June 5, 2014 BOARD OF COUNTY COMMISSIONERS ORANGE COUNTY, FLORIDA

ADDENDUM NO. 4 BID NO. Y14-792 PH EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATER STORAGE AND REPUMP FACILITY

BID OPENING: June 17, 2014

This addendum is hereby incorporated into the bid documents of the project referenced above. The following items are clarifications, corrections, additions, deletions and/or revisions to and shall take precedence over the original documents. Additions are indicated by <u>underlining</u>, deletions are indicated by <u>strikethrough</u>.

The bid opening date remains June 17, 2014 at 2:00 P.M.

A. **<u>BIDDER QUESTIONS</u>**

1. Will the Contractor be responsible to pay for the electrical power consumed by the process equipment during the testing and start-up period?

Answer: Yes.

2. When will potable water service be available for the Contractor to use for construction purposes?

Answer: The Contractor shall make a wet tap connection to the existing 8-inch potable water main near the entrance to the Moss Park Ridge Development for temporary water supply to the Project Site. The Contractor shall provide a 4-inch tap, 4-inch piping suitable for potable water service, a 4-inch reduced pressure zone backflow preventer, and 4-inch temporary potable water transmission main from the backflow preventer to the location that the Contractor will use for potable water use onsite during construction. The Contractor shall be responsible for protecting and maintaining this temporary water supply system for the duration of the Project. At the end of the Project, the Contractor shall remove the temporary water supply system and install a plug on the 4-inch tapping valve.

Addendum No. 4 Y14-792 PH June 5, 2014

3. Will the Contractor be charged for potable water used for the leak testing work as specified in Section 03091? If so, what will be the cost per gallon charged?

Answer: No. However, the water will be metered, and the Contractor shall make arrangements with the County for a temporary water meter.

4. Where and how on site will the Contractor be able to dispose of the water after completion of the leak testing work?

Answer: After leak testing, the water can be placed in the onsite retention pond west of the ground storage tanks location. For water with elevated chlorine residual from disinfection activities, the Contractor shall dechlorinate in accordance with AWWA C655, and place the water in the onsite retention pond west of the ground storage tanks location. Under no circumstances will heavily chlorinated water be allowed into a distribution system for customer use, whether dechlorinated or not.

5. Please indicate which method of concrete finishing, for formed surfaces exposed to view, bidder should base their bid on. Specification 03300, 3.08 indicates two methods, Specification 03345 3.01, B.3. indicates an "F3" method and Drawing S01 Structural Concrete Note F.1. indicates a different method.

Answer: Concrete finishing shall be per Drawing S01, note F. DELETE specification Section 03345 in its entirety. DELETE the last sentence from Section 03300, paragraph 3.08B in its entirety.

6. Upon Substantial Completion, will the Owner or the Contractor be responsible for the cost to fill the chemical storage tanks with chemicals?

Answer: Yes, the Contractor shall fill the chemical storage tanks with sodium hypochlorite solution (10-15% by weight sodium hypochlorite, 6-8% by weight sodium chloride, 0.2-0.4% by weight sodium hydroxide) conforming to ANSI/AWWA B300, Standard for Hypochlorites and ANSI/NSF 60, Drinking Water Treatment Chemicals-Health Effects. Information confirming the solution meets all requirements and the Material Safety Data Sheet shall be submitted to the Owner prior to chemical delivery.

7. Upon Substantial Completion, will the Owner or the Contractor be responsible for the cost to fill the 6,000-gallon fuel storage tank with fuel?

Answer: Yes, the Contractor shall fill the fuel storage tank with fuel upon Substantial Completion. Contractor shall have the storage tank approved for use by appropriate regulatory agencies prior to putting any fuel in the tank.

8. Attachment E states one of the similar projects should include installing 3,000 LF of 24" pipe. Can we use a project where we installed 3,700' of 20" and 16" in parallel in the same trench?

Answer: No.

9. Will the County consider a substitution request for consideration as an approved equal for xxxx product? [This question was asked by a number of manufacturers/vendors.]

Answer: No, the County does not consider requests for substitution during bidding. The selected Contractor may submit a request for a product substitution as a submittal after Notice of Award, in accordance with the General Conditions.

10. Bid Submittal – Please confirm that only one original bid bond is required (submitted with original bid form).

Answer: One original bid bond is required.

11. Reference Asphalt Paving per drawing C06 & C07 – Please provide an asphalt specification for this road work.

Answer: Provide the Asphaltic Concrete pavement and associated work in accordance with Section 02511 Asphaltic Concrete Paving, ATTACHED.

12. Drawing M02 – Please provide a detail for the 316 SS Pedestal called out for the PIT connection. Please clarify via Addendum.

Answer: Provide IMFS 54 S6 NDC 0000 by James C. White Company, Inc., or Engineer-approved equal. Anchor bolts shall be 316 stainless steel in accordance with Section 05510, paragraph 2.03.

13. Drawing M02 – Should there be a wall pipe for the 4' x 8' vault? Please clarify via Addendum.

Answer: No. The vault walls will be cast around the pipe. Please refer to Section J on Drawing S05, and Reinforcement Detailing Notes 12 and 17 on Drawing S01. For the slabs and walls of the vaults, the concrete mix shall include Crystalline Waterproofing Concrete Admix added to the concrete during the batching operation. The Contractor shall submit, along with the concrete delivery ticket, a certification from the concrete mix provider that the admix was incorporated in accordance with the admix manufacturer's recommendations.

14. Drawing C14, C16 and C17 – Do the Fire Hydrants coming off the Main, require a tapping sleeve or a reducing tee, nothing is shown. Please clarify via Addendum.

Answer: On Drawings C14, C16, and C17, the callout in the profile references Detail 19 on Drawing C20 for the Fire Hydrant Assembly. Detail 19 shows a reducing anchoring tee. Section 15100, paragraph 2.06 provides further guidance on the Fire Hydrant Assembly. The fire hydrant assemblies coming off the 36-inch water main require a 36"x6" anchoring tee, a 6" gate valve and box, a 6" anchoring coupling, a 6" 90 degree bend, and a 6" ductile iron riser pipe as configured in Detail 19 on Drawing C20.

15. Reference Section A, sheet C13 – In the section view, details 1 ea. 30" DI Flanged bends, and 2 ea. 36" DI Flanged Bends. In the plan view 3 ea. 36" DI Flanged Bends are detailed. *Which is correct?*

Answer: Section A on Drawing C13 is correct. In PW Valve Station Plan 1, REVISE the callout just below the Section D bubble to read: <u>30</u>" DI 90° BEND, FLG.

16. When will future lines be tied into the system?

Answer: Future lines will be tied into the system in 2 to 3 years. Also, please refer to the answer to Question 2.

17. On Sheet G02, note 22. Indicates all of the pvc and ductile iron being fully restrained. Should we follow the restraining schedules that Orange County has in their standards? Also, would this only refer to pressure pipe and not to the gravity sewer and/or services?

Answer: Note 22 will be revised to clarify that gravity sewer is not to be restrained. Refer to revised Note 22 on revised Drawing G02, ATTACHED.

18. Section 11216, Table 11214-A – With regards to the "secondary design point" requirements, is it acceptable if these operating points are met with the pump operating at a reduced speed?

Answer: Yes.

19. With regards to the manufacturers listed in paragraph 1.02F, would Orange County allow OCV as an acceptable manufacturer for the control valves?

Answer: Please refer to the answer to Question 9.

Addendum No. 4 Y14-792 PH June 5, 2014 20. This project has significant material and subcontract items that either are not offered by M/WBE firms or are beyond their capabilities. The WTP Equipment, Chemical System, Pumps, Pre-Stressed Concrete Tanks, Instrumentation & Controls, Generators and Fueling Systems will likely not be competitively bid by certified M/WBE firms. These items represent a significant portion of the project and will make the standard 25% participation requirement very difficult to meet on a competitive bid. We request that the County consider these concerns, and either adjust the percentage or waive the requirement for this bid.

Answer: The M/WBE Participation will remain 25%.

21. Details A, B, and C on drawing S05 show a compacted subgrade directly beneath the Operations Building slab. Detail 5 on drawing S06 shows a layer of crushed stone beneath the Operations Building slab. Please confirm that crushed stone is not required beneath the slab of the Operations Building. If yes, how much stone is required under the Operations Building slab?

Answer: Crushed stone is not required under the Operations Building slab.

22. Is there any re-usable topsoil onsite? If so, what is the average depth of topsoil?

Answer: There are no topsoil stockpiles on site. DELETE the following sentence in Section 02215, paragraph 2.01B "Use topsoil stockpiles on site if conforming to these requirements.". The soils reports for the site are included in Appendix A attached to the Specifications. The soils reports from 2008 and 2011 include a number of borings west and outside of the work area. Refer to the applicable boring numbers shown within the Limits of Work on Drawings C06, C07, and C08.

23. Please provide articles 38-40 as listed in the Table of Contents – C – Instructions to Bidder.

Answer: 38, 39 and 40 are deleted from the Table of Contents	
38 MOBILIZATION	<u>C-20</u>
39.UNBALANCED PRICING	<u> </u>
40 UNIT PRICES	<u> </u>

24. Unit Prices is one of the mentioned sections in the TOC but no such section exists in the Front Ends. Drawing C11 states "Silt Fence to be paid for under the contract unit price for staked silt fence, (LF)" Please clarify.

Answer: Delete 38, 39, and 40 from the Table of Contents. On Drawing C11, DELETE note 5 from the NOTES FOR SILT FENCES. The silt fence shall be included in Bid Item 12.

25. Please provide specifications for the Type 8 Asphaltic Concrete as called out on drawing C21.

Answer: Please refer to the answer to Question 11.

26. Detail 24 on drawing C20 indicates the pipe and fittings between the pipe main and the ARV are stainless steel. Section 15100 2.02 A. 3. states that the fittings from the main to the ARV shall be threaded and made of brass, please clarify.

Answer: Detail 24 on Drawing C20 is for ARVs mounted on top of pipelines or fittings, and shall use 316 Stainless Steel piping, valves, and appurtenances. Detail 20 on Drawing C20, and new Detail 31 on Drawing C22 ATTACHED, are for ARVs that are offset from pipelines, and can use either Brass or 316 Stainless Steel piping, valves, and appurtenances. Please note that underground portions of these items are considered appurtenances to underground DIP, and are required to be installed with polyethylene encasement in accordance with Note 1 on Drawing C12.

27. Section 11214 3.01 F. states that the seal water system shall be installed as indicated on the Drawings and as recommended by the manufacturer. Drawings M01 & M02 only show drains for the seal water system. Please provide a drawing depicting what is required for the seal water system.

Answer: These pumps typically have the seal water source being pumped fluid. If seal water supply piping is required by a particular pump manufacturer, it shall be included in that manufacturer's scope of supply.

28. Drawing M01 has a note on the discharge of PW-HSP-4 that states "3" ARV, Combination type, 316SS (Typ. X4)". There are (2) additional ARV's depicted on the discharge lines that are being installed with blind flanges in order to connect to new pumps in the future. Please clarify the quantity of ARV's required.

Answer: There are two 2" ARVs and four 3" ARVs on Drawing M01. The two 2" ARVs (TYP X2) are on the discharge pipes from PW-HSP-1 and PW-HSP-2, and the four 3" ARVs (TYP X4) are on the discharge pipes from PW-HSP-3, PW-HSP-4, future PW-HSP-5, and future PW-HSP-6.

29. Drawing M08, details 8 & 9 depict 2" diameter sample tap assemblies and 2" diameter chemical injection assemblies. The diameter of the sample and chemical lines that connect to these assemblies vary throughout the contract drawings. Please advise if the sample tap assemblies and the chemical injection assemblies should be the same diameter as the lines that are connecting to them or if a reducer is required to meet the 2" diameter that is in the detail.

Answer: In Drawing M08, REVISE the sample tap assemblies to 3/4-inch ball valve and 3/8-inch sampling probe, and the sample return and chemical injection assemblies to

3/4-inch ball valve and 3/8-inch solution tube. Provide SP-075-S-PVC-6-B-V-10 by Saf-T-Flo, or Engineer-approved equal, for each sample tap assembly. Provide EB-145-S-P-6-B-V-10 by Saf-T-Flo, or Engineer-approved equal, for the sample return assembly. Provide EB-145-S-P-6-CV-V-14 by Saf-T-Flo, or Engineer-approved equal, for the chemical injection assembly.

30. Please provide a specification for the sample tap assembly and the chemical injectors that are on drawing M08.

Answer: Please refer to the answer to Question 30.

31. Please advise if sample pipe is required to be routed from the sample assembly on M02 to the sample sink that is shown on detail 10 drawing M08.

Answer: No, the RW will not be sampled. On Drawing M02, DELETE the callout for the sample assembly and detail bubble (Detail 8 on Drawing M08). There will only be the PIT connection at the RW vault.

32. Section 15100 2.16 B. states that the bolts, nuts and washers shall be titanium for the expansion joints. Section 15062 2.01 A. 3. states that flanged joint bolts, washers and nuts for ductile iron pipe shall be 316 stainless steel with bolts and nuts conforming to ASTM A193 Grade B8M. Please clarify what material is required for the bolts, washers and nuts at the locations where ductile iron pipe flanges connect to the expansion joints.

Answer: Section 15100, paragraph 2.16 only applies to the Teflon expansion joints at the hypochlorite tanks shown on Drawing M06. Refer to Section 13209, paragraph 2.02E for bolts, nuts, and washers at the hypochlorite tanks. Section 15062, paragraph 2.01A.3.d.ii is intended to cover the non-hypochlorite flange joints.

The expansion joints at pumps shall be rubber, single arch type, with integral flat-face ANSI Class 125/150 flanges; minimum working pressure shall be 150 psi for joints 12 inches and smaller, 120 psi for 14- and 16-inch joints, 110 psi for 18- and 20-inch joints, and 100 psi for 24-inch joints. Provide steel thrust plates, retaining rings, and control rods. Expansion joints shall be Proco Style 231, or equal.

33. The detail "Stainless Steel Wall Manhole" on drawing M05 states that (2) are required. Drawing M03 has (2) detailed and drawing M04 has (1) detailed which would make a total of (3) required. Please clarify the quantity of the stainless steel wall manholes.

Answer: Drawings M03 and M04 are correct regarding the wall manholes. There are a total of three stainless steel wall manholes required: two at the PW Ground Storage Tank and one at the RW Ground Storage Tank.

34. Section 13209 2.02 E states that the bolts and hardware for the polyethylene tanks shall be titanium. Please advise if titanium bolts and nuts are required for the PVC flanges on the sodium hypochlorite lines that connect to the tanks

Answer: Yes, titanium bolts, nuts, and washers are required for the PVC flanges on the lines from the hypochlorite tanks.

35. Please provide the material for the nuts and bolts for PVC flanges.

Answer: The nuts, bolts, and washers at the hypochlorite tanks shall be titanium in accordance with Section 13209, paragraph 2.02E. Nuts, bolts, and washers for PVC pipe in other areas shall be 316 stainless steel.

36. The scale of the flange x flange spool pieces on drawing C13 sections G & H do not match the plan view of section 2. For example, the plan view length of one of the flange x flange spool pieces is 8'-0" and in the section it is 5'-0". Please advise whether to use the scale on the plan view or the scale on the section view.

Answer: On Drawing C13, please use the centerline-to-centerline dimension of 14 feet between the 24-inch pipes from the plan view 2 in the area of Section H. The plan view is more representative of what it will look like.

37. Please advise what the symbol represents that is shown at the pressure gauges on drawing M01 (plan view, section 1A and section 1B).

Answer: On Drawing M01, Sections 1A and 1B, please refer to the callouts for the pressure gauges and the reference to Detail 18 on Drawing M10.

38. Please advise what the symbol represents that is shown at the pressure transmitters on drawing C13.

Answer: On Drawing C13, the callouts for PIT (pressure indicating transmitter) at the upper right of Sections C and G refer to Drawing E16 and the I Drawings. Please refer to PRESSURE SENSOR DETAIL on Drawing E16, and Section 13300, paragraph 2.08G for the PIT requirements.

39. Please provide a specification section for the bag filter that is depicted on drawing M06, detail 5B.

Answer: On Drawing M06, Detail 5B, ADD Note 4 as follows:

4. THE BAG FILTER SHALL BE ALL PVC, SIMPLEX BAG FILTER, DOUBLE LENGTH, TRUE UNION WITH VITON SEALS SUITABLE FOR HYPOCHLORITE SERVICE, FLT SERIES AS SUPPLIED BY HAYWARD FLOW CONTROL, OR APPROVED EQUAL. SUPPLY THE FILTER HOUSING

Addendum No. 4 Y14-792 PH June 5, 2014

WITH ONE 1 MICRON TEFLON FELT FILTER BAG, SIZE #2 WITH TITANIUM RING AND TEFLON THREAD. PROVIDE TWO SPARE BAGS, SUITABLY PACKAGED AND LABELED FOR LONG-TERM STORAGE.

40. Please provide a detail for the 8" backflow preventer assembly on the 8" Fire Protection Line where is connects to the 36" PW Main in two locations on Drawing C12.

Answer: Please configure the 8-inch backflow preventer assembly using 8-inch flanged ductile iron pipe and fittings above grade, 8-inch restrained joint ductile iron pipe and fittings below grade, 8-inch flanged gate valves, and an 8-inch flanged Reduced Pressure Zone Backflow Preventer, similar to Detail 22 on Drawing C20.

41. Drawing A02 shows 10 fire extinguisher cabinets. Spec Section 10522 Table 1 lists 9 fire extinguishers on brackets without cabinets. Please clarify how many fire extinguishers and cabinets are needed.

Answer: DELETE the Fire Extinguisher Schedule in Section 10522 in its entirety and REPLACE with the following:

FIRE EXTINGUISHER SCHEDULE

				Type and Quality				
Room No.	Location ¹	Bracket	Cabinet	Clean Agent 2A-10BC	Dry Chemical 4A-60BC	CO ₂ 10BC-15	Water-Mist 2A-C	Remarks
101, 103, 105, 108 & 110	Generator/Mechanical / Electrical Rooms	Х				5		
102 & 107	Pump Rooms	Х				2		
106	Sodium Hypochlorite Room	Х				1		
104 & 109	Operator Control Room	Х				2		

1. As located on Drawing A02 - 1/A02 Life Safety Plan.

42. Please provide specifications for the 8" Fire Protection Line shown on Drawing C12.

Answer: Fire Protection pipe, fittings, and all appurtenances for fire protection (labeled FP on Drawing C12) back to the PW transmission main shall be Ductile Iron Pipe, UL Listed and FM Listed for Fire Main Equipment. Also, please refer to the answer to Question 49.

43. Drawing G02 Note 16 states that all water and force main and reclaimed water mains 12" in diameter and less shall be C900 DR18 PVC with ductile iron fittings. Please confirm that Sch 80 PVC pipe and fittings are acceptable for pipe sizes less than 4" in diameter since C900 pipe is not made below 4".

Answer: Please refer to revised General Construction Note 16 on revised Drawing G02, ATTACHED.

