

August 11, 2014

To Whom It May Concern:

The Polk County UTILITIES CODE COMMITTEE is charged with updating the seven REFERENCE MANUALS associated with Ordinance 10-081 (AKA: Utilities Code). In accordance with Section 11: Utilities Code Committee and Section 12: Reference Manual Revision Procedure, the UTILITIES CODE COMMITTEE recommends approval of revisions to portions of the following three reference manuals:

➤ **Utilities Standards and Specifications Manual (6B)**

1. USSM Table of Contents

2. Chapter 2: Development Coordination (Section 210)

- 2.07 PCU Bonding Package:
 - minimum bond set as 110% consistent with LDC, strike previous bonding criteria
 - change "Growth Management" to "Land Development Division", other minor text edits
- 2.08 Board Acceptance Request Package: Warranty Surety by Engineer
- 3.01 Record Documents: above ground features referenced from a minimum of two permanent points (6) text edit (10)
- 4.02 Deliverables: Strike out Bill of Sale, update bullet list, tweak new "J"
- 4.03 Acceptance of Improvements: Strike "... history of substandard..."
- Edits to various forms:
 - 250-C Request for Utilities Bond: minimum bond set as 110% as in 2.07 above
 - 250-D Developer's Letter of Dedication: Remove perpetual warranty
 - 250-E Engineer of Record's Letter of Certification: Remove perpetual warranty
 - 250-F Contractor's Letter of Certification: Remove perpetual warranty
- Standard Drawing Cover Sheets (Remove dated logo and signature block)

3. Chapter 3: General Requirements

- **(Section 310):** 2.14 Salvage (eliminate reference to specific items)
- **(Section 313):** 3.03.D: Change "Tracer" to "Locating", Reword using "Continuity"
- **(Section 314):** 4.02.E Add "Locating"
- **(General Details):** GR-07, 08, 09, 12, 14-1,

4. Chapter 4: Potable Water:

- (Section 412): Part 3.H: Include reference to key switch and Approved Materials Checklist
- (Section 450-A) Testing and Inspection for Acceptance: Strike out first section under 3.01 "TESTS" and prior to "Swabbing", re-number
- (Section 450-B) Approved Materials Checklist (Water):
 - Change "Tracer" to "Locating" (Cat 2, Cat 3)
 - Updated meter box specification to reference cast iron reader (Cat 2)
 - Added dual check for potable meters (3/4" and 1") (Cat 2)
- (Section 450-D) Approved Meters List: Replace Hersey/compound meters with Ultra Sonic; strainer NOT optional
- (Potable Water Details): WA-01-1, 01-2, 03

5. Chapter 5: Wastewater (Section 510)

- Part 5, B-2, I, K-9: Lining of Drop MHs consistent with Approved Materials
- Part 5, M: Encapsulation edits
- Part 6, C: Service laterals max length = 150'
- Lift Station Standards (Section 512):
 - Table 512-2 (SCADA)
 - Part 4 Design E.2.x Buoyancy calcs – soil ring weight shall be 100% of total weight of soil ring... minimum safety of 1.1 shall be achieved.
 - Part 4 Design E.7,8,9,10,12, F, G: (minor) SCADA related corrections/edits
 - Part 5 Construction 5.11 Fence posts: core drill 2x post diameter
 - Part 5 5.12.E Wet Well and Valve Vault (SCADA)
- (Section 516): Entire separate file provided due to extensive re-write
- (Section 517): Entire separate file provided due to extensive re-write
- (Section 518): Part 3.H Include reference to key switch and Approved Materials Checklist
- (Section 550-A) Testing and Inspection for Acceptance:
 - Strike out under 3.02 "Rejection of Gravity Mains"
 - Part 5 -- Change "Tracer" to "Locating"
- (Section 550-C) Approved Materials Checklist (Wastewater):
 - Change "Tracer" to "Locating" (Cat 2)
 - Add "ALL" for exterior MH coatings; Add "Standard" (MH) to Interior Coatings, and "DROP" (MH) to Lining Systems (Cat 4)
 - Remove Tradeswind from FIXED Generator Suppliers (Cat 5)
 - Remove USF Fab Hatch Net System from Fall Protection System (Cat 5)
 - Add Electric Override Key Switch (Knox) (Cat 5)

- Various SCADA related edits in Category 5, Lift Station Materials and Accessories
- (Section 550-K) I/O Listing (SCADA)
- (Wastewater Details): WW-12-2,3,4, 14-2,3, 18, 20-1,2, 24, 25, 26-1, 27

6. Chapter 6: (Section 650-B) Approved Materials Checklist (Reclaimed):

- Change "Tracer" to "Locating" (Cat 2, Cat 3)
- Updated specification to reference cast iron reader (Cat 2)

➤ Cross Connection Control Policy Manual (6C)

7. Cross Connection Control Policy Manual

- Update Definition of Master Meter Assembly

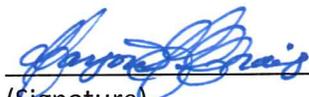
➤ Reclaimed Water Policy Manual (6D)

8. Reclaimed Water Policy Manual

- 2.0 Definitions Add definition for "ACTIVE"
- Tweak "AVAILABLE"
- 4.0 Connection and Use
 - 4.1 Availability of Service
 - 4.3 Requirements to Connect
 - 6.0 Inspections

Details concerning each respectively edited Manual, Section, Chapter, and Appendix are attached herewith for reference. Pursuant to Ordinance 10-081, all of the above listed and subsequently described recommendations are hereby approved as noted. In accordance with Section 12 of the aforementioned Ordinance, the Utilities Director is authorized to approve these updates as recommended by the Utilities Code Committee. The effective date of these revisions shall be 30 calendar days from the date of this approval and shall supersede the prior content and detail drawings in the respective manuals. Similarly all approved revisions will be incorporated into the master set of Utilities Code Documents and Manuals in a clean form without markups within 30 calendar days from the date of this approval.

Each REFERENCE MANUAL that has been revised shall be formally presented to the BoCC and adopted by separate resolution before calendar year end of 2015.



 (Signature)

Marjorie G Craig, P.E.
 Polk County Utilities Director



 (Date)

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Comment [EWP1]: Previously approved by
 UCC 5/2/2014

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Chapter 2: Development Coordination (Section 210)

- 2.07 PCU Bonding Package:
 - minimum bond set as 110% consistent with LDC, strike previous bonding criteria
 - change “Growth Management” to “Land Development Division”, other minor text edits
- 2.08 Board Acceptance Request Package: Warranty Surety by Engineer
- 3.01 Record Documents: above ground features referenced from a minimum of two permanent points (6) text edit (10)
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 - 250-E Engineer of Record’s Letter of Certification: Remove perpetual warranty
 - 250-F Contractor’s Letter of Certification: Remove perpetual warranty
- Standard Drawing Cover Sheets (Remove dated logo and signature block)

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Should the Growth Management Department determine the Package to be incomplete or any of the information to be unsatisfactory, a letter shall be sent to the ENGINEER stating the deficiencies. No further processing of the Package shall occur until all unsatisfactory items are satisfactorily addressed by the ENGINEER.

2.07 PCU BONDING PACKAGE

A. Applicability

This Package is required for all projects that will ~~be platted or any construction of any~~ portion of a utility system to be owned and/or operated by PCU.

B. Contents

The PCU Bonding Package shall contain the following items:

- 1) If applicable, one 24" x 36" copy of the proposed Final Plat showing the appropriate utility easements, street names, lot numbers, etc.
- 2) All original executed Polk County Utilities Easement documents that provide for non-platted easements that shall contain portions of the PCU utility system(s). Once reviewed and approved by PCU, and accepted by the COUNTY, these documents shall be recorded by Polk County.
- 3) A completed PCU Request for Utilities Bond Amount form. The ENGINEER shall provide a certified itemized cost breakdown of all items to be bonded. Items to be bonded shall be grouped by the following categories with each category having a minimum bond amount ~~as specified~~ of 110% of the value of the required improvements being bonded under performance in accordance with LDC Section 807.C.3.
 - i. Final Record Drawings of the project's complete construction: ~~the minimum amount shall be 0.25% of the ENGINEER's total certified final construction costs for all potable water, reclaimed water, and wastewater system improvements or the total actual certified itemized cost for completing the Final Record Drawings, whichever is higher.~~
 - ii. Potable water system only punch list deficiencies: ~~the minimum amount shall be 0.5% of the ENGINEER's certified final construction costs for all potable water system improvements or the total actual certified itemized cost for resolving all potable water deficiencies, whichever is higher.~~
 - iii. Reclaimed water system only punch list deficiencies: ~~the minimum amount shall be 0.5% of the ENGINEER's certified final construction costs for all~~

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~~reclaimed water system improvements or the total actual certified itemized cost for resolving all reclaimed water system deficiencies, whichever is higher.~~

- iv. Wastewater system, including all gravity, lift station, and force main improvements, ~~only punch list deficiencies: the minimum amount shall be 0.5% of the ENGINEER's certified final construction costs for all wastewater system improvements or the total actual certified itemized cost for resolving all wastewater system deficiencies, whichever is higher.~~
- v. ~~Wastewater lift station punch list deficiencies: the minimum amount shall be 2.0% of the ENGINEER's certified final construction costs for the wastewater lift station related improvements or the total actual certified itemized cost for resolving all wastewater lift station deficiencies, whichever is higher.~~

- 4) A completed PCU Request for Utilities Bond form and cashiers check, letter of credit, or other surety authorized to do business within the State of Florida made payable to "Polk County Board of County Commissioners" for bonding outstanding items specified on the PCU Request for Utilities Bond Form. Upon review and approval, PCU will notify the Growth Management Department Land Development Division that the bond items are sufficient for further processing.

C. Submittal

The ENGINEER shall submit this Package to the Growth Management Department Land Development Division.

D. PCU Response

Upon receipt of a complete PCU Bonding Package, the Growth Management Department Land Development Division shall review the submitted information, and, assuming it is found to be complete, forward the Package to the Development Review Staff within the Growth Management Department Land Development Division. The Development Review Staff shall review the submitted information. Upon satisfactory review of documents, PCU shall execute the "PCU Request for Utilities Bond" form and forward it to the appropriate processing entity within the Land Development Division ~~Growth Management Department~~.

Should the Land Development Division ~~Growth Management Department~~ determine the Package to be incomplete or any of the information to be unsatisfactory, a letter shall be sent to the ENGINEER stating the deficiencies. No further processing of the Package shall occur until all unsatisfactory items are satisfactorily addressed by the ENGINEER.

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Development Coordination

December 2010

2.08 BOARD ACCEPTANCE REQUEST PACKAGE

Rev December 2012

A. Applicability

This Package is required for all projects with utility systems that are to be accepted by PCU for ownership, operation, and maintenance.

B. Contents

The Board Acceptance Package shall contain the following items, as applicable:

- 1) Original Developer's Letter of Dedication.
- 2) Original Engineer's Certificate of Completion.
- 3) Original Contractor's Certificate of Completion.
- 4) Potable Water System Schedule of Values.
- 5) Wastewater System Schedule of Values.
- 6) Reclaimed Water System Schedule of Values.
- 7) All original executed Polk County Utilities Easement documents that provide for non-platted easements containing portions of the PCU utility system(s). Once reviewed and approved by PCU, and accepted by the COUNTY, these documents shall be recorded by Polk County.
- 8) Completed and executed Request for Utilities Bond Amount Form.
- 9) Warranty Surety, based upon the Engineer's signed and sealed cost estimate.
- 9)10) Any additional information required pursuant to a Developer/Utilities Agreement.
- 10)11) Final Record Drawings that are in accordance with the Section entitled "Project Design Documents and Submittals".

C. Submittal

The ENGINEER shall submit this Package to the Land Development Division.

D. PCU Response

Upon receipt of a complete Board Acceptance Request Package, the Development Review staff shall review the submitted information for completeness and accuracy. Should any of the information be incomplete or unsatisfactory, a letter shall be sent to the ENGINEER stating the deficiencies. No further processing of the Package shall occur until all incomplete and/or unsatisfactory items are satisfactorily addressed by the ENGINEER.

PART 3 PROJECT ACCEPTANCE DOCUMENTATION

3.01 Record Documents

A. General

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1. Three sets of certified, full size, black line prints of the RECORD DRAWINGS signed and sealed by the ENGINEER.
2. A digital version of the certified, hard copy RECORD DRAWING in tagged information file (tif) format OR portable document file (pdf) format.
3. The CONTRACTOR shall be responsible for recording information on the approved PLANS concurrently with construction progress.
4. The ENGINEER shall be responsible for preparing accurate RECORD DRAWINGS in accordance with Section 61G15-30.002(9) F.A.C. which presently requires the following minimum information be included if the ENGINEER is relying on information from others:
 - a. A statement that the documents are a compiled representation of the constructed project.
 - b. A listing of the sources and the basis of the information used in the preparation of the documents.
 - c. A statement that the documents are believed to be correct to the best of the ENGINEER's knowledge and that the accuracy of the information cannot be guaranteed.
5. RECORD DRAWINGS shall be legibly marked to record actual construction.
6. RECORD DRAWINGS shall show location of all underground and above ground water, wastewater and reclaimed water piping and related appurtenances, based upon record survey information. All above ground piping and surface utility features such as valves, hydrants, blow-offs, manholes, cleanouts, etc. ~~final piping locations including horizontal and vertical locations of pipe and appurtenances~~ shall be clearly shown and referenced to a minimum of two permanent surface improvements and/or surveyed road centerlines points.
7. RECORD DRAWINGS shall identify actual installed pipe, valves, fittings, hydrants and other assets. All assets that are different from those shown on the approved PLANS shall be attributed with materials, class, pressure rating, specifications, etc.
8. RECORD DRAWINGS shall clearly show all field changes of dimension and detail including changes made by field order or by change order.
9. RECORD DRAWINGS shall clearly show all details not on original contract drawings but constructed in the field. All equipment and piping relocation shall be clearly shown.
10. RECORD DRAWINGS shall clearly show the actual horizontal locations, distances, and vertical elevations of all utility assets.—~~S~~State plane coordinates shall be utilized for horizontal locations.
11. Dimensions between all manholes, slope of gravity mains, invert and top elevations shall be shown.
12. The RECORD DRAWINGS shall be properly signed and sealed by the ENGINEER. Should information from the CONTRACTOR be utilized by the

CHAPTER 2 DEVELOPMENT COORDINATION

Section 210

Development Coordination

December 2010

Drinking Water Facility into Service” and any required attachments necessary to obtain clearance of the system for service, when applicable.

~~I.~~ Bill of Sale with original signatures.

~~J.I.~~ Originals of all Polk County Utilities Easement and Warranty Deed documents ready for acceptance and recording by the COUNTY, when applicable.

~~K.J.~~ Maintenance, Materials, and Workmanship Warranty document and, ~~or~~ Bond ~~when required~~, with original signatures.

4.03 Acceptance of Improvements

A. Final Acceptance

1. Final acceptance by the COUNTY of a water distribution/transmission system, wastewater collection/transmission system, and/or reclaimed water distribution/transmission system, and the release of the performance bond will be made only after all inspections have been made, all regulatory clearances have been received, and the improvements found to be in accordance with the applicable requirements of this MANUAL, the LAND DEVELOPMENT CODE, and the regulations of FDEP.

B. Maintenance, Materials, and Workmanship Warranty or Bond

1. A PCU approved warranty document shall be executed by the DEVELOPER to warrant the maintenance, materials, and workmanship for all improvements intended to be owned and maintained by PCU for a one calendar year period, commencing on the date of formal acceptance by the COUNTY.

2. ~~When demonstrated by PCU that the DEVELOPER has a history of sub-standard performance in executing any warranty work requested by PCU on any prior accepted projects,~~ A bond payable to PCU shall be posted by the DEVELOPER that is executed by a financial institution authorized to do business in the State of Florida that is satisfactory to PCU. The bond shall be in the amount of 110 percent of the final construction costs of all required water, wastewater, and reclaimed water improvements to be owned and maintained by PCU. Such bond shall guarantee maintenance, materials, and workmanship of all improvements intended to be owned and maintained by PCU for a minimum of a one calendar year period commencing on the date of formal acceptance by the COUNTY. As an alternative to the provision of a surety bond, the DEVELOPER may provide for the deposit of cash in an escrow account at or a letter of credit from a financial institution authorized to do business in the State of Florida in a form acceptable to the COUNTY.

3. PCU shall perform an inspection of all improvements and the RECORD DRAWINGS approximately 30 calendar days prior to the expiration of the any warranty or bond. PCU shall notify the DEVELOPER and ENGINEER in writing of the inspection. The attendance of the DEVELOPER and ENGINEER shall be mandatory. A list of deficiencies shall be developed and transmitted to

CHAPTER 2 DEVELOPMENT COORDINATION

Section 250-C

Request for Utilities Bond

December 2010

Engineer: _____
 Developer: _____
 Project: _____
 PCU Project No.: _____

I, as the DEVELOPER of the above subject project, fully understand and am aware that the following items are the only potable water, reclaimed water, and/or wastewater system components acceptable for bonding for PCU's approval of the subject project for acceptance or plat for recording. I further acknowledge that these requested bond amounts are based on the attached certified itemized construction cost (CICC) breakdown provided by the project's design engineer.

Item Description	Minimum Amount*	Certified Actual Amount
Final Record Drawings of complete project construction	0.25 110 % of Total Project CICC	\$
Potable water distribution system punch list deficiencies	0.5 110 % of Total Potable Water Distribution CICC	\$
Reclaimed water distribution system punch list deficiencies	0.5 110 % of Total Reclaimed Water Distribution CICC	\$
Wastewater collection/transmission system punch list deficiencies	0.5 110 % of Total Wastewater Collection/Trans. CICC	\$
Lift station punch list deficiencies	2.0 110 % of Total Lift Station CICC	\$
Total Amount of Utilities Bond		\$

* The minimum acceptable bond amount for each item shall be the actual amount for the uncompleted portion of work as based on the CICC or the specified minimum percentage, whichever is higher.

 Developer's Signature Date Development Coordinator's Signature Date

The proposed Bond has been reviewed and approved by:

 Utilities Engineering Manager's Signature Date

CHAPTER 2 DEVELOPMENT COORDINATION

Section 250-D Developer's Letter of Dedication & Statement of Warranty

December 2010

Project: _____
PCU Project No.: _____

I, as the DEVELOPER of the above subject project, hereby dedicate to PCU all applicable water, wastewater, and/or reclaimed water systems constructed as part of, and in conjunction with the subject project for ownership, operation, and maintenance responsibility. Further, I certify that all bills relative to this project have been paid, and there are no liens or other encumbrances against the project.

