any act of an employee or trespasser, and CONTRACTOR shall make good all damage to COUNTY's property resulting from CONTRACTOR's failure to provide security measures as specified.
- D. All personnel, CONTRACTOR employees and or Subcontractors and suppliers that pass through the gates shall wear identification badges. All personnel passing through the gates shall be subject to background checks as described in Section 01015. Background checks shall be provided by the CONTRACTOR. The background checks shall include running fingerprints through FDLE to determine nationwide arrest history. Background check information for each personnel shall be submitted to the COUNTY prior to access to the facility. Refer to item 17-B Section 01015 for additional detail.
- E. All project deliveries shall be inspected prior to entering the security perimeter of the Facility in order to verify contents. All delivery personnel and delivery vehicles shall be under supervision while within the security perimeter of the Facility in lieu of issuance of photo identification badges. The CONTRACTOR shall maintain staff to accept all deliveries to the site, the COUNTY will not be responsible for receipt of any deliveries. CONTRACTOR shall notify the RPR 24 hours prior to any delivery to the site. Refer to item 17 Section 01015.

15.0. EROSION CONTROL

CONTRACTOR shall prevent erosion of soil on the Site and adjacent property resulting from its construction activities. Effective measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operation that will disturb the natural protection.

Work shall be scheduled to expose areas subject to erosion for the shortest possible time, and natural vegetation shall be preserved to the greatest extent practicable. Temporary storage and construction buildings shall be located, and construction traffic routed, to minimize erosion. Temporary fast-growing vegetation or other suitable ground cover shall be provided as necessary to control runoff.

16.0 NOISE CONTROL

CONTRACTOR shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the Work.

During construction activities on or adjacent to occupied buildings, and when appropriate, CONTRACTOR shall erect screens or barriers effective in reducing noise in the building and shall conduct its operations to avoid unnecessary noise which might interfere with the activities of building occupants.

17.0 REMOVAL OF TEMPORARY CONSTRUCTION WHEN NO LONGER NEEDED

When temporary facilities, services, and controls are no longer needed and before the Work is completed, remove the various temporary facilities, services, and controls and legally dispose of them. Portions of the site used for temporary facilities shall be reconditioned and restored to their previous condition. Refer to item 22 of Section 01015.

END OF SECTION

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SECTION 01614

HANDLING AND STORAGE

1.0 SCOPE

This section covers delivery, storage, and handling of materials and equipment. Reference Section 01500.

2.0 DELIVERY

- A. Contractor shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the site and shall comply with the requirements specified herein and shall provide required information concerning the shipment and delivery of the materials specified in this Contract. These requirements also apply to any sub suppliers making direct shipments to the jobsite.
- B. Contractor shall, either directly or through contractual arrangements with others, accept responsibility for the safe handling and protection of the equipment and materials furnished under this Contract before and after receipt at the port of entry. Acceptance of the equipment shall be made after it is installed, tested, placed in operation and found to comply with all the specified requirements.
- C. All items shall be checked against packing lists immediately on delivery to the site for damage and for shortages. Damage and shortages shall be remedied with the minimum of delay.
- D. Delivery of portions of the equipment in several individual shipments shall be subject to review of COUNTY before shipment. When permitted, all such partial shipments shall be plainly marked to identify, to permit easy accumulation, and to facilitate eventual installation.

3.0 STORAGE

- A. Upon delivery, all equipment and materials shall immediately be stored and protected until installed in the Work. The Contractor shall provide lien waivers for stored equipment as requested by the COUNTY. Refer to Section 01500.
- B. Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.
- C. In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be for export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.

4.0 HANDLING

Stored items shall be laid out to facilitate their retrieval for use in the Work. Care shall be taken when removing the equipment for use to ensure the precise piece of equipment is removed and that it is handled in a manner that does not damage the equipment.

END OF SECTION

DIVISION 2

SITework

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SECTION 02050

SOUTH WATER RECLAMATION FACILITY SUPPLEMENTAL WELL 5R

PART I – GENERAL

1.01 THE REQUIREMENT

- A. General: The work described herein consists of constructing a public supply well in accordance with the Specifications and Figures (Figures 1 through 3) contained herein. The work shall be performed by a licensed Florida Water Well Contractor or Driller, with equipment which is adequate to complete all phases of well construction. All work shall be performed under the direct supervision of an experienced well driller and an adequate number of competent helpers. If the CONTRACTOR's equipment is not capable of satisfactorily performing the work provided for in these Specifications, the CONTRACTOR at his own expense shall substitute equipment satisfactory to the OWNER. All work shall be completed in full conformance with South Florida Water Management District (SFWMD) and Florida Department of Environmental Protection (FDEP) rules and regulations for water wells, or this Specification, whichever is greater or more restrictive.
- B. Site Access: The CONTRACTOR shall make arrangements with the OWNER in order to gain access to the site. The contact person shall be the designated RPR at the preconstruction conference. Refer to item 14 of section 01500 for additional site security details.
- C. Supplemental Well : The CONTRACTOR shall provide all equipment, labor and materials to construct, develop, test, and log, one (1) upper Floridan aquifer (UFA) supplemental well at the South Water Reclamation Facility (SWRF). The construction of the new well and all appurtenant work, will be completed in accordance with the requirements of the Contract Documents, Specifications, and Figures contained herein.
- D. Sound Proofing: The CONTRACTOR shall provide mufflers on equipment, and take whatever other steps necessary during drilling, pumping, testing, and all other work incidental there to ensure that noise levels conform to any County or other applicable noise ordinances. The CONTRACTOR will take necessary measures to limit access to the drilling site to minimize public hazards. Refer to Section 01500.
- E. Work Hours: The CONTRACTOR shall limit work hours between 6:00 a.m. and 6:00 p.m. Monday through Friday, unless given approval by the OWNER.
- F. The CONTRACTOR shall complete the work, disinfect where applicable, and prepare the well for continuous service. The CONTRACTOR shall make repairs, replacements and restoration required as a result of any damages caused during construction and/or testing. The CONTRACTOR will restore all areas disturbed during progress of work.
- G. The OWNER/ENGINEER/GEOLOGIST reserves the right to move to an alternate site for drilling and constructing a well if unfavorable subsurface hydrogeologic conditions are encountered at the site.

- H. The CONTRACTOR shall notify the SFWMD and Orange County Department of Health, as required by regulations, prior to placement of any cement grout, and whenever else required for the construction of the well.

1.02 SCOPE OF SERVICES

- A. The Work to be performed under this Section includes the furnishing of all labor, materials, equipment, and all other facilities and incidentals necessary to construct, develop, and test one supplemental well with approximate construction specifications as summarized below.

New Well	Casing Length	Total Depth	Casing Diameter
Supplemental Well SW-5R	275'	550'	18"

The new supplemental well will be located at the SWRF in south Orange County, Florida as shown in Figure 1.

Casing for the supplemental well shall be constructed of new black steel pipe. The supplemental well shall be capable of producing 3,500 gpm with the lowest practical amount of drawdown. The 18-inch casing for the supplemental well shall be set a minimum of 10 feet into limestone. Cuttings from the drillings and a video log will be provided to the ENGINEER/GEOLOGIST to assist in determining if the 18-inch casing is adequately set into a layer of limestone. A combination of the mud rotary method and the reverse air method shall be used to construct the well. Alternate drilling methods may be proposed by the CONTRACTOR, but are not to be utilized unless prior approval from the ENGINEER/GEOLOGIST is provided. A detailed well location map is provided as Figure 2. Typical well construction details are shown in Figure 3.

The proposed well shall be constructed to public supply standards as described by the South Florida Water Management District (SFWMD) and Florida Department of Environmental Protection (FDEP) rules and regulations, and shall comply with any other applicable federal, state and local rules and regulations.

- B. The CONTRACTOR shall establish his work sequence based on the use of crews to facilitate completion and testing within the allotted contract time.
- C. A series of geophysical logs will be performed on the supplemental well during construction and a final suite of geophysical logs plus a video log will be performed on the well after completion. Prior to setting the surface casing string, a geophysical log shall be performed to include caliper, gamma ray and dual induction. The suite of geophysical logs performed after advancement of the pilot hole to total depth will include caliper, gamma ray, dual induction, sonic, fluid resistivity (dynamic and static), temperature (dynamic and static) and video. The video log will be made with a color video camera with 360° directional side viewing capability and be performed while the well is flowing. The final suite of geophysical logs will include caliper, gamma ray and video.
- D. A step drawdown test will be performed on the supplemental well and shall be conducted in order to show proper development. The Work includes furnishing all labor, materials, equipment, and all other facilities and incidentals necessary to perform the step-drawdown test.

- E. The Work includes the furnishing of all labor, materials, equipment and all other facilities and incidentals necessary to disinfect the well and bacteriologically clear them after pump removal, as required by FDEP.
- F. Location of all existing utilities will be the CONTRACTOR's responsibility. Damage to any utilities shall be repaired at the CONTRACTOR's expense.
- G. These Specifications are intended to be a general description of the required work, but may not cover all contingencies that may occur during well construction. Changes or variations from the work plan shall be approved by the ENGINEER/GEOLOGIST, prior to execution.