44. Drawing C24 calls for fitting 133A to be a 4"x3" reducer, fittings 134 and 134A to be 3" 90 bends, and valve 64 to be a 3" gate valve. Drawing C12 and P03 call for the line as 2" PW. Please confirm that the potable water line entering the operations building from the north is 2" in diameter.

Answer: The potable water line entering the east wall of the Operations Building is 2 inches in diameter. Fittings C12-134 and C12-134A will be 2" PW, and Valve C12-V64 will be 2".

45. Specifications 02660 and 02662 Part 1.02 A-1 both call for a minimum cover of 36inches for mains sized 12-inch and below and a minimum cover of 48-inches for mains sized 16-inch and greater. Please confirm that the elevation tables on Drawings C23, C24, and C25 govern in the event that an elevation provided in the tables would conflict with the minimum covers called for in the specs.

Answer. The elevations provided on Drawings C23, C24, and C25 will govern over the stated minimum covers for yard piping. Similarly, elevations shown on Drawings C14, C15, C16, and C17 will govern over the stated minimum covers for transmission mains. Please note that the 4-inch force main plan and profile is revised in Drawing C14, ATTACHED.

46. Reference Retention Ponds drawing C06 & C07 – Please indicate what material is required at the bottom of retention ponds.

Answer: In-situ soil shall be the material for the pond bottom. Based on the geotechnical reports in Attachment A at the end of the Specifications, suitable soils extend from land surface to below the proposed pond bottoms in the area of the retention ponds.

47. Drawing C-21, Detail 25 – What is the pipe material and size of the Blow Off Pipe? Please clarify via Addendum.

Answer: Please refer to Detail 25 on Drawing C-21 for the Blow Off Valve Assembly. The detail has a call out on the right side that states "Blow off valve assembly per Appendix D". Now refer to "Appendix D – List of Approved Products, Page 1 of 17" in the Project Manual. The fifth row down on this page indicates that blow off valves shall be "Truflo Series TF #550" as manufactured by Kupferle Foundry Company, or shall be "The Hydrant Plus Series VB 2000 B" as manufactured by Water Plus Corporation. Bidders should note the VB 2000 B model closely matches the Orange County Standard Detail in the drawings, whereas the TF 550 would also require a 2-inch curb stop and an additional valve box. The pipe size and material between the tapped plug and the temporary blow off valve in each case shall be 2-inch Schedule 40 brass pipe with NPT threads.

48. Are the subsurface mechanical joint fittings for the potable, reclaim, fire protection, and force main to be class C-153 or C-110?

Answer: Both types of mechanical joint fittings are acceptable. Refer to specification Section 15062, paragraph 2.01B.1: "All fittings shall conform to either ANSI/ AWWA C110/ A21.10 and/or C153/ A21.53, latest revision, and shall be ductile iron only. Also, please refer to the answer to Question 46.

49. Please furnish the size of power and communication man holes.

Answer: Refer to revised Drawing E02 for this information.

50. Drawing M01 does not provide any details on how the suction and discharge lines are to be installed through the vaults in the building. Are we to use wall castings or a link seal connection? Please provide applicable details. The structural drawings do not address this either.

Answer: The vault walls will be cast around the pipe. Please refer to Section J on Drawing S05, and Reinforcement Detailing Notes 12 and 17 on Drawing S01. For the slabs and walls of the vaults, the concrete mix shall include Crystalline Waterproofing Concrete Admix added to the concrete during the batching operation. The Contractor shall submit, along with the concrete delivery ticket, a certification from the concrete mix provider that the admix was incorporated in accordance with the admix manufacturer's recommendations.

51. Drawing M02 does not provide any details on how the suction and discharge lines are to be installed through the vault in the building. Are we to use wall castings or a link seal connection? Please provide applicable details. The structural drawings do not address this either.

Answer: The vault walls will be cast around the pipe. Please refer to Section J on Drawing S05, and Reinforcement Detailing Notes 12 and 17 on Drawing S01. For the slabs and walls of the vaults, the concrete mix shall include Crystalline Waterproofing Concrete Admix added to the concrete during the batching operation. The Contractor shall submit, along with the concrete delivery ticket, a certification from the concrete mix provider that the admix was incorporated in accordance with the admix manufacturer's recommendations.

52. The plans indicate a Type 8 Asphalt. I've never heard of this type. Usually a Type S or SP is specified. Please have this clarified and get back with me the type required.

Answer: The asphalt type is Type SP12.5. Please refer to Section 02511, Asphaltic Concrete Paving, ATTACHED.

53. Will the transmission lines be connected prior to project completion, to allow leak testing of the storage tanks as well as testing the pumping and facility equipment?

Answer: Please refer to the answer to Question 2, which addresses temporary potable water supply for construction purposes. The temporary jumper connection for flushing, cleaning, and testing the new lines is provided as Detail 16A on Drawing C19, ATTACHED.

54. Please furnish the make and model # of the pole mounted light.

Answer: Please refer to Symbol HD on the Luminaire Schedule located in the bottom left corner of Drawing E07.

55. Concerning the cost for the Progress Energy utility feed to be installed. Can we be provided with contact information for Progress/Duke Power?

Answer: Duke Energy new construction services: 800.700.8744

56. Duke Power is furnishing the site pad mount transformer, installed by Contractor. Who is responsible for furnishing and installing the transformer pad? Are there any utility cost associated with the transformer itself?

Answer: The Contractor shall be responsible for coordinating with the utility company and for furnishing and installing the transformer pad.

57. How will temporary power be brought to the site? What are the costs associated with temporary power?

Answer: The Contractor shall be responsible for providing temporary power and any costs associated with the temporary power.

58. What is panel PW-IP next to PW-LP on Sheet E06 for? No indication of what it serves or where it is fed from.

Answer: Panel PW-IP will be deleted.

59. Specification 16485-3.02-A. In order for the VFD suppliers to meet this requirement and include the cost in their bid they would need to know who the pump manufacturer will be and the location of their test facility prior to the project bidding. Can we be furnished with that information?

Answer: The VFD supplier does not need to ship the VFD to the pump manufacturer's facility for testing. Specification Section 16485, paragraph 3.02 will be deleted. However, the VFD manufacturer shall coordinate with the pump manufacturer to ensure that the requirements of Section 16485, paragraph 2.02A.8 are met.

60. Reference drawing sheet M01 section 1A & 1B, Drawing Sheet M02 section 2A, and Detail 18 on Drawing Sheet M10. Detail 18 specifies a tee at pressure gauge connections. However, the tee is omitted on sheets M01 & M02 and a strap connection is shown. *Can a ¼" tap be provided in lieu of a tee.*

Answer: In Detail 18 on Drawing M10, the main pipe tee fitting is not needed for the pressure gauge connection. On Drawings M01 and M02, a ¹/₄" threaded tap into the ductile iron pipe shall be provided for each pressure gauge connection instead of the tapping saddle shown. Contractor to coordinate tap threads with the stainless steel nipple threads.

61. Contract drawing S03 shows supports and pedestals to be poured for future pipe and pumps. These same supports and pedestals are shown to be poured in the future on contract drawing M02. Please advise if the pipe supports and pump pedestals for future work are to be poured in this contract.

Answer: The pipe supports and pump pedestals associated with future PW-HSP-5, PW-HSP-6, and RW-HSP-3 will be deferred to a future project.

62. On Drawing P-02 on the equipment schedule item P-3 the Emergency eye/face wash and shower is shown with a temperature mixing valve. There isn't any hot water heater or piping shown. Would you please clarify this?

Answer: The mixing valve will not be required for Fixture P3. DELETE that notation for P3 under NOTES in the PLUMBING FIXTURE SCHEDULE on Drawing P02.

63. Drawing M01 indicates that a sample sink is to be located on the south wall in the PW Pump Room. Is a floor drain required for the sample sink?

Answer: On Drawing M01, shift the sample sink, backboard, analyzers, and all related items west to the other side of the hose bibb and trap primer on the south wall of the PW Pump Room on Drawing P03. Pipe the sample sink outlet to the same floor drain as the suction sample flow to drain. The floor drain is shown in the southwest corner of the PW Pump Room on Drawing P03.

64. Drawing M01 calls for a Flow Switch at the discharge of the PW Pumps. Drawing I11 does not show this switch. Is a flow switch required?

Answer: Yes, flow switches are required. They take the place of the position switches on the check valves. The flow switches are specified in Section 13300, page 13300-29, paragraph 2.08K. Also, refer to revised Drawings E05, I04, I05, I09, I10, I11, and I16, ATTACHED.

- 65. Reference drawings C13 valve station pads, drawing M09 Flow Meter pad, and drawing M10 concrete pipe support detail.
 - Concrete pad thickness and reinforcing are not detailed on drawings C13 and M09.
 - On drawing M10 a pad thickness of 6 ¹/₂" is detailed but no pad reinforcing.

Please confirm pad thickness of 6 1/2", and reinforcing is not required.

Answer: Please refer to Detail 9 on Drawing S06 for thickness and reinforcing of Meter and Miscellaneous Slabs, including those at Valve Stations. DELETE "GENERATOR AND" from the title for Detail 9 on Drawing S06. Refer to revised Drawings S03 and S06, ATTACHED. The 3-1/2" and 3" dimensions at the bottom left of Detail 14 on Drawing M10 are clarified to represent <u>minimum</u> embedment and cover for the anchor bolts, not to represent slab thickness or lack of reinforcing.

66. Does all construction activity in the Transmission main area have to be confined to the 30' easement or can that be widened and restored?

Answer: The water and reclaimed water transmission mains are not in an easement. They are to be installed in a 30-foot wide "Transmission Mains Corridor" within property owned by Orange County as called out on Drawing C05 and as called out in Detail 27 on Drawing C21. All the construction activity associated with the construction of the transmission mains shall be confined to the 30-foot wide Transmission Mains Corridor.

67. The plans and it states on the civil details that its looking for Type 8 asphaltic concrete on page 26 of 208, please clarify the type of asphalt to be utilized for this project.

Answer: Please refer to the answer to Question 11.

68. Can the native sand be used for backfill in the proposed under-drain envelope or must we import the material?

Answer: The underdrain pipe shall be perforated PVC pipe conforming to ASTM D-3033, and perforations conforming to the requirements of ASTM C-508. Coarse aggregate around the underdrain pipe shall be #57 stone as specified in FDOT Section 901, washed and screened to remove fines. The filter fabric envelope shall be Mirafi 140N or approved equal. Backfill shall be select common fill from native soil from near the pond bottom.

69. Is a wastewater system in existence to the project site that could handle the dewatering discharge volume if necessary to address concerns with the discharge water quality?

Answer: No.

70. Is there a water source on site for construction use?

Answer: Please refer to the answer to Question 2.

71. Detail 27 on Sheet C21 shows 10 feet horizontal separation between the PW and RW Mains. Is that distance centerline to centerline or outside of pipe to outside of pipe?

Answer: It is centerline to centerline distance.

72. Will there be water available for start-up and testing of the RW and PW Pump Systems? Will there be a discharge available for both?

Answer: Please refer to the answers to Questions 2 and 4.

73. Please provide concrete thickness and reinforcing requirements for the PW Valve Station pad and the RW Valve Station pad shown on sheet C13.

Answer: Please refer to the answer to Question 66.

74. Please provide concrete thickness and reinforcing requirements for the Flow Meter pad shown on sheet M09.

Answer: Please refer to the answer to Question 66.

75. Please provide reinforcing requirement for the pump stands shown on sheets M01 and M02.

Answer: Please refer to the answer to Question 66 and Detail 14 on Drawing M10.

76. The Room Schedule on sheet A09 calls for the ceiling of PW Sodium Hypochlorite Room 106 to receive epoxy coating. This same schedule shows that the room is open to deck and the Reflected Ceiling Plan on sheet A04 shows no ceiling in this location. Please clarify.

Answer: The PW Sodium Hypochlorite Room does not have a ceiling. On Drawing A09, see the note below ROOM SCHEDULE – Where finish ceiling is not provided in space and is open to deck above – paint all exposed structural components including the underside of the metal roof deck and exposed metal trusses.

77. Drawing I14 which shows a power meter in the ATS connected to a control panel. Neither the drawing or the specs call out a model number for the meter. If a specific meter is required, please provide the model number.

Answer: The Contractor shall provide per page 13 of 17 in Appendix D attached to the Specifications:

Approved Generator Transfer Switch: Russelectric RMTD Series with model 2000 plus controller for power monitoring, NEMA 12/3R 316 SS enclosure.

78. Is there any background water quality data available from the existing wetlands and stream to the west and north of the site that provides pH data?

Answer: Unknown. However, data for surface waters in the general vicinity may be available from the South Florida Water Management District.

79. Does an existing Sanitary Sewage Force Main exist that is capable of receiving dewatering discharge at this time?

Answer: Please refer to the answer to Question 70.

80. Will we be required to over excavate at the Ground Storage Tank site 5 ft to 8 ft below existing grade and replace with Structural fill as stated on page 14 of GEC Project No. 3008g report with the excavation bottom extending 5 ft beyond the structures?

Answer: No. the borings in the GEC report that led to those recommendations were based on an earlier site plan that placed tanks in the floodplain west of where the retention ponds are shown. Refer to the Tank Foundation section in the Ardaman report dated August 26, 2013, also in Appendix A attached to the Specifications.

81. Are the proposed future storage tank sites to be overexcavated and backfilled as part of this project?

Answer: No.

82. Will the Owner pay for the Orange County Building permits as they have on previous projects?

Answer: No, the Contractor shall be responsible for the permit fees as required in Section 01065 and in Part F – General Conditions, page F-13, Permits.

83. Does an asset table exist for the fittings being used in the potable water & reclaim water pump manifold assemblies (sheet M01)? The valves are shown on the asset table (sheet C23), however no sizes are listed?

Answer: There isn't an asset table for the fittings on Drawings M01 and M02. Pipe, fitting, and valve sizes are called out on Drawings M01 and M02.

84. Specification 16010-1.03-A-7 calls for a new fire alarm system but we have been unable to find it in the specs or on the drawings. Please clarify.

Answer: Please refer to new Section 16722 and new Drawing E19A, ATTACHED.

85. Please clarify if we are required to include flood coverage in our builder's risk policy. This particular peril is listed as an excluded "causes of loss" in Exhibit D part B.1.g, however page F-8 of the contract documents lists a flood sub-limit. The need to included flood coverage could be interpreted either way, so we are asking for a clarification to eliminate any uncertainty and insure that all bidders include the necessary costs.

Answer: Yes flood coverage is required within the builders' risk coverage.

B. SPECIFICATIONS

1. Section 02511 – ASPHALTIC CONCRETE PAVING

ADD new Section 02511, ATTACHED.

2. Section 02660 – POTABLE WATER SYSTEMS

- a. In paragraph 3.06B on page 02660-8, REPLACE "AWWA C651, Standard Procedures for Disinfecting Water Mains" with "<u>AWWA C652, "Disinfection of</u> <u>Water Storage Facilities</u>".
- b. ADD the following sentences at the end of paragraph 3.06C.4 on page 02660-8:

Water used for disinfection shall be dechlorinated in accordance with AWWA C655. Perform testing to confirm acceptably low chlorine residual, and drain the water into the adjacent retention pond. Water resulting from the disinfection process shall not be allowed to enter a distribution system for use by customers.

- c. In paragraph 3.06C.6 on page 02660-8, REPLACE "C651" with "C652".
- d. In paragraph 3.06D on page 02660-8, REPLACE "line" with "tank".

Addendum No. 4 Y14-792 PH June 5, 2014

3. Section 02784 – CHAIN LINK FENCES AND GATES

ADD the following sentences at the end of paragraph 2.01A on page 02784-3:

All fence framework including posts, rails, bracing, posts tops, stretcher bars, gate frames, hinges, fabric ties, tension wires, and all miscellaneous hardware shall be provided a factory finish of black paint equivalent to PermaCoat® PC-20TM by Ameristar Fence Products, or approved equal.

4. Section 13205 – PRESTRESSED CIRCULAR CONCRETE TANK

ADD the following paragraph at the end of the Section:

3.04 **DISINFECTION**

The Potable Water Ground Storage Tank and the Reclaimed Water Ground Storage Tank shall be disinfected in accordance with paragraph 3.06 in Section 02660.

5. Section 15064 – POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

ADD the following sentence at the end of paragraph 2.02A.4 on page 15064-3:

PVC pressure pipe and fittings less than 4 inches in diameter shall be Schedule 80, Type I, Grade I, and shall conform to ASTM D1784 and D1785.

6. Section 16230 – STANDBY DIESEL GENERATOR SETS

Replace the PERMANENT ENGINE-GENERATOR SCHEDULE on page 16230-9 with new page 16230-9, ATTACHED.

7. Section 16722 – FIRE ALARM SYSTEM

INSERT new Section 16722, ATTACHED.

C. <u>DRAWINGS</u>

1. Drawing No. G02

REPLACE Drawing G02 with revised Drawing G02, ATTACHED. General Construction Notes 13, 15, 16, 22, and 33 are revised.

2. Drawing No. C14

REPLACE Drawing C14 with revised Drawing C14, ATTACHED. The 4-inch force main is rerouted, and other Drawing revisions are denoted by clouds and triangles.

3. Drawing No. C19

ADD Detail 16A, Temporary Jumper Connection, to revised Drawing C19, ATTACHED.

4. Drawing No. C22

ADD Detail 31, Combination Air Release Valve for Wastewater, to revised Drawing C22, ATTACHED.

5. Drawing No. C23

ADD Valve C14-ARV1 to revised Drawing C23, ATTACHED.

6. Drawing No. S03

REPLACE Drawing S03 with revised Drawing S03, ATTACHED.

7. Drawing No. S06

REPLACE Drawing S06 with revised Drawing S06, ATTACHED.

8. Drawing No. E02

REPLACE Drawing E02 with revised Drawing E02, ATTACHED.

9. Drawing No. E05

REPLACE Drawing E05 with revised Drawing E05, ATTACHED.

10. Drawing No. E13

ADD Circuits to PW-LP on revised Drawing E13, ATTACHED.

11. Drawing No. E19A

INSERT new Drawing E19A, ATTACHED.

12. Drawing No. I04

Addendum No. 4 Y14-792 PH June 5, 2014 REPLACE Drawing I04 with revised Drawing I04, ATTACHED.

13. Drawing No. I05

REPLACE Drawing I05 with revised Drawing I05, ATTACHED.

14. Drawing No. I09

REPLACE Drawing I09 with revised Drawing I09, ATTACHED.

15. Drawing No. I10

REPLACE Drawing I10 with revised Drawing I10, ATTACHED.

16. Drawing No. I11

REPLACE Drawing I11 with revised Drawing I11, ATTACHED.

17. Drawing No. I16

REPLACE Drawing I16 with revised Drawing I16, ATTACHED.

- **D.** The Bidder shall acknowledge receipt of this addendum by completing the applicable section in the solicitation or by completion of the acknowledgement information on the addendum. Either form of acknowledgement must be completed and returned not later than the date and time for receipt of the bid.
- E. All other terms and conditions remain the same.

Receipt acknowledged by:

Authorized Signature

Date Signed

Title

Name of Firm

Addendum No. 4 Y14-792 PH June 5, 2014

SECTION 02511 ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section includes provisions for hot-mixed asphalt paving including compacted sub base, base, prime and tack coats, and pavement.