All construction, materials, and workmanship are warranted for one (1) calendar year from the date of acceptance by the Board of County Commissioners.

~~All Record Drawing information is hereby warranted perpetually.~~

Developer's Signature Date Developer's Firm Name

Developer's Typed Name Telephone Number Fax Number

Developer's Mailing Address Developer's Physical Address

CHAPTER 2

DEVELOPMENT COORDINATION

Section 250-F

Contractor's Letter of Certification

December 2010

Project: _____

PCU Project No.: _____

I, as the CONTRACTOR for the above subject project, hereby certify to PCU that the water _____, wastewater _____, and/or reclaimed water _____ system (*check all that apply*) constructed as part of, and in conjunction with the above subject project are completed and in conformance with the Construction Plans approved by PCU, and State of Florida construction permit conditions. These utility systems are complete, functional, ready to be placed into operation to provide service to the public, and ready for County acceptance for PCU to take ownership, operation, and maintenance responsibility.

The Record Drawings accurately reflect all utility system information, to include: each and every water, wastewater, and reclaimed water service, tap, clean-out, valve, fire hydrant, fitting, casing, and pipe referenced either from at least two fixed and easily found reference points (e.g., property corners, manhole lids, valve lids, etc.) or by the use of stations and offsets from the center of wastewater manholes or inline valves, as applicable. Depths, material specifications, and sizes of pipes, valves, and fittings are indicated on the Record Drawings. Lot numbers, street names, locations of easements, property boundaries, etc. are shown on the Record Drawings and are consistent with the approved Recorded Plat. Horizontal dimensions and distances shown are within 0.1 foot accuracy. Vertical dimensions, elevations, and distances are within 0.1 foot accuracy.

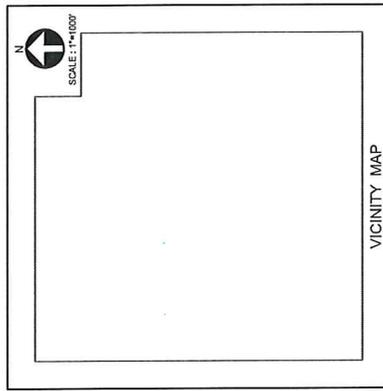
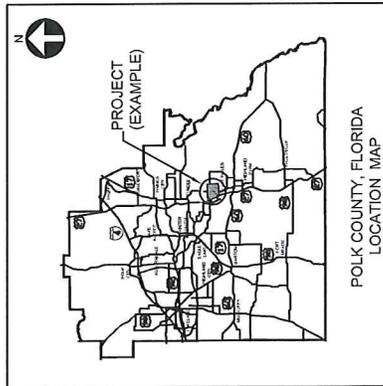
All construction materials and workmanship is warranted for one (1) calendar year from the date of acceptance by the Board of County Commissioners.

~~All Record Drawing information is warranted perpetually.~~

_____ Contractor's Signature	_____ Date	_____ Florida License Number
_____ Contractor's typed Name		_____ Contractor's Firm Name
_____ Contractor's Physical Address		_____ Contractor's Mailing Address
_____ Telephone Number		
_____ Fax Number		

PROJECT NAME
PROJECT NAME

RANGE XX, TOWNSHIP XX, SECTION XX
(ADDRESS, IF APPLICABLE)
PARCEL ID # XXXXXX XXXXXX XXXXXX
PCU PROJECT # XXXX.XXX.XX.XX



DEVELOPER/CONSULTANT
NAME
COMPANY NAME
CITY NAME, STATE NAME, ZIP
PHONE # (XXX) XXX-XXXX
FAX # (XXX) XXX-XXXX
INSURER OF RECORD
CONSULTANT NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
PHONE # (XXX) XXX-XXXX
FAX # (XXX) XXX-XXXX



UTILITIES PROVIDERS LIST

- 1 CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- 2 CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- 3 CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- 4 CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- 5 CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX

DRAWING INDEX
(SHEET NOS. 01 TO XX, NOT AS C-1 TO X-00)

RESERVED FOR
COUNTY APPROVALS

RAIN WATER PERMIT	#	_____
DEF SLOVER PERMIT	#	_____
FLOOD PERMIT	#	_____
FLOOD TRW PERMIT	#	_____
FLOOD UTILITY PERMIT	#	_____
COUNTY SW PERMIT	#	_____
COUNTY A/D/G PERMIT	#	_____
WATER PERMIT	#	_____
SEWER PERMIT	#	_____

- CONSTRUCTION DRAWING
- RECORD DRAWING

ENGINEER _____
LICENSE # _____
PRINT NAME _____
DATE _____
ENGINEER SIGNATURE _____
DATE _____

CALL 48 HOURS BEFORE YOU DIG
IT'S THE LAW!
DIAL 811
SUNSHINE STATE ONE CALL OF FLORIDA, INC.

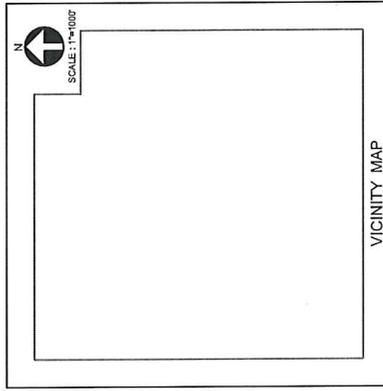
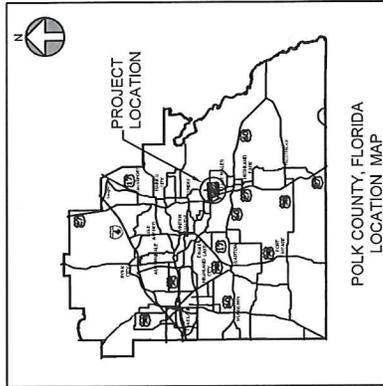
PROJECT NAME
PROJECT NAME

POLK COUNTY UTILITIES, FLORIDA

UTILITIES COMMUNITY INVESTMENT PROJECT

PROJECT NAME
PROJECT NAME

RANGE XX, TOWNSHIP XX, SECTION XX
(ADDRESS, IF APPLICABLE)
PARCEL ID # XXXXXX XXXXX XXXXX
PCU PROJECT # XXXX.XXX.XX.XX
ORACLE PROJECT # XXXXXXXX



UTILITIES PROVIDERS LIST

- CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- CONTACT NAME
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CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX
- CONTACT NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
(XXX) XXX-XXXX

BOARD OF COUNTY COMMISSIONERS

- DISTRICT ONE : BOB ENGLISH
- DISTRICT TWO : RANDY WILKINSON
- DISTRICT THREE : JACK MYERS
- DISTRICT FOUR : JEAN REED
- DISTRICT FIVE : SAM JOHNSON

* DISTRICT IN WHICH PROJECT IS LOCATED

COUNTY MANAGER : MICHAEL HERR

UTILITIES DIRECTOR : GARY FRIES, P.E.

PROJECT MANAGER :

NAME
COMPANY NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
PHONE # (XXX) XXX-XXXX
FAX # (XXX) XXX-XXXX

ENGINEER OF RECORD:

CONSULTANT NAME
XXX STREET NAME
CITY NAME, STATE NAME, ZIP
PHONE # (XXX) XXX-XXXX
FAX # (XXX) XXX-XXXX

811
Know what's below,
Call before you dig.
CALL 48 HOURS
BEFORE YOU DIG
IT'S THE LAW!
DIAL 811
SUNSHINE STATE ONE CALL OF FLORIDA, INC.

- CONSTRUCTION DRAWING
- RECORD DRAWING

ENGINEER _____
LICENSE # _____
DATE _____

ENGINEER _____
SIGNATURE _____
DATE _____

PROJECT NAME
PROJECT NAME

**RESERVED FOR
COUNTY APPROVALS**

DEP WATER PERMIT #	_____
DEP SEWER PERMIT #	_____
FOOT PERMIT #	_____
FOOT ROW PERMIT #	_____
FOOT UTILITY PERMIT #	_____
COUNTY ROW PERMIT #	_____
COUNTY BLDG PERMIT #	_____
WFO PERMIT #	_____
APDES PERMIT #	_____

DRAWING INDEX

- COVER
- SURVEY
- GENERAL NOTES
- SHEET
- SHEET

Chapter 3: General Requirements

- **(Section 310):** 2.14 Salvage (eliminate reference to specific items)
- **(Section 313):** 3.03.D: Change “Tracer” to “Locating”, Reword using “Continuity”
- **(Section 314):** 4.02.E Add “Locating”
- **(General Details):** GR-07, 08, 09, 12, 14-1,

CHAPTER 3

GENERAL REQUIREMENTS

Section 310

General Standards and Specifications

December 2010

2.10 SUSPENSION OF WORK DUE TO WEATHER

- A. During inclement weather, all WORK shall be suspended which might be damaged or rendered inferior by such weather conditions. The WORK shall be suitably covered, protected and/or backfilled to protect the WORK and public from damage or injury.

2.11 USE OF CHEMICALS

- A. Chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must indicate approval of either United States Environmental Protection Agency, National Safety Foundation, or United States Department of Agriculture. Use of such chemicals and disposal of residues shall be in strict conformance with label instructions. Material Safety Data Sheets (MSDS) for chemicals used during project construction shall be submitted to PCU for approval and then located within the construction trailer or with the project superintendent throughout the construction period.

2.12 COOPERATION WITH OTHER CONTRACTORS AND FORCES

- A. During construction progress, it may be necessary for other contractors and persons employed by PCU to work in or about the site. The CONTRACTOR shall not impede or interfere with the work of such other contractors and shall cooperate with the other contractor(s) for proper prosecution of the work.

2.13 CLEANING

- A. During Construction:
During construction the CONTRACTOR shall, at all times, keep the construction site and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of PCU, such material, debris, or rubbish constitutes a nuisance or is objectionable.
- B. Final Cleaning:
At the conclusion of the WORK, all tools, temporary structures and materials belonging to the CONTRACTOR shall be promptly taken away. The CONTRACTOR shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

2.14 SALVAGE

- A. Any existing PCU owned equipment or material ~~including but not limited to valves, pipes, fittings, couplings, etc.~~, which is removed or replaced as a result of construction, may be designated as salvage by PCU, and if so, shall be carefully excavated if necessary and delivered to PCU at a location designated by PCU.

CHAPTER 3

GENERAL REQUIREMENTS

Section 313

Installation of Pipe Specifications

December 2010

laid in water.

C. Pipe Laying in Trench:

Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned and re-laid. At times when pipe is laying is not in progress; the open ends of the pipe shall be closed by a means approved by PCU to ensure cleanliness inside the pipe. The color stripe shall be viewed from the top when installed.

D. Locating Wire:

Locating wire, for electronically locating pipe after it is buried, shall be securely attached along the entire length of and installed with the pipe. This is applicable to all sizes and types of pressure mains. The ~~tracing~~-locating wire shall be attached to the pipe with nylon wire ties or by other means approved by PCU, as shown in the STANDARD DRAWINGS. The wire itself shall be 14-gauge single strand solid core copper wire with non-metallic insulation, except that HDPE pipe installed by directional bore shall utilize two insulated 14 gauge ~~tracer~~-locating wires or one single insulated 10 gauge wire specifically designed for directional bored installation. The insulation shall be color coded for the type of pipe being installed. ~~Continuous~~ eContinuity must be maintained in the wire along the entire length of the pipe run. Permanent splices must be made in the length of the wire using waterproof wire connectors approved for underground applications as listed in the Florida Electrical Code. The wire shall extend to the surface and be connected to a test station box at valve locations, as shown in the STANDARD DRAWINGS.

E. Pipe Identification:

All pipes shall be identified in accordance with the STANDARD DRAWINGS.

F. PVC Pipe Installation:

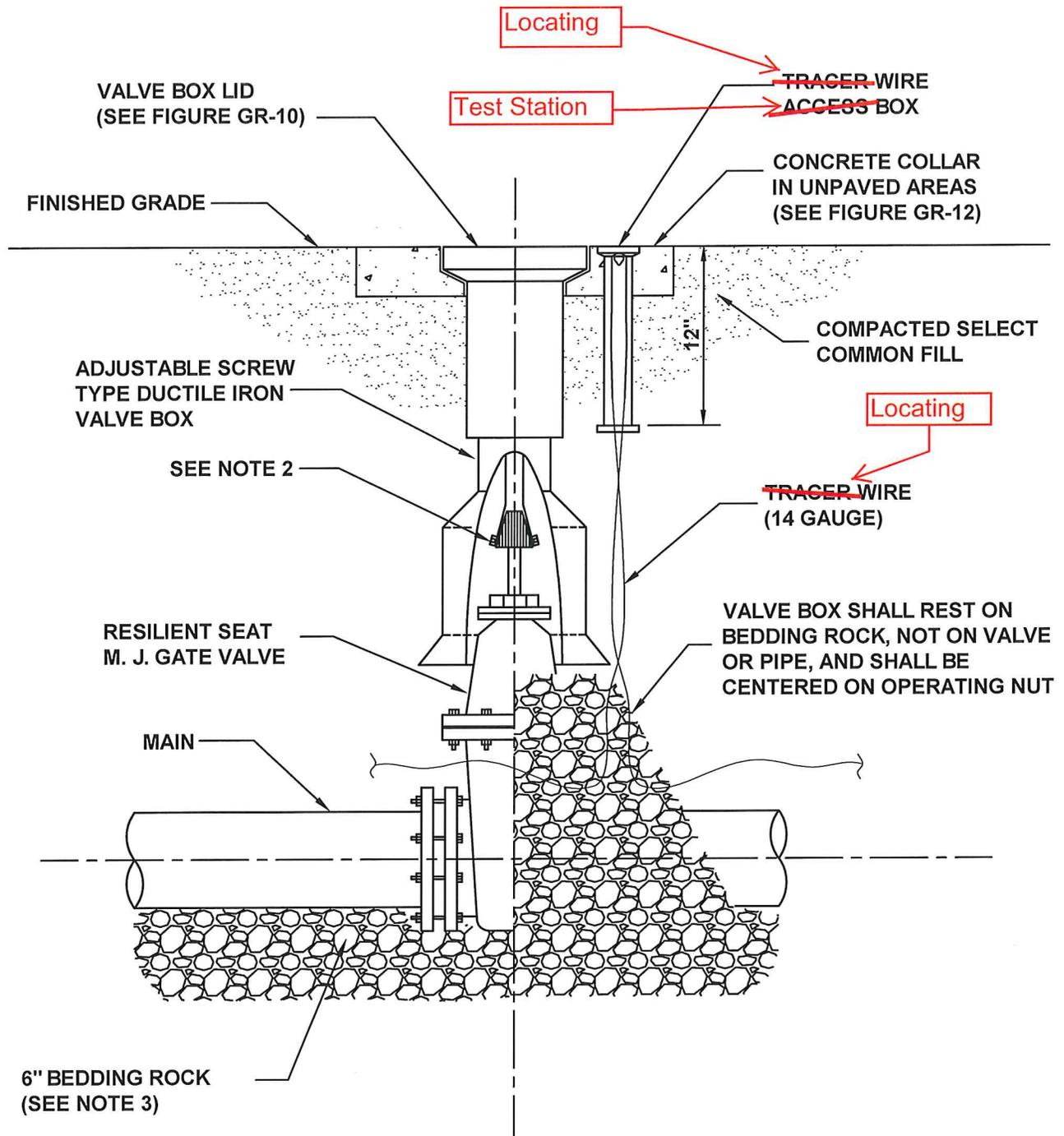
PVC pipe shall be installed in accordance with standards set forth in the UNI-BELL "Handbook of PVC Pipe", AWWA C605, and AWWA Manual M-23. The pipe shall be laid by inserting the spigot end into the bell flush with the insertion line or as recommended by the manufacturer. At no time shall the bell end be allowed to go passed the "insertion line". A gap between the end of the spigot and the adjoining pipe is necessary to allow for expansion and contraction.

G. Ductile Iron Pipe Installation:

Ductile iron pipes shall be installed in accordance with AWWA C600 and AWWA Manual M-42.

H. HDPE pipe installation:

HPDE pipe installation shall follow the methods described in the most recent revision of the "Plastic Pipe Institute Handbook".

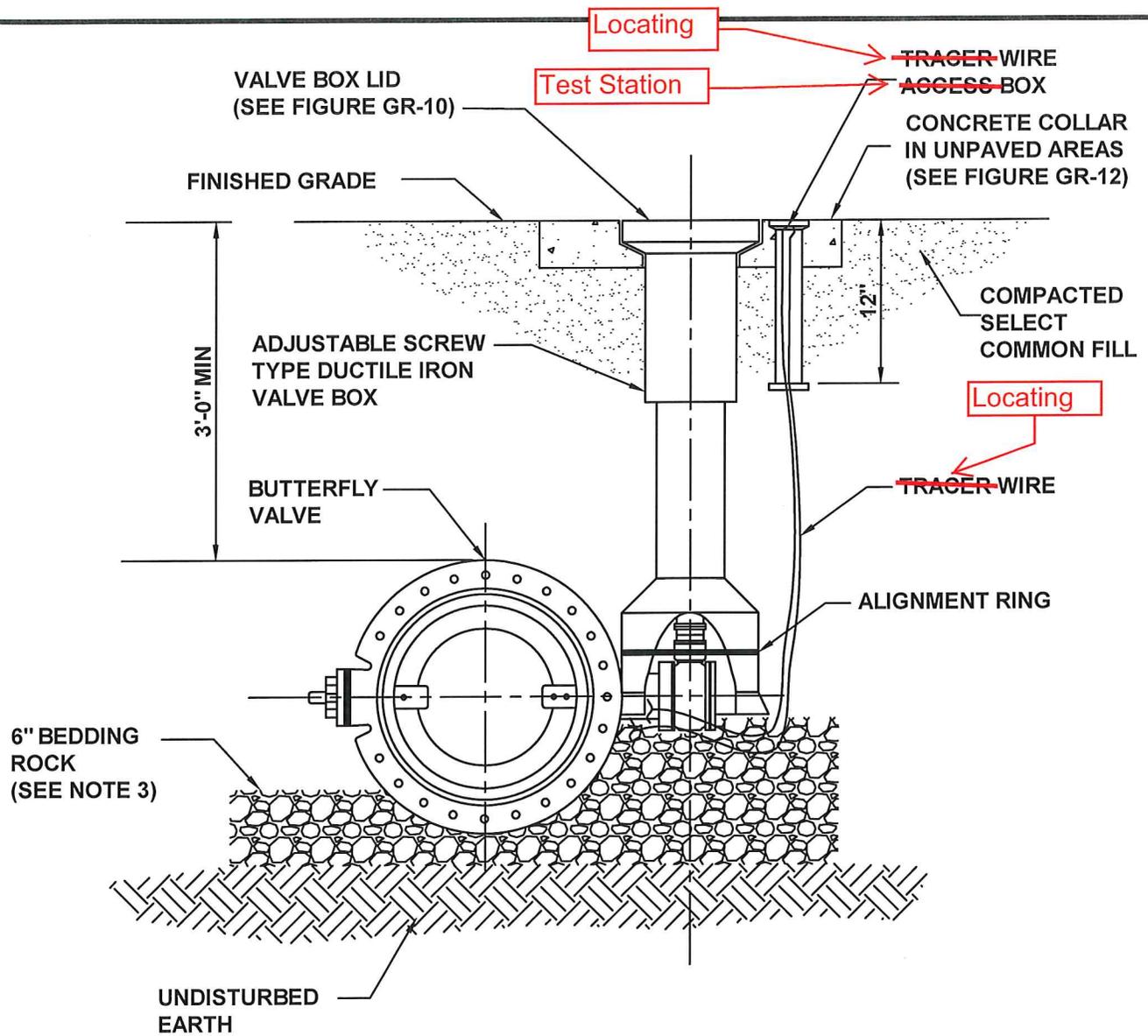


NOTES:

1. PVC PIPE OR DUCTILE IRON PIPE EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION IN PAVED AREAS.
2. THE VALVE ACTUATING NUT SHALL BE EXTENDED TO BE WITHIN 3' OF FINISHED GRADE.
3. BEDDING MATERIAL SHALL CONFORM TO FDOT NO. 57 AGGREGATE.
4. WIRE SHALL TERMINATE AT THE TOP OF THE ~~TRACER WIRE~~ BOX WITH 12" OF COILED EXCESS LENGTH.
5. REFER TO FIGURE GR-11 FOR INSTALLATIONS AT A DEPTH OF 6' OR GREATER.