1.03 REFERENCE TO STANDARDS

- A. AWWA, ASTM, ANSI, and API standards shall apply as referenced herein. Standards shall include, but are not restricted to the following:
 - 1. AWWA Water Well Standards, A100-06, A100-97 and A100-90.
 - 2. ASTM Pipe Standards A53, D2241 and F480.
 - 3. API Pipe Standards, 5L.
 - 4. ASTM Portland Cement Standards, C 150-92.
- B. The well shall be disinfected to remove bacteriological contamination in accordance with AWWA Water Well Standards AWWA C654-2013.

1.04 SUBMITTALS

- A. General: All CONTRACTOR submittals shall conform to the applicable requirements as specified by OWNER and the supplementary requirements specified. All measurements for depths shall be referenced to ground surface at the well site.
- B. Schedule: The CONTRACTOR shall submit a work schedule that includes the major components of the project. The work schedule shall be submitted to the OWNER and ENGINEER/GEOLOGIST.
- C. Materials and Shop Drawings: Copies of all materials required to establish compliance with the Specifications shall be submitted. Submittals shall at least include descriptive literature, bulletins, and/or catalogs providing description of all materials and mill certifications by material and specification (e.g., ANSI). These submittals shall include, but not be limited to the surface casing, well casing, and drilling fluid products.
- D. Supplier's List: The CONTRACTOR shall submit a complete list of all proposed vendors, and suppliers, along with corresponding material specifications to be used in the work. The Materials and Supplier's List shall be submitted to the OWNER and ENGINEER/GEOLOGIST one week prior to mobilizing the rig to the site.
- E. Applications for Payment: The CONTRACTOR shall submit copies of all applications for payment to the OWNER.

- F. Subcontractor's List: The CONTRACTOR shall submit a complete list of all proposed subcontractors to be used in the work, for acceptance by the OWNER, one week prior to mobilizing the rig to the site. The CONTRACTOR may be required to submit additional information or a resume of qualifications for any of the subcontractors proposed.
- G. Welders: Prior to the start of work, the CONTRACTOR shall submit a list of the welders he proposes to use during well construction, and the type of welding for which each has been qualified, along with current certification documents for each welder listed.
- H. Daily Log: The CONTRACTOR shall maintain a detailed daily log of events for his activities on the site during well construction and testing. The information shall be recorded on Daily Drilling Report forms. Failure to keep this log up to date on a weekly basis shall be grounds for the ENGINEER/GEOLOGIST to stop drilling operations. No standby time will be paid. The report forms should include information on bit assembly and drill string, drilling mud and additives, fluid losses, water- and fluid- level changes, footage drilled and formations encountered, change in formation, hard and soft zones, and cementing operations. Installed quantities of items identified on the Bid Form should be included in the daily log. In addition, information relative to maintenance and repair time, along with details of repair, CONTRACTOR'S personnel/sub-contractors personnel, and other pertinent information shall be included. Development and pump testing records shall also be included and attached. One legible form (with any attachments) suitable for photocopying shall be submitted to the ENGINEER/GEOLOGIST on a weekly basis
- I. Mill Certificates: Casing mill certificates shall be submitted to the ENGINEER/GEOLOGIST for all casings, one week prior to the installation of the casing in the ground. Heat numbers on casing joints shall be readily visible and legible or the casing will not be accepted by the ENGINEER/GEOLOGIST.
- J. Welding Procedures: The CONTRACTOR shall submit to the ENGINEER/GEOLOGIST proposed procedure specifications and qualification records for welding activities for all pipe and casing welding to be performed under this section, in accordance with Section IX, Article II of the ASME Boiler and Pressure Vessel Code. Materials shall be submitted to the ENGINEER/GEOLOGIST no less than one week prior to the proposed welding activity.
- K. Geological Samples: The CONTRACTOR shall collect label and store, samples of all geological formations encountered in ten foot increments or when changes in lithology occur, during drilling operations. Before collecting each sample, stop drilling and circulate drilling fluid until all cuttings are removed from the hole, then resume drilling and collect sample when cuttings reach the surface. Each sample shall be clearly labeled and indicate well number, date, time, and the exact depth from which the sample was taken. Two sets of samples shall be collected in zip lock or cloth bags and stored in a protected place near the drilling site.
- L. Geophysical Logging: The CONTRACTOR shall submit 2 draft field copies of all geophysical logs to the ENGINEER/GEOLOGIST within 24 hours following logging activities, and 6 final copies and an electronic file (pdf electronic file and Excel spreadsheet or txt binary file) within 10 days of logging. For each geophysical log suite performed, the ENGINEER/GEOLOGIST may request the CONTRACTOR to obtain a brief descriptive report from the service company interpreting the results of the log or logs. Caliper log reports must indicate borehole volume. Static and

pumping flow logs must have discharge rate plotted on log in gallons per minute. Flow stations through the middle semi-confining unit in to the upper Floridan Aquifer will be required. The printed reports must be submitted to the ENGINEER/GEOLOGIST within 72 hours of completion of logging. The logs to be performed are listed in Part 3.09.

- M. Abandonment: During back plugging or plugging of a well, daily reports shall be maintained by the CONTRACTOR and provided to the ENGINEER/GEOLOGIST. The daily report shall contain the following information: (a) number of feet plugged; (b) amount of cement and aggregate used; and (c) any other pertinent data that the CONTRACTOR may record or the ENGINEER/GEOLOGIST may request.
- N. Calibration Data: Calibration records for each measuring instrument used in the construction of the well shall be submitted to the ENGINEER/GEOLOGIST for review one (1) week prior to the installation or use of the instruments. Calibration of instruments shall have been performed within 30 days prior to use in testing. The calibration records shall contain the following information:
1. Flow meter calibration sheet: Serial Number, Model Number, Gears, Test apparatus size, Meter reading and flow rate for at least three (3) steps, Percent error for each step, Tester's name and title.
 2. Pressure gauge calibration sheet: Serial Number, Model Number, Scale range, Meter reading and inches of mercury for at least three steps covering the entire range of the gauge, Percent error for each step, Tester's name and title.
 3. Inclination tools and geophysical logs: Each downhole instrument used in testing the well during construction shall demonstrate acceptable calibration before use. Where possible, this calibration record shall be included on the output of the test or on the log.
- O. Operations: The CONTRACTOR shall submit for the ENGINEER/GEOLOGIST's approval plans for cementing operations and casing installation, at least 72 hours prior to commencing work on those operations. These plans shall include the following information:
- a. Cementing Program: Top and bottom of each interval to be cemented, pre-flush and spacer, composition of cement to be used in each interval and volume to be pumped, method of emplacement of cement, expected fill-up, expected pressures, and any additives to be used.
 - b. Casing Installation: Tabulation of casing on site and the length of each section, weight of each joint, cumulative string weight, order of installation of casing sections, locations of centralizers and casing tabs.
- P. Well Development Description and Test Records: A description of the Well Development procedure shall be submitted to the ENGINEER/GEOLOGIST one (1) week prior to development activities. Development and test records shall be recorded on a half-hour basis, showing production rates, static water level (pre-development and post-development), pumping level, drawdown, production of sand with centrifugal sand separating meter, and all other pertinent

information concerning development and testing methods. This data shall be recorded on a form to be provided to the ENGINEER/GEOLOGIST.

- Q. Permits: It is the CONTRACTOR's responsibility to obtain all permits with local and state regulatory agencies associated with the construction and testing of the facility. The CONTRACTOR shall not perform work on the well until these permits are obtained. The CONTRACTOR shall furnish copies of all permits to the OWNER and ENGINEER/GEOLOGIST as the permits are obtained. As required by law, the CONTRACTOR shall retain and/or post copies of the permits at the site.
- R. Plumbness and Alignment Tests: A plumbness and alignment test, as described in AWWA Specification A-100-06, Water Wells, Section D, shall be performed by the CONTRACTOR. Upon completion of the plumbness and alignment testing of the well, the CONTRACTOR shall submit to the ENGINEER/GEOLOGIST written test data results within 24 hours that contains depth of plummet, horizontal deflection of plumb line and the calculated drift of the well.
- S. Final Description: The final well descriptions shall show the following: diameter, wall thickness, depths and lengths of casings installed; borehole diameters; cemented casings; centralizer locations; depths and thickness' of annular seals; quantity of material removed during development operations; and all other pertinent details including surface ground and top of casing elevations, and shall be submitted to the ENGINEER/GEOLOGIST prior to acceptance of the well.
- T. Records Required by Law: The CONTRACTOR shall maintain all records required by governmental agencies having jurisdiction, and shall submit such records to them as may be required. Two copies of all such material shall also be furnished to the ENGINEER/GEOLOGIST.
- U. Record Figures: Record Figures shall be submitted in accordance with the relevant section of the technical specifications and Figures.
- V. Completion Report Required: A Water Well Completion Report (Form 62-532.900(2)) must be filed with the appropriate agencies within 30 days of well completion.
- W. Drilling Waste Disposal: The CONTRACTOR shall notify the ENGINEER/GEOLOGIST of a drilling waste disposal location for approval by OWNER two (2) weeks prior to disposal.
- X. Costs: All costs for meeting the provisions of the regulatory agencies having jurisdiction in this project shall be included in the lump sum bid. Should any action by the CONTRACTOR be necessary to meet these requirements during construction and testing, the entire cost of compliance shall be borne by the CONTRACTOR.
- Y. Video Survey: The CONTRACTOR shall perform a preliminary video survey of the well borehole prior to the installation of the 18-inch casing. Three (3) copies of the video survey, in DVD format, shall be provided by the CONTRACTOR to the ENGINEER/GEOLOGIST for distribution within 72 hours of completion of the video survey. Once the 18-inch casing is installed, the CONTRACTOR shall perform a video survey on the well from land surface to the base of the well following drilling and development activities. Six (6) copies of the completed survey, in DVD

format, shall be provided by the CONTRACTOR to the ENGINEER/GEOLOGIST for distribution within 30 days of completion of the video survey.