1.02 SUBMITTALS

- A. General: Submit shop drawings in accordance with Conditions of Contract and Section 01300.
- B. Materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceed, specified requirements.
- C. Pavement marking plans indicating lane separations, stop lines, fire lanes, islands, and defined parking spaces.
- D. Note dedicated handicapped spaces with international graphics symbol.

1.03 REFERENCE STANDARDS

A. Comply with Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, latest edition, and with local governing regulations if more stringent than herein specified.

1.04 SITE CONDITIONS

- A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg F (10 deg C), and when temperature has not been below 35 deg F (1 deg C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
- B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 40 deg F (4 deg C), and when base is dry. Base course may be placed when air temperature is above 30 deg F (minus 1 deg C) and rising.
- C. Grade Control: Establish and maintain required lines and elevations.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Use locally available materials and gradations, which exhibit a satisfactory record of previous installations.
- B. Base Course: Soil-cement mixture per FDOT Section 270 and an asphalt rubber membrane interlayer per FDOT Section 341, where soil cement base is noted on the Drawings.

- C. Surface Course Aggregate: Gradation for Type SP-12.5, FDOT Section 334.
- D. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with ASTM D 242 and FDOT Section 917.
- E. Asphalt Cement: FDOT Paragraph 916-1, and ASTM D 3381 for viscosity-graded material; ASTM D 946 for penetration-graded material.
 - 1. Viscosity grade AC-20 or AR-8000.
- F. Prime Coat: Cut-back asphalt type; ASTM D 2027; MC-30, MC-70 or MC-250. FDOT Paragraph 916-2.
- G. Tack Coat: Emulsified asphalt; ASTM D 977. FDOT Paragraph 300-2.3.
- H. Lane Marking Paint: FDOT Section 971, Code T-2.
 - 1. Color: White, except blue at handicapped parking.

2.02 ASPHALT-AGGREGATE MIXTURE

A. Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with ASTM D 3515 and meeting FDOT requirements for Type SP-12.5.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. General: Prepare subgrade prior to installing base course. Install each course to attain the required thickness, compaction, and grade.
- B. Proof-roll prepared subgrade to check for unstable areas and areas requiring additional compaction. Subgrade shall be compacted to a depth of 12 inches to a density of 98% of the maximum density as required by AASHTO T-180 (modified).
 - 1. Verify that the grade is within ¹/₄ inch of the cross-section grade shown on the plans prior to density testing. Maintain the density and cross section until the base has been laid.
 - 2. Density tests shall be performed by Owner's testing laboratory at intervals not more than 300 feet in roadways or 2,400 square feet in area paving.
 - 3. Notify Owner/Engineer of unsatisfactory conditions. Do not begin base work until deficient subgrade areas have been corrected and are ready to receive base.
- C. Base Course:
 - 1. Where soil cement base is indicated, construct a soil cement base course, thickness as indicated, according to FDOT Section 270. Compressive strength shall be 300 psi at 7 days. Soil cement base shall be plant mixed soil cement. A spreader box shall be used to spread soil cement; spreader bar will not be allowed. The applying of the cement shall not be allowed when the wind velocity is sufficient to jeopardize material interests (i.e., vehicles, structures,

etc.) from airborne cement particles. An Asphalt Rubber Membrane Interlayer (ARMI) shall be included in the pavement design per FDOT Section 341. The ARMI shall be overlain with asphalt on the same day as it is placed.

- 2. Unless otherwise noted, construct a limerock base course, thickness as indicated, according to FDOT Sections 200 and 911. Compact to 98% maximum density (LBR 40) per AASHTO T-180.
- 3. Check the finished surface of the base course with a template cut to the required cross section and with a straight edge laid parallel to the centerline of the road or other approved testing devices. Correct all irregularities greater than plus- or minus- ¹/₄ inch by scarifying and removing, or adding, material, followed by final compaction.
- 4. Density and thickness tests shall be performed by Owner's testing laboratory at intervals not more than 300 feet in roadways or 2,400 square feet in area paving.
- D. Prime Coat: Remove all loose material, dust, dirt, and other foreign materials, which might prevent proper bond. Apply according to FDOT Section 300 at a rate of 0.20 to 0.50 gal. per sq. yd., over compacted base. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile materials.
- E. Tack Coat: Apply to primed base course after 14 days and contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface.
 - 1. Allow to dry until at proper condition to receive paving.
- F. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.02 PLACING MIX

- A. General: Place hot-mixed asphalt mixture on prepared surface, spread and strike off. No placement shall occur if there is water on the surface to be paved, during rainfall, or if rain is expected to occur before the pavement is completely rolled. Spread mixture at minimum temperature of 225 deg F (107 deg C). Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness. Comply with FDOT Section 330.
- B. Paver Placing: Place in strips not less than 10 feet wide, unless otherwise acceptable to Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.
 - 1. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.
- C. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have Orange County Utilities

same texture, density and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.

3.03 ROLLING

- A. General: Begin rolling when mixture will bear roller weight without excessive displacement.
 - 1. Compact mixture with vibrating plate compactors in areas inaccessible to rollers.
- B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.
- C. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
- D. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 95 percent laboratory maximum density.
- E. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot-mixed asphalt. Compact by rolling to specified surface density and smoothness.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.
- 3.04 FIELD QUALITY CONTROL
 - A. General: Testing in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory. Repair or remove and replace unacceptable paving as directed by Owner or Engineer.
 - B. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus or minus 1/4 inch.
 - C. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:

02511 - 4

- 1. Base Course Surface: 1/4 inch.
- 2. Wearing Course Surface: 3/16 inch.

- 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
- D. Check surface areas at intervals as directed by Owner or Engineer.
- E. Pavement repairs shall be neatly done and shall not be less than 100 feet long for the full width of roadway.
- 3.05 TRAFFIC AND LANE MARKINGS
 - A. Cleaning: Sweep and clean surface to eliminate loose material and dust.
 - B. Striping: Use specified traffic lane-marking paint, factory-mixed, quick-drying, and non-bleeding.
 - 1. Do not apply traffic and lane marking paint until layout and placement has been verified with the Owner/Engineer.
 - 2. Apply paint with mechanical equipment to produce uniform straight edges.
 - 3. Apply in 2 coats at manufacturer's recommended rates to provide minimum 12 to 15 mils dry thickness.
 - C. Traffic signage: Install up to 5 stop lines and stop signs.

END OF SECTION

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PERMANENT ENGINE-GENERATOR SCHEDULE

Accessories	Required	<u>Remarks</u>
Engine Cooling Radiator	Frame Mount	
Engine Cooling Heat Exchanger	N/A	
Engine Cooling Remote Radiator	N/A	
Coolant Heater	208	volts
Enclosure	N/A	
Sound Attenuation	N/A	
Fuel System	Diesel	
Generator Size: 1,000 kW *		

*Stated minimum does not release CONTRACTOR from successfully completing the load test.

SECTION 16722

ADDRESSABLE FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish, test, install, and place in satisfactory operation a complete, addressable, microprocessor based fire detection and alarm system consisting of manual and automatic initiating devices, notification appliances, control panel, surge suppression, line isolators and all spare parts, accessories and appurtenances as herein specified and as shown on the Drawings. System shall electrically supervise all wires and both the alarm initiating devices and the audible and visual alarm devices. Contractor shall document the fire alarm monitoring & installation and transfer the documents to the Owner after testing.
- B. System is local only but central station monitoring will be required as stated on plans.
- C. Fire alarm system is designed around manufacturer Notifier, Silent Knight, BCI, ADT, Fike, or approved equal. If the CONTRACTOR chooses to use another manufacturer for the designed system, the manufacturer shall secure the services of a Florida Registered Professional Engineer to become Engineer-Of-Record and shall notify current Engineer-Of-Record in accordance with Chapter 61G15-27 of the Florida Administrative Code (FAC) of assumption of the work. For the Authority Having Jurisdiction (AHJ), the CONTRACTOR/Manufacturer/New Engineer-of-Record shall meet all permit requirements, make all submittals necessary, resolve all issues, incorporate all comments, perform all tests and inspections and pay all fees necessary for a complete, working installation that is accepted by the AHJ.
- D. Fire alarm system shall meet the following criteria:
 - 1. System shall be power limited.
 - 2. Secondary power shall be supplied by 24V DC batteries with capacity for 72 hours of continuous standby operation followed by 15 minutes of operation in alarm condition.
 - 3. Maximum voltage drop on 24V DC NAC circuits shall not exceed the lowest rated voltage of all connected devices on that circuit.
 - 4. Maximum voltage drop on 24V DC SLC circuits shall not exceed the lowest rated voltage of all connected devices on that circuit.
- 5. Device locations and mounting heights shall be in accordance with ADA requirements.
 Orange County Utilities
 ESA Potable Water and Reclaimed Water SRF
 Addendum No. 4
 16722-1
 June 2014

- 6. All flashing strobe or horn/strobe notification appliances located within the same area that can be seen in a 135° field of view and are within 55 feet of the next strobe or horn strobe shall be synchronized.
- E. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 6 (Class A) Signaling Line Circuits (SLC).
- F. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit.
- G. Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit.
- H. On Style 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
- I. Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.
- J. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.
- K. The CONTRACTOR shall employ NICET (minimum Level II Fire Alarm Technology) technicians for installation on site and to guide the final checkout and to ensure the systems integrity.
- L. Contractor also shall provide 2-year pre-paid service contract with Central Monitoring Services as part of this project for fire alarm system .
- M. All necessary raceway/conduits and junction boxes shall be supplied by the Electrical Contractor. Fire Alarm System Supplier shall be installed fire alarm system under the supervision of the Electrical Contractor so that no additional low voltage permit is needed. Coordinate with Electrical Contractor to meet all requirements to fall under the Electrical Contractor's low voltage permit before bidding. If Fire Alarm System Supplier does not meet the requirements to fall under the Electrical Contractor's low voltage permit, he/she shall supply additional permit as needed with no additional cost to the Owner.

1.02 RELATED SECTIONS

- A. Section 16010 Electrical General Requirements
- B. Section 16050 Basic Electrical Materials and Methods

1.03 REFERENCES

- A. This section contains references to the following documents. They are part of this section as specified and modified. In situations of conflict between the requirements of his section and those of the listed documents, the requirements of this section shall prevail.
 - 1. Florida Handicap Accessibility Code Latest Edition.
 - 2. UL Underwriters Laboratories
 - 3. NFPA 70 1999 National Electrical Code (NEC).
 - 4. NFPA 72 1999 National Fire Alarm Code.
 - 5. NFPA 101 Life Safety Code.
 - 6. UL 268 Smoke Detectors for Fire Protective Signaling Systems.
 - 7. UL 268A Smoke Detectors for Duct Applications.
 - 8. UL 521 Heat Detectors for Fire Protective Signaling Systems.
 - 9. UL 864 Control Units for Fire Protective Signaling Systems.
 - 10. UL 1971 Visual Notification Appliances.
 - 11. UL 464 Audible Signaling Appliances.
 - 12. UL 38 Manually Actuated Signaling Boxes
 - 13. UL 1481 Power Supplies for Fire Protective Signaling Systems
 - 14. Florida Building Code
 - 15. All Local Fire Codes.
 - 16. All requirements of the Authority Having Jurisdiction (AHJ).

1.04 WORK INCLUDED

A. Provide all materials, equipment, labor, supervision and all related items necessary to complete this phase of the work as indicated on the drawings and specifications, including fire alarm control panel, , manual stations, detectors, signal appliances and all other devices as required. Supply and install all conduits and wiring as required. The fire alarm system shall be complete and operable as required by the local Fire Marshall and state inspector.

1.05 DEFINITIONS

- A. Alarm-Initiating Device: A manual station, smoke detector, heat detector, flame detector, or sprinkler water-flow switch.
- B, Alarm Signal: Signifies a state of emergency requiring immediate action. Pertains to signals such as the operation of an alarm-initiating device.
- C. Class A Wiring: Circuits arranged and electrically supervised so a single break or single ground fault condition will be indicated by a trouble signal at the fire alarm control panel (FACP) and the circuit will continue to be capable of operation for its intended service in the faulted condition no matter where the break or ground fault condition occurs.
- D. Multiplex System: One using signaling method characterized by the simultaneous or sequential transmission, or both, and the reception of multiple signals in a communication channel, including means for positively identifying each signal.
- E. Notification Appliance: Audio and/or visual indicating device such as a strobe or horn/strobe.
- F. Supervisory Signal: Indicates abnormal status or need for action regarding fire suppression or other protective system.
- G. Trouble Signal: Indicates that a fault, such as an open circuit or ground, has occurred in the system.
- H. TVSS: Transient Voltage Surge Suppression
- 1.06 SYSTEM DESCRIPTION
 - A. Signal Transmission: Multiplex signal transmission dedicated to fire alarm service only.
 - B. Functional Description: The following are required system functions and operating features:
 - 1. Priority of Signals: Accomplish automatic response functions by the first device initiated. Alarm functions resulting from initiation by the first device are not altered by subsequent alarms. The highest priority is an alarm signal. Supervisory and trouble signals have second- and third-level priority. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all alarm signals regardless of priority or order received.

- 2. Non-interfering: Design, power, wire, and supervise the system so a signal one device does not prevent the receipt of signals from any other device. All alarms are manually resettable from the FACP after the initiating device or devices are restored to normal. Systems that require the use of batteries or battery backup for the programming function are not acceptable.
- 3. Signal Initiation: The manual or automatic operation of an alarm-initiating or supervisory-operating device causes the FACP to activate all audible and visual alarm devices. The signals shall include, but not be limited to, the following:
 - a. General alarm.
 - b. Smoke detector alarm.
 - c. System trouble.
 - d. Fan shutdown.
- 4. Silencing at FACP: Keypad provides capability for acknowledgment of alarms; supervisory, trouble, and other specified signals at the FACP; and capability to silence the local audible signal. Subsequent alarms cause the audible signal to sound again until silenced in turn by keypad operation.
- 5. A single ground or open on any system signaling line circuit, initiating device circuit or notification appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
- 6. Loss of primary power at the FACP sounds trouble signal at the FACP. An emergency power light is illuminated at both locations when the system is operating on an alternate power supply.
- 7. Annunciation: Manual and automatic operation of alarm- and supervisory-initiating devices is annunciated on the FACP indicating the location and type device.
- 8. General Alarm: A system general alarm includes:
 - a. Indicating the general alarm condition at the FACP.
 - b. Identifying the device that is the source of the alarm at the FACP and the annunciator.
 - c. Initiating audible and visible alarm signals throughout the building.
 - d. Stopping supply and return fans serving zone where alarm is initiated.

- e. Recording the event on the system printer.
- 9. Manual station alarm operation initiates a general alarm.
- 10. Smoke detection initiates a general alarm.
- 11. Duct smoke detectors initiate supervisory notification and air handler shutdown.
- 12. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.
- 13. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and control of changes in those settings. The same controls can be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors.
- 14. Digitized electronic signals shall employ check digits or multiple polling.
- 15. Any device in the system may be enabled or disabled through the system keypad. Any system output may be turned on or off from the system keypad.
- 16. Addressable devices shall provide an address-setting means using rotary decimal switches.
- 17. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on a loop. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the loop. If a wire-to-wire short occurs, the isolator module shall automatically disconnect the loop. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section. The isolator module shall not require any address setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after normal operation.
- C. Recording of Events: Record all alarm, supervisory, and trouble events. Records are by device, and function. When the FACP receives a signal, the alarm, supervisory, and trouble conditions are stored. The record shall include the type of signal (alarm, supervisory, or trouble) the device address, date, and the time of the occurrence. The record differentiates alarm signals from all other printed, indications. When the system is reset, this event is also recorded, including the same information concerning device, location, date, and time. A command initiates the listing of existing alarm, supervisory, and trouble conditions in the system.

- 1. Permissible Signal Time Elapse: The maximum permissible elapsed time between the actuation of any fire alarm or fire-detection system alarm-initiating device and its indication at the FACP is ten seconds.
- 2. Independent System Monitoring: Supervise each independent smoke detection system and duct detector system for both normal operation and trouble.
- 3. Circuit Supervision: Indicate circuit faults by means of both a zone and a trouble signal at the FACP. Provide a distinctive indicating audible tone and (LED) indicating light. The maximum elapsed time between the occurrence of the trouble condition and its indication at the FACP is 200 seconds

1.07 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
 - 1. Eight copies of all submittals shall be submitted to the Architect/Engineer for review. Shop drawings shall mirror design drawings for design and technical data, but not necessarily in appearance.
 - 2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.
 - 3. Equivalent compatible UL-listed equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
 - 4. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.
 - 5. Product data for system components. Include dimensioned plans and elevations showing minimum clearances and installed features and devices. Include list of materials and NRTL-listing data.
 - 6. Wiring diagrams from manufacturer differentiating between factory- and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Indicate components for both field and factory wiring.
 - 7. System operation description covering this specific Project including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
- 8. Operating instructions for mounting at the FACP.
 Orange County Utilities
 ESA Potable Water and Reclaimed Water SRF
 Addendum No. 4 16722-7
 June 2014

- 9. Operation and maintenance data for inclusion in Operating and Maintenance Manual specified in Division 1. Include data for each type product, including all features and operating sequences, both automatic and manual. Include recommendations for spare parts to be stocked at the site. Provide the names, addresses, and telephone numbers of service organizations that carry stock of repair parts for the system to be furnished.
- 10. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
- 11. Record of field tests of system.

1.08 QUALITY ASSURANCE

- A. The fire alarm system shall comply with the applicable provisions of the NFPA Standard 72 "National Fire Alarm Code" and meet all the requirements of NEC 760. All equipment and devices shall be listed by the Underwriters' Laboratories or approved by the Factory Mutual Laboratories.
- B. Installation shall meet Class A requirements. Fire alarm system shall require supervision of installation by authorized factory representative or agency.
- C. After installation, the fire alarm system shall be balanced, checked, tested, operated and certified in writing as operational by factory representative or agency. Test each smoke and heat detector individually for operation.
- D. Testing shall be performed in the presence of the plant chief operator and Fire Marshall, or his designated assistant.
- E. Contractor shall obtain a written approval of the installed fire alarm system from the Fire Chief and send one (1) copy to the Owner and one (1) copy to the Engineer.
- F. Installer Qualifications: A certified or qualified Installer is to perform the Work of this Section.
- G. Compliance With Local Requirements: Comply with the applicable building code, local ordinances, and regulations, and the requirements of the authority having jurisdiction.
- H. Comply with NFPA 70, "National Electrical Code."
- I. NFPA Compliance: Provide fire alarm and detection systems conforming to the requirements of the following publications:
 - 1. NFPA 72, "Installation, Maintenance, and Use of Protective Signaling Systems."
 - 2. NFPA 72 Appendix B, "Automatic Fire Detectors."
- J. NRTL Listing: Provide systems and equipment that are listed and labeled.
 - 1. Terms "Listed" and "Labeled": As defined in the "National Electrical Code," Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- K. UL Compliance: Provide fire alarm systems and components that are UL-listed.
- L. Single-Source Responsibility: Obtain fire alarm components from a single source that assumes responsibility for compatibility for system components.
- M. Certifications:
 - 1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.09 EXTRA MATERIALS

- A. General: Furnish extra materials, matching products installed (as described below), and packaging with protective covering for storage, and identifying with labels clearly describing contents.
- B. Glass Rods for Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed: minimum of 6 rods.
- C. Lamps for Strobe Units: Furnish quantity equal to 10 percent of the number of units installed, but not less than one.
- D. Smoke Detectors: Furnish quantity equal to 10 percent of the number of units of each type installed but not less than one of each type.
- E. Detector Bases: Furnish quantity equal to 2 percent of the number of units of each type installed but not less than one of each type.