GATE VALVE AND BOX (SHALLOW)

FIGURE GR-07



NOTES:

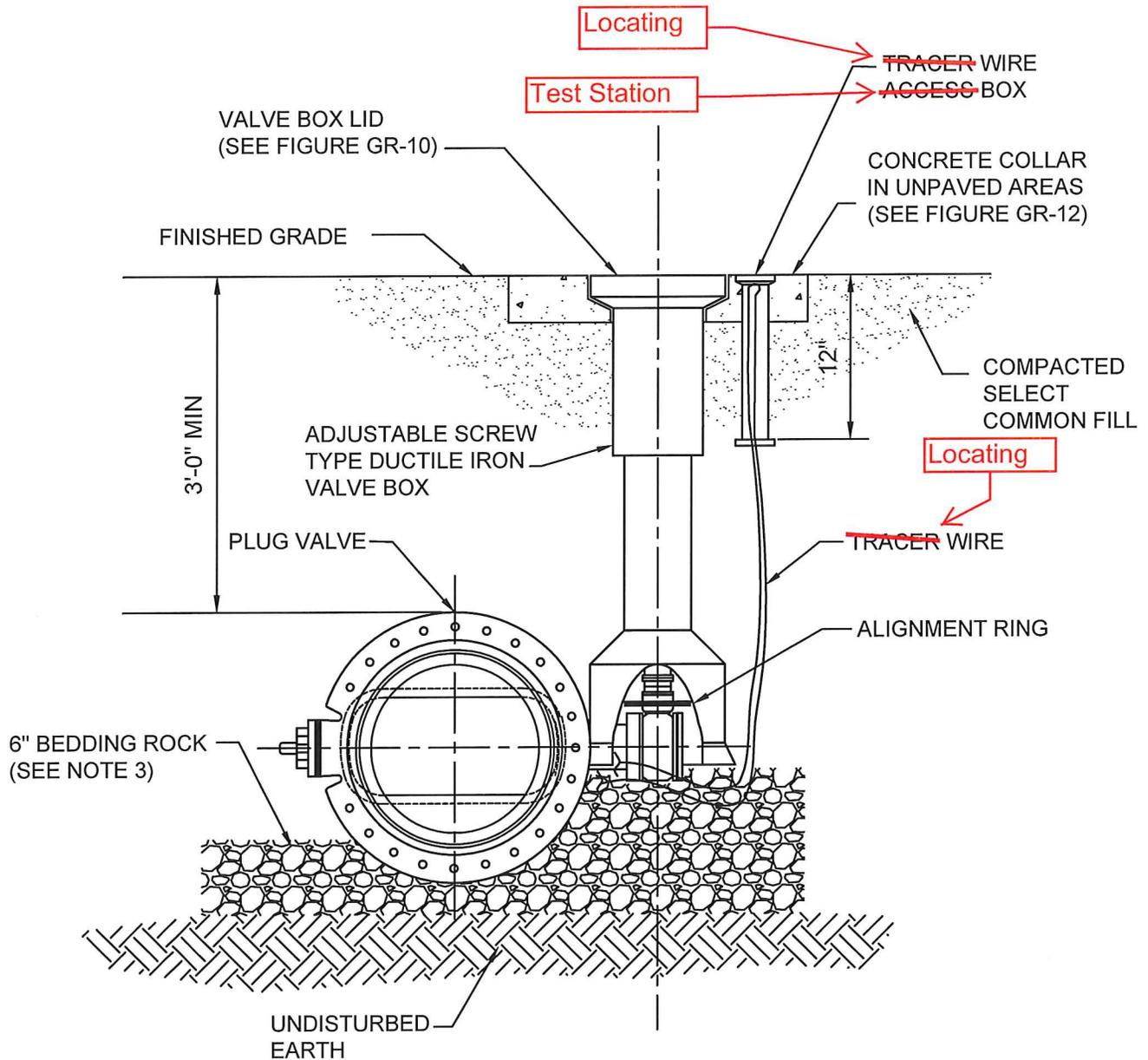
1. PVC PIPE OR DUCTILE IRON PIPE EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION IN PAVED AREAS.
2. THE ACTUATING NUT FOR VALVES SHALL BE EXTENDED TO 3' OF FINISHED GRADE.
3. BEDDING MATERIAL SHALL CONFORM TO FDOT NO. 57 AGGREGATE.
4. WIRE SHALL TERMINATE IN ~~TRACER WIRE ACCESS BOX~~.
5. VALVE BOX SHALL REST ON BEDDING ROCK NOT ON VALVE OR PIPE AND SHALL BE CENTERED ON OPERATING NUT.
6. REFER TO FIGURE GR-11 FOR INSTALLATIONS AT A DEPTH OF 6' OR GREATER.

**BUTTERFLY VALVE AND BOX (SHALLOW)
(FOR STORAGE TANK ISOLATION USE ONLY)**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
GR-08**

DECEMBER, 2010



NOTES:

1. PVC PIPE OR DUCTILE IRON PIPE EXTENSION SHALL NOT BE USED ON VALVE BOX INSTALLATION IN PAVED AREAS.
2. THE VALVE ACTUATING NUT FOR SHALL BE EXTENDED TO BE WITHIN 3' OF FINISHED GRADE.
3. BEDDING MATERIAL SHALL CONFORM TO FDOT NO. 57 AGGREGATE.
4. WIRE SHALL TERMINATE IN ~~TRACER WIRE ACCESS BOX~~.
5. VALVE BOX SHALL REST ON BEDDING ROCK NOT ON VALVE OR PIPE AND SHALL BE CENTERED ON OPERATING NUT.
6. REFER TO FIGURE GR-11 FOR INSTALLATIONS AT A DEPTH OF 6' OR GREATER.

**PLUG VALVE (SHALLOW)
(FOR WASTEWATER TREATMENT FACILITY USE ONLY)**

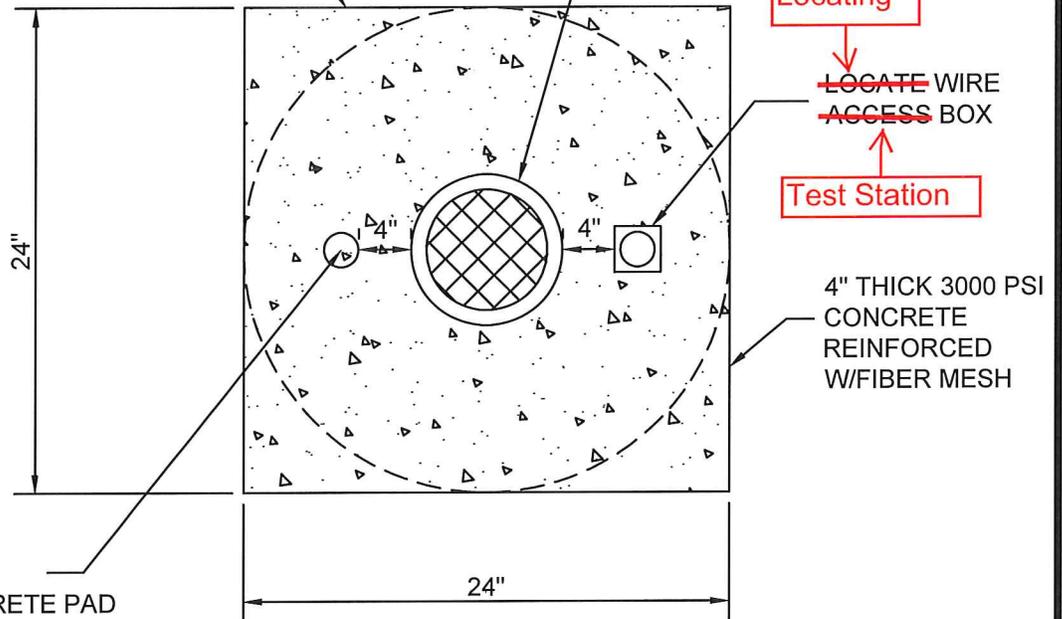
POLK COUNTY UTILITIES, FLORIDA

**FIGURE
GR-09**

DECEMBER, 2010

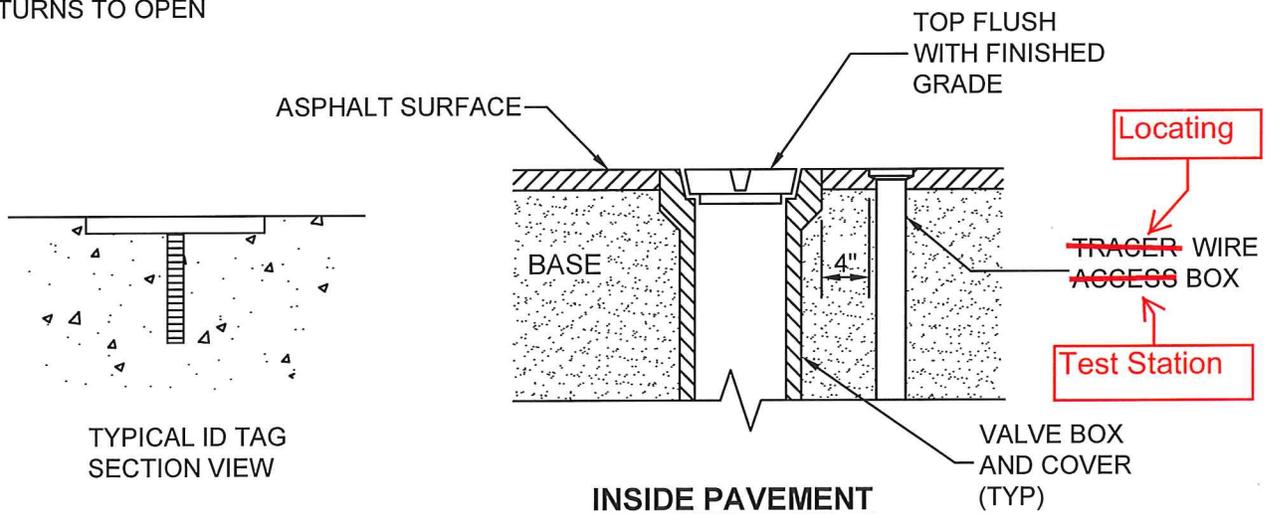
SQUARE (ROUND OPTIONAL)
CONCRETE PAD

VALVE BOX AND COVER
(SEE FIGURE GR-10)



ID TAG :
3" DIA. BRONZE DISC
ANCHORED IN CONCRETE PAD
FOR ALL VALVES 3" AND LARGER
* SIZE OF VALVE
* TYPE OF SERVICE
* DIRECTION & NUMBER OF
TURNS TO OPEN

OUTSIDE PAVEMENT



INSIDE PAVEMENT

NOTES:

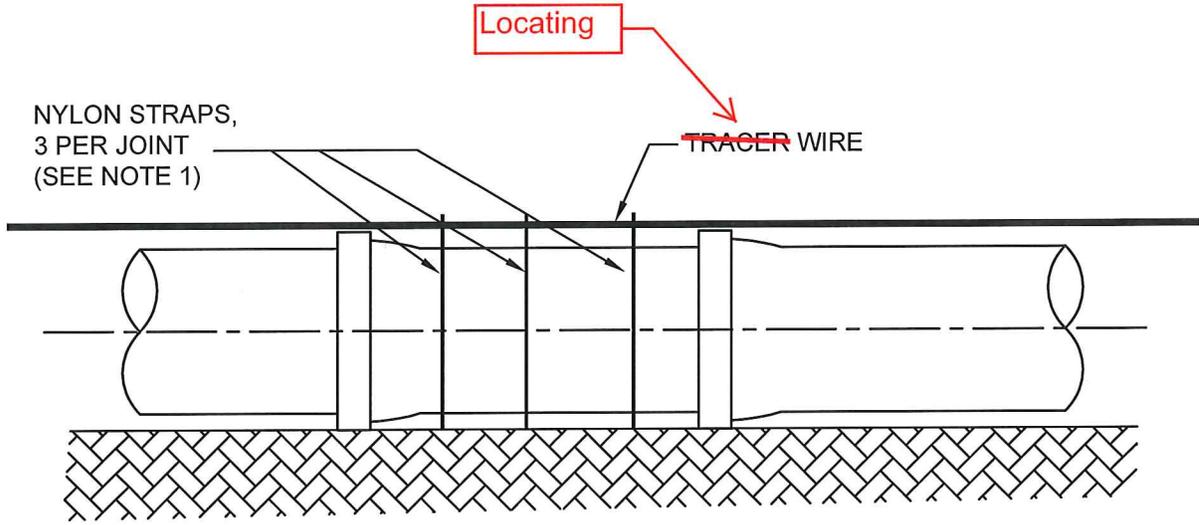
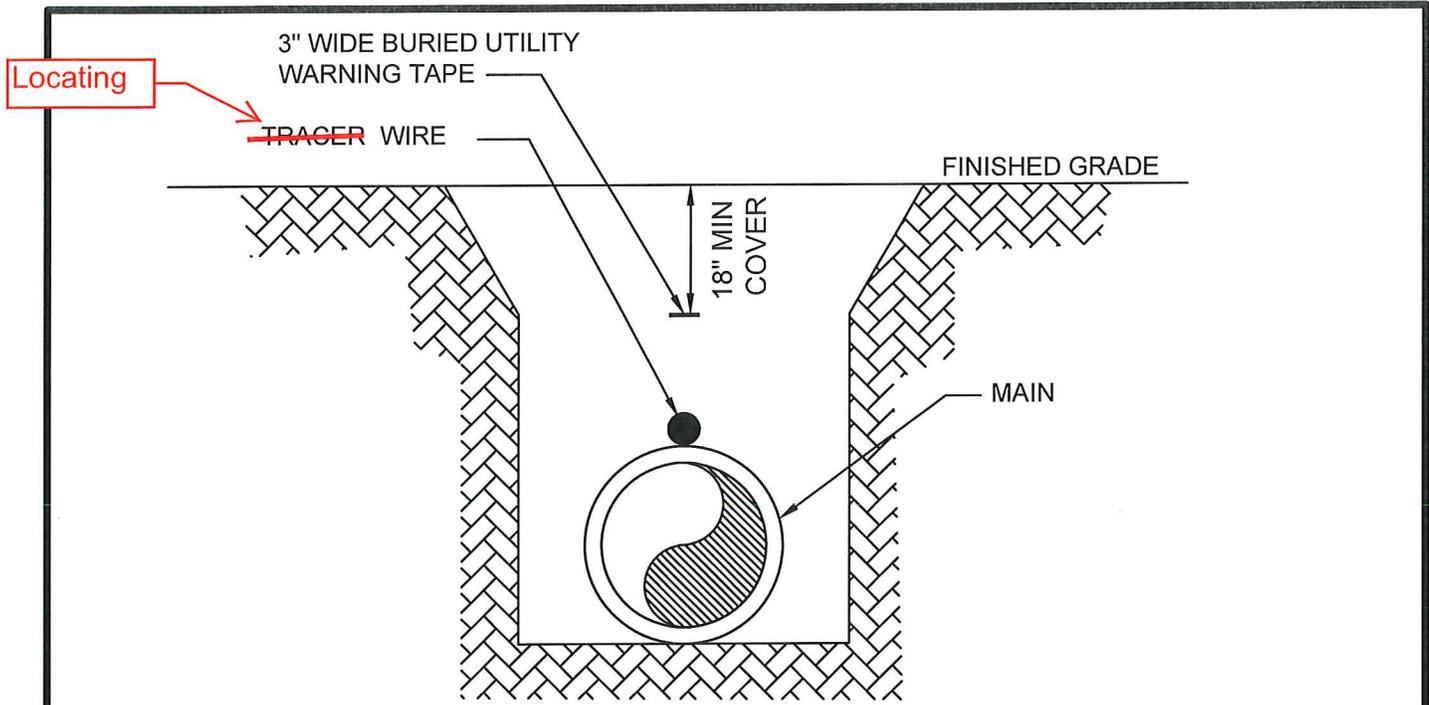
1. BRASS IDENTIFICATION DISC AND VALVE COLLAR SHALL BE REQUIRED FOR ALL VALVES LOCATED OUTSIDE OF PAVEMENT.

VALVE COLLAR

**FIGURE
GR-12**

POLK COUNTY UTILITIES, FLORIDA

DECEMBER, 2010



NOTES:

1. ALL PIPE SHALL REQUIRE INSULATED LOCATING WIRE (14 GAUGE SINGLE STRAND COPPER) CAPABLE OF DETECTION BY A CABLE LOCATOR AND SHALL BE SECURED TO THE TOP AND ON THE CENTERLINE OF THE PIPE WITH NYLON STRAPS THAT ARE SLIPPED ON THE PIPE PRIOR TO THE INSTALLATION OF EACH PIPE SECTION, AND TIGHTENED OVER THE WIRE AFTER INSTALLATION.
2. ~~TRACER WIRE~~ SHALL TERMINATE AS INDICATED BY FIGURES GR-07 AND GR-12.
3. ALL CONNECTIONS SHALL BE MADE USING WATER-PROOF CONNECTORS.