1.05 REVIEW

- A. The proposed method of well disinfection must be submitted to the ENGINEER/GEOLOGIST for approval thirty (30) days prior to well disinfection. The method of disinfection should comply with the latest AWWA C654-13.
- B. The proposed method and setup for the step drawdown and constant rate discharge testing must be submitted to the ENGINEER/GEOLOGIST for approval thirty (30) days prior to running these tests. The submittals must include plans for accessing all well included in the particular tests, routing of discharge water, pump equipment, meters, water level indicators, pressure transducers, data loggers and scheduling.

1.06 PERMITS

- A. The CONTRACTOR shall be responsible for obtaining and shall, within thirty days (30) working days following notice to proceed, apply for the well construction permits from the SFWMD to construct the well specified herein, in accordance with the Rules of the SFWMD, Chapter 40E-3, F.A.C. The permit shall be available for inspection at the site during construction and shall be kept on-site at all times. The CONTRACTOR shall be responsible for obtaining permit time extensions in accordance with the rule specified above, if well construction extends beyond the valid permit date.
- B. The CONTRACTOR shall be responsible for obtaining any additional federal, state, or local permits required for constructing the well or discharging water from the site. If a generic discharge permit is required by the FDEP, the CONTRACTOR shall be responsible for obtaining the permit and for the compliance of all permit conditions.
- C. The CONTRACTOR shall not perform any work on the well until these permits are obtained and SJRWMD notified 24 hours before construction begins.
- D. The CONTRACTOR shall furnish separate copies of all permits to the ENGINEER/GEOLOGIST as the permits are received.
- E. The CONTRACTOR is responsible for all permit fees.

1.07 QUALIFICATIONS

- A. The CONTRACTOR responsible for constructing the well shall be licensed by the SFWMD as a water well CONTRACTOR employing only competent workmen for the execution of this Work, and all such Work shall be performed under the direct supervision of an experienced well driller satisfactory to the OWNER and ENGINEER/GEOLOGIST.
- B. The CONTRACTOR's well driller shall be capable of identifying lithologic samples, maintaining complete and current well logs and daily notes for the well completion report, and developing

and testing the well, as required by these specifications. A well completion report shall be submitted to the ENGINEER/GEOLOGIST and the SFWMD.

- C. The ENGINEER/GEOLOGIST may make any other investigations deemed necessary to determine the ability of the CONTRACTOR to perform the Work, and the CONTRACTOR shall furnish to the ENGINEER/GEOLOGIST all such information and data for this purpose as the ENGINEER/GEOLOGIST may request.
- D. The CONTRACTOR shall furnish satisfactory evidence upon request that all materials to be furnished in performing the specified Work are new and all equipment to be used is in good working order.
- E. The CONTRACTOR shall complete the Work described in this Section in accordance with (a) the American Water Works Association Standard for Water Well (AWWA A100-06), (b) applicable portions of the Rules of the SFWMD, Chapter 40E-3, F.A.C., and (c) applicable portions of the Rules of the FDEP, Chapter 62-555, and 62-532 F.A.C.

1.08 PROJECT RECORDS

- A. Before installing the casing or materials in the well, a report listing the source and description of the materials to be used and the mill certificates shall be submitted to the ENGINEER/GEOLOGIST.
- B. During drilling of the well, the CONTRACTOR shall maintain at the well site a complete log setting forth the following:
 - 1. The surveyed reference point for all depth measurements.
 - 2. The depth at which changes of formation occur.
 - 3. The depth and interval of each cavity encountered during drilling.
 - 4. The identification of the material of which each stratum is composed.
 - 5. The depth interval from which each formation sample is taken.
 - 6. The depth interval from which each water sample is taken.
 - 7. The depth at which hole diameters change.
 - 8. Depth at which drilling method is changed.
 - 9. Other pertinent data requested by the ENGINEER/GEOLOGIST.
- C. Lithologic samples shall be collected and preserved immediately upon retrieval. Lithologic samples shall be preserved in separate air tight jars or ziplock bags of at least 1.0 pound capacity for each interval specified by the CONTRACTOR. Lithologic samples shall be taken during drilling at 5-foot intervals in the siliceous surficial sediments, 10-foot intervals in the Floridan aquifer, and at lithologic changes. The CONTRACTOR will coordinate with the ENGINEER/GEOLOGIST for the collection of water samples during reverse-air circulation drilling of the upper Floridan Aquifer starting when drilling with air as directed by the ENGINEER/GEOLOGIST.
- D. Upon completion of the well, the CONTRACTOR shall also submit to the ENGINEER/GEOLOGIST a report and as-built drawings to include the following:
 - 1. Surface ground and well Top of Casing elevation (NAVD 88 datum).

2. The total depth of the borehole and the length of casing installed in the well.
 3. The nominal hole diameter.
 4. The depth or location of any lost drilling fluid, drilling materials, or tools.
 5. The type and amount of drilling fluid additives used.
 6. The depth and diameter of any surface casing.
 7. The amount of cement (cubic yards) used in grouting the well annulus and/or surface casing.
 8. The complete description (including length, diameter, depth, and mill certificates) of the well casing.
 9. Other pertinent data requested by the ENGINEER/GEOLOGIST.
 10. Any and all other pertinent information for a complete and accurate log (e.g., temperature, pH, and appearance (color) of any water samples taken).
- E. Formation sample jars or bags shall be provided and properly labeled by the CONTRACTOR.
- F. Blank well completion report forms can be obtained by written application to the Florida Department of Environmental Protection, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida, 32301, or the South Florida Water Management District. Well completion reports shall be submitted by the CONTRACTOR to the SFWMD and ENGINEER/GEOLOGIST within 30 days of well completion.
- G. A daily detailed driller's report shall be maintained and delivered upon request to the ENGINEER/GEOLOGIST or the OWNER's REPRESENTATIVE at the well site. The report shall give a complete description of all lithologies encountered, number of feet drilled, number of hours on the job, shutdown time due to breakdown or other cause, the fluid level in the hole measured daily before starting pumps, the properties of the drilling fluid, feet of casing set, and such other pertinent data as requested by the ENGINEER/GEOLOGIST.
- H. The CONTRACTOR shall provide, install and maintain erosion controls for the duration of the well construction work as needed and to prevent sediment and turbidity from entering surface water bodies and to avoid erosion problems by directing flow away from the drilling site and adjacent properties. Refer to Section 01500.

1.09 HANDLING OF MATERIALS

- A. All materials shall be properly protected so that no damage or deterioration will occur during a prolonged delay from time of shipment until installation is completed and the well and equipment are ready for operation. Refer to Sections 01500 and 01614.
- B. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

1.10 QUALITY ASSURANCE

- A. Subcontractor's List: Each subcontractor listed shall be approved by the ENGINEER/GEOLOGIST. The ENGINEER/GEOLOGIST reserves the right to disapprove the use of any subcontractor proposed.

- B. Tests: The CONTRACTOR shall conduct performance tests to demonstrate well soundness prior to acceptance.
- C. Instrumentation: The CONTRACTOR shall provide calibration records of all instruments used during testing to the ENGINEER/GEOLOGIST one (1) week prior to installation.
- D. Video Survey: The video camera to be used for the video survey will be centralized and of a type that is capable of focusing on the diameter of open borehole or casing upon which the survey is being performed, having sharp contrast and good resolution. The borehole video survey shall be accomplished using a color, radial view, 360-degree camera, with tilt capability of up to 85 degrees from vertical. The borehole camera shall have remote focus ability. Mirrors shall not be used to accomplish this range of view.
- E. Geophysical Logs: All geophysical logs shall be run by a qualified service company experienced (having performed at least 10 surveys) in the type of logs they are to perform. The firm retained to run the geophysical survey shall perform all geophysical requirements for the project. The logs will be run using accurate instruments of resolution sufficient to allow detailed interpretation of the logs. The correct calibration of each instrument shall be demonstrated at the time of logging, and a record of the calibration shall be included on the logs, where possible. The logs shall be run at no more than 30 feet per minute and shall be output at 20 feet per inch. A repeat section shall be included on each log to demonstrate the sensitivity of the instrument to variations in the properties of the intervals being logged and to demonstrate repeatability of the logs. The caliper tool shall include a minimum of 3 arms. Borehole volume shall be indicated on the reamed borehole caliper log, and shall be provided to the ENGINEER/GEOLOGIST for cementing calculations.
- F. Guarantee: The CONTRACTOR guarantees that the work performed under this section of the Contract, and the workmanship, materials and equipment supplied or used in the execution of the work, is free from defects or flaws and is furnished in strict accordance with the Contract Documents in every respect. The CONTRACTOR further guarantees that the performance test requirements of the Contract Documents shall be fulfilled. The CONTRACTOR shall repair, correct, or replace all damage to the work covered by failures covered by the guarantee. The guarantee shall remain in effect for a period of 5 years from the date of final acceptance by the OWNER.
- G. Sand Production: Sand production during well development shall be recorded on a form for pump development and testing. Sand production, shall be measured by a centrifugal sand separating meter as described in the AWWA A-100-90 Standard for Water Wells and Groundwater and Wells (Driscoll, 1986), and should not exceed 5 parts per million during the 30-minute period after the pump starts pumping at the design discharge rate, or as determined appropriate by the ENGINEER/GEOLOGIST. Should the well produce sand exceeding 5 parts per million, additional well development will occur at a discharge rate and for a time period determined appropriate by the ENGINEER/GEOLOGIST.
- H. Cement: Material used for sealing the casing shall consist of a neat cement grout using Type II Portland cement conforming to ASTM C 150. Neat-cement grout shall contain no more than 5.2 gallons of fresh water per 94 pound sack of cement yielding a weight of roughly 15.6 lbs/gal for neat cement grout. A maximum of 9.1 gallons of fresh water shall be added to a 94 pound sack