1.10 GUARANTY

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. All equipment in the system shall be the product of a single manufacturer and shall be marketed as a complete and functioning system. The addition of any components, systems and/or panels required, but not a product of the manufacturer, shall require certification of compatibility by the manufacturer.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Siemens: Cerberus, Faraday.
 - 2. Edwards Company.
 - 3. Fenwal, Inc.
 - 4. Fire Alarm and Systems Technology, Inc.
 - 5. Honeywell, Inc: Farenhyt, Silent Knight, Notifier, Fire Lite
 - 6. Tyco: Simplex Time Recorder Co.

2.02 EQUIPMENT

A. GENERAL

- 1. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.
- 2. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- 3. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.
- 4. Addressable devices shall use simple to install and maintain decade, decimal address switches. Devices shall be capable of being set to an address in a range of 001 to 127.

- 5. Addressable devices, which use a binary-coded address setting method, such as a DIP-switch, are not an allowable substitute.
- 6. Detectors shall be intelligent (analog) and addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits. Detectors shall use Flash Scan technology.
- 7. Addressable devices shall store an internal identifying code that the control panel shall use to identify the type of device.

B. MAIN FIRE ALARM CONTROL PANEL (FACP)

- 1. Main FACP shall be an intelligent analog/addressable fire control panel and shall contain a microprocessor based Central Processing Unit (CPU) and power supply in an economical space saving single board design. The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules and other system controlled devices as shown on drawings.
- 2. Operator Control
 - a. Acknowledge Switch:
 - 1. Activation of the control panel acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the LCD display to the next alarm or trouble condition.
 - 2. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
 - b. Alarm Silence Switch:
 - 1. Activation of the alarm silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm condition. The FACP software shall include silence inhibit and auto-silence timers.
 - c. Alarm Activate (Drill) Switch:
 - 1. The Alarm Activate switch shall activate all notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

- d. System Reset Switch:
 - 1. Activation of the System Reset switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.
- e. Lamp Test:
 - 1. The Lamp Test switch shall activate all local system LEDs, light each segment of the liquid crystal display and display the panel software revision for service personal.
- 3. System Capacities and General Operation
 - a. The control panel shall provide, or be capable of a minimum of 127 SLC intelligent/addressable devices.
 - b. The control panel shall include Form-C alarm, trouble, supervisory, and security relays rated at a minimum of 2.5 amps @ 24 VDC. It shall also include four Class B (NFPA Style Y) or two Class A (NFPA Style Z) programmable Notification Appliance Circuits.
 - c. The system shall include a full featured operator interface control and annunciation panel that shall include a backlit 80 character Liquid Crystal Display (LCD), individual color coded system status LEDs, and an keypad with easy touch rubber keys for the field programming and control of the fire alarm system.
 - d. The system shall be programmable, configurable, and expandable in the field without the need for special tools, PROM programmers or PC based programmers. It shall not require replacement of memory ICs to facilitate programming changes.
 - e. The system shall allow the programming of any input to activate any output or group of outputs. Systems that have limited programming (such as general alarm), have complicated programming (such as a diode matrix), or require a laptop personal computer are not considered suitable substitutes.
 - f. The FACP shall provide the following features:
 - 1. Drift compensation to extend detector accuracy over life. Drift compensation shall also include a smoothing feature, allowing transient noise signals to be filtered out.
 - 2. Detector sensitivity test, meeting requirements of NFPA 72, Chapter 7.

- 3. Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.
- 4. The ability to display or print system reports.
- 5. Alarm verification, with counters and a trouble indication to alert maintenance personnel when a detector enters verification 20 times.
- 6. PAS pre-signal, meeting NFPA 72 3-8.3 requirements.
- 7. Rapid manual station reporting (under 3 seconds) and shall meet NFPA 72 Chapter 1 requirements for activation of notification circuits within 10 seconds of initiating device activation.
- 8. Periodic detector test, conducted automatically by the software.
- 9. Self-optimizing pre-alarm for advanced fire warning, which allows each detector to learn its particular environment and set its pre-alarm level to just above normal peaks.
- 10. Walk test, with a check for two detectors set to same address.
- g. The FACP shall be capable of coding main panel node notification circuits in March Time (120 PPM), Temporal (NFPA 72 A-2-2.2.2), and California Code. Panel notification circuits (NAC 1,2,3 and 4) shall also support Two-Stage operation, Canadian Dual Stage (3 minutes) and Canadian Dual Stage (5 minutes). Two stage operation shall allow 20 Pulses Per Minute (PPM) on alarm and 120 PPM after 5 minutes or when a second device activates. Canadian Dual stage is the same as Two-Stage except will only switch to second stage by activation of Drill Switch 3 or 5 minute timer. The panel shall also provide a coding option that will synchronize specific strobe lights designed to accept a specific "sync pulse."
- 4. Central Microprocessor
 - a. The microprocessor shall be a state-of-the-art, high speed, 16-bit RISC device and it shall communicate with, monitor and control all external interfaces. It shall include an EPROM for system program storage, Flash memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
 - b. The microprocessor shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Control-by-event equations shall be held in non-volatile programmable memory, and shall not be lost even if system primary and secondary power failure occurs.

- c. The microprocessor shall also provide a real-time clock for time annotation of system displays, printer, and history file. The time-of-day and date shall not be lost if system primary and secondary power supplies fail. The real time clock may also be used to control non-fire functions at programmed time-of-day, day-of-week, and day-of-year.
- d. A special program check function shall be provided to detect common operator errors.
- e. An auto-program (self-learn) function shall be provided to quickly install initial functions and make the system operational.
- f. For flexibility and to ensure program validity, an optional Windows(TM) based program utility shall be available. This program shall be used to off-line program the system with batch upload/download, and have the ability to upgrade the manufacturers (FLASH) system code changes. This program shall also have a verification utility, which scans the program files, identifying possible errors. It shall also have the ability to compare old program files to new ones, identifying differences in the two files to allow complete testing of any system operating changes. This shall be in incompliance with the NFPA 72 requirements for testing after system modification.
- 5. System Display
 - a. The system shall support the following display mode options:
 - 1. 80 character display option. The display shall include an 80-character backlit alphanumeric Liquid Crystal Display (LCD).
 - b. The display shall provide all the controls and indicators used by the system operator:
 - 1. The 80-character display shall include the following operator control switches: ACKNOWLEDGE, ALARM SILENCE, ALARM ACTIVATE (drill), SYSTEM RESET, and LAMP TEST.
 - c. The display shall annunciate status information and custom alphanumeric labels for all intelligent detectors, addressable modules, internal panel circuits, and software zones.
 - 1. The display shall also provide Light-Emitting Diodes.
 - d. The 80-character display shall provide 8 Light-Emitting-Diodes (LEDs), that indicate the status of the following system parameters: AC POWER, FIRE ALARM, PREALARM WARNING, SECURITY ALARM, SUPERVISORY SIGNAL, SYSTEM TROUBLE, DISABLED POINTS, and ALARM SILENCED.

- e. The LCD-80 display:
 - 1. This shall be part of the standard system and have the capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
- f. The system shall support the display of battery charging current and voltage on the 80-character LCD display.
- 6. Signaling Line Circuits (SLC)
 - a. Each FACP shall support one SLC interface and shall provide power to and communicate with intelligent detectors (ionization, photoelectric or thermal), intelligent modules (monitor or control) for a loop capacity of 127 devices. Each SLC shall be capable of NFPA 72 Style 4, Style 6, or Style 7 (Class A or B) wiring.
 - b. CPU shall receive analog information from all intelligent detectors to be processed to determine whether normal, alarm, pre-alarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.
- 7. Notification Appliance Circuit (NAC) Module
 - a. The Notification Appliance Circuit module shall provide four fully supervised Class A or B (NFPA Style Z or Y) notification circuits.
 - b. The notification circuit capacity shall be 3.0 amperes maximum per circuit.
 - c. The module shall not affect other module circuits in any way during a short circuit condition.
 - d. The module shall provide four green ON/OFF LEDs and four yellow trouble LEDs.
 - e. The module shall also provide a momentary switch per circuit that may be used to manually turn the particular circuit on or off or to disable the circuit.
 - f. Each notification circuit shall have a custom label to identify each circuit's location.
 - g. The notification circuit module shall have terminal strips UL listed for use with up to 12 AWG wire.

- h. Each circuit shall be capable of, through system programming, deactivating upon depression of the signal silence switch.
- 8. Control Relay Module
 - a. The control relay module assembly shall provide two Form-C auxiliary relay circuits rated at 2.5 amperes, 24 VDC.
 - b. Each relay circuit shall be capable of being activated (change in state) by any initiating device or from any combination of initiating devices.
 - c. The module shall provide a momentary switch per relay circuit that may be used to manually turn the relay ON/OFF or to disable the relay.
 - d. Each relay circuit shall include a custom label to identify its location.
 - e. The control relay module shall have terminal blocks UL listed for use with up to 12 AWG wire.
- 9. Enclosures:
 - a. The control panel shall be housed in a UL-listed cabinet suitable for surface or semiflush mounting. The cabinet and front shall be corrosion protected, given a rustresistant prime coat, and manufacturer's standard finish.
 - b. The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top.
 - c. The door shall provide a key lock and shall include a glass or other transparent opening, as applicable, for viewing of all indicators. For convenience, the door may be site configured for either right or left hand hinging.
- 10. Power Supply:
 - a. A high tech off-line switching power supply shall be available for the fire alarm control panel or network node and provide 6.0 amps of available power for the control panel and peripheral devices.
 - b. Provisions will be made to allow the audio-visual power to be increased as required by adding modular expansion audio-visual power supplies.
 - c. Positive-Temperature-Coefficient (PTC) thermistors, circuit breakers, or other overcurrent protection shall be provided on all power outputs. The power supply shall provide an integral battery charger for use with batteries up to 33 AH or may be

used with an external battery and charger system. Battery arrangement may be configured in the field.

- d. The power supply shall continuously monitor all field wires for earth ground conditions, and shall have the following LED indicators:
 - 1) Ground Fault LED
 - 2) AC Power Fail LED
 - 3) NAC on indication
- e. The main power supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
- f. The main power supply shall provide a battery charger using dual-rate charging techniques for fast battery recharge and be capable of charging batteries up to 33 AH.
- g. All circuits shall be power-limited, per UL864 requirements.
- 11. Specific System Operations
 - a. Smoke Detector Sensitivity Adjust: A means shall be provided for adjusting the sensitivity of any, or all, addressable intelligent detectors in the system from the system keypad. Sensitivity range shall be within the allowed UL window.
 - b. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification delay shall be programmable from 5 to 30 seconds and each detector shall be able to be selected for verification.
 - c. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
 - d. Point Disable: Any addressable device or conventional circuit in the system may be enabled or disabled through the system keypad.
 - e. Point Read: The system shall be able to display or print the following point status diagnostic functions:
 - 1. Device status
 - 2. Device type
 - 3. Custom device label

- 4. View analog detector values
- 5. Device zone assignments
- 6. All program parameters
- f. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system status.
- g. System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 200 events minimum. Up to 50 events shall be dedicated to alarm and the remaining events are general purpose. Systems that do not have dedicated alarm storage, where events are overridden by non-alarm type events, are not suitable substitutes. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the history buffer may be manually reviewed, one event at a time, or printed in its entirety. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable substitutes.
- h. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
- i. Pre-Alarm Function: The system shall provide two levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level, to assist in avoiding nuisance alarms.
- j. Software Zones: The FACP shall provide 100 software zones, 10 additional special function zones, 10 releasing zones, and 20 logic zones.
- k. The fire alarm control panel shall include a walk test feature. It shall include the ability to test initiating device circuits and notification appliance circuits from the field without returning to the panel to reset the system. Operation shall be as follows:

- 1. Alarming an initiating device shall activate programmed outputs, which are selected to participate in walk test, for 3 seconds.
- 2. Introducing a trouble into the initiating device shall activate the programmed outputs for 8 seconds.
- 3. All devices tested in walk test shall be recorded in the history buffer.
- 12. Supervisory Operation
 - a. An alarm from a supervisory device shall cause the appropriate indication on the system display, light a common supervisory LED, but will not cause the system to enter the trouble mode.
- 13. Signal Silence Operation
 - a. The FACP shall have the ability to program each output circuit (notification, relay, speaker etc) to deactivate upon depression of the signal silence switch.

C. INITIATING DEVICES

- 1. General: Comply with UL 268. Include the following features:
 - a. Factory Nameplate: Serial number and type identification.
 - b. Operating Voltage: 24-V DC, nominal.
 - c. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 - d. Plug-In Arrangement: Detector and associated encapsulated electronic components are mounted in a module that connects to a fixed base with a twist-locking plug connection. The plug connection requires no springs for secure mounting and contact maintenance. Terminals in the fixed base accept building wiring. Design detector for mounting on interchangeable type base, capable of operating on either 2-wire or 4-wire loop. For Class A Style 7 systems, base shall contain internal isolation so that no external isolation device is necessary.
 - e. Visual Indicator: Connected to indicate detector has operated. Provide flashing LED indicator for normal operation, which changes to steady on alarm condition.
 - f. Addressability: Detectors include a communication transmitter and receiver having a unique identification and capability for status reporting to the FACP.

- g. Remote Controllability: Individually monitor detectors at the FACP for calibration, sensitivity, and alarm condition, and individually adjust for sensitivity from the FACP.
- i. Each of the intelligent addressable detector in the system may be independently selected and enabled to be an alarm verified detector The FACP shall keep count of the number of times each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
- j. Detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
- k. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
- 1. Detectors will operate in an analog fashion, where the detector simply measures its designed environment variable and transmits an analog value to the FACP based on real-time measured values.
- 2. Addressable Photoelectric Smoke Detectors:
 - a. Detector Sensitivity: Between 2.5- and 3.5-percent-per-foot smoke obscuration when tested according to UL 268.
 - b. Sensor: An infrared or LED light source with matching photo diode receiver.
 - c. Furnish with isolator integral to base for Class A Style 7.
- 3. Addressable Photoelectric Duct Smoke Detector:
 - a. Photoelectric-type, with sampling tube of design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied shall be used within the duct housing mounted in the proper location as per NFPA 72 and 90A. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to take over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system. Fan shutdown shall occur throughout the entire building on a general basis. Duct sampling tubes shall extend the entire width of the A/C ductwork. Remote test stations shall be provided for each duct mounted smoke detector.

- b. Furnish housing with detector, sampling tube and remote test switch. Coordinate exact sampling tube size with HVAC.
- 4. Addressable Manual Pull Stations
 - a. Description: U.L. Listed, double-action or single action type, fabricated of metal or plastic, and finished in red with molded, raised-letter operating instructions of contrasting color. Stations requiring the breaking of a glass panel are not acceptable. Stations requiring the breaking of a concealed glass rod may be provided.
 - b. Station Reset: Key-operated, double-pole, double-throw, switch-rated for the voltage and current at which it operates. The key shall operate a test-reset lock, and shall be designed so after actual emergency operation, they cannot be restored to normal use except by the use of a key.
 - c. Addressable pull stations shall on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status.
 - d. Indoor general use: provide manufacturer's standard unit. Outdoor, weather resistant and corrosion resistant use: furnish a die cast metal manual pull station with addressable monitor module.

D. NOTIFICATION APPLIANCES

- 1. Horn/Strobe
 - a. Horn/strobe shall be UL 1971 and UL 464 listed, operates on 24VDC, and shall be approved for fire protective service. Unit shall be wired as a primary signaling notification appliance and shall comply with ADA requirements for visible signaling appliances, flashing at 1 Hz over the strobes entire operating voltage range. Operating voltage range shall be 17-33VDC.
 - b. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. The horn shall be temporal 3 pattern at 24 VDC. Strobes shall be powered independently of the sounder with the removal of factory installed jumper wires. The horn shall operate on a coded or non-coded power supply.
 - c. Supply appliances rated for the conditions in which installation will take place. Appliances to be used in outdoor, wet or corrosive locations shall have appropriate materials of construction and degradation resistance.

- 2. Synchronization Module
 - a. Synchronization Module shall be UL 464 listed and shall be approved for fire protective service. The unit shall synchronize strobes at 1 Hz and horns at temporal 3. Also, the module shall silence the horns on horn/strobe units, while operating the strobes, over a single pair of wires. The module shall control two Class B (Style Y) or one Class A (Style Z) circuit. Module shall be capable of multiple-zone synchronizing by daisy chaining multiple modules together and re-synchronizing each other along the chain.

E. ACCESSORIES

- 1. Addressable Input Module
 - a. Addressable input modules shall be provided to connect one supervised alarm initiating device circuit zone of conventional, dry contact, alarm initiating devices (or single non-addressable conventional alarm initiating device) to one of the fire alarm control panel SLC'S. Unit shall operate on Class A, Style 7. Unit shall fit in a standard 4" square box.
 - b. The alarm-initiating device shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
 - c. For difficult to reach areas, the input module shall be available in a miniature package that shall fit in a single gang box.
- 2. Addressable Relay Module
 - a. Addressable Relay Module assemblies shall be used for HVAC control, elevator recall, exhaust fan operation and other building functions. The relay shall be form C and rated for a minimum of 2.0 Amps @ 30V DC or 0.6A @120VAC. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NAC'S may be energized at the same time on the same pair of wires. Unit shall mount in a 4" square box.
- 3. Line Isolator Module
 - a. Line isolator modules shall isolate a short circuit fault on a Class A Style 7 SLC without disrupting the communication on the remainder of the circuit. Unit shall operate on mount in a standard 4" box.

4. Batteries

- a. The battery shall be rechargeable sealed lead-acid type with sufficient capacity to power the fire alarm system for not less than twenty-four hours plus five minutes of alarm upon a normal AC power failure.
- b. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.
- c. If necessary to meet standby requirements, external battery and charger systems may be used.
- d. Battery enclosures shall be ventilated if necessary to meet standby requirements.
- e. Provide material safety data sheets for all batteries supplied.
- 5. Surge Suppression
 - a. TVSS protection shall be provided to protect the electronic components from induced surges propagating along the signal and power supply lines. The protection systems shall be such that the protective level shall not interfere with normal operation, but shall be lower than the device surge withstand level, and be maintenance free and self-restoring.
 - b. Devices shall be housed in a suitable case, properly grounded. Ground wires for all TVSS shall be connected to the building grounding counterpoise and where practical, each ground wire run individually and insulated from each other. These protectors shall be mounted within the device enclosure or a separate junction box next to the enclosure.
 - c. Power Supply:
 - 1. Protection of all 120 VAC FACP power supply lines shall be provided.
 - d. Signal Line and Notification Appliance Circuits
 - 1. Protection of SLCs and NACs originating and terminating not in the same building shall be provided by TVSS.