Locating

Locating

PIPE ~~TRACER WIRE~~

FIGURE
GR-14-1

POLK COUNTY UTILITIES, FLORIDA

DECEMBER, 2010

Chapter 4: Potable Water:

- **(Section 412):** Part 3.H: Include reference to key switch and Approved Materials Checklist
- **(Section 450-A)** Testing and Inspection for Acceptance: Strike out first section under 3.01 "TESTS" and prior to "Swabbing", re-number
- **(Section 450-B)** Approved Materials Checklist (Water):
 - Change "Tracer" to "Locating" (Cat 2, Cat 3)
 - Updated meter box specification to reference cast iron reader (Cat 2)
 - Added dual check for potable meters (3/4" and 1") (Cat 2)
- **(Section 450-D)** Approved Meters List: Replace Hersey/compound meters with Ultra Sonic; strainer NOT optional
- **(Potable Water Details):** WA-01-1, 01-2, 03

CHAPTER 4

WATER

Section 412

Potable Water Production Facilities Design Standards

December 2010

PART 1 - GENERAL

- A. This Section shall be applicable to the design of potable water production facilities proposed as part of any development to be constructed in compliance with the LAND DEVELOPMENT CODE, as amended, or as part of the PCU Community Investment Program.
- B. Design, Construction, and Plan Review:
The design and construction of potable water production facilities associated with COUNTY approved developments shall be in compliance with this MANUAL. PLANS will be reviewed and approved by PCU as part of the subdivision or commercial site plan review process as specified by the LAND DEVELOPMENT CODE.
- C. Compliance with Other Regulatory Requirements:
It shall be the responsibility of the DEVELOPER/CONTRACTOR to obtain and comply with all applicable federal, state, and local regulatory permits.
- D. The DEVELOPER shall be financially responsible for any proposed designs that require modification to or may adversely affect any portion of PCU's potable water infrastructure.

PART 2 - DESIGN

- A. The design of the potable water production facility, including the water source and treatment facilities shall be designed for the maximum day demand of the design year, as a minimum. Requirements of the FDEP, LAND DEVELOPMENT CODE, and COMPREHENSIVE PLAN, whichever is more restrictive, shall govern. Consideration shall be given to the design requirements of other federal and state regulatory agencies regarding safety requirements, special designs for the handicapped, plumbing, and electrical codes. No part of the facility shall be constructed below the 100 year flood prone elevation as established by FEMA.
- B. The potable water production facility shall be sited on a square shaped fee simple parcel of land that measures not less than one acre in size and centered around the onsite well(s). Off site wells shall be placed in the center of a square shaped fee simple parcel of land that measures not less than one acre in size.

PART 3 - PLANT LAYOUT

- A. The ENGINEER shall consider the functional aspects of the plant layout, provisions for future plant expansion, provisions for expansion of the plant waste treatment and disposal facilities, access roadways, site grading, site drainage, walkways, driveways, and delivery of chemicals.

CHAPTER 4

WATER

Section 412

Potable Water Production Facilities Design Standards

December 2010

- B. Onsite buildings shall provided with adequate ventilation, adequate lighting, lightning protection system, adequate heating, adequate drainage, accessibility of equipment for operation, serving, and removal, flexibility of operation, operator safety, convenience of operation, and the placement of chemical storage and feed equipment in a separate room to reduce hazards and dust problems. Main electrical control equipment shall be located above grade and above the 100 year flood prone elevation. Adequate facilities shall be included for shop space and storage consistent with the needs of the designed facilities.
- C. All buildings shall be of concrete masonry unit construction with either engineered trusses and coated metal roof systems or hollow core reinforced concrete slab based roofs. All structures shall be painted with colors in accordance with PCU standards, unless otherwise approved by PCU. All exterior doors shall be of steel construction and interior doors shall be of wood or steel construction.
- D. A permanently mounted standby power generator system of sufficient size shall be required so that potable water may be treated and/or pumped to the most distance portion of the distribution system during power outages to meet the average day demand while maintaining a minimum residual pressure of 20 psi.
- E. Adequate monitoring equipment, sample taps, flow meters, and pipe color coding shall be provided.
- F. An operation and maintenance manual including a parts list and parts order form, operator safety procedures, and operational trouble shooting section shall be supplied for any proprietary unit installed in the facility.
- G. Consideration shall be given to the safety of plant personnel and visitors. The design must comply with all applicable safety codes and regulations that may include the Florida Building Code, Uniform Fire Code, National Fire Protection Association Standards, and OSHA standards.
- H. Security measures shall be installed and instituted in accordance with this MANUAL. Appropriate design measures to help ensure the security of water system facilities shall be incorporated. Such measures, as a minimum, shall include heavy duty type locks for exterior doorways, windows, gates, and other entrances to sources, treatment, and water storage facilities, signage, intrusion alarms, motion sensitive flood lighting, and 6 foot high security type fencing topped with 3 strands of barb wire. Facilities secured with electrically operated gates shall include key switches in accordance with the appropriate "Approved Materials Checklist" (See Wastewater Checklist). Other measures may include close circuit monitoring and real time water quality monitoring.
- I. Electrical supply to the facility shall be placed underground onsite of the plant

CHAPTER 4

WATER

Section 412

Potable Water Production Facilities Design Standards

December 2010

property.

- J. Other than pipes, conduits, foundations, and footings, the potable water production facility shall be constructed above ground.
- K. Hydropneumatic tanks shall be made of steel, ASME certified, and no smaller than 15,000 gallons in size.
- L. Lightning protection systems shall be installed and certified in accordance with all applicable sections of UL 96A, "Installation Requirements for Lightning Protection Systems" as published by the Underwriters Laboratories, Inc. A Master Label Certificate of Inspection for Lightning Protection Systems shall be provided to the COUNTY for each such installation.

PART 4 - MATERIALS

- A. All materials used in the construction of a potable water production facility shall be in accordance with this MANUAL.

CHAPTER 4

WATER

Section 450-A

Testing and Inspection for Acceptance

December 2010

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. These specifications cover the testing and inspection for the acceptance of water systems.
- B. Hydrostatic tests shall be conducted for pressure pipes, joints, fittings and valves for allowable limits of pressure and leakage. Air testing of pressure pipes will not be permitted under any circumstance.
- C. Requests for testing and acceptance of water systems shall follow the procedure in listed in the Section entitled "Field Testing and Inspection Procedures".
- D. The purpose of swabbing a new pipeline is to conserve water while thoroughly cleaning the pipeline of all foreign material, sand, grit, gravel, construction debris and other items not found in a properly cleaned system. Prior to pressure testing and chlorinating of a new pipeline swabbing shall be utilized as specified on the construction plans for each project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TESTS

~~A. Pipe cleaning shall be accomplished through a full diameter preliminary flush followed by swabbing (also known as pigging).~~

~~2. The preliminary flush shall have a minimum velocity of 0.5 feet per second velocity throughout the main's full diameter in accordance with AWWA C651 Standard, "Disinfecting Water Mains".~~

~~2.A. Swabbing~~

- ~~a.1.~~ All mains shall be hydraulically cleaned with a polypropylene swabbing device to remove dirt, sand, and debris from main.
- ~~b.2.~~ If swabbing access and egress points are not provided in the design drawings, it will be the responsibility of the CONTRACTOR to provide and remove temporary access and egress points for the cleaning, as required.
- ~~c.3.~~ Passage of cleaning poly swabs through the system shall be constantly monitored, controlled, and all poly swabs entered into the system shall be individually marked and identified so that the exiting of the poly swabs from the system can be confirmed.
- ~~d.4.~~ Cleaning of the system shall be done in conjunction with the initial filling of the system for its hydrostatic test.
- ~~e.5.~~ The line to be cleaned shall only be connected to the existing distribution system at a single connection point.

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CHAPTER 4

WATER

Section 450-A

Testing and Inspection for Acceptance

December 2010

- ~~f~~6. The CONTRACTOR shall locate and open all new in-line valves beyond the point of connection on the pipeline to be cleaned during the swabbing operation.
- ~~g~~7. At the receiver or exit point for the poly swab, the CONTRACTOR is responsible for creating a safe environment for collection of debris, water, and the swab. The CONTRACTOR shall provide for the protection of surrounding personnel and property and the safe retrieval of the swab.
- ~~h~~8. Only PCU personnel shall operate the supply valve from the existing distribution system. Cleaning and flushing shall be accomplished by propelling the swab down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear and swab is retrieved.
 - i)a. Re-apply a series of individual swabs in varying diameters and/or densities as required, to attain proper cleanliness of pipeline.
 - ii)b. Swabbing speed shall range between two and five feet per second. After the swabbing process, pressure testing and disinfection of the pipe shall be completed in accordance with this MANUAL.

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B. Hydrostatic Pressure Testing of Ductile Iron and PVC Pressure Pipe:

Hydrostatic pressure tests shall consist of a pressure test and leakage test for non-butt welded jointed pipes. Hydrostatic tests shall be conducted on all newly laid pressure pipes, joints, and valves including all service lines to the curb stops and fire hydrants assemblies. Testing shall be performed from in-line valve to in-line valve with a depressurized section behind each valve, whenever possible.

- 1) All pipe sections to be pressure tested shall be subjected to a minimum hydrostatic pressure of 150 psi. The duration of each pressure test shall be for a period of two hours. If during the test, the integrity of the tested line is in question, PCU may require a six-hour pressure test. The basic provisions of AWWA C600 shall be applicable.
- 2) All testing and the quantity of acceptable leakage shall be documented and certified using the appropriate Pressure Test Form.
- 3) Water supply from the existing distribution system shall be provided through a jumper connection consisting of fittings, a reduced pressure zone cross connection control assembly, and installed as shown in the STANDARD DRAWINGS.
- 4) Procedure for Pressure Test:

Pipe to be tested shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. Provisions shall be made to expel air entrapped in the pipe before applying the specified test pressure. To accomplish this, taps shall be made, and appropriate valves installed to ensure bleeding of all air from the main. If defective pipes, fittings, valves, or hydrants are discovered in consequence of this pressure test, all such items shall be removed and replaced by the CONTRACTOR with sound material and the test shall be repeated until satisfactory results are obtained. Provisions of AWWA C600 and C651, where applicable, shall apply.

CHAPTER 4
Section 450-B

WATER
Approved Materials Checklist

December 2010

PLEASE TYPE OR PRINT CLEARLY IN BLACK INK

Project Name: _____

PCU Project File Number: _____

Contractor's Name: _____

Contractor's Address: _____

Contractor's Signature: _____

Engineer's Name: _____

Engineer's Address: _____

PCU Reviewer: _____	Date: _____
Approved: _____	Denied/Resubmit: _____
Comments:	

With the submission of this document, the CONTRACTOR understands that the use of the following selected items, as individually indicated by the use of an "X", is mandatory.

Substitutions using other items contained within this Checklist shall be initiated by the CONTRACTOR submitting a revised Checklist to PCU for its review and approval at least 10 calendar days in advance of need.

It is also understood by the CONTRACTOR that PCU shall reject materials and products not in accordance with this document and the MANUAL. Any material or product not contained within this Checklist shall be approved in advance by the Utilities Code Committee in accordance with the provisions of the Utilities Code.

Shop drawings shall be required for all structures and similar items not contained on this checklist, such as manholes, wet wells, and other castings.

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WATER

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	Ford	BA44-444W	
	Mueller	P25146	
	McDonald	6100W-22	

Dual Check Valve (Two Independently Acting Spring-Loaded Check Valves)

	<u>Apollo</u>	<u>4NLF-3C5-5B</u>	<u>For ¾-inch Meter</u>
	<u>Apollo</u>	<u>4NLF-3S6-5B</u>	<u>For 1-inch Meter</u>

Comment [EWP1]: Added per Terry Atkisson

Polyethylene Tubing (Blue With UV Protection [SDR-9] 1-inch And 2-inch Only):

	Endot	PE-4710 EndoPure	
	Endot	PE-4710 EndoTrace	Alternative Pipe and Tracer <u>Locating</u> Wire Combo
	Charter Plastics	PE-4710	
	ARNCO	PE-4710 Perma-Guard	
	ARNCO	PE-4710 Perma-Find	Alternative Pipe and Tracer <u>Locating</u> Wire Combo
	ADS	CTS 200 PSI DR-9	Service Tubing

Service Saddles (Epoxy Or Nylon Coated Ductile Iron Body with Stainless Steel 18-8-Type 304 Straps, CC Threads – 2-inch To Be Iron Pipe Threads Controlled OD Saddles To Be Used On C-900 And IPS OD PVC Pipe, Double Straps To Be 2-inch Minimum Width Each):

	Ford	Series FC202	
	JCM	Series 406	
	Mueller	DR2S, DR2SOD	
	McDonald	3855, 3855	
	Cascade	CNS 1, CNS 2	
	Romac	202N	
	Romac	202N-H	For Use With HDPE Pipe

Y Branch (1-inch By 2-inch):

	Ford	U-48-43	
	Mueller	P15363	
	McDonald	08U2M	

Y Branch Assemblies With Angle Ball Valves (1-inch By 2-inch):

	Ford	UVB43-42W	
	Mueller	P15363-05	
	McDonald	09U2BW	

Meter Boxes w/ ~~Plastic~~ Cast Iron Lids (Black, HDPE):

	Carson Poly Plastie	4015-12 <u>10152026</u> (Box) <u>10151033</u> (Combo)	4015-5 <u>10154018</u> (Lid)
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	DFW Alliance	DFW-1200- 12-Body (Box) DFW-1200- 12-IR-1C (Combo Unit)	DFW-1200- IR-1C-LID (Lid)
--	--------------	--	--------------------------------------

Water Category 3 of 5: PIPE MATERIAL			
ITEM TO BE USED	Manufacturer	Part Number	Comments
Casing Spacers (All Sizes) Stainless Steel With Vinyl Runners:			
	Cascade	Series CCS / CCPS / AZ	
	PSI	Series S-G-2	
	PSI-Ranger	Ranger II	
	RACI	S/T, F/G, P/Q, M/N, E/H	
	CCI	CSS8, CSS12	
	Advanced Systems		
Ductile Iron Pipe Cement Lined (4-inch To 12-inch = PC 350, 16-inch To 20-inch= PC 250, 24-inch = PC 200, 30-inch To 64-inch = PC 150) (DI Flanges As Applicable, AWWA C115):			
	American		
	Clow		
	Griffin		
	McWane		
	US Pipe		
Paint: Aerial Pipe, Fittings, And Valves (Field and Factory Primer):			
	Color Wheel	635 Primer Red	
	Glidden	Alkyd Metal Primer	
	Porter/International	286 U-Primer	
	Tnemec	37H-77 Chem-Primer	
	Tnemec	Pota-Pox Plus N140	
	Wasser	Ferro Clad Primer	
Paint: Finish (Exterior):			
	Color Wheel	600 Alkyd Enamel	
	Glidden	Alkyd Industrial Enamel	
	Porter/International	2749 Alkyd Gloss	
	Tnemec	Tnemec - Gloss 2H	

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	Tnemec	Pota-Pox 100 Series 22	
PVC (Blue) 4-inch Through 12-inch Pipe (AWWA C-900, DR18) and 16-inch and larger pipe (AWWA C-905 or C-909, DR 25):			
	Bristolpipe	4" to 12"	
	Certainteed	Certa-Lok 4" to 12"	
	Diamond Plastic		
	Ipex		
	J-M Manufacturing		
	National Pipe		
	NAPCO		North American Pipe Company
	Upinor ETI 9	Ultra Blue-C-909	
	Underground Solutions	Fusible PVC	<u>For Horizontal Directional Drill Use Only</u>
HDPE Pipe DR11 (Blue Striped):			
	Chevron/Phillips	Performance Pipe / ISCO Pipe	
	CSR	Polypipe/Charter Plastics	
	JM-Eagle		
	National Plastics		
	ARNCO		
Potable Water Main Identification Tape (Blue, 6-Inches Wide, 2-Inch High Black Lettering, Adhesive Backed):			
Buried Potable Water Main Warning Tape (Blue, 3-inches Wide, 1-Inch High Black Lettering, Non-Adhesive Backed):			
Locating Wire (Single Strand 14-Gauge Solid Copper Wire with Blue Colored Insulated Covering):			
	Copperhead	Reinforced Tracer <u>Locating</u> Wire	Alternative
Locating Marker Systems (Potable Water) (Blue In Color):			
	3M	Scotch Mark EMSII Electronic Marker Blue Locator #1265	
	3M	Scotch Marker Electronic Ball Marker #1404	
Curb and Pavement Markers (Blue in Color, Imprinted With The Words "POLK COUNTY UTILITIES" And "CALL 811 BEFORE YOU DIG" With "POTABLE WATER SERVICE" or "POTABLE WATER VALVE" As Applicable):			

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PCU approved meters that are 3/4 inch through 2 inch shall be provided and installed by PCU in accordance with the Utilities Administration Manual. For all other sizes, PCU approved meters shall be selected in accordance with this List, purchased privately, and installed by the CONTRACTOR in accordance with this Manual. All meters, regardless of manufacturer, shall come equipped with Master Meter AMR Registers.

Reclaimed water meters shall be equipped with purple register faces and meter lids, as a minimum.

Fire Service Type ~~Compound~~ Meters that are 4 inch and larger shall be utilized when a development has a combined Domestic and Fire Suppression Water System.

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In general, 2 inch and larger Turbine Type Meters shall not be considered in lieu of similar size Compound Meters without full justification.

Ratio = Equivalent Residential Connection Ratio MCD = Max Continuous Demand

Unless otherwise stated, the Maximum Continuous Demand flow is based on AWWA standards.

NOTE: All strainers shall be designed and manufactured by each meter manufacturer for its specific meter.

METER SIZE	METER TYPE	RECOMMENDED APPLICATION	APPROVED METER
5/8" x 3/4"	Multi-Jet	Small to Medium House, Individual Apartment, and Small Business. Ratio: 1.0 MCD: ≤20 GPM	1) Master Meter BLMJ <u>B13-A31-A01-0101A-1</u>
1"	Multi-Jet	Medium Apartment Bldg., Gas Station, Salon, Small Motel, and Small Business. Ratio: 2.5 MCD: ≤50 GPM	1) Master Meter BLMJ <u>B16-A31-A01-0101A-1</u>
1 1/2"	Multi-Jet	Medium Motel, Medium Hotel,	1) Master Meter IMJ <u>M22-A00-A01-0101A-1</u>

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Large Apartment Bldg.,
 Small to Medium Business,
 and Small Industry.