of cement with 6 percent bentonite added to yield a weight of approximately 13.5 lbs/gal for cement bentonite grout. Mixes between the two grout mixtures shall comply with manufacturer recommendations and shall yield weights between 13.5 and 15.6 lbs/gal. Grout samples shall be collected by the CONTRACTOR and checked with a Fluid Density Balance in accordance with API Spec. 10. Grout samples shall be collected a minimum of three (3) times during each cement stage: prior to pumping, in the middle, and near end of the stage. The specified slurry density shall match the specified slurry density indicated on the delivery certificate.

1.11 MATERIALS DELIVERY, STORAGE and PROTECTION OF MATERIALS

- A. All materials shall be delivered in an undamaged condition and stored to provide protection against damage. All defective or damaged materials shall be replaced with new materials at the CONTRACTOR'S expense.
- B. All materials must be properly protected against damage during a prolonged period at the site.
- C. The CONTRACTOR shall prepare an area, within the limits of a location approved by the ENGINEER/GEOLOGIST, for the storage of materials required for this work.

1.12 CONTRACTOR EQUIPMENT

- A. Storage Area: The CONTRACTOR shall prepare an area, within the limits of a location approved by the ENGINEER/GEOLOGIST, for the storage of materials required for this work.
- B. Protection: The CONTRACTOR is responsible for protecting his own work including materials from theft, vandalism, and unauthorized entry.
- C. Equipment Use: The equipment shall be provided with all sound deadening devices reasonably possible. The rig engines and all other power plant equipment shall have mufflers, and metal parts of the rig that may encounter casing or drill pipe shall be protected through the use of wood, or other sound absorbent material, where possible. CONTRACTOR shall provide complete rotary drilling units, combination rig drilling units, cable tool drilling rig, all tools, accessories, power, pumps, lighting, water and other equipment necessary to conduct efficient drilling and testing operations.
- D. Equipment Requirements: The CONTRACTOR's drilling rig shall have a lift capacity exceeding the greatest load required during construction of the well. The rig shall be equipped with drill string weight and drilling speed recorder.
- E. CONTRACTOR shall make necessary arrangements to acquire construction water as specified under Section 01500. A connection point from the South Water Reclamation Facility may be available for this project subject to OWNER approval. Any water used may have to be metered and reported to the OWNER.

1.13 MOBILIZATION, PERSONNEL AND OPERATING REQUIREMENTS

- A. Mobilization: The CONTRACTOR shall mobilize its equipment and personnel to effectively commence its drilling operations to meet project requirements.

- B. Personnel Requirements: The CONTRACTOR shall furnish capable personnel, experienced in the work required by these specifications. In addition, the following shall apply:
1. The CONTRACTOR shall provide an adequate number of competent helpers.
 2. The drillers shall be capable of keeping good and clean well logs, and reports of the drilling, developing and pump testing operations as instructed by the ENGINEER/GEOLOGIST.
 3. Welders: All welding shall be performed according to the American Welding Society standards and American Society for Testing and Materials standards. All welding shall be conducted by certified welders of the AWS, ASTM, ASME, or approved equal.
 4. Well Drillers: All well drillers shall possess a current State of Florida Water Well Contractor License, issued by the one of the five water management districts. The drillers must have prior experience operating the drilling equipment selected for the project and should be capable of identifying and describing local geologic formations, maintaining complete and current well logs and daily notes for the well completion reports.
- C. Work Hours: The CONTRACTOR shall limit work hours between 6:00 a.m. and 6:00 p.m. Monday through Friday, unless given approval by the OWNER. The CONTRACTOR is not allowed to have personnel onsite before 6:00 a.m. and after 6:00 p.m. unless approved by the OWNER.
- D. Service Companies: Where possible, the CONTRACTOR shall utilize the skills of a specialist service company, expert in the type of service for which they are employed. The name and the background of the company and the individuals providing the services shall be submitted to the ENGINEER/GEOLOGIST for approval prior to beginning work. The ENGINEER/GEOLOGIST reserves the right to reject any service company. At a minimum, service companies shall be employed for the following:
1. Geophysical Logging;
 2. Video Surveying;
 3. Cementing, unless the CONTRACTOR can demonstrate previous experience and expertise in cementing
 4. Land Surveying.
- E. Work Area: The CONTRACTOR shall prepare an area, within the limits of the location delineated in the field by the ENGINEER/GEOLOGIST, for the work described in these Technical Specifications.
- F. Cuttings and Fluid Disposal: It shall be the CONTRACTOR'S responsibility to arrange for an approved disposal site for drill cuttings, fluid from drilling, fluid from well development, and fluid from well production testing that complies with all applicable regulations. No drilling operations can commence without an approved disposal site by the OWNER or ENGINEER/GEOLOGIST. The CONTRACTOR shall be responsible for providing and maintaining all necessary tank trucks, dump trucks, pipe, pumps and equipment necessary to pump and haul

excess pad drainage, drilling fluid, drill cuttings and pumped water to a pre-determined disposal site in accordance with federal, state and local regulations, or sub-contract with a firm capable of providing these services when necessary.

- G. Construction Safety Program: The CONTRACTOR shall comply with the OSHA regulations contained in 29CFR Section 1910 for General Industry Regulations and 29CFR Section 1926 for Construction Regulations.

1.14 WELL ACCEPTANCE CRITERIA

- A. The sand content in the water pumped from the completed supplemental well shall not, at any time, exceed 1 mg/L while the well is being pumped at 3,500 gpm.
- B. The turbidity of the water from the completed supplemental well shall not exceed 1 NTU as measured on a calibrated turbidimeter when the well is being pumped at its design capacity of 3,500 gpm.
- C. The CONTRACTOR must supply the equipment necessary to test, in the field, sand and turbidity concentrations.
- D. The casing and borehole for the well shall be constructed round, plumb and true to line; the well shall comply with AWWA A100-06. The well shall be tested for plumbness and alignment by the CONTRACTOR in accordance with Appendix D of the American Water Works Association (AWWA) Standard A100-06.
- E. The CONTRACTOR shall demonstrate that the well is properly disinfected and bacteriologically cleared by passing two consecutive microbiological samples as described in Paragraph 3.13 of this Section.

1.15 WARRANTY

- A. All materials supplied under this Section shall be warranted for a period of five (5) years by the CONTRACTOR and material manufacturers. The manufacturer's warranty period shall run concurrently with the CONTRACTOR's warranty period. The warranty period shall commence on the Final Completion Date, as specified in the Contract or upon completion and acceptance by the OWNER of testing or remedial procedures.
- B. The materials shall be warranted to be free from defects in workmanship and design. Any materials that fail during the warranty period shall be replaced and the unit(s) restored to service at no expense to the OWNER.

1.16 SITE CLEANUP, PRESERVATION AND RESTORATION

- A. Unused Materials and Equipment: During construction, the CONTRACTOR shall regularly remove from the site all accumulated debris and surplus materials of any kind which results from his operations. Unused tools or equipment shall be stored at the CONTRACTOR's yard or base of operations for the project.

- B. Periodic Cleaning: The CONTRACTOR shall perform clean-up work on a regular basis and as frequently as requested by the ENGINEER/GEOLOGIST.
- C. Basic site restoration in an area shall be accomplished immediately following installation or substantial completion of the required facilities in that area. Also, such work shall be performed, when requested by the ENGINEER/GEOLOGIST, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.
- D. If the CONTRACTOR fails to perform periodic clean-up and basic restoration of the site to the ENGINEER/GEOLOGIST's satisfaction, he/she may, upon five days written notice to the CONTRACTOR, employ such labor and equipment as he/she deems necessary for the intended purpose at the CONTRACTOR's expense.
- E. Work Completion: Upon completion of work at the site, the CONTRACTOR shall promptly remove all equipment and unused materials. CONTRACTOR shall dismantle any temporary structures erected for purposes not part of the final product. CONTRACTOR shall promptly provide minor repairs and leave the site in a manner acceptable to the ENGINEER/GEOLOGIST, within one month after the completion of drilling and testing. Refer to item 22 of Section 01015 for site restoration guidelines.