2.03 CONDUIT AND WIRE:

- A. Conduit:
 - 1. Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.

Orange County Utilities ESA Potable Water and Reclaimed Water SRF Addendum No. 4 16722-23 June 2014

- 2. All conductors shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
- 3. Fire alarm conductors shall be separate from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these types of conductors, per NEC Article 760-29.
- 4. Wiring for 24 volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
- 5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
- 6. Conduit shall be 3/4-inch (19.1 mm) minimum painted red.
- 7. Exposed conduits installed indoors shall be as per specification 16110.
- B. Wire:
 - 1. All fire alarm system wiring shall be new.
 - 2. Wiring shall be in accordance with state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 16 AWG (1.29 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
 - 3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
 - 4. Wiring used for the multiplex communication circuit (SLC) shall be twisted and unshielded and support a minimum wiring distance of 6,000 feet. The design of the system shall permit use of NAC wiring in the same conduit with the SLC communication circuit.
 - 5. All field wiring shall be electrically supervised for open circuit and ground fault.
 - 6. Class A: 4-wire initiating and 2-wire alarm indicating circuits with electrical supervision for shorts and open conditions.

- C. Terminal Boxes, Junction Boxes and Cabinets:
 - 1. All boxes and cabinets shall be UL listed for their use and purpose. All junction boxes must be painted red and identified as fire alarm.
 - 2. Initiating circuits shall be arranged to serve like categories (manual, smoke, waterflow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.
 - 3. The fire alarm control panel shall be connected to a separate dedicated branch circuit, minimum 20 amperes. This circuit shall be labeled at the main power distribution panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be 12 AWG. The control panel cabinet shall be grounded securely to either a cold water pipe or grounding rod.
 - 4. Provide basic wiring materials that comply with Division 16.

2.04. TAGS

- A. Tags For Identifying Tested Components: Comply with NFPA 72.
- B. Test Chart Instructions: Provide fire alarm system test instructions chart mounted in lexan enclosed frame assembly on control cabinet hinged door or adjacent to control panel.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Installation shall be in accordance with the NEC, NFPA 72, Local County and state codes, as shown on the drawings, and per the major equipment manufacturer specifications.
- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

- D. Manual pull stations shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches (1067 mm), nor more than 48 inches (122 mm) above the finished floor.
- E. Install in accordance with plans and supplier's data sheets. Provide "as-built" data to Engineer upon completion.
- F. After installation, the fire alarm system shall be balanced, checked, operated and certified in writing as operational by factory representative or agency. Certify by letter that system is installed in accordance with data sheets and conforms to plans and specifications. CONTRACTOR shall obtain a written approval of the installed fire alarm system from the Fire Chief and send one (1) copy to the Owner and one (1) copy to the Engineer.
- G. Installation and maintenance manuals shall be provided on all components and the system.
- H. Number, size and type of wires shall be as specified by Equipment Manufacturer. Conduit type and size shall be as per NEC.
- G. Submit as-built drawings including, but not limited to, dimensional drawings, installation instructions, operation instructions, and wiring diagram for all fire alarm equipment and wiring diagrams for all fire alarm equipment and wiring.
- I. Fire Alarm Power Supply Disconnect: Paint red and label "FIRE ALARM." Provide with lockable handle or cover.
- 3.02 EQUIPMENT INSTALLATION
 - A. Manual Pull Stations: Mount semi-flush in recessed back boxes with operating handles in accordance with ADA requirements.
 - B. Smoke Detectors: Install ceiling-mounted detectors not less than 4 inches from a sidewall to the near edge. Install detectors located on the wall at least 4 inches but not more than 12 inches below the ceiling. For exposed solid joist construction, mount detectors on the bottoms of the joists. On smooth ceilings, install detectors not over 30 feet apart in any direction. Install detectors no closer than 5 feet from air registers. Detectors installed in suspended ceiling tiles shall be supported from structure above using T-bar hangers per NEC article 300.
 - C. Audible Alarm-Indicating Devices: Install not less than 80 inches above the finished floor nor less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille or as indicated. Combine audible and visual alarms at the same location into a single unit. In process areas, mounting height shall be between 80 inches and 96 inches as necessary depending upon process equipment layout.

- D. Visual Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and not less than 80 inches above the finished floor and at least 6 inches below the ceiling. In process areas, mounting height shall be between 80 inches and 96 inches as necessary depending upon process equipment layout.
- E. Device Location-Indicating Lights: Locate in the public space immediately adjacent to the device they monitor.
- F. Fire Alarm Control Panel (FACP) and/or Remote Annunciator Panel: Surface mount with tops of cabinets not more than 6 feet above the finished floor.

3.03 WIRING INSTALLATION

- A. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceways." Conceal raceway except in unfinished spaces and as indicated.
- B. Wiring Within Enclosures: Install conductors parallel with or at right angles to the sides and back of the enclosure. Bundle, lace, and train the conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the wiring diagrams of the system. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- C. Cable Taps: Use numbered terminal strips in junction, pull or outlet boxes, cabinets, or equipment enclosures where any circuit tap is made.
- D. System Wiring: For the low-voltage portion of the fire alarm system, install No. 18 VNTC conductors for SLC and 75-deg C THWN insulation in wet or damp locations. For NAC wiring, install No. 12 AWG THWN with insulation rated 75 deg C minimum in wet or damp locations.
- E. Risers: Install at least 2 vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum two-hour-rated wall or a minimum of 10 feet of separation, so the loss of one riser does not prevent the receipt or transmission of signal from other floors or zones.

3.04 GROUNDING

A. Ground equipment and conductor and cable shields. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

3.05 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
- B. Pre-testing: Upon completing installation of the system, align, adjust, and balance the system and perform complete pre-testing. Determine, through pre-testing, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pre-testing. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.
- C. Report of Pre-testing: After pre-testing is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.
- D. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.
- E. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72 Chapter 7. All testing shall be completed by a factory-trained/certified technician authorized by the manufacturer of the fire alarm equipment. The CONTRACTOR shall technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7 and shall meet all city requirements to the satisfaction of the Fire Marshall. Minimum required tests are as follows:
 - 1. Verify the absence of unwanted voltages between circuit conductors and ground.
 - 2. Megger test all conductors other than those intentionally and permanently grounded with electronic components disconnected. Test for resistance to ground and conductor to conductor. Report readings less than 100-megohm for evaluation.
 - 3. Test all conductors for short circuits utilizing an insulation-testing device.
 - 4. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
 - 5. Verify the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.
 - 6. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of the

initiating and indicating devices. Observe proper signal transmission according to class of wiring used.

- 7. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
- 8. Test the system for all specified functions according to the manufacturer's operating and maintenance manual. Systematically initiate specified functional performance items at each station including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all system devices, affected by the item, under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, and quality, freedom from noise and distortion, and proper volume level.
- 9. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the period and in the manner specified.
- 10. Open initiating device circuits and verify that the trouble signal actuates.
- 11. Open and short signaling line circuits and verify that the trouble signal actuates.
- 12. Open and short notification appliance circuits and verify that trouble signal actuates.
- 13. Ground all circuits and verify response of trouble signals.
- 14. Check presence and audibility of tone at all alarm notification devices.
- 15. Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log upon the satisfactory completion of tests.
- H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

3.06 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean unit internally using methods and materials recommended by the manufacturer.

Orange County Utilities ESA Potable Water and Reclaimed Water SRF Addendum No. 4 16722-29 June 2014 B. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

3.07 DEMONSTRATION

- A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.
 - 1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 8 hours' training.
 - 2. Schedule training with the Owner at least seven days in advance.

END OF SECTION

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	3.	THE ORANGE COUNTY UTILITI PRIOR TO ANY CONSTRUCTION ACTION BY UTILITIES STAF CONNECTION, PUMP STATION	ES C N AC ⁻ F SU OPER	ONSTRUCTIO TIVITY, OR F JCH AS S ATIONS OR	ON DIVISION PRIOR TO AN SCHEDULING SHUTDOWNS.	SHALL BE N Y ACTIVITY F VALVE OPE ETC.	OTIFIED AT L REQUIRING TH RATION, PRE	EAST SEVEN (E PRESENCE C SSURE TESTIN	(7) DAYS F OR AN NG, PIPE	23. 24.	KEEP WATE
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	7.	THE CONTRACTOR SHALL EXE WASTEWATER FORCE MAINS, GRAVITY MAIN, AND RECLAIN GUARANTEED. THE CONTRACT	GRCISE GRAV MED OR IS	E EXTREME ITY MAINS, WATER MAII RESPONSIE	CAUTION WH AND RECLAI N LOCATIONS BLE FOR FIELI	EN EXCAVAT MED WATER S SHOWN ON D VERIFYING	ING IN PROXI MAIN. WATER N THE PLANS EXISTING UTIL	MITY OF WATE MAINS, FORC ARE NOT E ITY LOCATIONS	R MAINS, E MAINS, XACT OR S.		SHAL THE SERV SUBM
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	9.	IMMEDIATELY AT ONSET OF OLOCATIONS OF ALL EXISTING RECLAIMED WATER, POWER, T IN A WRITTEN REPORT. ANY DISCOVERY AND DETAILED IN	CONST UTILI ELEPH ´CON THE	TRUCTION, C TIES CRITIC IONE, GAS, IFLICTS SH REPORT.	CONTRACTOR AL TO COMP AND CABLE ALL BE REP	SHALL FIELD LETING THE TV) AND SH ORTED TO E) VERIFY HOR PROJECT (INC ALL EVALUATI NGINEER/OWN	IZONTAL AND XLUDING WATER E POTENTIAL C IER IMMEDIATE	VERTICAL 2, SEWER, CONFLICTS LY UPON	26.	ALL (OPEN RIGHT (14) SUBM HOUR RIGHT
	10.	CONTRACTOR SHALL COORDI CONTRACTOR SHALL HAVE 48 CONFLICTS. COSTS INCURRED CLAIMS MAY BE MADE AGAINS COMPENSATION SHALL BE MA	NATE 3 HOU SHA ST OF DE F(WITH ALL JRS TO DET ALL BE BOF RANGE COUN DR THE PER	OTHER UTI TERMINE THE RNE BY THE NTY OR THE RIOD OF TIME	LITY OWNER: RESOLUTION UTILITY OWI ENGINEER FC TO RESOLVE	S FOR RESO OF ANY UNH NER AND/OR DR THESE CON ANY CONFLI	LUTION OF CONTRACTOR CONTRACTOR NFLICTS. NO AECTS.	ONFLICTS. FORESEEN AND NO DDITIONAL	27.	CONS CONS INSTA AIR
	11.	SUPPORT & PROTECT ALL LOCATION OF ALL EXISTING UTILITY OWNERS AND BE RES OTHER UTILITIES DURING CON	EXIS FACII PONS STRU(TING UTILI ⁻ LITIES. CON IBLE FOR F CTION.	TIES. CONTR. TRACTOR S⊢ ROVIDING TE	ACTOR SHAL IALL BE RES MPORARY SU	L CONTACT SPONSIBLE FO IPPORT FOR U	UTILITY OWNI DR COORDINAT JTILITY POLES	ERS FOR ING WITH AND ALL	28.	CONT
	12.	THE UTILITIES IMPROVEMENTS THE INTEGRITY OF THE ORA DRAWINGS DO NOT INCLUDE STATED OTHERWISE ON THE D	AND NGE WORK DRAWI	ADJUSTMEN COUNTY W PERFORME NGS.	NTS SHOWN (ATER, WASTE D ON, OR FO	ON THESE DE EWATER, ANE DR UTILITY S	RAWINGS ARE D RECLAIMED YSTEMS OWNE	INTENDED TO WATER SYSTE ED BY OTHERS	MAINTAIN EMS. THE , UNLESS	29.	DRAW RESP BEAR BENC
	13.(INSTALLATION, FLUSHING, AND IN ACCORDANCE WITH AWWA PIPELINES. FLUSHING, HYDROS OF THE ORANGE COUNTY STA MINOR REPLACEMENT SEGMENT THOROUGHLY DISINFECTED BY PRIOR TO INSTALLATION. CO MANPOWER TO ACCOMPLISH TO BE PRESENT DURING THE TES (7) DAYS PRIOR TO START TO	D PRE C600 STATIO ANDAF NTS F Y SW/ DNTR A THESE ST. CO HIS W	ESSURE AND FOR DUCT C TESTING, RDS AND CO REQUIRED TO ABBING THE ACTOR SHA OPERATION OORDINATE ORK.	D LEAK TEST ILE IRON WA AND DISINFE DISTRUCTION D MAKE CON E ENTIRE INT LL PROVIDE IS. AUTHORIZ WITH ORANG	ING SHALL E TER PIPELINE SPECIFICATI INECTIONS T ERIOR WITH ALL NECES ED ORANGE E COUNTY U	BE PERFORMEN S AND AWWA CONFORM TO ONS AND AW O EXISTING Y A MINIMUM S SARY EQUIPN COUNTY UTILI TILITIES INSPE	D BY THE CON C605 FOR PV APPLICABLE WA C651. FTTT VATER LINES S 5% CHLORINE MENT, MATERIA TIES PERSONNI ECTOR AT LEAS	ITRACTOR C WATER SECTIONS NGS AND SHALL BE SOLUTION ALS, AND EL SHALL ST SEVEN	30. 31.	THE AND TO TH NO V TO A CONT WHER SHEE UTILIT
	14.	ALL EXISTING AND NEW OC PROTECTED AND ADJUSTED SHALL REMAIN ACCESSIBLE A SHALL BE MARKED WITH A M WATER MAIN), A MINIMUM OF REMAIN CLOSED DURING CONS	U WA TO F AT AL MARKE F FOU STRUC	ATER AND INISHED GR L TIMES. A IR (GREEN IR (4) FEET CTION.	SEWER VALV ADE WHETHE NY VALVES FOR SEWER, BELOW GRA	/ES, VALVE ER SHOWN (THAT MIGHT BLUE FOR V ADE. ALL VAI	BOXES, AND DR NOT. VAL BE COVERED VATER, AND F LVES UNDER	MANHOLES S VE AND VALV DURING CONS PURPLE FOR R CONSTRUCTION	HALL BE E BOXES TRUCTION ECLAIMED ARE TO	32. 33{	CONT CONT AS-E UNCC
	15. {	SEE DETAIL SHEET FOR SEP PIPELINES AND MAINS NO C NOTED OR CALLED OUT IN TH	ARAT ONCR IE DR	ION REQUIR ETE ENCAS ÀWINGS.	EMENTS BET EMENT OF P	WEEN WATER PIPES_WILL_B	R MAINS, SEV E PERMITTED,	VER_MAINS_AN (UNLESS SPEC	D OTHER CIFICALLY		USE. MATE ACCO MAY
	16.	ALL FORCE MAINS 4-INCHES DR 18. ALL WATER AND REC PVC AND CONFORM TO AWWA WATER AND RECLAIMED WA	TO 1 CLAIMI COO TER	12-INCHES ED WATER 0, OR SHAL PIPELINES	IN DIAMETER PIPELINES 4- L BE DUCTIL GREATER TI	SHALL BE -INCHES TO E IRON AND HAN 12-INC	PVC AND COM 12-INCHES I CONFORM TO HES IN DIAN	NFORM TO AWY N DIAMETER S AWWA C150/0 METER, AND A	WA C900, SHALL BE C151. ALL ALL FIRE	34. 35.	THE THE
		PROTECTION PIPELINES, SHAL PVC PRESSURE PIPE SHALL POLYETHYLENE PIPES AND 4—INCHES WILL BE SCHEDULE	USE TUBIN 80 (DUCTILE IG WILL CONFORMING	IRON AND CO IRON FITTINO ONFORM TO G TO ASTM D	GNFORM TO GS. FITTINGS AWWA C901 1784 AND D	FOR SERVIC I. PVC PIPE 1785.	CISI. ALL AW CES SHALL BE AND FITTING	BRASS. < S UNDER <	36.	THE UTILIT
	17.	ALL PIPE, PIPE FITTINGS AND MARKED IN ACCORDANCE V PREDOMINANT COLOR FOR WA	APPU VITH ATER;	JRTENANCES SUBPARAGE GREEN FOR	S INSTALLED RAPH 62–55 WASTEWATE	UNDER THIS 55.320 (21) R; PURPLE F	PROJECT WIL (B) 3, FAS FOR RECLAIME	L BE COLOR C 5, USING BLU D WATER.	ODED OR E AS A	37.	ANY MADE CONT
	18.	ALL BACKFILL SHALL BE CON BY AASHTO T -180 METHOD MAXIMUM DRY DENSITY AS M EXISTING OR PROPOSED ASPH PAVEMENT. ALL SOIL TESTING REASONABLE ASSISTANCE DU	MPAC ⁻ 'D' T IEASU HALT G TO RING	TED TO NO EST (MODIF RED BY AA OR CONCRE BE CONDUC SOIL TESTIN	T LESS THAN IED PROCTOR SHTO T	N 95% OF M. ?) IN OPEN A O METHOD 'I IT AND WITH COUNTY. TH	AXIMUM DRY AREAS AND T D' TEST (MOD IN 3-FT OF IE CONTRACTO	DENSITY AS M O NOT LESS T DIFIED PROCTOF EXISTING OR P OR SHALL PRO	IEASURED HAN 98% ?) UNDER ROPOSED VIDE ALL	38.	CONT
	19.	PIPE LENGTHS SHOWN ON PL CONSTRUCTION.	LANS	ARE APPR	OXIMATE. AC	TUAL LENGT	HS ARE TO E	BE DETERMINED) DURING		
	20.	ALL STATIONS AND OFFSETS	RFEF	K IU BASEL	INE OF STAT	IONING.					
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2/2013 60% DRAWINGS

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MAINS SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS. PIPING SHALL BE LAID WITH A MINIMUM ER OF 36 INCHES BELOW FINISHED GRADE FOR MAINS SIZED 12-INCHES AND BELOW, AND A MINIMUM ER OF 48 INCHES FOR MAINS SIZED 16-INCHES AND GREATER, WHERE IT IS NOT OTHERWISE SPECIFIED PLANS OR DIRECTED BY THE ENGINEER. FOR PVC PIPE, NO HORIZONTAL/ VERTICAL PIPE OR JOINT ECTION SHALL BE ALLOWED. CONTRACTOR SHALL USE FITTINGS TO OBTAIN REQUIRED CLEARANCES. ON TILE IRON PIPE, CONTRACTOR SHALL NOT EXCEED 75% OF THE MANUFACTURER'S RECOMMENDATION PIPE DEFLECTION. OTHERWISE USE FITTINGS TO OBTAIN REQUIRED CLEARANCES. $\sim\sim\sim\sim\sim$

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DUCTILE IRON AND PVC PRESSURE (PIPE JOINTS SHALL BE FULLY RESTRAINED. IN ADDITION, ALL NGS SHALL BE MECHANICAL JOINT RESTRAINED. NO THRUST BLOCKS SHALL BE PERMITTED.