Ratio: 5.0
 MCD: ≤100 GPM

2" Multi-Jet

Medium to Large Hotel,
 Medium to Large Motel,
 Medium to Large
 Apartment Complex,
 Medium to Large Business,
 and Small to Medium
 Industrial Plant.

1) Master Meter IMJ
M24-A00-A01-0101A-1

Ratio: 8.0
 MCD: ≤160 GPM

2" Turbine

Industrial Plant
 and Irrigation.

1) Master Meter MMT
T31-A1-A02-0101A-1

Ratio: 8.0
 MCD: ≤160 GPM

2" ~~Compound~~
~~(Dual Registers)~~
Ultra Sonic

Medium Hotel,
 Medium Motel,
 School,
 Public Building,
 Large Apartment Complex,
 Large Condo Complex,
 and Hospital.

1) Master Meter ~~DB~~ Octave
O302-E1-A01

Ratio: 8.0
 MCD: ≤160 GPM

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3"	Turbine	Industrial Plant and Irrigation.	1) Master Meter MMT <u>T32-A1-A02-0101A-1</u>
		Ratio: 17.5 MCD: ≤350 GPM	
3"	Compound (Dual Registers) <u>Ultra Sonic</u>	Medium Hotel, Medium Motel, School, Public Building, Large Apartment Complex, Large Condo Complex, and Hospital.	1) Master Meter DB <u>Octave O303-E1-A01</u>
		Ratio: 16.0 MCD: ≤320 GPM	
4"	Turbine	Large Industrial Plant, and Irrigation	1) Master Meter MMT <u>T33-A1-A02-0101A-1</u>
		Ratio: 30.0 MCD: ≤600 GPM	
4"	Compound (Dual Registers) <u>Ultra Sonic</u>	Medium Hotel, Medium Motel, School, Public Building, Large Apartment Complex, Large Condo Complex, and Hospital.	1) Master Meter FSM <u>Octave (Fire Service Meter)</u> 2) Master Meter DB <u>O304-E1-A01</u>
		Ratio: 25.0 MCD: ≤500 GPM	

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6"	Turbine	Large Industrial and Manufacturing Plant, and Irrigation.	1) Master Meter MMT <u>T34-A1-A02-0101A-1</u>
		Ratio: 62.5 MCD: ≤1250 GPM	
6"	Compound (Dual Registers) <u>Ultra Sonic</u>	Medium Hotel, Medium Motel, School, Public Building, Medium to Large Apartment Complex, Large Condo Complex, and Hospital.	1) Master Meter FSM (Fire Service Meter) 2) Master Meter DB-Octave (Strainer) <u>O305-E1-A01</u>
		Ratio: 50.0 MCD: ≤1000 GPM	
8"	Turbine	Industrial and Manufacturing Plant.	1) Master Meter MMT <u>T35-A1-A02-0101A-1</u>
		Ratio: 90.0 MCD: ≤1800 GPM	
8"	Compound (Dual Registers) <u>Ultra Sonic</u>	Medium Hotel, Medium Motel, School, Public Building, Medium to Large Apartment Complex, Large Condo Complex, and Hospital.	1) Hersey Meter MFM-H (Fire Service Meter) 2) Hersey Meter MCT-H (8"x4"x1") <u>Master Meter Octave O306-E1-A01</u>
		Ratio: 80.0 MCD: ≤1600 GPM	

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10"	Turbine	Industrial and Manufacturing Plant	1) Master Meter MMT <u>W36-E1-A02-0101A-1</u>
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Ratio: 145.0
 MCD: ≤2900 GPM

10"	Compound (Dual Registers) <u>Ultra Sonic</u>	Medium to Large Hotel, Medium to Large Motel, School, Public Building, Large Apartment Complex, Large Condo Complex, and Hospital.	1) Hersey Meter MFM-H (Fire Service Meter) (10"x6"x1½") <u>Master Meter Octave (Strainer) O307-E1-A01</u>
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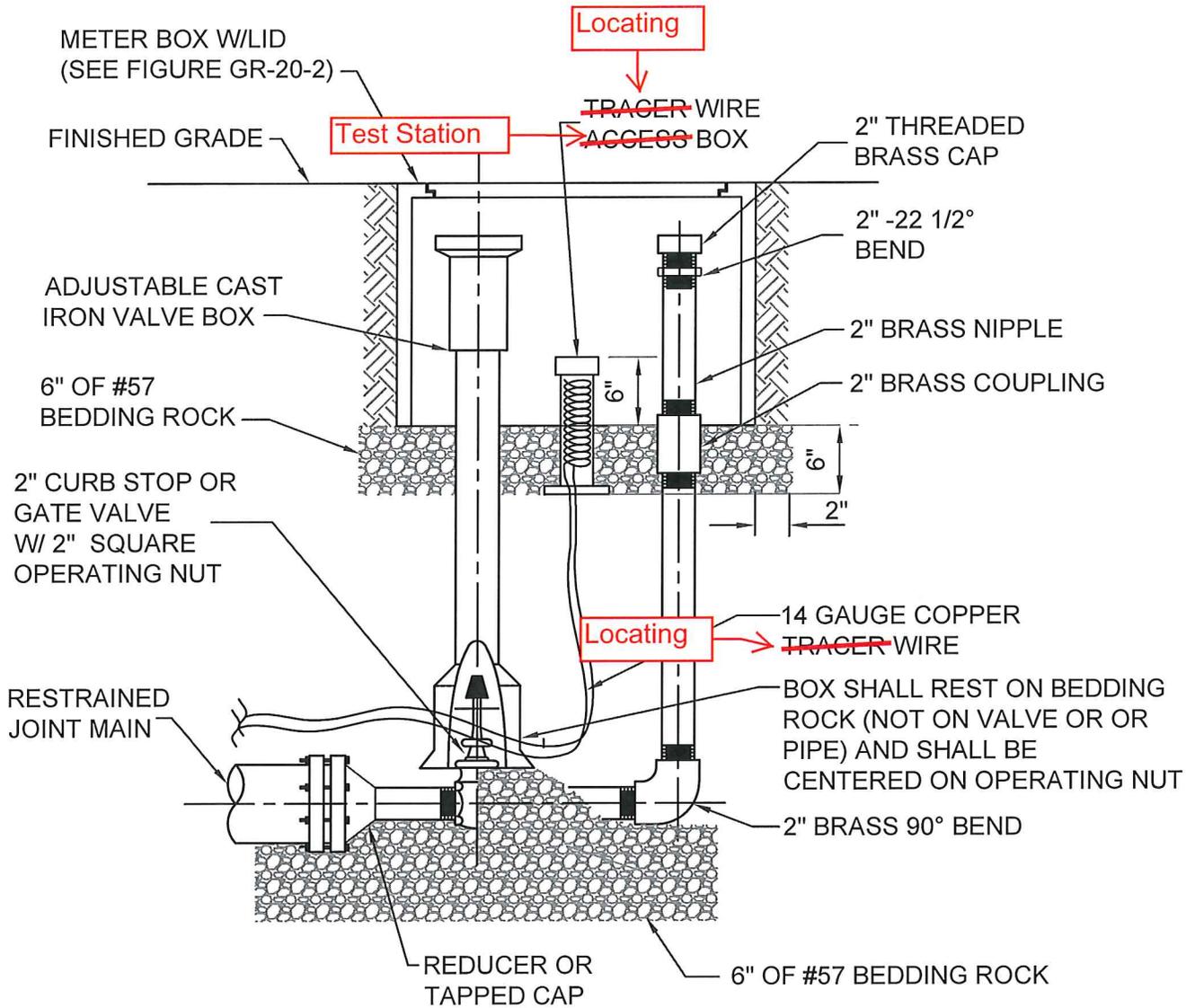
Ratio: 110.0
 MCD: ≤2200 GPM

12"	Turbine	Industrial and Manufacturing Plant.	1) Master Meter MMT <u>W37-E1-A02-0101A-1</u>
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Ratio: 250.0
 MCD: ≤5000 GPM

12"	Compound (Dual Registers) <u>Ultra Sonic</u>	Medium to Large Hotel, Medium to Large Motel, School, Public Building, Large Apartment Complex, Large Condo Complex and Hospital.	1) Hersey Meter MFM-H (Fire Service Meter) (12"x6"x1½") <u>Master Meter Octave (Strainer) O308-E1-A01</u>
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Ratio: 140.0
 MCD: ≤2800 GPM (Calculated)



NOTES:

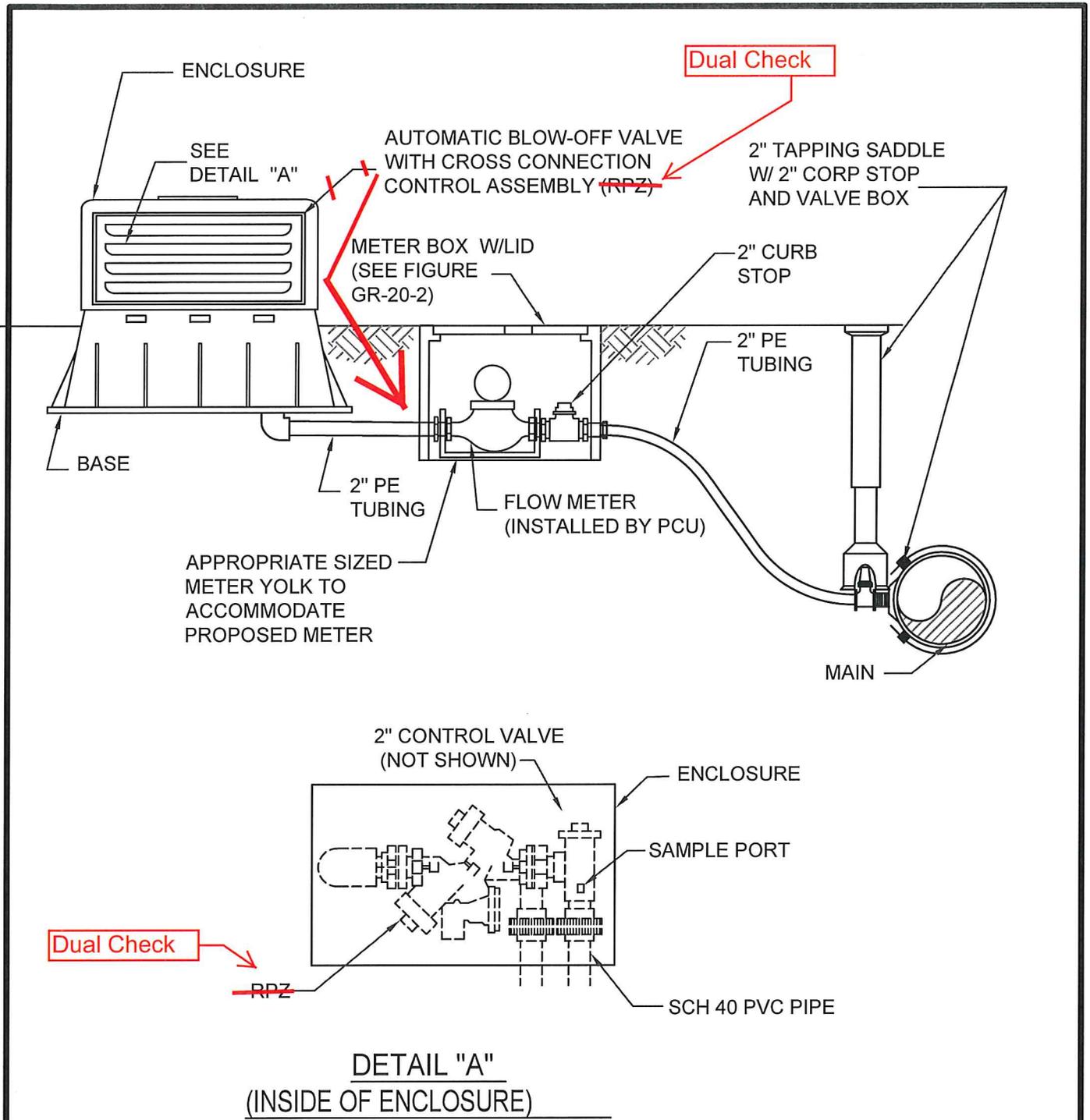
1. ALL 2" PIPE AND FITTINGS SHALL BE THREADED (NPT) BRASS JOINTS.
2. SCHEDULE 40 PVC PIPE AND FITTINGS MAY BE SUBSTITUTED FOR THE BRASS PIPE AND FITTINGS.

**BLOW OFF VALVE
STANDARD**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WA-01-1**

DECEMBER, 2010



NOTES:

1. COLOR OF ENCLOSURE AND BASE SHALL BE :
 - a) POTABLE WATER - BLUE
 - ~~b) RECLAIMED WATER - PURPLE (PANTONE 522C)~~
2. METER BOX SHALL BE IN ACCORDANCE WITH FIGURE GR-20-2.

← 3. No automatic blow off valve will be installed on reclaimed water systems.

**BLOW OFF VALVE (ABOVE GROUND)
AUTOMATIC**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WA-01-2**

DECEMBER, 2010

Chapter 5: Wastewater (Section 510)

- Part 5, B-2, I, K-9: Lining of Drop MHs consistent with Approved Materials
- Part 5, M: Encapsulation edits
- Part 6, C: Service laterals max length = 150'
- **Lift Station Standards (Section 512):**
 - Table 512-2 (SCADA)
 - Part 4 Design E.2.x Buoyancy calcs – soil ring weight shall be 100% of total weight of soil ring... minimum safety of 1.1 shall be achieved.
 - Part 4 Design E.7,8,9,10,12, F, G: (minor) SCADA related corrections/edits
 - Part 5 Construction 5.11 Fence posts: core drill 2x post diameter
 - Part 5 5.12.E Wet Well and Valve Vault (SCADA)
- **(Section 516):** Entire separate file provided due to extensive re-write
- **(Section 517):** Entire separate file provided due to extensive re-write
- **(Section 518):** Part 3.H Include reference to key switch and Approved Materials Checklist
- **(Section 550-A) Testing and Inspection for Acceptance:**
 - Strike out under 3.02 “Rejection of Gravity Mains”
 - Part 5 -- Change “Tracer” to “Locating”
- **(Section 550-C) Approved Materials Checklist (Wastewater):**
 - Change “Tracer” to “Locating” (Cat 2)
 - Add “ALL” for exterior MH coatings; Add “Standard” (MH) to Interior Coatings, and “DROP” (MH) to Lining Systems (Cat 4)
 - Remove Tradeswind from FIXED Generator Suppliers (Cat 5)
 - Remove USF Fab Hatch Net System from Fall Protection System (Cat 5)
 - Add Electric Override Key Switch (Knox) (Cat 5)

- Various SCADA related edits in Category 5, Lift Station Materials and Accessories
 - **(Section 550-K) I/O Listing (SCADA)**
 - **(Wastewater Details):** WW-12-2,3,4, 14-2,3, 18, 20-1,2, 24, 25, 26-1, 27

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Section 510 Gravity Wastewater System Standards and Specifications

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B. Type:

1. Standard Manhole:

Where the difference in elevation between the incoming gravity main invert and the manhole invert is less than 24 inches, the manhole invert shall be filleted to prevent solids deposition.

2. Drop Manhole:

An interior drop pipe shall be provided for wastewater gravity main entering a manhole where the invert elevation is 24 inches or more above the manhole invert. All drop manholes shall be lined or coated in accordance with the appropriate "Approved Materials Checklist".

3. Master Manhole:

All gravity and force mains shall discharge their flows into a master manhole prior to the wet well of a wastewater lift station. Force mains intersecting gravity main systems shall discharge into a master manhole at a maximum angle of 45 degrees to the flow path in the manhole. All master manholes shall be lined or coated and have a minimum interior diameter in accordance with Table 510-3.

C. Personnel Access Opening:

Manhole covers and frames shall provide a 24 inch minimum access clearance through the frame opening.

D. Diameter:

Manholes shall have minimum interior diameters from the structure's base to the bottom of the top conical section as based on the main diameter in accordance with Table 510-3.

Table 510-3. Minimum Manhole Diameters.

Gravity Main Diameter (inches)	Minimum Inside Manhole Diameter (inches)
8 to 24	48 (60 for Master Manholes)
24 to 36	60
36 and larger	72

E. Flow Channel:

The flow channel through manholes shall be made to conform in shape and slope to that of the gravity mains. Flow direction changes in excess of 90 degrees shall not be included in gravity main alignments without written permission from PCU. Flow line elevation drop of 0.1 feet across manholes shall be provided. Benching shall have a minimum downward slope of 1/2 inch per foot from the wall of the manhole towards the rim of the flow channel. No bricks shall be used to construct channels.

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F. Materials:

1. Manholes shall be constructed of precast units as specified in this Section. Brick or cast-in-place manholes may be permitted on a case by case basis for retrofitting or repair purposes as approved by PCU.
2. Wastewater pipes, valves, and appurtenances shall be constructed of materials as specified in the Section entitled "Wastewater Pipes, Valves, and Appurtenances Specifications".

G. Castings:

All manhole frame and cover sets shall be in accordance with the STANDARD DRAWINGS and the appropriate "Approved Materials Checklist." Manholes that have 5 foot and larger inside diameters shall be provided with two piece covers in accordance with the STANDARD DRAWINGS. Bolt down covers shall be provided where manholes are located in areas outside of improved right-of-way and subject to ponding or flooding.

H. Vehicular Access:

A 12-foot wide access road shall be provided for all manholes that are located outside of State, COUNTY, or local roadways. The access road shall have a sub-base that is stabilized to a Florida Bearing value of 75 psi, and a base that is compacted to 98 percent of AASHTO T-180.

I. Coating or Lining:

A special coating or liner shall be provided for master manholes, drop manholes or any manhole that directly receives a discharge from a force main, as a minimum. A liner or coating may be required for other manholes as directed by PCU. All coatings and liners shall be in accordance with the appropriate "Approved Materials Checklist".

J. Manhole Inserts:

All manhole cover and ring assemblies shall be furnished and installed complete with an insert. The purpose of the insert is to prevent intrusion of storm water, dirt, debris, and to help control emission of odors.