1.17 ADDITIONAL WORK

- A. At the option of the OWNER, additional work may be authorized. Additional work shall be completed at prices not exceeding those of comparable work and materials contained in the CONTRACTOR's bid or as determined by the ENGINEER/GEOLOGIST.

PART 2 - PRODUCTS

2.01 INNER WELL CASING

- A. The well casing for the supplemental well shall be new black steel pipe having perfect roundness and uniform thickness. The well casing shall be free of surface deterioration, pinholes, and rust holes in the surface area. Well casing shall have a nominal diameter of 18 inches, and a minimum wall thickness of 0.50 inches. The well casing shall conform to ASTM A53B or API 5L, Grade B, seamless or electric resistance welded, for black steel casing.
- B. The well casing shall be as manufactured by U.S. Steel Corporation, Steel & Pipe Supply Inc., or an approved equal. Copies of the mill certificates shall be submitted by the CONTRACTOR to the OWNER/ENGINEER/GEOLOGIST for approval prior to shipment of casing to the site.
- C. Casing lengths shall be joined watertight by a method appropriate to the material used, as selected by the CONTRACTOR, so that the resulting joints shall have the same structural integrity as the casing itself. If metallic casing is welded, the standards of the American Welding Society and AWWA C206 shall apply. Casing ends shall be coupled by field welding and shall be beveled. If threaded and coupled joints are used, couplings shall be API or equivalent, made up so that, when tight, all threads will be buried in the lip of the coupling. Should the joints fail or break, the CONTRACTOR shall be responsible for abandonment, repair or replacement of the well.

- D. No well casing shall be ordered or delivered to the site until approval has been provided by the ENGINEER/GEOLOGIST or the OWNERS REPRESENTATIVE. This is required due to the potential for quantity and size changes.

2.02 SURFACE CASING

- A. The surface casing for the supplemental well shall be black steel and shall have a nominal diameter of 36 inches, and a minimum wall thickness of 0.50 inches. The surface casing shall conform to ASTM A53B or API 5L, Grade B, seamless or electric resistance welded, for black steel casing. Driven casing shall meet SJRWMD regulation 40C-3.502 F.A.C. and FDEP regulations 62.532.500 F.A.C. Refer to the table below for detail:

Surface Casing Installation Method	Well ID	Casing Length (FT)	Casing Diameter (IN)	Min. Casing Thickness (IN)
Non-Driven	SW-5R	75	18	0.500
Driven (w/shoe)	SW-5R	75	18	0.500

- C. Casing lengths shall be joined watertight by a method appropriate to the material used, as selected by the CONTRACTOR, so that the resulting joints shall have the same structural integrity as the casing itself. If metallic casing is welded, the standards of the American Welding Society and AWWA C206 shall apply. Casing ends shall be coupled by field welding and shall be beveled. If threaded and coupled joints are used, couplings shall be API or equivalent, made up so that, when tight, all threads will be buried in the lip of the coupling. Should the joints fail or break, the CONTRACTOR shall be responsible for abandonment, repair or replacement of the well.
- D. The surface casing shall be as manufactured by U.S. Steel Corporation, or an approved equal. Copies of the mill certificates shall be submitted by the CONTRACTOR to the OWNER/ENGINEER/GEOLOGIST for approval prior to shipment of casing to the site.
- E. If any surface casing is intended for construction purposes only, it shall be reasonably watertight, and of such weight and design as necessary to prevent entrance of sand and unconsolidated material, and to permit its installation without distortion or rupture to the specified depth and dimension.
- F. No surface casing for the supplemental well shall be ordered or delivered to the site until approval has been provided by the ENGINEER/GEOLOGIST or the OWNERS REPRESENTATIVE.

2.04 DRILLING FLUID

- A. The drilling fluid shall possess such characteristics as are required to adequately maintain the walls of the hole, to prevent caving of the wall as drilling progresses, and to permit recovery of representative samples of cuttings. The fluid shall be consistent with AWWA A100-90 standards.
- B. Bentonite- or native-clay-based drilling fluids shall have residual chlorine content not less than 10 mg/L. The CONTRACTOR may select a drilling fluid (consistent with these Specifications) for completion of the boreholes below the surface casing to total cased depth.

- C. The CONTRACTOR shall provide all materials and equipment for mixing, circulating and testing the drilling fluid and for maintaining its properties. The drilling fluid shall be maintained within limits that allow their complete removal from the well, if necessary, and shall not damage the potential capacity, efficiency, or quality of the well.
- D. All additives used to maintain the properties of the drilling fluid shall be approved by the ENGINEER/GEOLOGIST and specifically recommended by the manufacturer for use in water well drilling. No additive shall be used which causes persistent bacterial growth in the well and aquifer. Makeup water shall be from an approved source.

2.05 CEMENT GROUT

- A. Grout shall be Type II (ASTM C150) neat Portland cement and proportioned in accordance with AWWA A100. The grout mixture may contain up to 6 percent (by volume) of bentonite clay and will be subject to testing at the discretion of the ENGINEER/GEOLOGIST. Grout not meeting the specification shall be rejected. The CONTRACTOR shall have an approved method of testing density of grout on site.
- B. Approximately 5.2 gallons of fresh water shall be added to a 94-lb sack of cement yielding a weight of roughly 15.6 lbs/gal for neat cement grout. A maximum of 9.1 gallons of fresh water shall be added to a 94-lb sack of cement with 6 percent bentonite added to yield a weight of approximately 13.5 lbs/gal for cement bentonite grout. Mixes between these two grout mixtures shall comply with manufacturer recommendations and shall yield weights between 13.5 and 15.6 lbs/gal.

2.06 TEST PUMPING EQUIPMENT

- A. The CONTRACTOR shall provide a test pump capable of pumping to 3,500 gpm under atmospheric conditions after the maximum drawdown in the well and all piping head losses have been accounted for to test the supplemental well. The pump must be disinfected prior to use and shall be a dedicated pump for potable or groundwater pumping operations only. Additionally, the CONTRACTOR shall provide an opening or fitting such that depth to water level or potentiometric surface pressure may be measured using a pressure transducer during pumping.
- B. The CONTRACTOR shall provide a generator to power the test pump(s). If electric power is available at the site, the CONTRACTOR may use it at his option and expense. Any generator used for the test pumping shall have the necessary capacity to adequately power the selected test pump through the pumping period and discharge range.
- C. Discharge pipe shall be of a diameter and length adequate to transmit water at the maximum discharge rate specified herein from the well site to a designated discharge point up to 500 feet down gradient from the well site at a location to be determined by the OWNER. Discharge pipe shall be in good condition, shall be free from leaks and adequately restrained to withstand the maximum anticipated pressure without bursting of the pipe or separation of the joints. A hose bib suitable for collecting representative water samples shall be located on the discharge upstream from the flow meter. A ¼-inch diameter NPT threaded tap suitable for the installation

of a sand tester shall be located on the horizontal centerline of the discharge pipe at a location approved by the ENGINEER/GEOLOGIST or the OWNER's REPRESENTATIVE. The discharge pipe layout and discharge point must be approved by the OWNER's REPRESENTATIVE at least seven (7) days prior to the start of the test.

- D. A gate valve suitable for controlling flow through the discharge pipe shall be provided and shall be located at the well head, downstream of the calibrated flowmeter.
- E. The CONTRACTOR shall provide a totalizing flow meter calibrated for the design flow and pipe size and capable of an accuracy of 5% or better. The meter shall have been calibrated within 90 days of the proposed use. The flow meter shall be installed as specified by the manufacturer for accurate operation. The meter shall be located a minimum of 5 pipe diameters upstream and 10 pipe diameters downstream from any flow obstructions.
- F. The test pump shall be set a minimum of 100 feet below land surface. This requirement may be waived if pumping at a rate of 3,500 gpm in the supplemental well results in pumping water level drawdowns, which are considerably less than 100 feet below land surface.
- G. The CONTRACTOR shall provide one (1) data logging pressure transducer with appropriate pressure ranges for the measurement of water level changes or potentiometric pressure changes during the step-drawdown variable rate discharge testing.
- H. The data logger(s) shall be capable of recording measurements one second intervals up to 12 hours.
- I. All test pumping equipment shall remain the property of the CONTRACTOR.

2.07 WELL COVERS

- A. Whenever work on the well is interrupted, such as during an overnight shutdown, the well opening shall be tack welded with a substantial cover in accordance with the Rules of the SFWMD, Chapter 40E-3, F.A.C. At all times during construction of the well, the CONTRACTOR shall use reasonable precautions to prevent both tampering with the well and entrance of foreign material into the well.
- B. The cover shall be watertight, restrict the positive upward pressure, and stop any potential flowing conditions at the wellhead.

2.08 DISINFECTANT

- A. Disinfectant solution shall be prepared for a minimum concentration of 50 mg/L of Sodium Hypochlorite chlorine for the full length of the well. A disinfection plan must be submitted to the OWNER and/or ENGINEER for approval prior to implementation.