VALVES ON ALL WET TAPS CLOSED UNTIL CLEARED BY FDEP. DO NOT CONNECT ANY PROPOSED ER MAIN TO ANY EXISTING WATER MAIN UNLESS CLEARED BY FDEP.

CONNECTIONS TO EXISTING MAINS SHALL BE MADE BY THE CONTRACTOR ONLY AFTER THE PROPOSED VECTION PROCEDURE AND WORK SCHEDULE HAVE BEEN REVIEWED AND ACCEPTED BY THE OWNER. THE TRACTOR SHALL SUBMIT A WRITTEN REQUEST TO THE OWNER A MINIMUM OF FIVE (5) WORKING DAYS R TO SCHEDULING ANY CONNECTION. THE REQUEST SHALL REFERENCE THE PROFESSIONAL LAND VEYOR CERTIFIED COMPLETED AS-BUILT RECORD DRAWINGS PREVIOUSLY SUBMITTED AND SHALL LINE THE FOLLOWING:

POINTS OF CONNECTION, FITTINGS TO BE USED, METHODS OF FLUSHING AND DISINFECTION AND VERIFICATION OF RESTRAINT ON EXISTING PIPE.

ESTIMATED CONSTRUCTION TIME FOR THE CONNECTIONS.

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OWNER SHALL REVIEW THE SUBMITTAL WITHIN FIVE (5) WORKING DAYS AFTER RECEIVING IT AND RM THE CONTRACTOR REGARDING APPROVAL OR DENIAL OF THE REQUEST. IF THE OWNER REJECTS REQUEST, THE CONTRACTOR SHALL RESUBMIT THE REQUEST MODIFYING IT IN A MANNER ACCEPTABLE HE OWNER. ALL CONNECTIONS SHALL ONLY BE MADE ON THE AGREED UPON DATE AND TIME. SHOULD CONTRACTOR NOT INITIATE AND COMPLETE THE CONNECTION WORK IN THE AGREED UPON MANNER, HE . BE REQUIRED TO RESCHEDULE THE CONNECTION BY FOLLOWING THE PROCEDURE OUTLINED ABOVE. CONTRACTOR SHALL NOT OPERATE ANY VALVES IN THE SYSTEM. MAINS SHALL NOT BE PLACED IN /ICE UNTIL CLEARANCE IS RECEIVED FROM FDEP. AS-BUILT DRAWINGS MUST BE COMPLETED AND MITTED PRIOR TO WATER MAIN CHLORINATION.

FECT EXISTING IMPROVEMENTS TO THE MAXIMUM EXTENT POSSIBLE. RESTORE ALL EXISTING OVEMENTS AND DISTURBED AREAS TO ORIGINAL CONDITION. PAVEMENT TO BE RESTORED IN DRDANCE WITH THE PAVEMENT RESTORATION DETAILS SHOWN ON THE CONSTRUCTION DETAIL SHEETS. DAMAGED SIDEWALK, ROADWAY PAVEMENT AND OTHER IMPROVEMENTS SHALL BE RESTORED TO INAL CONDITION.

COUNTY ROADS TO BE OPEN CUT SHALL BE APPROVED BY ORANGE COUNTY PUBLIC WORKS PRIOR TO I-CUTS. SUBMIT A MAINTENANCE OF TRAFFIC (MOT) PLAN CONFORMING TO ORANGE COUNTY F-OF-WAY UTILIZATION REGULATIONS TO ORANGE COUNTY PUBLIC WORKS A MINIMUM OF FOURTEEN DAYS PRIOR TO ANY WORK WITHIN COUNTY RIGHT-OF-WAY. A COPY OF THIS PLAN SHALL ALSO BE AITTED TO THE ENGINEER AND UTILITY COUNTY INSPECTOR. NOTIFY THE COUNTY TRAFFIC ENGINEER 48 RS PRIOR TO ANY OPEN CUT OF ROADWAYS OR JACK AND BORE OPERATIONS WITHIN THE COUNTY I-OF-WAY. TWO WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES DURING THE COURSE OF STRUCTION. MAINTAIN A SET OF COUNTY APPROVED CONSTRUCTION PLANS AND MOT PLANS AT THE STRUCTION SITE AT ALL TIMES WHEN WORKING WITHIN THE COUNTY RIGHT-OF-WAY.

ALL AIR RELEASE VALVES (ARV) AT ALL HIGH POINTS IN THE SYSTEM WHERE AIR CAN ACCUMULATE. RELEASE VALVES AND APPURTENANCES SHALL BE COLOR CODED BLUE FOR WATER, GREEN FOR R, AND PURPLE FOR RECLAIMED WATER. STATIONING FOR AIR RELEASE VALVES IS APPROXIMATE. TRACTOR TO INSTALL AIR RELEASE VALVES AT HIGH POINTS IN MAIN.

TRACTOR TO CLEAR AND GRUB ALL AREAS WITH PROPOSED WORK, INCLUDING 5' OUTSIDE OF POSED FENCE, 5' OUTSIDE TOE OF BERMS AND EDGE OF PAVEMENT, AND WITHIN LIMITS SHOWN ON WING NO5. 14 THROUGH 17. MUCH OF THESE AREAS ARE HEAVILY WOODED. CONTRACTOR IS PONSIBLE FOR TREE REMOVAL AND OTHER ACTIVITIES NECESSARY TO CLEAR AND GRUB.

RING AND COORDINATES ARE RELATIVE TO NAD83/90. ELEVATIONS ARE BASED ON NAVD88. CHMARK LOCATIONS AND ELEVATIONS ARE SHOWN IN THE PLANS AS REPRESENTED BY SURVEYOR AT TIME OF SURVEY. CONTRACTOR SHALL VERIFY THEIR CORRECTNESS AT THE TIME OF CONSTRUCTION INSTALL HIS OWN TEMPORARY BENCHMARKS. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT HE ATTENTION OF THE OCU UTILITIES INSPECTOR.

VALVE BOXES, METERS, PORTIONS OF MANHOLES, OR OTHER APPURTENANCES OF ANY KIND RELATING ANY UNDERGROUND UTILITIES SHALL BE LOCATED IN ANY PORTION OF A CURB-AND-GUTTER SECTION. TRACTOR SHALL ADVISE ENGINEER IMMEDIATELY UPON DISCOVERY OF A POTENTIAL CONFLICT.

RE REQUIRED, AT NO ADDITIONAL COST TO THE COUNTY, THE CONTRACTOR SHALL USE TEMPORARY ETING OR TRENCH BOXES TO MINIMIZE THE SIZE OF EXCAVATIONS AND PROTECT EXISTING ROADWAYS, ITIES AND OTHER FACILITIES. OR AS NEEDED TO REMAIN WITHIN THE LIMITS OF CONSTRUCTION. TRACTOR TO COMPLY WITH OSHA TRENCH SAFETY REQUIREMENTS AT ALL TIMES.

TRACTOR TO PROVIDE DETAILED AS-BUILT DRAWINGS OF ALL UTILITIES UNCOVERED IN TRENCHES. THE BUILT SHALL RECORD LOCATION, SIZE, TYPE, ELEVATION AND OWNER OF ALL UTILITY FACILITIES OVERED.

ER PIPE SHALL BE STAMPED BY THE NATIONAL SANITATION FOUNDATION (NSF) FOR POTABLE WATER PIPING MATERIAL SPECIFICATIONS COVERING POTABLE WATER PIPES, JOINTING AND PACKING ERIALS, INTERNAL COATING AND LININGS, FITTINGS, SPECIALS AND APPURTENANCES SHALL BE IN 🤇 ORDANCE WITH THE CORRESPONDING AWWA STANDARDS AND CONFORM TO NSF REQUIREMENTS, AS \langle BE APPLICABLE. ANY PIPE, PIPE FITTING, SOLDER, AND FLUX SHALL BE LEAD-FREE.

CONTRACTOR SHALL IMMEDIATELY NOTIFY ORANGE COUNTY UTILITIES DISPATCH (EMERGENCY ONLY) IN EVENT OF UTILITY MAIN BREAK OR DAMAGE AT (407) 836-2777.

MAIN REPAIRS TO BE COMPLETED IMMEDIATELY BY THE CONTRACTOR, AT THE CONTRACTOR'S COST. IF MAIN IS NOT REPAIRED IN A TIMELY MANNER, AS DETERMINED BY THE ENGINEER, ORANGE COUNTY TIES PERSONNEL MAY REPAIR THE MAIN AND THE CONTRACTOR WILL BE CHARGED FOR REPAIRS.

TRACTOR SHALL COORDINATE WITH ALL OTHER UTILITY OWNERS FOR THE RESOLUTION OF CONFLICTS. COST INCURRED SHALL BE BORNE BY THE UTILITY OWNER OR CONTRACTOR AND NO CLAIMS MAY BE AGAINST ORANGE COUNTY FOR THESE CONFLICTS.

TRACTOR SHALL APPLY FOR AND SECURE ALL NECESSARY PERMITS FROM STATE, COUNTY, AND LOCAL CIPALITIES. PERMITS SHALL INCLUDE, BUT NOT BE LIMITED TO, RIGHT OF WAY USE, CONSTRUCTION, NESS LICENSE, AND DEWATERING.

TRACTOR SHALL USE EXTREME CAUTION WHEN WORKING NEARBY THE EXISTING GAS MAIN, AND SHALL CTLY FOLLOW ALL REQUIREMENTS OF THE FLORIDA GAS TRANSMISSION CO.

	L	MN	0	1		P Q R
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		DRAWING INDEX		HVAC		
SHEET	DRAWING	DESCRIPTION		050		HVAC NOTES ABBREVIATIONS AND STMBOLS
GENER	AL			060		OPERATIONS BUILDING HVAC PLAN
001	G01	COVER SHEET		061	H04	HVAC DETAILS
002	G02	DRAWING INDEX AND GENERAL NOTES		062	H05	HVAC DETAILS
003	G03	LEGAL DESCRIPTION AND LOCATION MAP		063	H06	HVAC CONTROLS
004	G04	STANDARD LEGEND AND ABBREVIATIONS		064	H07	HVAC CONTROLS
005	G05	PROCESS FLOW DIAGRAM		PLUMB	ING	
CIVIL	1			065	P01	PLUMBING NOTES ABBREVIATIONS AND SYMBOLS
006	C01	EXISTING SITE PLAN SOUTH	-	066	P02	PLUMBING SCHEDULES
007	C02	EXISTING SITE PLAN NORTH		067	P03	OPERATIONS BUILDING PLUMBING PLAN
800		EXISTING SHE PLAN NORTHWEST		068	P04	OPERATIONS BUILDING FUEL SYSTEM PLAN
009		SITE PLAN SOUTH		069	P05	PLUMBING DETAILS
010		SHE PLAN NURTH		070	P06	PLUMBING DETAILS
012		PAVING GRADING AND DRAINAGE-SOUTH		FIRE P	ROTECTION	N
012		PAVING GRADING AND DRAINAGE-NORTH		071	FP01	FIRE PROTECTION NOTES ABBREVIATIONS SYMBOLS
014		CRADING AND DRAINAGE SECTIONS AND DETAILS		072	FP02	OPERATIONS BUILDING FIRE PROTECTION PLAN
015	C10	GRADING AND DRAINAGE SECTIONS AND DETAILS		ELECTE	RICAL	
016	C11	FROSION CONTROL PLAN AND DETAILS		073	E01	ELECTRICAL LEGEND AND NOTES
017	C12	YARD PIPING PLAN		074	E02	ELECTRICAL SITE PLAN
018	C13	VALVE STATIONS		075	E03	DUCTBANK SECTIONS
019	C14	TRANSMISSION MAINS-PLAN AND PROFILE 1		076	E04	ELECTRICAL SINGLE-LINE DIAGRAM
020	C15	TRANSMISSION MAINS-PLAN AND PROFILE 2		0//	E05	ELECTRICAL POWER PLAN
021	C16	TRANSMISSION MAINS-PLAN AND PROFILE 3		078		ELECTRICAL POWER PLAN
022	C17	TRANSMISSION MAINS-PLAN AND PROFILE 4		079		ELECTRICAL LIGHTING PLAN
023	C18	CIVIL DETAILS		080		ELECTRICAL GROUNDING AND LIGHTNING PROTECTION PLAN
024	C19	CIVIL DETAILS		082		ELECTRICAL POWER PLAN
025	C20	CIVIL DETAILS		083		ELECTRICAL POWER PLAN
026	C21	CIVIL DETAILS		084	F12	
027	C22	CIVIL DETAILS		085	F1.3	PANEL BOARD SCHEDULES
028	C23	ASSET ATTRIBUTE TABLES		086	F14	
029	C24	ASSET ATTRIBUTE TABLES		087	F15	
030	C25	ASSET ATTRIBUTE TABLES		088	E16	ELECTRICAL DETAILS
ARCHI	TECTURAL			089	E17	ELECTRICAL DETAILS
031	A01	ARCHITECTURAL NOTES ABBREVIATIONS AND SYMBOLS	-	090	E18	DUPLEX PUMPS STATION DETAILS
032	A02	LIFE SAFETY AND CODE REVIEW PLAN		091	E19	DUPLEX PUMPS STATION CONTROL PANEL DETAILS
033	A03	OPERATIONS BUILDING FLOOR PLAN		091A	E19A	FIRE ALARM PLANS
034	A04	OPERATIONS BUILDING ROOF AND REFLECTED CEILING PLAN		INSTRU	JMENTATIO	N AND CONTROL
035	A05	OPERATIONS BUILDING EXTERIOR ELEVATIONS		092	101	INSTRUMENTATION LEGEND
037	A00	OPERATIONS BUILDING SECTIONS		093	102	PROPOSED NETWORK ARCHITECTURE
038	A08	OPERATIONS BUILDING WALL SECTIONS		094	103	CP-PW PROPOSED LAYOUT
0.39	A09	OPERATIONS BUILDING FINISH AND DOOR SCHEDULES		095	104	PW-CP WIRING DIAGRAM
040	A10	ARCHITECTURAL DETAILS/INTERIOR ELEVATIONS		096	105	PW-CP I/O LAYOUT
041	A11	ARCHITECTURAL DETAILS		097	106	PW-CP I/O LAYOUT
STRUC	TURAL			098	107	PW-CP I/O LAYOUT
042	S01	GENERAL NOTES	1	099	108	RW-CP PROPOSED LAYOUT
043	S02	GENERAL NOTES	1	100	109	RW-CP WIRING DIAGRAM
044	S03	OPERATIONS BUILDING FOUNDATON AND SLAB PLAN		101	110	PW-CP P&ID
045	S04	OPERATIONS BUILDING ROOF PLAN		102		PW-CP P&ID
046	S05	OPERATIONS BUILDING SECTIONS		103	112	
047	S06	TYPICAL DETAILS		104	113	
MECHA	NICAL			105	114	
048	M01	POTABLE WATER PUMPS PLAN AND SECTIONS		106		
049	M02	RECLAIMED WATER PUMPS PLAN AND SECTIONS	ļ	107	17	
050	M03	POTABLE WATER GST PLAN AND SECTIONS			1	
051	M04	RECLAIMED WATER GST PLAN AND SECTIONS				
052	M05	IGST DETAILS				
053	M06	HYPOCHLORITE SYSTEM PLAN AND SECTIONS				
054		UN SHE LIFT STATION				
055		FUME SKID AND ANALYZEK DETAILS				
050		DIDE SUDDODT AND SUAD DETAILS				
		FIFE SUFFURI AND SLAD DETAILS	J			

Issue Certification			Designed DNN
Curtis I. Kunihiro, P.E. Elorida P.E. No. 33688			Drawn <u>RLL</u>
Reiss Engineering, Inc.		04.04	Checked_DNN
1016 Spring Villas Pt.	No.	8181	Reviewed <u>MAC</u>
Winter Springs, FL 32708			Approved <u>CIK</u>
			FULL SIZE

Date <u>2/21/14</u>

RLL

ΒY

ORANGE COUNTY EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATER STORAGE AND

GENERAL

DRAWING INDEX AND GENERAL NOTES

	PROJECT NO .:		
) REPUMP FACILITY	110	005	
	scale: NOTED	REVISION:	REISS ENGINEERING, INC. 1016 SPRING VILLAS PT WINTER SPRINGS, FL 32708
S	DRAWING NO.	SHEET NO .:	(407) 679–5358
	G02	002 _{of} 108	



	G	н	1		J	K		L	1
)X	— CONST 36" POLYI ENCASED RJ DI V — x — x — x — (C' — — — — — (C14	ETHYLENEX XXX 14-P26)	STA 17+65. INSTALL: 1-4" 45° BEI 1-4" 11.25° 	25, 210.5' LT ND (C14-F5) BEND (C14-F6) 0, 188.5' LT ND (C14-F3) BEND (C14-F3) BEND (C14-F4)	S + It 1 + (0 1 1 5 6 1 5 1 5 1 5 1 5 1 5 1 5 1 1 1 1	TA 18+60.0, 215.5' LT NSTALL: -WASTEWATER AIR SELEASE VALVE ASSE C14-ARV1)	EMBLY (C14-P13)		(C14-P15)
/	(C1	4-P8)	(C14-P10)	(C14-P12)	X X X	78	(C14-P14)	<u> </u>	(C14-P16) xx -
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x	XX	x x 75	<u></u>	<u> </u>	X				WETLAND
				25' WETLAND		 /			
	15+00		16+00		17+00		18+00		19+00
·	·				· /		₽ SURVEY		
₽ SURVEY P.O.T. STA. 1 SET 5/8" I.R	14+00.36 R.C.	•					SET 5/8" I.R.C. "TRAV PT LB 6556" N: 1486889.05 F: 533880.86		
"TRAV PT LB N: 1486526.3 E: 593691.11	3 6556" 36	SITE E STA. 1 OFFSE SFT	<u>BENCHMARK 2</u> 15+60.68 T: 19.94 ⁺ RT. AILROAD SPIKE				2. 0000000		
		IN 12" N: 144 E: 59 EL. =	'PINE TREE 86687.18 3706.51 78.33'						