The manhole insert shall be manufactured from corrosion-proof material, such as HDPE, polypropylene, or stainless steel, suitable for atmospheres containing hydrogen sulfide and diluted sulfuric acid and other gases associated with wastewater collection systems. The minimum continuous uniform thickness of a polymer based insert, including all angles, shall be 1/8 inch.

The body of the HPDE insert shall be made of high density polyethylene co-polymer material that meets ASTM D1248, Class A, Category 5, Type 111, and have a

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4. Sections shall be cured by an approved method as per ASTM C 478 for at least 28 days prior to coating and shall not be shipped until at least two days after having been coated.
5. Concrete surfaces shall have form oil, curing compounds, dust, dirt and other interfering materials removed by brush sand blasting and shall be fully cured prior to the application of any coatings.
6. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on each pre-cast section after coating on exterior surface.
7. Pre-cast concrete top slabs shall be used where cover over the top of the pipe is less than four feet.
8. Lift rings or non-penetrating lift holes shall be provided for handling pre-cast manhole sections.
9. With the exception of master manholes, drop manholes or manholes that have force mains directly discharging into them, the interior surfaces of all manholes shall have a protective bituminous epoxy coating formulated to resist corrosion from a wastewater environment. The interior surfaces of master manholes, drop manholes, or manholes that have force mains directly discharging into them shall have a protective cementitious or polymer based coating or lining in accordance with the appropriate "Approved Materials Checklist". All exterior surfaces of all manholes shall have a protective bituminous epoxy coating capable of sealing out moisture. Coatings or liners shall be as specified in the appropriate "Approved Materials Checklist" and applied in strict accordance with the coating or liner manufacturer's recommendations. All coatings and liners shall have a minimum of a one year manufacturer's warranty from the date of installation.

L. Liners and Coatings:

1. HDPE Liner:

The light colored HDPE embedment sheeting shall be mechanically bonded to the concrete by integral studs. The liner shall be cast in place by the precast manufacturer and the CONTRACTOR shall field weld the joints. Minimum thickness of liner is 80 mils. All inserts and sleeves for piping shall be in accordance with the liner manufacturer's recommendations and shall result in complete coverage of all pre-cast sections and be capable of passing a spark test.

2. Coatings:

Coatings shall be light in color. The receiving surface shall be prepared using a wet or dry sand blasting surface preparation process in accordance with the manufacturer's recommendations. Coatings shall be applied in accordance with the manufacturer's recommendations. All coatings shall be selected in accordance with

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the appropriate “Approved Materials Checklist”.

M. Encapsulation:

1. Where a structure is subject to a high ground water condition, is within the boundaries of a storm water management facility, or is subject to flooding, the cone, grade rings, joints, and iron frame shall be encapsulated with a heat shrink-wrap with a minimum final thickness of 100 mils unless otherwise approved by Polk County. The wrap shall have a cross-linked polyolefin backing coated with a protective heat activated adhesive. The wrap shall effectively bond to the substrate in order to provide corrosion and moisture protection. The PLANS shall specifically identify each structure that is designated to receive encapsulation.

N. Castings:

1. Gray iron castings for manhole frames, covers, adjustment rings and other items shall conform to the ASTM A 48, Class 30B. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects which would impair their strength or otherwise make them unfit for the service intended. The seating surfaces between frames and covers shall be machined to fit true. No plugging or filling will be allowed. Lifting or “pick” holes shall be provided, but shall not penetrate the cover. Casting patterns shall conform to those shown or indicated on the STANDARD DRAWINGS. All manhole frames and covers shall be traffic bearing to meet AASHTO H-20 loadings. Frames shall be suitable for the future addition of a cast iron ring for upward adjustment of top elevation.

O. Precast Concrete Manhole Installation:

1. Bedding, excavation, and backfill shall be in accordance with the Section entitled “Excavations, Backfill, Compaction, and Grading Specifications”.
2. Placing Pre-Cast Sections:
 - a. The pre-cast base section shall be carefully placed on the prepared bedding so as to be fully and uniformly supported, in true alignment, and ensure that all pipes entering the structure shall be inserted to the proper grade.
 - b. Pre-cast manhole sections shall be handled by lift rings or non-penetrating lift holes. Such holes shall be filled with non-shrink grout after installation of the manhole and coated. Lifting of manhole sections shall be as per manufacturer’s recommendation.
 - c. Sections shall be uniformly supported by the base structure, and shall not bear directly on any of the pipes. Influent and effluent pipes shall be properly installed so as to form an integral watertight unit.

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marked for identification and shall be removed from the job at once. Sections that have been damaged after delivery will be rejected and if already installed, removed and replaced, entirely at the CONTRACTOR's expense.

2. At the time of inspection, the sections will be carefully examined for compliance with the specified ASTM designation and with the approved manufacturer's drawings. Sections shall be inspected for general appearance, dimension, "scratch-strength" blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.
3. Manholes shall be inspected by PCU and defective manholes replaced by the CONTRACTOR. Pressure grouting of manholes for repair shall not be accepted.

PART 6 - SERVICE LATERAL CONNECTIONS

- A. Service connections shall be as shown in the STANDARD DRAWINGS.
- B. Service connections shall be permanently marked by cutting an "S" in the curb in direct alignment with the wye and the installation of a stake at the temporary plug to indicate the location of the service pipe as per the STANDARD DRAWINGS.

C. Size and Length:

Service laterals and fittings shall be a minimum of four inches in diameter for single services and six inches in diameter for double services. Service laterals shall be laid perpendicular to the receiving main, except in cul-de-sacs where service laterals may be connected to an upstream terminal manhole. ~~The use of long service laterals shall not be considered as a substitute for installing or extending a wastewater gravity main that is necessary in order to comply with the above requirement.~~ Service laterals shall not exceed 150 feet. Service laterals shall terminate with a temporary plug at the right-of-way with individual cleanouts installed by the building's plumber in accordance with the STANDARD DRAWINGS.

D. Slope:

Service laterals shall have a minimum slope of one percent.

- E. If a floor slab elevation is lower than the closest manhole top elevation, then a private prefabricated pump station with a check valve (for each occurrence) shall be required to pump wastewater to the lateral at the cleanout in the road right-of-way. The private pump station shall be operated and maintained by the property OWNER.

F. Connection:

Service laterals shall not be directly connected to sanitary manholes, except at terminal manholes. A maximum of three service laterals may be connected directly to a terminal manhole. Incoming flows shall not be more than 90 degrees to the flow path in the manhole.

PART 7 - GREASE TRAPS, INTERCEPTORS, AND SEPARATORS

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4a	Access Gate	swing	swing or sliding	swing or sliding
5	Flow Meters	no	yes	yes
6	Odor Control System	*	*	*
7	SCADA <u>and Control Panel</u>	yes	yes	yes
8	Generator	*	yes	yes
9	A/C MCC	no	no	yes
10	VFD	no	*	*
11	Wet Well / Valve Vault Liner	yes	yes	yes
12	Level Control	float ball and/or transducer	float ball and/or transducer	float ball and/or transducer
13	SCADA Panel	Type 2	Type 3	Type 4
14 13	Automatic Gear Actuator	*	*	*
15	Pump Control Panel	yes	yes	*
16 14	Wet Well Fall Protection System	yes	yes	yes

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NOTE: Please refer below for component explanation.

* In accordance with MANUAL or as determined by PCU for proper system operation.

1. Site Sizing, Tract, and Easement Requirements:

Lift station sites shall be sized as delineated in the STANDARD DRAWINGS for the duplex, triplex, or more than three pumps per the lift station site plans. The DEVELOPER shall dedicate the lift station site and driveway by plat or separate instrument to PCU. Dedicated easements shall be shown as specified on the lift station site plans in the STANDARD DRAWINGS. All temporary access roads shall be improved to accommodate heavy truck traffic and dedicated to PCU, with a minimum 20 foot wide Polk County Utilities Easement that provides for ingress and egress to the lift station.

2. Wet Well Requirements:

a. Single wet well:

- i. The wet well for a duplex lift station shall have a minimum six feet inside diameter. If the design requirements require 35 horsepower pumps or larger for a duplex lift station (less than 1000 gpm), a minimum 10-foot inside diameter wet well shall be required. Sufficient depth shall be provided to accommodate cycle time and motor submergence.
- ii. The wet well for a triplex lift station shall have a minimum 12-foot inside diameter. Sufficient depth shall be provided to accommodate cycle time and

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Rev November 2013
December 2018

motor submergence.

- iii. In determining the cycle time, no consideration of volume shall be used for the volume below the top of the pump or the manufacturer's minimum submergence recommendation, whichever is greater.
 - iv. Pumping levels shall be set to provide a minimum capacity between operational water levels sufficient to allow a minimum of ten minutes in one pumping cycle. The minimum time between successive starts of the same pump shall be ten minutes.
 - v. -For duplex lift stations (less than 1,000 GPM), the effective volume (from pump off elevation to the invert of the gravity pipe) shall be based on a fill time of 30 minutes at Average Daily Flow (ADF). For triplex lift stations, the fill time shall not exceed 10 minutes at ADF. The high liquid level in the wet well (storage capacity) shall not exceed the invert elevation of the lowest inflow pipe. When new development proposes connection to an existing lift station, vertical storage criteria within the wet well shall not be applied to the existing lift station without consideration of other factors including, but not limited to generator installation.
 - vi. Pump-off water levels shall provide adequate submergence to preclude pump inlet cavitations. Design maximum water levels shall not exceed the invert elevation of the influent pipe.
 - vii. The wet well floor shall have a minimum slope of one to one to the hopper bottom. The horizontal area of the hopper bottom shall be no greater than necessary for proper installation and function of the pump inlet.
 - viii. Interior ladders shall not be permitted.
 - ix. Only one inlet connection shall be permitted to a wet well.
 - x. For buoyancy calculations, the soil ring weight (from the outer face of the bottom slab to the outer edge of the wet well) shall be ~~50~~ 100 percent of the total weight of the soil ring. The net density of the soil shall be used for calculating weight, i.e., soil density less the water density (62.4 pounds per cubic foot). A minimum safety factor of 1.1 shall be achieved.
- b. Dual wet wells:
When required, dual wet wells shall be designed with the same criteria as a single wet well; except with master manhole and valving to separate either wet well. The influent slope of the wet well floor shall have a minimum slope one inch per foot to the hopper bottom.
3. Piping in Valve Vault or Above Ground:
Piping shall be installed in a valve vault or above ground with a concrete slab for a duplex lift station. Above ground piping with a concrete slab shall be installed for lift stations with more than two pumps. In general, all lift stations servicing non-residential, industrial, and commercial developments shall utilize above ground piping. The use of above ground piping for duplex lift stations servicing residential

Comment [EWP1]: Previously approved by UCC 5/2/2014

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developments may be permitted if desired by the DEVELOPER.

4. Site Enclosures:

All lift station sites shall be enclosed. Duplex lift stations shall have six-foot high factory applied black vinyl security type chain link fencing with two offset six foot high chain link double swing gates or one single six foot high chain link rolling type gate as specified by PCU. PCU may require that lift stations with more than two pumps have eight-foot high concrete masonry unit perimeter walls and two offset eight-foot high minimum aluminum, double-hung swing gates instead of the required chain link fencing and gates. The use or substitution of chain link fencing slats, vinyl fencing, or wood fencing instead of or in addition to the black vinyl coated chain link fencing shall be prohibited. Three strands of barb wire shall be installed on top of the chain link fencing at the direction of PCU if it is determined to be necessary for site security.

Florida Friendly Landscaping may be permitted along the outside perimeter fencing of the lift station site as long as the center of all trees are no closer than fifteen feet and the center of all other non-tree type plantings are no closer than five feet. Maintenance and irrigation of the landscaping shall be the responsibility of the installing entity and not PCU.

5. Flow Meters:

Indicating, totalizing, and recording flow measurement devices shall be provided at lift stations where required in Table 512-2. Bypass piping around the meter shall be provided for all stations with flow meters to facilitate meter maintenance.

6. Odor Control System:

Provide a complete system for the control of hydrogen sulfide gas and other wastewater odors as required and specified by PCU.

7. SCADA:

a. Control Panel:

Panel shall be of type to match lift station configuration (number of pumps, control features, etc) as determined by PCU. Refer to the Section [517](#) entitled "SCADA RTU and Control Panel Specifications" for additional information.

8. Emergency Generator:

a. Permanent stationary emergency generator sets shall be provided for all lift stations that utilize a 12 inch and larger force main, receive flows from one or more contributing lift stations, that receive flow from a generator equipped tributary lift station, pump more than 1000 gallons per minute, or as required by FDEP.

b. The ENGINEER shall size the generator and fuel tank as required by PCU and submit the name of the manufacturer, burn rate specifications, and sizing calculations to PCU for review and approval. The generator and fuel tank manufacturer shall be as specified in the appropriate "Approved Materials

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Checklist”.

- c. Lift stations shall be provided with manual transfer switches or emergency power receptacles, except for those lift stations with permanent stationary emergency generator sets, as specified in the Section 516 entitled “Wastewater Lift Station Electrical ~~and Control~~ System Specifications”.

9. Air Conditioned Motor Control Center:

When a motor control center is required, a fully enclosed structure of concrete masonry unit construction with a stucco exterior on a concrete slab, prestressed concrete roof slab with built-up roofing, R-4 insulated or greater interior walls, and R-19 insulated suspended ceiling shall be provided. As specifically approved by PCU, low maintenance and long life prefabricated modular structures may be substituted for the above required concrete masonry unit based structures. A high temperature alarm with dry contact shall be provided for connection to the SCADA control panel.

10. Variable Frequency Drive Motors:

Where variable frequency drives (VFDs) are installed, motors shall be rated for inverter duty operation and shall indicate inverter duty rating on the nameplate.

11. Wet Well Liner:

Wet well liner to be provided as specified in the appropriate “Approved Materials Checklist”.

12. Level Control:

Requirements in the Section entitled “Wastewater Lift Station Electrical ~~and Control~~ System Specifications” shall apply.

13. Structural Bearing Design:

- a. All wet wells, valve vaults, and other such buried structure that are not subject to vehicular traffic, including their associated lids and covers, shall be designed utilizing a minimum 300 pound per square foot load bearing design.

- b. All wet wells, valve vaults, and other such buried structures that are subject to vehicular traffic, including their associated lids and covers, shall be designed utilizing a H-20 traffic load bearing design.

F. Electrical Equipment, Power Supply and Power Cords:

Requirements in the Sections entitled “Submersible Wastewater Pump Specifications” and “Wastewater Lift Station Electrical ~~and Control~~ System Specifications” shall apply.

G. Controls:

Requirements in the Sections 516 and 517 entitled “Wastewater Lift Station Electrical ~~and Control~~ System Specifications” and “SCADA and Control Panel Specifications” shall apply.

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~~Lift stations with two and three pumps shall have pump control panels as specified in the Standard Drawings. A terminal enclosure shall be provided to one side of the control panel with conduit seals on either side of the enclosure to isolate the control panel from the atmosphere in the wet well.~~

PART 5 - CONSTRUCTION

5.01 SCOPE OF WORK

- A. This Section applies to the equipment, materials, site work, fences or walls, and appurtenances for the installation of wastewater lift stations.
- B. Shop drawings for all components of a proposed lift station, not addressed in the appropriate "Approved Materials Checklist", shall be submitted to PCU for review and approval prior to construction.
- C. All liners and coatings shall have a minimum of a one year warranty from the date of installation.

5.02 WET WELL

A. Wet Well Liners and Coatings:

1. HDPE Liner:

The light colored HDPE embedment sheeting shall be mechanically bonded to the concrete by integral studs. The liner shall be cast in place by the precast manufacturer and the CONTRACTOR shall field weld the joints. Minimum thickness of liner is 80 mils. All inserts and sleeves for piping shall be in accordance with the liner manufacturer's recommendations and shall result in complete coverage of all pre-cast sections and be capable of passing a spark test.

2. Coatings:

Coatings shall be light in color, applied in accordance with the manufacturer's recommendations using dry sand blasting surface preparations, and in accordance with the appropriate "Approved Materials Checklist".

B. Pre-cast Concrete Sections:

- 1. Pre-cast wet wells shall conform to specifications for ASTM C 478 "Pre-cast Reinforced Concrete Manhole Sections", except as otherwise specified below.
- 2. The minimum wall thickness shall be eight inches. Pre-cast wet-wells shall be constructed with a pre-cast monolithic base structure as shown on the STANDARD DRAWINGS. The minimum base thickness shall be eight inches.
- 3. Concrete shall be Type II, 4000 psi at 28 days. All sections shall have tongue and groove joints except for top slab. All jointing material shall be a cold adhesive

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1. Operating stem shall be 316 stainless steel designed to transmit in compression at least two times the rated output of the operating manual mechanism with a 40-pound effort on the crank or hand-wheel.
 2. The threaded portion of the stem shall have machined cut or rolled threads of the Acme type and shall have a surface finish of 32 microns or less.
 3. When hydraulic, pneumatic or electric operators are used, including portable operators, stem design force shall not be less than 1.25 times the output thrust of the hydraulic or pneumatic cylinder with a pressure equal to the maximum working pressure of the supply, or 1.25 times the output thrust of the electric or hydraulic motor in the stalled condition. Sections of stem assemblies of diameter 1-3/4 inches and larger shall be joined together with solid couplings. The couplings shall be grooved and keyed and shall be of greater strength than the stem.
 4. Gates having widths equal to or greater than two times the height shall be provided with two lifting mechanisms connected by a tandem shaft.
 5. Clear acrylic threaded stem cover with graduated markings to show the position of the gate.
- F. Stem Guides:
1. Stem guides shall be fabricated from type 316L stainless steel and ultra high molecular weight polyethylene (UHMWPE) bushed where required by the manufacturer.
 2. Guides shall be adjustable in two directions and shall be spaced in accordance with manufacturer's recommendation.
 3. Stem guides shall not be located on the threaded portion of the stem.
- G. Thrust Nut:
1. For rising stem arrangement, the thrust nut shall be located at the operator level.

5.11 FENCE INSTALLATION

A. Post Setting:

1. All posts shall be core drilled twice the diameter of the actual post and secured in place by high strength cement into the lift station site's concrete slab to a depth of three feet.
2. After the post has been set, aligned and plumbed, the hole shall be filled with 2,500 psi concrete. The concrete shall be thoroughly worked into the hole so as to leave no voids. The exposed surface of the concrete shall be crowned to shed water.
3. End, corner, pull and gate posts shall be braced to the nearest post with horizontal brace used as a compression member and a galvanized 3/8-inch steel truss rod and truss tightener used as a tension member. Corner posts and corner bracing shall be constructed at all changes of fence alignment of 30 degrees or more. All chain link fences shall be constructed with a top rail and bottom tension wire.