PART 3 – EXECUTION

3.01 BOREHOLE CONSTRUCTION

- A. The supplemental well shall be constructed by a combination of the mud rotary and the reverse air rotary drilling methods. Alternate drilling methods may be proposed by the CONTRACTOR, but are not to be utilized unless prior approval from the ENGINEER/GEOLOGIST is provided.
- B. Eight inch (8") minimum diameter pilot holes shall be utilized to determine the seating depths of all casing strings.
- C. The CONTRACTOR shall furnish pit casing at the well, if necessary, to provide initial surface stability. Use of a pit casing will be left to the discretion of the CONTRACTOR. If 36-inch pit casing is to be installed at a well, the nominal borehole diameter shall be approximately 42 inches for the supplemental well. The annular space between the borehole and the pit casing shall be a minimum of three (3) inches.
- D. When 30-inch surface casing is installed at a well, the nominal borehole diameter shall be approximately 36 inches for the supplemental well (Figure 3). The annular space between the borehole and the surface casing shall be a minimum of three (3) inches.
- E. The nominal diameter of the borehole in which the final well casing shall be set will be 24 inches for the supplemental well. The annular space between the borehole and the well casing shall be a minimum of two (2) inches.
- F. The nominal diameter of the open borehole shall be a nominal 18 inches in the supplemental well.
- G. The borehole shall be drilled using clean, uncontaminated equipment in good working order and free from fuel, oil, and hydraulic fluid leaks or discharges. The drill bit, bottom hole assembly, and rod shall be in good condition and appropriate for rapid and correct completion.
- H. Drilling fluid shall be prepared using fresh uncontaminated water and approved additives. The flow of water at the site during drilling will be controlled to prevent excessive flooding of the site. At the earliest time possible after the Floridan aquifer has been penetrated, drilling with mud additives will be discontinued and drilling will continue using the reverse air method. Heavy mineral additives such as barite or ilmenite may be used to increase the density of the drilling fluid in order to restrict the flowing conditions of the well.
- I. An 8-inch minimum diameter pilot hole shall be advanced from the bottom of each pit casing to approximately 100 feet below land surface to verify the depth to set the surface casing.
- J. An 8-inch minimum diameter pilot hole shall be advanced from the bottom of surface casing to approximately 275 feet below land surface to verify the depth to set the inner casing.
- K. An 8-inch minimum diameter pilot hole shall be advanced from the bottom of inner casing to approximately 550 feet below land surface.
- L. All drilling procedures must comply with all applicable local, state and federal requirements, and be in accordance with the standards of AWWA A100.

3.02 SURFACE CASING INSTALLATION

- A. Once a borehole has been advanced to slightly below the depth at which the surface casing is to be set, the CONTRACTOR shall perform necessary work to condition the borehole, including as a minimum circulating cuttings out of the borehole.
- B. The CONTRACTOR shall lower the surface casing into the hole and hold plumb and center by use of welded steel centralizers. These centralizers will be placed within 5 feet of the bottom and the top of the casing and at approximately 40-foot intervals in between.
- C. The surface casing shall extend 12 inches above land surface.

3.03 INNER WELL CASING INSTALLATION

- A. The inner well casing will be installed to an approximate depth of 275 feet or to another depth at the instruction of the ENGINEER/GEOLOGIST. The well casing shall be set at least 10 feet into the limestone, and shall extend at least 36 inches above land surface at completion.
- B. The inner well casing shall be lowered into the hole and held plumb and centered by the use of commercially available steel or fabricated steel centralizers. These centralizers will be placed within 5 feet of the bottom and the top of the casing and at approximately 40-foot intervals in between. Refer to paragraph 3.05 of this section.

3.05 CASING CENTRALIZER

- A. Casing centralizers may either be field fabricated, provided they are constructed of the same carbon steel as the casing, or Halliburton-type centralizers. Both type shall meet or exceed API Specification 10D.
- B. Fabricated centralizers shall be a curved steel band with the minimum following dimensions:
 - 1. 18-inches long,
 - 2. 2-inches wide and,
 - 3. 0.50 inch thick.
- C. Fabricated centralizers shall be welded to the casing with their concave side facing the pipe and must provide at least 3.5-inches of clearance around the casing string. Centralizers shall be arranged in four vertical lines arranged at 0, 90, 180, and 270 degrees around the casing to accommodate any tremie lines that may be inserted on the outside of the casing.
- D. Install Centralizers at 5 feet above the bottom end and every 100 feet thereafter to nearest 100 feet from pad surface.
- E. Centralizers shall be installed in a vertical line to facilitate the installation of tremie pipes for grouting.

3.06 GROUTING

- A. The supplemental well shall be grouted in accordance with the Rules of the SFWMD, Chapter 40E-3, F.A.C.
- B. All grouting and sealing of the well shall be performed in the presence of the ENGINEER/GEOLOGIST and a Department of Health or SFWMD representative, if available. The grouting shall be done in a manner that will ensure that the annular space will be filled completely in one continuous operation. No drilling operations or other work in a well will be permitted until at least 24 hours after grouting the well.
- C. The CONTRACTOR shall flush the annular space with drilling fluids or water until clear and free of cuttings prior to the start of well grouting.
- D. Before proceeding with placement of the grout, the CONTRACTOR shall secure the ENGINEER/GEOLOGIST approval of the proposed method of placement. No method will be approved that does not specify the forcing of grout from the bottom of the space to be grouted towards the surface.
- E. A pressure-tight bulkhead is to be maintained on the casing being cemented during pressure cementing. The CONTRACTOR shall be responsible for adding or releasing water from the casing to maintain required pressure. Minimum setting time between stages is 8 hours, if more than one stage is required. The well shall remain undisturbed for at least 24-hours after cementing on casing is completed. After each stage of cementing and before the next stage, the CONTRACTOR shall tag the top of cement with the tremie pipe. Cementing shall be continuous for each stage after cementing begins. If there is a loss of circulation or there are no returns at the surface, the ENGINEER/GEOLOGIST shall be informed immediately of remedial procedures that will be used to re-establish circulation and complete the cementing program according to the well design and technical specifications.
- F. Where large cavernous zones exist and prohibit the use of cement, limestone gravel shall be used to bridge the cavities, as determined by the ENGINEER/GEOLOGIST. If measurements indicate grouting does not progress at least 50 percent of the calculated theoretical volume for each lift, the CONTRACTOR shall immediately contact the ENGINEER/GEOLOGIST to discuss the use of limestone.
- G. The CONTRACTOR shall be responsible for any damage to well casing resulting from cementing operations and for the cost required to correct such damages.

3.07 WELDING

- A. The standards of the American Welding Society, Structural Welding Code (AWS D1.1) shall apply for all welded joint casing and accessories. All welds shall conform to the latest revision of ANSI B31.1. All welded casing joints shall be made by certified welders of the AWS, ASTM, ASME, or approved equal.
- B. Casing Connection: All casing shall be handled using drilling rig tools that are equipped with a weight indicator. Each casing joint shall be able to support the weight of the casing below. The casing joints shall be made with the casing properly aligned and using casing tabs to insure alignment and sufficient strength at the joint. Each weld shall be made with sufficient tensile

strength to support the weight of the casing below and with sufficient burst strength to contain water at a pressure of 300 psi without leaking.

- C. Tension: The casing shall be suspended in tension from the surface by means of a landing clamp. The bottom of the casing shall be at a sufficient distance above the bottom of the reamed hole as to insure that none of the casing will be supported from the bottom of the hole.
- D. Weld Reinforcement: Weld reinforcement shall be as specified by the AWS code. Upon completion of welding, all weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions.
- E. Failure to Complete: If the casing cannot be landed in the correct position or at a depth acceptable to the ENGINEER/GEOLOGIST, the CONTRACTOR shall construct another well immediately adjacent to the original location and complete this well in accordance with the Contract Documents at no additional cost to the OWNER. The abandoned hole shall be sealed in accordance with all State of Florida regulations at CONTRACTOR's expense.
- F. Collapsed Casing: If the casing should collapse for any reason prior to well completion, it shall be withdrawn and replaced at the CONTRACTOR'S expense.
- G. Casing Installation: The casings shall be lowered into the borehole open-ended and the weight of the casing shall be supported by the drilling rig. The hook load of the drilling rig must exceed the maximum casing weight to be encountered during the construction of the well. Alternative methods of casing installation may be proposed by the CONTRACTOR by submitting the proposed method to the ENGINEER/GEOLOGIST for approval.
- H. Centralizers (Applicable only to Standard Rotary Casing Installations): All casings in the well shall be centralized in the borehole installed at intervals along the pipe at 0, 90, 180 and 270 degrees around the casing at each position. The four centralizers spaced at 90 degrees around the casing constitute a centralizer group. These centralizers will be placed within 5 feet of the bottom and the top of the casing the casing strings and at approximately 100-foot intervals in between.
- I. Alignment: All centralizer groups shall be vertically aligned, one above the other in order to permit the passage of tremie pipes alongside the casing to the bottom of the borehole.
- J. All welders and welding operators shall be qualified by a qualified testing laboratory at the CONTRACTOR's sole expense before performing any welding under this section. Qualification tests shall be in accordance with Section IX, Article III of the ASME Boiler and Pressure Vessel Code. Welders and operators shall be qualified for making groove welds in carbon steel pipe in position 6G for each welding process to be used.
- K. Qualification tests may be waived if evidence of prior qualification is deemed suitable by the ENGINEER/GEOLOGIST. CONTRACTOR shall retest any welders at any time the ENGINEER/GEOLOGIST considers the quality of the welder's work substandard. When the ENGINEER/GEOLOGIST requests the retest of a previously qualified welder, the labor costs for

the retest will be at the OWNER's expense if the welder successfully passes the test. If the welder fails the retest, all costs shall be at the CONTRACTOR's expense.