		ROP GRADE F CL BETWEEN M AND RWM	48" MIN	4" 45° BEND 4" 11.25° BEN		31 C22 OFFS (TYP) 4" 45° BEND 4" 11.25° BE	TE WATER SET ARV	136" MIN COVER	
24" POLYETHYLENE ENCASED RJ DI RWM			36" POLYE ENCASED	ETHYLENE ORJ DI WM					
15 Issue Certification	5+00	16+	00	17+00)	18+00		19+0	00
Geoffrey J. Hennessy Florida P.E. No. 586 Engineering Business Barnes Ferland and 1230 Hillcrest Street Orlando, FL 32803	y, P.E. 537 No. 6899 Associates, Inc.	Designed <u>GJH</u> Drawn <u>JAB</u> Checked <u>GJH</u> Reviewed <u>CKM</u> Approved <u>DLA</u>	EA	ST SERVICE AI	rea potable wa Ransmissioi	TER AND RE MAINS	e county Eclaimed wat civil S—PLAN <i>A</i>	er storag and Pr	;e and rep cofile 1

ate <u>2/21/14</u>



019 _{of} 108

C14





ID Number	Plan Shoot #	Easting	Northing	Flavation	Valve Type	Main Type	Valva Siza	Commente
		Laoing		67 90	Gate	Water Main	valve Size	PIV2 for FP
C12-V1	C12			07.50	Backflow Preventer	Water Main	8	BEP2 for EP
C12-V2	C12.C13			81.00	Butterfly	Water Main	36	PW from F
C12-V3A	C12,C13			67.90	Gate	Water Main	36	PW Main from E
C12-V4	C12,C13			81.00	Butterfly	Water Main	36	PW from S
C12-V5	C12,C13			81.00		Water Main	24	Flow to PW GST
C12-V6	C12,C13				Gate	Water Main	4	to PW GST ARV
C12-V7	C12,C13				ARV - Combination	Water Main	4	to PW GST ARV
C12-V8	C12,C13			81.00	Butterfly	Water Main	30	PW to E
C12-V9	C12,C13				Gate	Water Main	4	PW to E ARV
C12-V10	C12,C13				ARV - Combination	Water Main	4	PW to E ARV
C12-V11	C12,C13			81.00	Butterfly	Water Main	30	PW to S
C12-V12	C12,C13				Gate	Water Main	4	PW to S ARV
C12-V13	C12,C13				ARV - Combination	Water Main	4	PW to S ARV
C12-V13A	C12,C13			67.90	Gate	Water Main	36	PW Main from S
C12-V14	C12,C13			72.50	Gate	Water Main	30	PW Return
C12-V15	C12			71.00	Gate	Water Main	24	PW to fut PW GST
C12-V16	C12, M03			75.00	Gate	Water Main	36	PW GST1 Supply
C12-V17	C12, M03			75.00	Gate	Water Main	36	PW GST1 In
C12-V18	C12, M03			75.00	Gate	Water Main	36	PW GST1 Recirc
C12-V19	C12			75.00	Gate	Water Main	36	PW GST2 Supply
C12-V20	C12			75.28	Gate	Water Main	12	PW GST1 Drain
C12-V21	C12			74.83	Gate	Water Main	12	PW Drain to Pond
C12-V22	C12			75.04	Gate	Water Main	12	PW Drain to Sewer
C12-V23	C12			71.00	Gate	Water Main	36	PW GST1 Out
C12-V24	C12			71.00	Gate	Water Main	36	PW GST1 to 2
C12-V25	C12			71.00	Gate	Water Main	36	PW GST1 to PWP
C12-V26	C12			71.00	Gate	Water Main	36	from fut PW GST
C12-V27	C12,C13			80.00	Butterfly	Reclaimed Water Main	24	RW from E
C12-V27A	C12,C13			70.20	Gate	Reclaimed Water Main	24	RW Main from E
C12-V28	C12,C13			80.00	Butterfly	Reclaimed Water Main	24	RW from S
C12-V29	C12,C13			80.00		Reclaimed Water Main	16	Flow to RW GST
C12-V30	012,013				Gate	Reclaimed Water Main	4	to RW GST ARV
C12-V31	012,013			00.00	ARV - Combination	Reclaimed Water Main	4	to RW GST ARV
012-V32				80.00	Butterniy	Reclaimed Water Main	24	
C12-V33	C12,C13					Reclaimed Water Main	4	
C12-V34	C12,C13			80.00	Butterfly	Reclaimed Water Main	4	
C12-V35	C12,C13			80.00	Cate	Reclaimed Water Main	24	
C12-V30	C12 C13					Reclaimed Water Main	4	
C12-V37	C12 C13			70.20	Gate	Reclaimed Water Main	4	RW Main from S
C12-V38	C12			68.00	Gate	Reclaimed Water Main	24	RW Return
C12-V39	C12, M04			68.00	Gate	Reclaimed Water Main	30	RW GST1 Supply
C12-V40	C12. M04			68.00	Gate	Reclaimed Water Main	30	BW GST1 In
C12-V40	C12, M04			68.00	Gate	Reclaimed Water Main	30	RW GST1 Recirc
C12-V42	C12, M04			68.00	Gate	Reclaimed Water Main	30	RW GST2 Supply
C12-V43	C12			74.37	Gate	Reclaimed Water Main	6	RW GST1 Drain
C12-V44	C12			70.50	Gate	Reclaimed Water Main	30	RW GST1 Out
C12-V45	C12			70.50	Gate	Reclaimed Water Main	30	RW GST1 to 2
C12-V46	C12			70.50	Gate	Reclaimed Water Main	30	RW GST1 to RWP
C12-V47	C12			70.50	Gate	Water Main	30	from RW GST2
C12-V47A	C12				Gate	Water Main	4	PW to MM ARV
C12-V47B	C12				ARV - Combination	Water Main	4	PW to MM ARV
C12-V48	C12,M09			79.75	Butterfly	Water Main	30	PW MM In
C12-V49	C12,M09			79.75	Butterfly	Water Main	30	PW MM Out
C12-V50	C12,M09				Gate	Water Main	4	PW MM ARV
C12-V51	C12,M09				ARV - Combination	Water Main	4	PW MM ARV
C12-V52	C12,M09			79.75	Butterfly	Reclaimed Water Main	24	RW MM In
C12-V53	C12,M09			79.75	Butterfly	Reclaimed Water Main	24	RW MM Out
C12-V54	C12,M09				Gate	Reclaimed Water Main	4	RW MM ARV
C12-V55	C12				ARV - Combination	Reclaimed Water Main	4	RW MM ARV
C12-V56	C12			70.00	Gate	Water Main	8	PIV1 for FP
C12-V57	C12				Backflow Preventer	Water Main	8	BFP1 for FP
C12-V58	C12			69.00	Gate	Water Main	6	for FH1
C12-V59	C12			69.00	Gate	Water Main	6	for FH2
C12-V60	C12			69.00	Gate	Water Main	6	for FH3
C12-V61	C12			69.00	Gate	Water Main	6	for FH4
C12-V62	C12			70.50	Gate	Water Main	6	for FH5
C12-V63	C12			70.00	Gate	Water Main	4	PW/YH Supply
C12-V64	C12			70.75	Gate	Water Main	3	PW Shutoff
	1							



D	6/2014	ADDENDUM No. 4	RLL
С	2/21/14	100% DRAWINGS	RLL
В	6/2013	90% DRAWINGS	RLL
А	2/2013	60% DRAWINGS	RLL
REV	DATE	DESCRIPTION	BY

ID Number C12-V66				VAI VE					7
C12-V66	Plan Sheet #	Easting	Northing	Elevation	Valve Type	Main Type	Valve Size	Comments	-
	C12				Backflow Preventer	Water Main	4	BFP for YH	
C12-V67	C12			70.50	Gate	Water Main	4	for YH1	-
C12-V68	C12			70.50	Gate	Water Main	4	for YH2	
C12-V89	C12 C12			70.30	Gate	Water Main	4	for YH3	-
C12-V71	C12			70.25	Gate	Water Main	4	for YH4	-
C14-GV1	C14				Gate	Reclaimed Water Main	24"		-
C14-GV2	C14				Gate	Water Main	36"		
C14-PV1	C14				Plug	Force Main	4"		\sim \wedge
C14-ARV1	C14				ARV - Combination	Force Main	2"	C14-ARV1	
C15-GV1	C15				Gate	Water Main	2"	C15-ARV1	
C15-ARV1	C15				ARV - Combination	Water Main	2"	C15-ARV1	-
C15-ABV2	C15				ARV - Combination	Reclaimed Water Main	2"	C15-ARV2	-
C15-GV3	C15				Gate	Water Main	2"	C15-ARV3	-
C15-ARV3	C15				ARV - Combination	Water Main	2"	C15-ARV3	-
C15-GV4	C15				Gate	Water Main	2"	C15-ARV4	
C15-ARV4	C15				ARV - Combination	Water Main	2"	C15-ARV4	
C15-GV5	C15				Gate	Reclaimed Water Main	2"	C15-ARV5	
C15-ARV5	C15				ARV - Combination	Reclaimed Water Main	2"	C15-ARV5	4
C16-GV1	C16				Gate	Water Main	36"		-
	C16				Gate	Reclaimed Water Main	24" 24"		-
C16-GV4	C16				Gate	Water Main	36"		-
C16-GV5	C16				Gate	Water Main	2"	C16-ARV1	1
C16-ARV1	C16				ARV - Combination	Water Main	2"	C16-ARV1]
C16-GV6	C16				Gate	Reclaimed Water Main	2"	C16-ARV2	
C16-ARV2	C16				ARV - Combination	Reclaimed Water Main	2"	C16-ARV2	
C17-GV1	C17				Gate	Reclaimed Water Main	24"		-
C17-GV2	C17				Gate	Water Main	36"		-
M01-V1	M01				Butterfly	Water Main		PW-HSP-1 Suction	-
M01-V2	M01				Gato	Water Main		PW-HSP-1 Check Valve	-
M01-V4	M01				Gate	Water Main		PW-HSP-1 ARV	-
M01-V5	M01				ARV - Combination	Water Main		PW-HSP-1 ARV	-
M01-V6	M01				Butterfly	Water Main		PW-HSP-2 Suction	-
M01-V7	M01					Water Main		PW-HSP-2 Check Valve	
M01-V8	M01				Gate	Water Main		PW-HSP-2 Discharge	
M01-V9	M01				Gate	Water Main		PW-HSP-2 ARV	-
M01-V10	M01				ARV - Combination	Water Main		PW-HSP-2 ARV	-
M01-V11	M01				Butterny	Water Main		PW-HSP-3 Suction	-
M01-V13	M01				Gate	Water Main		PW-HSP-3 Discharge	-
M01-V14	M01				Gate	Water Main		PW-HSP-3 ARV	-
M01-V15	M01				ARV - Combination	Water Main		PW-HSP-3 ARV	
M01-V16	M01				Butterfly	Water Main		PW-HSP-4 Suction	
M01-V17	M01					Water Main		PW-HSP-4 Check Valve	
M01-V18	M01				Gate	Water Main		PW-HSP-4 Discharge	4
M01-V19	M01				Gate	Water Main		PW-HSP-4 ARV	-
M01-V20	M01				ARV - Combination	Water Main		PW-HSP-4 ARV	-
M01_V22	M01				Gate	Water Main		PW-HSP-5 Discharge	-
M01-V23	M01				Gate	Water Main		PW-HSP-5 ARV	-
M01-V24	M01				ARV - Combination	Water Main		PW-HSP-5 ARV	1
M01-V25	M01				Butterfly	Water Main		PW-HSP-6 Suction	1
M01-V26	M01				Gate	Water Main		PW-HSP-6 Discharge]
M01-V27	M01				Gate	Water Main		PW-HSP-6 ARV	
M01-V28	M01				ARV - Combination	Water Main		PW-HSP-6 ARV	_
M02-V1	M02				Butterfly	Reclaimed Water Main		RW-HSP-1 Suction	-
	M02					Reclaimed Water Main		RW-HSP-1 Check Valve	4
M02-V2	M02				Gate	Reclaimed Water Main			-
M02-V2 M02-V3	IVIUZ				Gate ARV - Combination	Reclaimed Water Main		RW-HSP-1 ARV	-
M02-V2 M02-V3 M02-V4 M02-V4	MO2			1		Reclaimed Water Main			
M02-V2 M02-V3 M02-V4 M02-V5 M02-V6	M02				Butterflv			RW-HSP-2 Suction	
M02-V2 M02-V3 M02-V4 M02-V5 M02-V6 M02-V6	M02 M02 M02				Butterfly	Reclaimed Water Main		RW-HSP-2 Suction	-
M02-V2 M02-V3 M02-V4 M02-V5 M02-V6 M02-V6 M02-V7	M02 M02 M02 M02 M02				Butterfly Gate	Reclaimed Water Main Reclaimed Water Main Reclaimed Water Main		RW-HSP-2 Suction RW-HSP-2 Check Valve RW-HSP-2 Discharge	-
M02-V2 M02-V3 M02-V4 M02-V5 M02-V6 M02-V6 M02-V7 M02-V8	M02 M02 M02 M02 M02 M02				Butterfly Gate Gate	Reclaimed Water Main Reclaimed Water Main Reclaimed Water Main		RW-HSP-2 Suction RW-HSP-2 Check Valve RW-HSP-2 Discharge RW-HSP-2 ARV	-
M02-V2 M02-V3 M02-V4 M02-V5 M02-V6 M02-V6 M02-V7 M02-V8 M02-V9	M02 M02 M02 M02 M02 M02 M02				Butterfly Gate Gate ARV - Combination	Reclaimed Water Main		RW-HSP-2 Suction RW-HSP-2 Check Valve RW-HSP-2 Discharge RW-HSP-2 ARV RW-HSP-2 ARV	
M02-V2 M02-V3 M02-V4 M02-V5 M02-V6 M02-V6 M02-V7 M02-V8 M02-V9 M02-V10	M02 M02 M02 M02 M02 M02 M02 M02 M02				Butterfly Gate Gate ARV - Combination Butterfly	Reclaimed Water Main		RW-HSP-2 Suction RW-HSP-2 Check Valve RW-HSP-2 Discharge RW-HSP-2 ARV RW-HSP-2 ARV RW-HSP-3 Suction	
M02-V2 M02-V3 M02-V4 M02-V5 M02-V6 M02-V6 M02-V7 M02-V7 M02-V8 M02-V9 M02-V10 M02-V11	M02 M02 M02 M02 M02 M02 M02 M02 M02 M02				Butterfly Gate Gate ARV - Combination Butterfly Gate Gate	Reclaimed Water Main Reclaimed Water Main		RW-HSP-2 Suction RW-HSP-2 Check Valve RW-HSP-2 Discharge RW-HSP-2 ARV RW-HSP-2 ARV RW-HSP-3 Suction RW-HSP-3 Discharge	

Issue Certification	Designed DNN	
Curtis I. Kunihiro, P.E.	Drawn <u>RLL</u>	
Reiss Engineering, Inc.	Checked_DNN	EAST SERVICE AREA PUTABLE WATER A
Certificate of Authorization No. 8181 1016 Spring Villas Pt.	Reviewed <u>MAC</u>	
Winter Springs, FL 32708	Approved <u>CIK</u>	
	LINE IS 1" AT	ASSET
	Date	

A B C D E F G H I Q R

RANGE COUNTY AND RECLAIMED WATER STORAGE AND CIVIL

ATTRIBUTE TABLES

	PROJECT
REPUMP FACILITY	
	SCALE:
	NOT
	DRAWING I

Issue Certification	Designed M.PETAJA	ORANGE COUNTY
Matthew Petaja, PE	Drawn J.GREENWELL	EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATE
Florida P.E. No. 61353	Checked C.COLEMAN	REPUMP FACITLITY
 Certificate of Authorization No. 2429	Reviewed <u>C.COLEMAN</u>	STRUCTURAL
201 East Pine Street, Suite 1000	Approved <u>C.COLEMAN</u>	ODEDATIONS DIFFICULTO EQUINDATION AND SI
 Orlando, FL 32801	FULL SIZE	OPERATIONS BUILDING FOUNDATION AND SL
	Date <u>2/21/14</u>	

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www.tetratech.com

D	6/2014	ADDENDUM No. 4	
С	2/21/2014	100% DRAWINGS	JTE
В	6/2013	90% DRAWINGS	JTE
А	2/2013	60% DRAWINGS	JTE
REV	DATE	DESCRIPTION	BY

	Designed JAS						URAI	NGE (JOUN	ΙΥ		
Robert T. Murphy, P.E. Florida P.E. No. 36132 Tetratoch	Drawn <u>JAS</u>	EAST	SERVICE	AREA	POTABLE	WATER	AND	RECLA	AIMED	WATER	STORAGE	<u> </u>
Certificate of Authorization No. 2429 201 East Pine Street, Suite 1000	Reviewed_RTM							ELECTRI	CAL			
Orlando, FL 32801	Approved <u>RTM</u>					FI F(TRI	$\cap \Delta I$	SITE	ριδη		
	$ \begin{array}{c c} & \text{LINE IS 1" AT} \\ \hline & \text{FULL SIZE} \end{array} $								JIL			
	Date <u>2/21/2014</u>											

	A 110 11		· · · · · ·
	issue Certification Robert T. Murphy, P.E. Florido P.E. No. 36132 Tetratech	Designed <u>JAS</u> Drown <u>JAS</u>	EAST SE
JTE	Certificate of Authorizatian No. 2429 201 Eost Pine Street, Suite 1000 Orlando, FL 32801	Reviewed_RTM	
JIE		LUNE IS 1" AT	

ORANGE COUNTY F L O R L D A	E D C B A REV	6/2014 5/2014 2/21/2014 6/2013 2/2013 DATE	ADDENDUN #4 ADDENDUN #2 100% DRAWINGS 90% DRAWINGS 60% DRAWINGS DESCRIPTION	JTE JTE JTE BY	Issue Certification Robert T. Murphy, P.E. Florido P.E. No, 36132 Tetratech Certificate of Authorization No, 2429 201 East Pine Street, Suite 1000 Orlando, FL 32801	Designed JAS Drawn JAS Checked_RTM Reviewed_RTM Approved_RTM Image: Comparison of the state of th	ORANGE COUNTY EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATER STORAGE AND REPUMP FACIL ELECTRICAL ELECTRICAL POWER PLAN
-----------------------------------	------------------------------	---	--	-------------------------	--	--	--

			PANELBOARD:	PW-P	P								
			SERVICE: 480/277V,	3 PH,	3 W								
			BUS SIZE: 400A		LOAD:			NOTES	:				
			MAIN DEVICE: 400A	CONN	30.6	kVA			-				
			SFC RATING: 22,000AI	DEM.	30.6	kVA		LOCAT	TION:	PW ELECTRICAL ROOM			
			MOUNTING: SURFACE	DEM.	36.8	Amps							
CKT	TRIP/			CONNEC	TED LOA	D(VA)						TRIP/	CK
#	POLE	NOTES	CIRCUIT DESCRIPTION	PHA SE A		PHASEB		PHA SE C	;	CIRCUIT DESCRIPTION	NOTES	POLE	#
1	200/3		PW-LP	-	-					FCV-PW-1		20/3	2
3						-	-						4
5								-	-				6
7			SPACE	-	-					FCV-PW-2		20/3	8
9			SPACE			-	-						10
11			SPACE					-	-				12
13	15/3		VAV-1	3,999	-					FCV-PW-3		20/3	14
15						3,999	-						16
17								3,999	-				18
19	15/3		VAV-2	3,999	-]				FCV-PW-4		20/3	20
21						3,999	-]	_				22
23								3,999	-				24
25	15/3		VAV-3	2,004	-	1				FCV-PW-5		20/3	26
27						2,004	-		_				28
29								2,004	-				30
31	20/1		SITELIGHTS	600	-					SPACE			32
33			SPACE			-	-			SPACE			34
35			SPACE			-		-	-	SPACE			36
37			SPACE	-	-	ļ,		-		SURGE			38
39			SPACE			-	-			PROTECTION		20/3	40
41			SPACE			1		-	-	DEVICE			42
ſОТ	AL CON	NECTED	LOADS:	10,602	0	10,002	0	10,002	0				