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E. Doors:

Wet well and valve vault frames shall be securely mounted and doors shall open above the pumps. Wet well and valve vault hinges shall not be mounted on the same side as guide rails and ~~float/control ball~~ cable rack.

F. Power Cable:

Each pump power cable shall be supported on a separate 3/8-inch Type 316 stainless steel hook located within six inches of guide rail bracket for each pump. Each pump power cable shall be run as not to restrict removal of pumps.

5.13 CLEANING

- A. All newly constructed wet wells shall be cleaned of any accumulation of silt, debris, or foreign matter of any kind and shall be free from such accumulations at the time of final inspection.

5.14 SLUICE GATE INSTALLATION AND TESTING

- A. The manufacturer shall guarantee the sluice gate, actuator, and appurtenance items for a period of three years covering the equipment and installation from the date of service.
- B. After installation, all gates shall be tested for leakage. Each gate shall be operated through one complete cycle and then closed for testing, zero leakage tight shutoff as detailed in the manufacturer's manual.

5.15 WATER SUPPLY

- A. All wastewater lift stations shall be provided with a water system with adequate capacity and pressure for station wash down and other requirements. The water supply shall be supplied with a water meter and equipped with a PCU approved reduced pressure zone (RPZ) principle cross connection control assembly. The RPZ shall be installed and located inside the fenced area as described in the STANDARD DRAWINGS.

5.16 WET WELL AND VALVE VAULT FALL PROTECTION SYSTEM

- A. A grate based wet well and valve vault fall protection system shall be furnished and installed by the CONTRACTOR. A system shall be installed when the door(s) is fabricated or field installed on existing door(s). The system shall be installed in accordance with the manufacturer's recommendations.
- B. The System shall be:
1. Designed to support a 300 PSF live load.
 2. Highly visible in color.
 3. Capable of locking in the fully open position.
 4. Provided with lift assistance for ease of operation.

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PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies the electrical system requirements for wastewater lift stations. These requirements apply to standard lift stations and also include general requirements applying to stations with Variable Frequency Drives (VFDs) and Motor Control Centers (MCCs). Provide all work necessary for a complete and operational lift station installation.
- B. All work shall be performed in accordance with the current revision of the National Fire Protection Association (NFPA) 70, National Electrical Code (NEC) and OSHA regulations and guidelines. Provide equipment labeled or listed by a nationally recognized testing laboratory or other organization as a basis for approval under the NEC.
- C. Pump Operation shall be controlled automatically by means of hydrostatic pressure transducer level sensors with a float ball backup system for pump control and level alarms. VFD pump operation shall be PID-controlled to maintain a level set point in the wet well. VFD driven pumps shall start and stop based on specific level set points.
- D. Lift station control panel(s) shall be provided for each wastewater lift station. Refer to Section 517, SCADA and Control Panel Specifications for requirements related to lift station control and monitoring and control panel construction and materials.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide products and materials as specified in the appropriate "Approved Materials Checklist" and as specified herein. Provide products of the same or similar type of one manufacturer in order to achieve standardization.
- B. Equipment and devices installed outdoors shall be capable of continuous operation within a minimum ambient temperature range of minus 22 degrees F to 144 degrees F unless noted otherwise.
- C. Provide manufacturer's standard finish except where specific color or finish is indicated.

2.02 POWER SUPPLY AND MAIN DISCONNECT

- A. Coordinate installation of all new and modified power services with the local utility and obtain all required permits.
- B. Power supply to the control panel shall be 240-volt, 3-phase, 4-wire (Delta) or 480-volt, 3-phase, 4-wire (Wye). Service shall be designed for the station full load amperes including the loading of any planned future equipment plus a minimum 50% spare capacity. Single-phase power is not permitted.

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- C. The power supply cables to the control panel from the off-site source shall be installed underground within a minimum 3-inch diameter schedule 80 PVC electrical conduit and in accordance with the NEC.
- D. For systems having a permanently mounted standby generator, refer to Section 516 Part 2.07 “Standby Power Generator System” for generator and transfer switch requirements.
- E. Systems requiring a portable generator connection shall meet the following requirements:
 - 1. Coordinate requirements with control panel supplier to ensure the appropriate transfer mechanisms, breakers, and generator receptacle are provided based on the selection of service entrance equipment.
 - 2. Provide a breaker based UL1008 listed and service entrance rated transfer switch with generator cam-lock connectors to be used as the service entrance equipment and terminate utility feed to this device. Refer to Manual Transfer Switch (MTS) specification for requirements.
 - 3. At the option of the Contractor, a generator receptacle with appropriately interlocked breakers in the control panel and externally mounted breaker-based service entrance rated disconnect switch may be used in lieu of the above transfer switch. A separately mounted service entrance rated breaker type main disconnect shall be provided to terminate utility power outside of the control panel. The service entrance rated breaker type disconnect shall be rated for 100A minimum and be of NEMA 4X construction. A main circuit breaker and generator breaker with mechanical interlock and generator receptacle shall be installed in the control panel for manual switching between utility and generator power. Coordinate all requirements with the control panel supplier.
- F. Manual Transfer Switch:
 - 1. Provide service entrance rated UL 1008 listed manual transfer switch for lift stations requiring portable generator systems.
 - 2. Transfer switch shall be molded case breaker-based with safety interlocked door and interior dead-front panel construction. Transfer switch enclosure shall be NEMA 3R 304 Stainless Steel construction powder coated white.
 - 3. Switches shall be 240V or 480V AC 3-phase, 4-wire based on available site voltage and rated for a minimum of 100A. Provide with color coded cam-lock style connectors as required for the site specific amperage having a minimum 400A rating.
 - 4. Provide local indication of utility power available and utility power status dry contact for connection to the control panel.
 - 5. Manufacturer: ESL Power Systems Stormswitch or approved equal.
- G. On all 480-volt systems, an additional UL listed, NEMA 3R, lockable, non-fused,

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safety type switch utility service disconnect shall be installed ahead of the utility meter in accordance with local utility requirements. The disconnect shall be rated for the maximum available fault current from the utility serving the lift station.

- H. Provide 3-phase surge suppression on the downstream side of the transfer switch to provide surge protection on both utility and generator power. A Surge Protective Device (SPD) shall be included and wired to protect motors and control equipment from induced line surges. All SPD's shall be UL listed and installed in accordance with the respective power company requirements and manufacturer's specifications. SPD's shall be attached to the load side of the main transfer switch and mounted in a separate NEMA 4X enclosure directly attached to the transfer switch enclosure. Where a manual transfer switch is not supplied, SPD's shall be installed downstream of the control panel main and generator breakers and mounted external to the control panel. SPD's shall meet the following minimum requirements:
1. The SPD unit shall be UL listed and labeled as per UL 1449 latest edition and have a UL 1283 listing for active sine wave tracking.
 2. The unit shall meet "Testing Requirements" of IEEE 62.41 and 62.45.
 3. Minimum 10-year replacement warranty.
 4. Provide with Disconnect Only option.
 5. Provide status indicator lights and contact relay output indicating suppressor fault.
 6. Manufacturer:
 - i. Eaton, SPD series.
 - ii. Eaton/Innovative Technology Protector, PTE series.
 - iii. Approved Equal.

2.03 BOXES

- A. Outlet and Device Boxes:
1. General: Outlet and device boxes shall be cast aluminum with a powder coat finish and threaded outlets. The boxes shall be gasketed, weatherproof, and UL listed for wet locations. Provide with matching gasketed weatherproof covers selected for the appropriate application.
 2. All receptacles and switches shall be industrial grade as manufactured by Eaton/Cooper, Hubbell, or Leviton.
 3. For wet location receptacles, provide die-cast powder coated aluminum impact-resistant, single-gang outlet cover with a NEMA 3R rating while in-use.
 4. For wet location switches, provide gasketed powder coated aluminum covers with hinge.
 5. Manufacturers (boxes):
 - i. Crouse-Hinds, Cast Aluminum Weatherproof FS/FD Boxes.

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- ii. Thomas and Betts, Cast Aluminum Weatherproof FS/FD Boxes.
 - iii. Appleton, Cast Aluminum Weatherproof FS/FD Boxes.
- B. Terminal Junction Boxes (Hazardous Locations):
- 1. Terminal junction boxes for hazardous locations shall be provided for all junction boxes having a direct connection to the lift station wet well where there is not an appropriate listed conduit seal-off or air gap in between.
 - 2. Provide an ATEX or equivalently approved Type Ex e Class I Zone 1 terminal junction box having UL Listed NEMA 4X Type 304 stainless steel construction for termination of wet well power and control wiring. Power and control wiring shall be separated by a minimum of 12-inches. Separate power and control wiring junction boxes may be provided. The box shall be provided with corrosion resistant terminal strips to accommodate instrumentation and power conductors from the wet well. Seal conduits entering the junction box from the wet well with duct seal, or equivalent, and provide a minimum Class I Division 2 poured conduit seal between the junction box and control panel.
 - 3. Junction Box: Hoffman Zonex ATEX certified Type 4X, or approved equal.
 - 4. Terminal Block: Eaton XB series, Phoenix Contact UT series, or approved equal Ex e labeled corrosion resistant screw type terminal block.
- C. Terminal Junction Boxes (Non-Hazardous Locations):
- 1. General: Provide terminal junction boxes as required.
 - 2. Terminal junction boxes shall be NEMA 4X Type 304 Stainless Steel with hinged cover and white enamel painted interior mounting panel.
 - 3. Manufacturers:
 - i. Hoffman.
 - ii. Rittal.
 - iii. Schaefer.
- D. Concrete electrical box:
- 1. General: Provide concrete electrical boxes as required for underground electrical circuits.
 - 2. Concrete electrical boxes shall be sized as required, have H/20 loading capacity and shall be reinforced concrete with extension and open bottom with openings in each end for conduit entry. Covers shall be galvanized steel diamond plate with integral handle with appropriate label/markings and locking bolts.
 - 3. Manufacturer: Oldcastle/Christy B series or approved equal.

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2.04 CONDUIT AND FITTINGS

A. Rigid Aluminum Conduit:

1. Provide rigid aluminum conduit above grade and where conduit sealing fittings are used. Provide aluminum sealing fittings to prevent galvanic corrosion and seizing of threaded connections. Use with stainless steel Myers hub for connections to enclosures. Provide PVC-coated conduit or coat aluminum with bitumastic where in contact with concrete.
2. Rigid aluminum conduit shall meet requirements of NEMA C80.5 and UL6A and be of Type 6063 copper-free aluminum alloy.

B. PVC Schedule 80 Conduit:

1. Provide PVC Schedule 80 conduit below grade. PVC conduit may be extended from below to above grade where conduit sealing fittings are not required such as from the wet well to the terminal junction box.
2. PVC Schedule 80 conduit shall meet the requirements of NEMA TC-2 and UL 651 and shall be furnished without factory formed bell.

C. Flexible Metal Liquid-tight Conduit:

1. Provide flexible metal liquid-tight conduit where necessary to provide flexible connections for instrument and equipment connections.
2. Flexible metal liquid-tight conduit shall meet the requirements of UL 360 and be constructed of galvanized steel with an extruded PVC jacket.

D. Fittings:

1. Rigid aluminum fittings shall meet the requirement of UL 514B and be of copper-free construction.
2. PVC fittings shall meet the requirements of NEMA TC-3.
3. Manufacturers:
 - i. Crouse-Hinds.
 - ii. Thomas and Betts.
 - iii. OZ-Gedney.

2.05 ALARM LIGHT, HIGH LEVEL

- A.** A vapor proof and vandal proof screw-on type red alarm light shall be mounted on top of a separate 1½ inch minimum diameter Schedule 40 aluminum riser pole located behind and connected to the bottom of the panel by a 1½ inch minimum diameter water tight flexible electrical conduit. The riser pole shall be secured to the horizontal cross member struts, not the panel, with the bottom of the light being no less than 12 inches but not more than 18 inches above the top of the enclosure.

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- B. Alarm Light Specification:
 - 1. Type: Rotating reflector or flashing bulb.
 - 2. Dome: Polycarbonate.
 - 3. Color: Red.
 - 4. Enclosure: NEMA 4X with ½-inch threaded pipe fitting.
 - 5. UL Listed.
 - 6. Power: 24Vdc.
 - 7. Manufacturer:
 - a. Federal Signal, 225XST.
 - b. Edwards Signaling.
 - c. Approved equal.

2.06 ELECTRICAL EQUIPMENT RACK

- A. The main support beams shall be minimum 6-inch structural aluminum I-Beams or H-Beams with a minimum web thickness of 0.210 inches. Two coats of bitumastic coating shall be applied where aluminum will be in contact with concrete or the ground.
- B. Horizontal cross member struts shall be 12-gauge stainless steel U-channels with a minimum nominal dimension of 1-1/2” inch by 1-inch. The ENGINEER shall review the structure’s wind loading requirements and make any size increases to the main support posts as needed. All other electrical equipment support brackets and hardware shall be 316-stainless steel. Hardware shall include, as a minimum, brackets, nuts, bolts, washers, toggle bolts, clamps, straps, etc.
- C. An outdoor rated weatherproof GFCI receptacle, UL listed for wet locations, shall be mounted on the electrical equipment rack with NEMA 3R while-in-use aluminum cover. The receptacle shall be fed from a dedicated circuit.

2.07 STANDBY POWER GENERATOR SYSTEM

- A. General:
 - 1. A stationary standby power generator system including the diesel engine generator and automatic transfer switch shall be installed at lift stations, as required by Section 512 entitled “Wastewater Lift Station Standards and Specifications”.
 - 2. The generator shall be sized to carry the full lift station load with all pumps operating. Operating voltage shall match of the lift station utility source.
 - 3. Generator configuration shall be diesel engine in a weatherproof sound attenuated enclosure with a diesel fuel tank(s) and separately mounted automatic transfer switch.

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4. Manufacturers:
 - i. Caterpillar
 - ii. Cummins
 - iii. Kohler
- B. Generator Set:
 1. Generator Set shall be a UL 2200 listed package.
 2. The generator set shall consist of a diesel engine directly coupled to an electric generator, together with the necessary controls and accessories to provide continuous electric power to the lift station for a minimum duration of 48-hour failure of the normal power supply. The main fuel tank shall have at least 133 percent of the amount of fuel required for the class rating (Class 48), as defined in NFPA 110. The generator set shall be sized to operate continually for the minimum run time of 48 hours under a full load condition.
 3. A complete engine generator system shall be furnished and installed with fuel transfer pump, fuel tank, day tank with rupture basin (where required), battery, battery charger, muffler, radiator, control panel, remotely mounted automatic transfer switch, and all other accessories required for an operational system. All materials and parts of the generator set shall be new and unused. Each component shall be of current manufacture from a firm regularly engaged in the production of such equipment. The set shall be of a standard model in regular production at the manufacturer's place of business.
- C. Requirements:
 1. The emergency generator set and accessories shall be of a type that complies with the latest edition of the NEC and all applicable state and local building codes.
 2. The material and workmanship used in the manufacture of this equipment shall be of the highest quality consistent with the current standards for like equipment, and the equipment shall be manufactured in such a manner so as to conform to the latest applicable IEEE, ANSI, ISA, and NEMA standards.
- D. Engine:
 1. The engine shall be water-cooled, four-stroke cycle, compression ignition diesel. The engine shall be equipped with a fuel filter with a replaceable spin-on canister, lube oil and intake air filters, lube oil and fuel coolers, a fuel transfer pump, fuel priming pump, and a jacket water cooling system consisting of jacket water pump, fan assembly, fan guard, and duct flange outlet.
 2. The engine and generator shall be torsionally compatible to prevent damage to either engine or generator. An engine instrument panel shall be installed on the generator set in an approved location. The panel shall include oil and fuel pressure and water temperature gauges. A mechanically driven engine hour meter shall also be provided.

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3. The engine governor shall be of the isochronous electronic type. Frequency regulation shall not exceed plus/minus 0.25 percent under steady state conditions. The engine shall start and assume its rated load within 10 seconds, including transfer time.

E. Generator:

1. The generator shall be a three-phase, 60-hertz, single bearing, synchronous type, built to NEMA Standards. Epoxy impregnated Class F insulation shall be used on the stator and the rotor.
2. The excitation system shall employ a generator-mounted volt per hertz type regulator. Voltage regulation shall be plus/minus two percent from no load to full load. Readily accessible voltage drop, voltage level and voltage gain controls shall be provided. Voltage level adjustment shall be a minimum of plus/minus five percent.

F. Engine Generator Control Panel:

Control panel shall be mounted inside generator enclosure. Panel shall contain, but not be limited to, the following equipment:

1. Control Equipment:

Control equipment shall consist of all necessary exciter control equipment, generator voltage regulators, voltage-adjusting rheostat, and speed control equipment and automatic starting controls, as required to satisfactorily control the engine/generator set. In addition an automatic safety shut down shall be provided for low oil pressure and/or high temperature conditions in the engine. An emergency shut down lever switch shall be provided on the air intake. Provide the following I/O for interface with the control panel PLC:

- a) System Not in Auto.
- b) Engine ON.
- c) Engine Fault.
- d) Engine Control Panel Fault.
- e) Low Battery.
- f) Low-Oil Pressure.
- g) Low-Coolant Temperature.
- h) High-Coolant Temperature.
- i) Over Crank Fault.
- j) Over Speed.

2. Metering Equipment:

Metering equipment shall include 3-1/2-inch meters (dial or digital type frequency meter, two percent accuracy voltmeter, and ammeter and ammeter-voltmeter phase selector switch). The control panel shall also include the engine water temperature, lube oil pressure and hour meter.

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3. Fault Indicators:

Individual press-to-test fault indicator lights for low oil pressure, high water temperature, low water level, over speed, and over crank shall be provided.

4. Function Switch:

A four-position function switch marked "Auto", "Manual", "Off/Reset", and "Stop" shall be provided.

G. Battery Charger:

The battery charger shall be UL 1236 listed and designed that it shall not be damaged and shall not trip its circuit protective device during engine cranking or it shall be automatically disconnected from battery during cranking period. The charger shall be mounted inside the emergency generator enclosure. The charger shall have a 7-day/24-hour timer control. The charger shall include an ammeter and voltmeter, Power ON pilot light, AC failure relay and light, and a low and high DC voltage alarm and relay.

H. Battery:

The battery shall be lead-acid type with sufficient capacity to provide 90 seconds total cranking time without recharging. The battery shall be adequately rated for the specific generator set. The battery shall be encased in hard rubber or plastic, shall be housed in an acid resistant frame, and shall be furnished with proper cables and connectors, together with rack and standard maintenance accessories.