- L. There shall be a minimum of three (3) weld passes on all pipe.
- M. When the reaming operation has been completed, blank casing shall be installed. The lengths and intervals of each casing type will be determined by the ENGINEER/GEOLOGIST. All casings shall be installed as shown in the Figures and in accordance with the Technical Specifications.

3.08 WELL DEVELOPMENT

- A. The supplemental well shall be developed by surging and interrupted over-pumping, or other methods approved by the ENGINEER/GEOLOGIST. Over-pumping shall be at various rates up to 4,000 gpm or greater. Development shall continue until the well produces less than 1 mg/L of sand at 3,500 gpm. It shall also continue until turbidity is below 1 NTU after 5 minutes of uninterrupted pumping at 3,500 gpm. The CONTRACTOR shall test the turbidity and sand content at least every four hours during development and report the results to the ENGINEER/GEOLOGIST or the OWNERS REPRESENTATIVE. If the method of development employed by the CONTRACTOR is not yielding satisfactory results, which, in the opinion of the ENGINEER/GEOLOGIST, will produce levels of sand and turbidity that meet the acceptance criteria following the specified development period, the ENGINEER/GEOLOGIST may suspend work, at no additional cost to OWNER, and request that the CONTRACTOR modify his development procedure prior to continuation of further development.
- B. Sand content shall be determined using a Rossum sand tester or approved equivalent. The CONTRACTOR shall demonstrate that the well meets the acceptance criteria under Paragraph A of this Section. It is the responsibility of the CONTRACTOR to secure prior written approval from the ENGINEER/GEOLOGIST for any changes in the sand content testing method.
- C. If a diesel engine is used to drive the test pumps, it shall be equipped with a clutch to allow instantaneous disengagement of the drive shaft and free spooling of the impellers. If an electric motor is used, it will not be equipped with an anti-reverse ratchet, therefore allowing the impellers to backspin when the motor is turned off.
- D. Pumping for the turbidity test for well acceptance will begin after a rest period of at least 5 minutes.
- E. Well development shall be deemed complete when sand content and turbidity are below the levels specified in Paragraph 1.10 G and well efficiency as calculated by the Hantush-Bierschenk's method is greater than the level specified in Paragraph 1.14 D at the design pump rate. Development shall be proved by step drawdown testing. It is the responsibility of the CONTRACTOR to attempt to meet the development criteria by the methods outlined.
- F. If the development criteria are not met after the time specified on the bid form for aggressive development using methods approved by the ENGINEER/GEOLOGIST, the ENGINEER/GEOLOGIST and CONTRACTOR shall meet to evaluate alternative development methods. It is not the intent of these criteria to place the entire burden on the CONTRACTOR for circumstances and events beyond his control. If, after due diligence by the CONTRACTOR

and ENGINEER/GEOLOGIST, the development criteria cannot be met, these criteria may be waived.

3.09 GEOPHYSICAL AND VIDEO LOGGING

- A. A series of geophysical logs will be performed on the supplemental well during construction and a final suite of geophysical logs plus a video log will be performed on the well after completion. Prior to setting the surface casing string, a geophysical log shall be performed to include caliper, gamma ray and dual induction. The suite of geophysical logs performed after advancement of the pilot hole to total depth will include caliper, gamma ray, dual induction, fluid resistivity (dynamic and static), temperature (dynamic and static) and video. The video log will be made with a color video camera with 360o directional side viewing capability and be performed while the well is flowing. The final suite of geophysical logs will include caliper, gamma ray and video.
- B. The sequence of the geophysical and video logging will be at the Contractor's discretion based on the use of crews to facilitate completion and testing within the allotted contract time.
- C. The dynamic flow log shall be performed at least 1,000 gpm. If the well does not naturally flow at this rate, the CONTRACTOR shall pump the well during the dynamic flow log to attain the desired flow rate.
- D. A final video log will be performed on the supplemental well after interval and final development of the well.
- E. All data from the geophysical logging will be provided to the ENGINEER/GEOLOGIST data CD or DVD in ASCII format, in hard copy log format (six (6) copies), and with a graphics log viewer program with logs on CD.
- F. The video logs will be made with a color video camera with 360° directional side viewing capability. It will include inspection of the casing and open hole. The well will be allowed to flow during the video log to allow for inspection of highly transmissive zones that may be flowing and to help select zones for interval development. Four (4) copies of each video log will be provided.
- G. Water from the geophysical and video logging will be controlled by the CONTRACTOR in a manner similar to the one used for the step-drawdown and constant rate discharge testing.
- H. Geophysical logging shall be performed by experienced and well-trained personnel. Those performing the logging operations shall have a minimum of 10 years' experience. Five (5) years of the required experience shall be waived if the logger is a Florida registered Professional Geologist (P.G.) or Professional Engineer (P.E.). Training shall include more than the minimum training offered by manufacturers with the purchase of new logging equipment. The geophysical logging contractor shall submit a copy of their professional registration.\

3.10 PLUMBNESS AND ALIGNMENT

- A. Surface, conductor, and well casings shall be set round, straight, and plumb. To demonstrate compliance with this requirement, the CONTRACTOR shall perform the test described herein in

conformance with AWWA A100-06. The final test for plumbness and alignment would be made following construction of the well and before test pump equipment is installed. The CONTRACTOR may, at his option and expense, perform such a test at other times, such as prior to cementing surface casing. Such additional testing would not replace final testing after construction of the well. The CONTRACTOR shall notify the ENGINEER/GEOLOGIST and the OWNER's REPRESENTATIVE at least seven (7) days prior to the start of the test.

B. Alignment shall be tested by lowering into the well a section of pipe 40 feet long or a dummy of the same length, in conformance with AWWA A100-06. Plumbness shall be tested by lowering into the well a cylindrical plummet to the specified depth. The plummet shall consist of a rigid spindle with round plates at both ends. The outer diameter of the end plates shall be 0.5-inches smaller than the inside diameter of that part of the casing or hole being tested. The distance between the end plates shall be approximately 1.25 times the diameter of that part of the casing or hole being tested. The plummet shall be heavy enough to keep the plumb line taut. The plumb line is attached to the plummet at the exact center of the top end plate and shall be of uniform diameter.

C. The plumbness and alignment of a well would be corrected by the CONTRACTOR at his sole expense under the following conditions:

1. The plummet fails to move freely throughout the length of the casing or hole.
2. The well varies from plumb more than two thirds the smallest inside diameter of that part of the well being tested per 100 feet of depth.
3. Alignment is not satisfactory for successful operation of pumping equipment provided by the OWNER.
4. Does not meet specifications described in AWWA A100-06.

Should the CONTRACTOR fail to correct such faulty plumbness or alignment, the ENGINEER/GEOLOGIST may direct that the well be abandoned and replaced at no expense to the OWNER.

D. The CONTRACTOR may propose an alternative method at no extra cost, such as inclinometer survey, capable of demonstrating to the satisfaction of the ENGINEER/GEOLOGIST that the well is plumb and straight as described in this Section and Appendix D - AWWA A100-06.

3.11 STEP DRAWDOWN TESTING

A. Two step drawdown tests will be conducted on the well to determine performance. The tests will consist of step-drawdown tests in which the well will be pumped at four (4) escalating rates. The step drawdown test will be conducted within one week of the completion and development of the well and will test the upper Floridan aquifer.

1. The discharge rates shall be as follows (or higher if the test pump will allow):

Step	Pump Rate
1	1,750 gpm

2	1,625 gpm
3	3,500 gpm
4	4,375 gpm

2. The pump used in the step-drawdown tests shall be capable of producing the discharge rates listed above.
 3. Water levels, discharge rates, and totalizer flow meter readings shall be manually measured and recorded every 10 minutes through each step by the CONTRACTOR.
 4. Each pumping step shall last until stabilization of drawdown occurs or two hours whichever occurs first.
 5. The well will be allowed to recover a minimum of 1 hour or to within 0.05 feet of the original static water level at the end of the last step.
 6. Water quality samples might be collected at the conclusion of the step drawdown test at the discretion of the OWNER.
- B. Prior to the start of well testing, the CONTRACTOR shall collect surface ground and well Top of Casing elevation and install test data collection equipment. The pump and all measuring or testing equipment must be disinfected prior to being placed in the well.
1. A gate valve shall be installed in the discharge pipe located at the well head. The valve shall be in good condition and shall be capable of controlling the discharge rate of the well.
 2. A totalizing flow meter calibrated to read within 5% of actual discharge shall be installed in the discharge pipe to measure the discharge during testing.
 3. The pressure transducer shall be setup in the pumping well and connected to the data logger. The data logger will be setup to record measurements every 5 seconds for the duration of the test and recovery period.
- C. During testing of the well, the CONTRACTOR will record discharge rates and water levels in the well at predetermined times. For this purpose, the CONTRACTOR shall operate the pump without interruption, at no more than 2 percent fluctuation in the designated rates of discharge, during the full period of the step-drawdown test. If a test is started, but must be stopped due to equipment breakdown or inadequate supervision by the CONTRACTOR, no extra payment will be made for the time spent pumping before the test had to be stopped, or the time spent waiting for recovery before the test is restarted. If any part of the pumping equipment fails to operate properly or impairs the proper functioning of another element or instrument involved in the test, the equipment shall be removed and repaired at the expense of the CONTRACTOR and no extra payment will be made for the delay.
- D. If, as a result of step-drawdown test analysis, the ENGINEER/GEOLOGIST determines that a pumping well has not been fully developed, the CONTRACTOR shall continue well development using the test pump or other means. No additional payment will be due the CONTRACTOR for time in setting up and conducting the additional step-drawdown test which will be required for well acceptance following this additional development.