			PANELBOARD:	PW-I	Р								
			SERVICE: 208/120V ,	3 PH,									
			BUS SIZE: 225A		LOAD:			NOTES:					
			MAIN DEVICE: 200A	CONN.	30.5	kVA							
			SFC RATING: 10,000AIC	DEM.	30.5	kVA		LOCAT	<u>ION:</u>	PW ELECTRICAL ROOM			
			MOUNTING: SURFACE	DEM.	84.8	Amps							
СКТ	TRIP/			CONNEC	TED LOA	AD (VA)						TRIP/	СКТ
#	POLE	NOTES	CIRCUIT DESCRIPTION	PHASE A		PHASE B		PHASE C)	CIRCUIT DESCRIPTION	NOTES	POLE	#
1	30/1		PW-CP	528	600			_		NaClO METERING SKID		20/1	2
3	20/1		EF-1			1,656	-			GEN. RM. RECEPT.		20/1	4
5	20/3		EF-2			_		1,513	-	NaClO RM RECEPT.		20/1	6
7				1,513	-					PW Pump RM RECEPT.		20/1	8
9						1,513	-			PW Electrical RM Recept.		20/1	10
11	20/3		EF-3			•		2,450	-	PW CONT./MECH. RM RECE	EPT.	20/1	12
13				2,450	-			_		GATE CONTROLLER		30/1	14
15						2,450	-			EXHAUST DAMPER	\sim	-20/1	.1 6
17	20/1		EF-5			_		525	1,500	ĞEN. ČOOLANT HEATER	\sim \sim	20/2	18)
19	20/1		LIGHTING	1,500	1,500			_	}				20)
21	20/1		LIGHTING			1,140	600		>	GEN. BATTERY CHARGER		20/1	22
23	20/1		LIGHTING					1,110	864	GEN. DAY TANK		20/1	24
25	20/1		LIGHTING	1,500	400				2	GEN. FUEL TANK	<u> </u>	20/1	2,6
27	20/1		LIGHTING			1,140	-]	0	SPARE		20/1	28
29	20/1		LIGHTING			_		1,470	-	SPARE		20/1	30
31	20/1		LIGHTING	1,110	-					SPACE			32
33	20/1		LIGHTING			1,020	-]		SPACE			34
35	20/1		LIGHTING					864	1,500	PW-IP UPS		30/1	36
37	20/1		LIGHTING	1,170	-					SURGE			38
39	20/1		LIGHTING			720	-			PROTECTION		20/3	40
41	41 20/1 SITE RECEPTACLES							1,080	-	DEVICE			42
TOT	AL CON	INECTED	LOADS:	9,771	2,500	9,639	600	9,012	3,864				

	D	6/2014	ADDENDUM No. 4	
	С	2/21/2014	100% DRAWINGS	JTE
	В	6/2013	90% DRAWINGS	JTE
	A	2/2013	60% DRAWINGS	JTE
	REV	DATE	DESCRIPTION	BY
-				

			PANELBOARD:	RW-F	PP								
			SERVICE: 480/277V,	3 PH,	3 W								
			BUS SIZE: 400A		LOAD:			NOTES:					
			MAIN DEVICE: 400A	CONN.	33.0	kVA							
			SFC RATING: 22,000AIC	DEM.	33.0	kVA		LOCAT	ION:	RW ELECTRICAL ROOM			
			MOUNTING: SURFACE	DEM.	39.7	Amps							
СКТ	TRIP/			CONNEC	TED LOA	AD (VA)						TRIP/	СКТ
#	POLE	NOTES	CIRCUIT DESCRIPTION	PHASE A		PHASE B		PHASE C	2	CIRCUIT DESCRIPTION	NOTES	POLE	#
1	200/3		RW-LP	-	-					FCV-RW-1		20/3	2
3						-	-						4
5						-		-	-				6
7			SPARE	-	-			_		FCV-RW-2		20/3	8
9			SPARE			-	-						10
11			SPARE			-		-	-				12
13	15/3		VAV-4	3,999	-			_		FCV-RW-3		20/3	14
15						3,999	-						16
17						_		3,999	-				18
19	15/3		VAV-5	3,999	-					FCV-RW-4		20/3	20
21						3,999	-						22
23								3,999	-				24
25	15/3		VAV-6	3,000	-					FCV-RW-5		20/3	26
27						3,000	-]					28
29								3,000	-				30
31			SPACE	-	-]		· · · · · ·		SPACE			32
33			SPACE			-	-			SPACE			34
35			SPACE					-	-	SPACE			36
37			SPACE	-	-					SURGE			38
39			SPACE			-	-			PROTECTION		20/3	40
41			SPACE					-	-	DEVICE			42
TOT	AL CON	NECTED	LOADS:	10.998	0	10.998	0	10.998	0				

A B C D E F G H I Q R

			PANELBOARD:	RW-I	Р								
			SERVICE: 208/120V.	3 PH.	4 W								
			BUS SIZE: 225A		LOAD:			NOTES	:				
			MAIN DEVICE: 200A	CONN	17.4	kVA			-				
			SFC RATING: 10,000A	DEM.	17.4	kVA		LOCAT	FION:	RW ELECTRICAL ROOM			
			MOUNTING: SURFACE	DEM.	DEM. 48.4 Amps								
СКТ	TRIP/			CONNEC	FED LOA	.D (VA)						TRIP/	CKT
#	POLE	NOTES	CIRCUIT DESCRIPTION	PHASE A		PHASE B	3	PHA SE C)	CIRCUIT DESCRIPTION	NOTES	POLE	#
1	30/1		RW-CP	528	-					RW RM RECEPT.		20/1	2
3	20/3		EF-4			2,162	-]		RW Elec. RM RECEPT.		20/1	4
5								2,162	-	RW CONT./RR, MECH. RECE	PT.	20/1	6
7				2,162	-]				SPARE		20/1	8
9	20/1		EF-6			528	-	-		SPARE		20/1	10
11	20/1		EF-7					360	-	SPARE		20/1	12
13	30/2		IWH-1	4,763	-					SPARE		20/1	14
15						4,763	-			SPARE		20/1	16
17	20/1		SPARE					-	-	SPARE		20/1	18
19	20/1		SPARE	-	-			_		SPARE		20/1	20
21	20/1		SPARE			-	-			SPARE		20/1	22
23	20/1		SPARE			_		-	-	SPARE		20/1	24
25	20/1		SPARE	-	-			_		SPARE		20/1	26
27	20/1		SPARE			-	-			SPARE		20/1	28
29	20/1		SPARE			_		-	-	SPARE		20/1	30
31	20/1		SPARE	-	-			_		SPACE			32
33	20/1		SPARE			-	-			SPACE			34
35	20/1		SPARE					-	-	SPACE			36
37			SPACE	-	-			_		SURGE			38
39			SPACE				-			PROTECTION		20/3	40
41			SPACE					-	-	DEVICE			42
TOT	AL CON	INECTED	LOADS:	7,453	0	7,453	0	2,522	0				

Issue Certification Robert T. Murphy, P.E.	Designed <u>JAS</u> Drawn <u>JAS</u>	ORANGE COUNTY
Tetratech	Checked RTM	LAST SERVICE AREA POTADLE WATER AND RECLAIMED WATER STORAGE
Certificate of Authorization No. 2429 201 East Pine Street, Suite 1000	Reviewed <u>RTM</u>	ELECTRICAL
Orlando, FL 32801	Approved <u>RTM</u>	
-	FULL SIZE	PANEL BOARD SCHEDULES
	Date <u>2/21/2014</u>	

			T PHONE	ETRA TECH ENGINEERING BUSINESS NO. 2429 www.tetratech.com 201 EAST PINE STREET, SUITE 1000 ORLANDO, FLORIDA 32801 :: (407) 839-3955 FAX: (407) 839-3790
ND REPUMP FACILITY	project no.: 110	005		
	scale: NOTED	REVISION: D	RB	REISS ENGINEERING, INC. 1016 SPRING VILLAS PT WINTER SPRINGS, FL 32708 (407) 679-5358
	DRAWING NO.	SHEET NO.:		
	E13	085 _{of} 108		

	Issue Certification Robert T. Murphy, P.E. Florida P.E. No. 36132 Tetratech	Designed <u>JAS</u> Drawn <u>JAS</u> Checked RTM	EAST	SERVICE	AREA	POTABLE	WATER	ORAI AND	NGE COUN RECLAIMED	TY WATER	STORAGE
_	Certificate of Authorization No. 2429 201 East Pine Street, Suite 1000 Orlando, El. 32801	Reviewed <u>RTM</u>							ELECTRICAL		
_	010100, 12 02001	Approved <u>KIM</u>	-				FII	RE	ALARM P	PLAN	
		Date <u>2/21/2014</u>									

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F L O R I D A	

D	6/2014	ADDENDUM #4	
С	2/21/2014	100% DRAWINGS	JTE
В	6/2013	90% DRAWINGS	JTE
A	2/2013	60% DRAWINGS	JTE
EV	DATE	DESCRIPTION	BY

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Issue Certification Robert T. Murphy, P.E. Florida P.E. No. 36132	Designed <u>JAS</u> Drawn <u>JAS</u>	ORANGE COUNTY EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATER STORAGE
Certificate of Authorization No. 2429 201 East Pine Street, Suite 1000 Orlando, FL 32801	Reviewed <u>RTM</u>	INSTRUMENTATION AND CONTROL
	HULL SIZE →	PW-CP WIRING DIAGRAM
	Date <u>2/21/2014</u>	

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Α			A	
BC	N Y		B C	
D	NaCIO METERING PUMP		D	
00	No.2 FAULT NaCIO METERING PUMP		00	
	No.2 FAULT NaCIO METERING PUMP			SECURITY INTRUSION
02	No.2 FAULT		02	SWITCH DOOR No.110A
03	No.2 FAULT NaCIO TANK		03	SWITCH DOOR No.111A SECURITY INTRUSION
04	EMERGENCY SHOWER FLOW SWITCH		04	SWITCH PW CONTROL PANEL SECURITY INTRUSION
05	SWITCH DOOR No.101A		05	SWITCH RW CONTROL PANEL SECURITY INTRUSION
06	SECURITY INTRUSION SWITCH DOOR No.101B		06	SWITCH PW GROUND STORAGE TANK No.1 HA
07	SECURITY INTRUSION SWITCH DOOR No.102A		07	PW GROUND STORAGE 1 No.1 LADDER
08	SECURITY INTRUSION SWITCH DOOR No.102B		08	UPS ALARM
09	SECURITY INTRUSION SWITCH DOOR No.102C		09	UPS BYPASSED
10	SECURITY INTRUSION SWITCH DOOR No.102D		10	LOW BATTERY FAIL
11	SECURITY INTRUSION SWITCH DOOR No.103A	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	11	FCV-PW-2 OPENED
12	SPARE		12	SPARE
13	SPARE		13	SPARE
14	SPARE		14	SPARE
15	SPARE		15	SPARE
E COMMON	•		E COMMON	
(DISCRETE INPUT MODULE 140DAI54000 RACK 0 SLOT 5			(DISCRETE IN MODULE 1400 RACK 0 SLOT	>UT)AI54000 7
Α			A	
B			B	
D	HIGH SERVICE PLIMP		D	HIGH SERVICE PUMP
00	No.3 RUNNING		00	(FUTURE) HIGH SERVICE PUMP
01	No.3 IN AUTO		01	(FUTURE)
02	No.3 FAULT		02	No.6 FAULT (FUTURE)
03	SECURITY INTRUSION SWITCH DOOR No.105A		03	SECURITY INTRUSION SWITCH DOOR No.108A
04	SECURITY INTRUSION SWITCH DOOR No.106A		04	SECURITY INTRUSION SWITCH DOOR No.108B
05	SECURITY INTRUSION SWITCH DOOR No.106B		05	SECURITY INTRUSION SWITCH DOOR No.109A
06	SECURITY INTRUSION SWITCH DOOR No.106C		06	PW GROUND STORAGE T No.2 HATCH (FUTURE)
07	SECURITY INTRUSION SWITCH DOOR No.106E		07	PW GROUND STORAGE T No.2 LADDER (FUTURE)
08	SECURITY INTRUSION SWITCH DOOR No.107A	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	08	NaCIO METERING PUMP No.2 RUNNING
09	SECURITY INTRUSION SWITCH DOOR No.107C		09	HIGH SERVICE PUMP No FLOW (FUTURE)
10	FCV-PW-2 CLOSED		10	SPARE
	FCV-PW-5 CLOSED	↓ −−□□0−−++−−0	11	PUMP STATION POWER FAIL
12	SPARE		12	SPARE
13	SPARE		13	SPARE
14	SPARE		14	SPARE
15	SPARE		15	SPARE
E COMMON	•		E COMMON	• • •
(DISCRETE INPUT MODULE 140DAI54000 RACK 0 SLOT 6		V	(DISCRETE IN MODULE 140E RACK 0 SLOT	PUT 0AI54000 ▼
Issue Certification	Designed <u>JAS</u>		ORAN	GE COUNTY
Florida P.E. No. 36132 Tetratech Certificate of Authorization No.	Drawn <u>JAS</u> Checked <u>RTM</u>	EAST SERVICE AREA POTAE	BLE WATER AND F	RECLAIMED WATER STORAGE A
201 East Pine Street, Suite 1 Orlando, FL 32801	000 [°] Reviewed <u>RTM</u> Approved <u>RTM</u>		INSTRUMEN	TATION AND CONTROL
	FULL SIZE		PW-CP	I/O LAYOUT
	Date <u>2/21/2014</u>			

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D	6/2014	ADDENDUM #4	
С	2/21/2014	100% DRAWINGS	JTE
В	6/2013	90% DRAWINGS	JTE
А	2/2013	60% DRAWINGS	JTE
REV	DATE	DESCRIPTION	BY

Issue Certification Robert T. Murphy, P.E. Florida P.E. No. 36132	Designed <u>JAS</u> Drawn <u>JAS</u>	ORANGE COUNTY EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATER STORAGE
Certificate of Authorization No. 2429 201 East Pine Street, Suite 1000 Orlando, FL 32801	Reviewed <u>RTM</u>	INSTRUMENTATION AND CONTROL
	FULL SIZE	RW-CP WIRING DIAGRAM
	Date <u>2/21/2014</u>	



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L	A	NL	
	C D	Y Y	/
	00	HIGH SERVICE PUMP No.1 RUNNING	
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	01	HIGH SERVICE PUMP No.1 IN AUTO	00
	02	HIGH SERVICE PUMP No.1	01
	03	SECURITY INTRUSION SWITCH RW GROUND STORAGE TANK	02
		No.1 HATCH SECURITY INTRUSION SWITCH RW GROUND STORAGE TANK	03
	05	No.2 HATCH (FUTURE) SECURITY INTRUSION SWITCH RW GROUND STORAGE TANK	04
		No.1 LADDER HIGH SERVICE PUMP	05
	08	No.1 FLOW	06
		VSPC CONTROL UNIT	07
	08	NO. 1 (SEE NOTE 1)	08
• <u> </u>	09	NO. 2 (SEE NOTE 1)	09
	10	NO. 3 (SEE NOTE 1)	10
	11	FCV-RW-1 OPENED	11
	12	FCV-RW-1 CLOSED	12
	13	FCV-RW-2 OPENED	13
← − − − + − − − −	14	FCV-RW-2 CLOSED	14
	15	SPARE	15
		•	(RELAY OUTPUT) RACK 0 SLOT 5
	RACK 0 SLOT 3		
	A B		
			~-Ĥ─
	00	RW GROUND STORAGE TANK No.2 LADDER (FUTURE))
← − − − − + − − − − − − − − − − − − − −	01	HIGH SERVICE PUMP No.2 RUNNING	~-ŲŲ
← − − + + − − − −	02	HIGH SERVICE PUMP No.2 IN AUTO	~- <u>Ĥ</u> O
← − − + + − − − −	03	HIGH SERVICE PUMP No.2 FAULT	
	04	HIGH SERVICE PUMP №.3 RUNNING (FUTURE)	~_HO ~_ŲO
	05	HIGH SERVICE PUMP No.3 IN AUTO (FUTURE)	~- <u>Ĥ</u> O
	06	HIGH SERVICE PUMP No.3 FAULT <u>(E</u> UTURE)	~-₩O ĽO
↓	07	HIGH SERVICE PUMP	\bigcirc
		SPARE	—
		HIGH SERVICE PUMP No.3	$\tilde{\bigcirc}$
	10	SPARE	$\tilde{\mathbf{O}}$
	11	FCV-RW-4 OPENED	
	12		•
		FCV-RW-5 OPENED	
		FCV-RW-5 CLOSED	
		SPARE	
	(DISCRETE INPUT)		
▼	RAUN U SLUI 4	▼	
ORANGE			
D 6/20	014 ADDENDUM #4		
	2013 90% DRAWINGS		

DATE DESCRIPTION

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Issue Certification	Designed <u>JAS</u>	ORANGE COUNTY
Robert T. Murphy, P.E. Florida P.E. No. 36132 Tetratech	Drawn <u>JAS</u>	EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATER STORAGE
Certificate of Authorization No. 24 201 East Pine Street, Suite 1000	Reviewed_RTM	INSTRUMENTATION AND CONTROL
Unando, FL 32601	Approved <u>RTM</u>	RW-CP I/O LAYOUT
	Date <u>2/21/2014</u>	



Issue Certification Designed JAS ORANGE COUNTY	
Robert T. Murphy, P.E. Elorida RE No. 36132 Drawn JAS EAST SERVICE AREA DOTARIE WATER AND RECLAIMED WATER	
Tetratech Checked_RTM Checked_RTM	STURAGE
Certificate of Authorization No. 2429 201 East Pine Street, Suite 1000 Reviewed <u>RTM</u> INSTRUMENTATION AND CONTROL	
Orlando, FL 32801 Approved <u>RTM</u>	
= = = = = = =	
 Date2/21/2014	



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2/2013 60% DRAWINGS

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Issue Certification	Designed <u>JAS</u>	ORANGE COUNTY
Robert T. Murphy, P.E. Florida P.E. No. 36132	Drawn <u>JAS</u>	EAST SERVICE AREA POTABLE WATER AND RECLAIMED WATER STORAGE
letratech Certificate of Authorization No. 2429 201 East Dias Streat Swite 1000	Checked <u>RIM</u>	INSTRUMENTATION AND CONTROL
Orlando, FL 32801	Approved <u>RTM</u>	
-	FULL SIZE	RW-CP P&ID
-	Date2/21/2014	

CONTINUED ON SHEET I17			201 EAST PII OF PHONE: (407) 839-39	NE ≀LA 955
F AND REPUMP FACILITY	PROJECT NO.: 110005			
	SCALE: NOTED	REVISION: D	REISS 1016 S WINTER (407)	EN SPI
	DRAWING NO.	SHEET NO.:		07
	116	107 _{of} 108		

ENGINEERING, INC. SPRING VILLAS PT SPRINGS, FL 32708 679-5358

NE STREET, SUITE 1000 (LANDO, FLORIDA 32801 955 FAX: (407) 839-3790

www.tetratech.com

TETRA TECH ENGINEERING BUSINESS NO. 2429

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