- E. A copy of the test data collected by the data logger will be provided to the ENGINEER/GEOLOGIST for reduction and analysis in its raw form on a data CD or DVD in ASCII or Microsoft® Excel format. A copy of all other data, hand written or otherwise, collected for the test will also be provided to the ENGINEER/GEOLOGIST for reduction and analysis.

3.12 DISCHARGE CONTROL

- A. Discharge pipe shall be laid from the well to a discharge location. A convenient location shall be determined by the OWNER and OWNER's REPRESENTATIVE at their discretion and discussed with the CONTRACTOR prior to the start-up of any activity that involves discharge flow. CONTRACTOR shall secure any local and/or state permit required prior to any discharging activity.
- B. The quality of water discharged from the supplemental well and allowed to flow to the surface water discharge points shall be monitored by the CONTRACTOR. Both dissolved oxygen and turbidity concentrations are a concern with the proposed discharge. The CONTRACTOR shall be responsible for maintaining conditions at the point of discharge within acceptable limits of the FDEP.
- C. If water is discharged to any surface water body, dissolved oxygen concentrations shall be maintained by the CONTRACTOR at a minimum of 5 mg/L at the points of discharge. This shall be achieved by injecting compressed air in the discharge line a minimum of 500 feet upstream of the end of the discharge pipe. Alternate methods of aeration may be approved by the ENGINEER/GEOLOGIST, if the ultimate goal of dissolved oxygen concentration can be achieved. Discharge pipe shall be laid from the well to a distance of up to 500 feet at a location to be determined by the OWNER's REPRESENTATIVE.
- D. Turbidity shall be maintained by the CONTRACTOR at a maximum of 25 NTU at the points of discharge. This shall be achieved by filtration through hay bales or some other means in the discharge stream upstream of the actual points of discharge.
- E. Discharge shall be discontinued until these water quality conditions can be met.
- F. Dissolved oxygen and turbidity concentrations shall be monitored with calibrated dissolved oxygen meter and turbidimeter, respectively. The quality of the discharge water shall be recorded and maintained by the CONTRACTOR twice a day during periods of discharge.
- G. The CONTRACTOR shall provide, install and maintain erosion controls for the duration of the well construction work as needed and to prevent sediment and turbidity from entering surface water bodies and to avoid erosion problems by directing flow away from the drilling site and adjacent properties.

3.13 WELL DISINFECTION

- A. Following completion of testing, the well shall be disinfected using sodium hypochlorite to remove bacteriological contamination in accordance with AWWA C654-2013. The well shall also be disinfected at any time when work on the well is stopped and not expected to recommence

for a period of greater than 5 days. A disinfection plan must be submitted to the OWNER and ENGINEER for approval prior to implementation.

- B. A Sodium Hypochlorite solution shall be prepared and applied so that a minimum concentration of 50 mg/L of available chlorine shall be maintained for the entire depth of the well. The solution shall be allowed to remain in the well for at least 2 hours as a minimum holding time.
- C. A sufficient volume of disinfectant must be applied to the well bore and aquifer to disinfect the well in accordance with the latest revision of Chapter 62-555.315, F.A.C.
- D. The Contractor shall disinfect the pump and equipment selected for pumping the well prior to sampling.
- E. After the well has been chlorinated and pumped to waste or allowed to free flow for a minimum of 15 minutes with zero chlorine residual, duplicate analyses shall be taken not less than 30 minutes apart and the samples tested for the presence of coliform in accordance with Standard Methods for the Examination of Water and Wastewater. Additional samples shall be collected until samples collected on two consecutive days do not show the presence of coliform bacteria. When no coliforms are present for two consecutive days disinfection shall be considered complete.
- F. Chlorinated water from the well must be impounded or neutralized with sodium bisulfite or sulfur dioxide to reduce the residual to less than 0.02 mg/L prior to discharge.
- G. The County or County representative will collect and test the samples. Each well requires a minimum of two (2) bacteriological samples collected over two (2) consecutive days at least six hours apart. Each sample will be distributed in two bags per single event. A minimum of 2 sample bags per event will be provided and collected by the County for testing. The Contractor shall coordinate each sampling event with the County and provide at least a 48 hr. notice prior to the event
- H. If after two consecutive days of sampling, the levels of bacteria are unacceptable, the CONTRACTOR shall re-disinfect the well at no additional cost to the OWNER.

3.14 WATER QUALITY ANALYSIS

- A. Water quality samples might be collected from the supplemental well during advancement of the pilot hole, at the discretion of the ENGINEER/GEOLOGIST within the upper Floridan aquifer for the following field parameters: chloride, sulfate and total dissolved solids. Once development has been completed samples might be collected by the ENGINEER/GEOLOGIST at the discretion of the OWNER.
- B. The water samples shall be collected from a smooth sample port while the well is being discharged at the design pump rate.
- C. The CONTRACTOR shall be responsible for coordination with the Orange County Utilities laboratory for the delivery of the required sample containers, appropriate storage and delivery

of samples to the laboratory. Refer to paragraph 1.13 E of this section for additional coordination detail.

- D. The CONTRACTOR will perform bacteriological sampling following disinfection and pump off as described in Paragraph 3.13 of this Section. The CONTRACTOR shall be responsible for providing a pump capable of sampling the well and all appurtenances as per AWWA C654-2013. The well requires a total of two (2) bacteriological samples collected over two (2) consecutive days. If the sample contains unacceptable levels of bacteria, the CONTRACTOR shall re-disinfect the well at no additional cost to the OWNER.

3.15 WELLHEAD COMPLETION

- A. Immediately after removing the test pump, the CONTRACTOR shall secure the well by installing a blind flange plate to the supplemental well casing.

3.16 WELL ABANDONMENT

- A. In the event that the CONTRACTOR fails to complete any well to the depth specified or to such lesser depth as requested by the ENGINEER/GEOLOGIST due to equipment failure, or fails to set or grout the casing to SJRWMD and FDEP standards, or must abandon a well because of loss of tools or for any other cause, he shall, if requested by the ENGINEER/GEOLOGIST, plug the well in accordance with standards and procedures specified in the Rules of the SFWMD, Chapter 40E-3, F.A.C.
- B. The well casing of any well to be abandoned may, at the CONTRACTOR's option, be salvaged and become the property of the CONTRACTOR. Such casing shall not be reused without approval by the ENGINEER/GEOLOGIST.
- C. No hourly rate will be paid for pulling casing or reconditioning the open borehole unless the ENGINEER/GEOLOGIST directs that the casing be pulled.
- D. If the CONTRACTOR must abandon a well through fault of the CONTRACTOR or his employees or SUBCONTRACTORS, costs of drilling and abandonment will be borne by the CONTRACTOR.

3.17 PROTECTION AND SITE CLEAN-UP

- A. At all times during the progress of the Work the CONTRACTOR shall use all reasonable precautions to prevent tampering with a well or entrance of foreign material into it. The CONTRACTOR shall also maintain the site in a clean and orderly fashion at all times so that no adverse aesthetic impacts are created upon adjacent private properties or the adjacent public right-of-way. The OWNER reserves the right to suspend work and have the site cleaned prior to proceeding, at no additional expense to OWNER, if the site is not properly maintained.
- B. Immediately upon disinfection of the well, the CONTRACTOR shall remove all of his equipment, materials, and supplies from the site of the Work, remove all surplus materials and debris, fill in all holes or excavations, and regrade the site to conform to the contours of the land which existed before work started. The site shall be thoroughly cleaned and made ready for the contractors on succeeding work. Not more than two weeks will be allowed for this site

restoration, and the CONTRACTOR shall complete all site restoration work within that time. Refer to item 22 Section 01015 for site restoration guidelines.

C. Refer to Section 01015 for additional guidelines.

3.18 SANITARY FACILITIES

A. The CONTRACTOR shall provide temporary sanitary facilities at the site for the needs of all construction workers and others performing work or services in connection with this project. Sanitary facilities shall be of reasonable capacity, and properly maintained throughout the construction period. The CONTRACTOR shall place the sanitary facilities such that they are obscured from public view to the greatest practical extent. A least one (1) chemically-treated type toilet will be provided for every ten (10) employees. The CONTRACTOR shall enforce the use of such sanitary facilities by all personnel at the site. All toilets, regardless of type, must have self-contained waste storage facilities.

END OF SECTION

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