I. Base Mounting:

A suitable number of spring-type vibration isolators with a noise isolation pad shall be provided to support the set and its liquids. Isolators shall be bolted to concrete generator pad.

J. Electrical Connections:

All connections to the generator set shall be underground.

K. Cooling System:

The generator set shall be equipped with an engine-mounted radiator sized to maintain safe operation at 110 degrees Fahrenheit maximum ambient temperature. A blower type fan shall be used directing the airflow from the engine through the radiator. The motor shall be equipped with a crankcase heater. The entire cooling system shall be filled with 50 percent glycol-water solution.

L. Fuel System:

1. Regulated Tanks - a fuel tank that has a capacity greater than 550 gallons.

Regulated tanks are subject to F.A.C. 62.762 and must have registration submitted and insurance in place. Both registration and monthly visual inspection reports shall be kept on site and readily available for review by the Federal Department of Environmental Protection (FDEP) and/or the Florida Department of Health (DOH). Any tank installation that is greater than 1320 gallons shall have a Spill

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Prevention, Control, and Countermeasure Plan (SPCC) completed by the Engineer of Record prior to installation and registration as per the COUNTY and Title 40 Code of Federal Regulations (CFR), Part 112. Tanks shall have a 1993 sticker and content "diesel" label located in a conspicuous location that can be seen by anyone approaching the tank for inspection or fueling.

2. Non-Regulated Tanks - a fuel tank that has a capacity of less than 550 gallons.
Non-regulated tanks do not require registration or insurance and will be visually inspected quarterly and shall have a 1993, "Less than 550 Gallons" sticker and a content "diesel" label applied to the tank in a conspicuous location that can be seen by anyone approaching the tank for inspection or fueling.
3. All fuel tanks that are to be incorporated into a design drawing shall be reviewed and signed off by COUNTY staff prior to 100 percent plans for CIP projects being submitted for review or Level 2 approval for private development projects involving such infrastructure to be dedicated to PCU. Prior to ordering any fuel tank, the following will take place. Five signatures will be collected from the appropriate COUNTY staff that acknowledges a proposed delivery and installation of a fuel tank. Those signatures will come from the offices of Purchasing, PCU, Risk (insurance), Risk (regulatory) and Fleet Management. The PCU Environmental Staff shall be notified thirty (30) days prior to delivery to a COUNTY facility.
4. Fuel Storage Tank:
 - a. All fuel tanks shall be double wall steel or steel and concrete tanks with an interstitial annular space.
 - b. Provide fuel tanks sized as required for 48 hours of continuous runtime.
 - c. Two fuels tanks in series is the maximum allowed at any one facility.
 - d. Fuel tanks requiring a day tank for the generator shall include a rupture basin for the day tank.
 - e. All fuel lines shall be installed above ground with a concrete pad separating the piping from the ground. The piping will be secured to the concrete every five feet to avoid vibration. The pipe shall be black iron with threaded ends. Pipe dope shall be used at all connections. No thread tape shall be used. Underground piping is prohibited for the fuel delivery system.
 - f. All external tanks (non-belly tanks) shall have hurricane tie downs.
 - g. Provide audible alarm when liquid level in tank reaches 90 percent of the capacity.
 - h. Non-regulated tanks may have visual leak detection.
 - i. Regulated tanks shall be equipped with the following fuel monitoring system:
 - a) Fuel tank level control panel for tank gauging, leak sensing, and audible/visual alarm annunciation. Panel shall be NEMA 4X construction.
 - b) Provide 4-20mA output proportional to tank level and dry contact outputs for leak indication, and high-high, low, and low-low levels suitable for connection to SCADA control panel.

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- c) Provide audible alarm for high and low levels and leak detection.
- d) Provide visual indication of tank level.
- e) If two tanks of 500 gallons, or greater, are installed at one site, both tanks shall follow the “regulated” installation procedures, meaning both tanks shall be equipped with the Pneumercator system.
- f) Provide Pneumercator type TMS-1000D console with MP55xS level probe and LS-600 series leak sensor.

5. Paint:

The fuel piping shall be painted red. The spill bucket, handrails, and front of stair tread shall be painted yellow. Vent pipes and all other appurtenances shall be painted black.

6. Fueling:

No fuel will be delivered to any tank prior to pressure testing and inspection by COUNTY staff. This includes but is not limited to testing of the generator. Fuel for testing and the first delivery to fill the tanks shall be at the CONTRACTOR’s expense.

7. Inspection and Testing:

Inspection of the fuel tank and piping shall be completed by a member of the PCU Environmental staff. Inspection by anyone other than a member of the PCU Environmental staff will not relieve the CONTRACTOR or ENGINEER of responsibility or be accepted. Pressure testing of the fuel lines shall be conducted with a member of PCU Environmental staff present. The test will be conducted for two (2) hours at 5 PSI.

8. Violations:

All violations of the rules set forth by the Polk County Environmental Regulatory Committee shall be punishable as set forth by the Florida Department Environmental Protection. Any and all fines charged to the COUNTY as a result of regulatory violations on the part of a contractor will be paid by the contractor. All violations incurred by the CONTRACTOR will be reported to the Polk County Purchasing Division.

N. Exhaust System:

1. The generator set supplier shall provide a residential grade critical-type silencer, with flexible exhaust fittings, properly sized and installed, according to the manufacturer’s recommendation. The silencer shall be mounted so that the engine does not support its weight.
2. Exhaust pipe size shall be sufficient to ensure that measured exhaust backpressure does not exceed the maximum limitations specified by the generator set manufacturer. The exhaust system shall be stainless steel and include a flexible, seamless, stainless steel connection between the engine exhaust outlet and the muffler. The exhaust system shall be a part of generator enclosure. A stainless

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steel weatherproof rain cap shall be installed over the exhaust pipe.

O. Weatherproof Enclosure:

1. Enclosure and all other items shall be designed and built by engine manufacturer as an integral part of the entire generator set in accordance with UL 2200 and shall be designed to perform without overheating in the ambient temperature specified.
2. Enclosure shall be constructed of 14 or 16-gauge sheet aluminum suitably reinforced to be vibration free in the operating mode. Enclosure shall have a rating of 75 db at the perimeter of the lift station site. Enclosure hardware shall be stainless steel.
3. Four hinged doors shall be provided to allow complete access without their removal. Doors shall be pad lockable on handles.
4. Each door shall have at least two latch-bearing points.
5. Panels shall be completely and simply removable for major service access. Additional doors in front of the radiator shall be supplied for easy removal of radiator assembly.
6. Enclosure shall be waterproof and the roof shall be peaked to allow drainage of rainwater.
7. Baked enamel finish with primer and finish coat shall be painted before assembly. All fasteners shall be stainless steel.
8. Unit shall have sufficient guards to prevent entrance by small animals.
 - a. Batteries shall be designed to fit inside enclosure and alongside the engine and shall be easily removable for service. Batteries under the generator are not acceptable.
 - b. Unit shall have coolant and oil drains outside the unit to facilitate maintenance. Each drain line shall have a high quality valve located near the fluid source.
 - c. Fuel filter shall be inside the base perimeter and located so spilled fuel cannot fall on hot parts of engine or generator. A cleanable primary fuel strainer shall be used to collect water and sediment between tank and main engine fuel filter.
 - d. Crankcase fumes disposal shall terminate in front of the radiator to prevent oil from collecting on the radiator core and reducing cooling capacity.

P. Automatic Transfer Switch:

1. The automatic transfer switch shall be the product of a single manufacturer and housed in a NEMA 3R Type 304-stainless steel enclosure with drip shield and door gasket. There shall be permanently affixed to the interior side of the enclosure door both a data-plate that includes generator kVA/kW, fuel tank capacity, rated fuel consumption, serial and model number of generator set, and a 10-inch x 12-inch pocket for log sheet storage.
2. The transfer switch shall be provided with the following features:

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- a. Complete protection, close differential voltage sensing relays monitoring all three phases (pick-up set for 95 percent of nominal voltage, dropout set for 85 percent nominal voltage).
 - b. Voltage sensing relay on emergency source (pick-up set for 95 percent of nominal frequency).
 - c. Time delay on engine starting-adjustable from 1 second to 300 seconds (factory set at three second)
 - d. Time delay normal to emergency transfer-adjustable from zero second to 300 seconds (factory set at one second). The CONTRACTOR shall request time delay settings in accordance with the priority rating or their respective loads.
 - e. Time delay emergency to normal transfer-adjustable 30 seconds to 30 minutes (factory set at five minutes), and time delay bypass switch shall be provided on door of the switch cabinet.
 - f. Unload running time delay for emergency engine generator cooling down-adjustable from zero to five minutes (factory set at five minutes) unless the engine generator control panel includes the cool down timer.
 - g. A dual time on neutral position shall be present from emergency power to regular utility power upon generator exercise routine.
 - h. Provisions shall be adequate for monitoring the condition of the generator under the SCADA system. Provide dry contacts for monitoring of the following status signals:
 - a) Switch in Auto.
 - b) Switch in Utility Position.
 - c) Switch in Generator Position.
 - d) Utility Power Available.
 - e) Generator Power Available.
 - f) Fault.
3. Manufacturers:
- a. Emerson/ASCO
 - b. Cummins
 - c. Russelectric
 - d. Eaton/Cutler-Hammer

2.08 INSTRUMENTATION

- A. Provide instrumentation as shown on the PLANS and as required by Section 512 entitled "Wastewater Lift Station Standards and Specifications". Wire all analog instrumentation to the SCADA control panel for local and remote monitoring.
- B. Level Element/Transmitter, Hydrostatic, Wastewater:
 1. General: Measure and transmit signal proportional to water level. Provide cable

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length and level range as required for lift station.

2. Type: Hydrostatic.
 3. Wetted materials may be stainless steel, titanium, Teflon, or Kynar.
 4. Provide with sintered metal filter or desiccant vent to prevent water intrusion into the vent tube.
 5. Loop-powered 4-20mA transmitter with integral lightning protection.
 6. Provide with all necessary installation materials. Provide strain relief cord for cable hanging.
 7. The element/transmitter shall be specifically designed for wastewater application.
 8. Manufacturer:
 - a. Endress and Hauser, Waterpilot FMX 21 with 42mm heavy duty construction.
 - b. Keller America, Level Rat.
 - c. Blue Ribbon, BC001 Birdcage type.
- C. Large Float Level Switches:
1. General: Actuate contact at set liquid level.
 2. Type: Teflon coated stainless steel float with mercury switch.
 3. 6.5-inch maximum actuation differential.
 4. Provide switches with stainless steel mounting cable kit including 15-pound anchor and stainless steel cable clamps.
 5. Manufacturer:
 - a. Anchor Scientific, Roto-Float.
 - b. Siemens, 9G.
 - c. Contegra, FS 96.
- D. Pressure Gauges:
1. General: Pressure indication with range 0 – 60 psi.
 2. Type: Bourdon tube with glycerin fill.
 3. Phenolic case with 4-1/2” diameter dial and glass window.
 4. Connection size: 1/2” lower connection.
 5. Manufacturer:
 - a. Ashcroft, 1279 series.
 - b. Ametek, 1980 series.
 - c. Wika, XSEL series.

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- E. Pressure Transmitter:
 - 1. General: Measure and transmit signal proportional to pressure.
 - 2. Provide with 0-150 psi range.
 - 3. Loop-powered with 4-20mA output with HART.
 - 4. Silicone filled with 1/2" NPT connection.
 - 5. NEMA 4X coated aluminum housing.
 - 6. Provide installation brackets, stand, and block and bleed valves.
 - 7. Manufacturer:
 - a. Rosemount; Model 2051.
 - b. Siemens; Sitrans P.
 - c. Endress and Hauser; Cerebar S.

- F. Electromagnetic Flow Meter and Transmitter:
 - 1. General: Measure, indicate, and transmit the flow of a conductive process liquid in a full pipe.
 - 2. Type: The magnetic flow meter shall be of the low frequency electromagnetic induction type and shall produce a DC-pulsed signal directly proportional and linear to the liquid flow rate..
 - 3. Provide flow range as required with a minimum 10:1 turndown ratio.
 - 4. Features:
 - a. Zero stability feature.
 - b. Empty pipe detection.
 - c. Measure bi-directional flow.
 - 5. Metering Tube: The metering tubes shall be constructed of stainless steel with carbon steel flanges. All magnetic flow meters shall be designed to mount directly in the pipe between ANSI Class 150 flanges and shall consist of a flanged pipe spool piece with laying length of at least 1-1/2 times the meter diameter.
 - 6. Enclosure: NEMA 6P continuous submergence.
 - 7. Liner: Hard rubber or polyurethane.
 - 8. Electrodes: Type 316 Stainless Steel or Hastelloy C.
 - 9. Grounding rings: Provide two (2) type 316 stainless steel, if required.
 - 10. The length of the section of straight pipe before and after the meter shall be a minimum of five (5) times the outside diameter of the pipe or as otherwise recommended by the manufacturer.
 - 11. Transmitter:

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- a. NEMA 4X construction remote mounted.
 - b. Power 120Vac, 60Hz.
 - c. Digital LCD display with configuration menu and keypad.
 - d. 4-20mA output proportional to flow with HART.
 - e. Mount transmitter on separate stand with sunshield and face north.
12. Calibrated in an ISO 9001 or NIST certified factory.
13. Manufacturer:
- a. Foxboro; 9100A with IMT25.
 - b. Siemens; Sitrans F M Mag 5100 W with F M MAG 5000.
 - c. ABB; WaterMaster.
- G. Outdoor Instrument Surge Suppression:
1. General: Provide surge suppression for all 2, 3, and 4-wire instrumentation. Ground surge suppressor in accordance with manufacturer's instructions.
 2. NEMA 4X enclosure.
 3. UL 1449 Listed.
 4. LED indication where available.
 5. Manufacturers: Phoenix Contact, Weidmuller, Emerson/Edco.

2.09 ELECTRICAL GROUNDING SYSTEM

- A. Lift stations shall be grounded in accordance with the NEC and IEEE 142-2007, Recommended Practice for Grounding for Industrial and Commercial Power Systems. All grounding systems shall be tested by the 3-point fall of potential test in accordance with ANSI/IEEE Standard 81, or approved equivalent testing. Documentation shall include all test apparatus information and results in both tabular and graphical formats, where applicable.
- B. General: Provide 5/8-inch diameter copper clad steel ground rods 10-feet in length.
- a. Provide ground rods around the concrete wet well pad perimeter at all four corners. Provide additional ground rods as required to ensure ground rods have a separation of approximately 20-feet.
 - b. Provide ground rod box for most accessible ground rod to allow for access for testing purposes. Ground rod box shall be Christy No. G5, Lightning and Grounding Systems Inc. I-R series, Alltec Corp. TW-FL8T, or approved equal.
- C. Connectors:
- a. Below grade connectors and connections to reinforcing steel shall be exothermic weld type, Erico Cadweld or Cadweld Exolon.

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- b. All other connectors shall be mechanical type copper alloy as manufactured by Erico, Burndy, or Thomas and Betts.
- D. Conductors:
 - a. Provide grounding ring connecting all system ground rods. Ground ring conductor shall be minimum #2/0 tinned stranded copper. Install ground ring approximately 30 inches below grade and 30 inches away from the wet well.
 - b. Provide #2/0 tinned stranded copper wire to equipment and structures as noted below.
 - c. Provide minimum #6 AWG green XHHW insulated copper stranded ground wire to instrumentation and equipment as noted below.
- E. The following outlines minimum grounding requirements:
 - a. Bond wet well cover to wet well structural steel using #2/0 tinned copper wire.
 - b. Bond metallic valve vault covers to ground system using #2/0 tinned copper ground wire.
 - c. Bond control panel ground bus to grounding system using minimum #6 insulated copper ground.
 - d. Bond generator frame and neutral to grounding system with #2/0 tinned copper ground wire in accordance with the NEC.
 - e. Bond utility system neutral to grounding system with #2/0 tinned copper ground wire in accordance with the NEC.
 - f. Bond metallic enclosures to grounding system with minimum #6 insulated copper ground wire.
 - g. Bond chain link fencing to nearest ground rod using #2/0 tinned copper ground wire.
 - h. Ground all surge suppression and instrumentation in accordance with manufacturer's instructions using minimum #6 insulated copper ground wire.
 - i. Ground electromagnetic flow meter grounding rings with #6 insulated copper ground wire.
 - j. Ground all analog instrumentation shielded cables at one end at the control panel ground bus.
 - k. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.
 - l. Bond all metallic railing, supports, and cable racks with minimum #2/0 tinned copper ground wire.

2.13 VALVE ACTUATORS

- A. The actuators shall be suitable for use on a nominal 460-volt or 220-volt three-phase

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60-hertz power supply and are to incorporate motor, integral reversing starter, local control facilities, and terminals for remote control and indication connections. It shall be possible to carry out the setting of the torque, turns, and configuration of the indication contacts without the necessity to remove any electrical compartment covers.

- B. The electric motor shall be Class F insulated with a time rating of at least 15 minutes at 104 degrees Fahrenheit (40 degrees Celsius) or twice the valve stroking time, whichever is the longer, at an average load of at least 33 percent of maximum valve torque. Electrical and mechanical disconnection of the motor should be possible without draining the lubricant from the actuator gear case. Plugs and sockets are not acceptable as a means of electrical connection for the motor.

C. Motor Protection:

1. Protection shall be provided for the motor as follows:

- a. The motor shall be de-energized in the event of stall when attempting to unseat a jammed valve.
- b. A thermostat to protect against overheating shall sense motor temperature.

D. Gearing:

The actuator gearing shall be totally enclosed in an oil-filled gear case suitable for operation at any angle. All main drive gearing must be of metal construction. Where the actuator operates gate valves or large diameter ball or plug valves, the drive shall incorporate a lost-motion hammer blow feature. For rising spindle valves, the output shaft shall be hollow to accept a rising stem and incorporate thrust bearings of the ball or roller type at the base of the actuator, and the design should be such as to permit the gear case to be opened for inspection or disassembled without releasing the stem thrust or taking the valve out of service. Standard SAE80EP gear oil shall be used to lubricate the gear case.

E. Hand Operation:

1. A hand wheel shall be provided for emergency operation and engaged when the motor is declutched by a lever or similar means. The hand/auto selection lever should be pad lockable in both "hand" and "auto" positions. It should be possible to select hand operation while the actuator is running or start the actuator motor while the hand/auto selection lever is locked in "Hand" without damage to the drive train.
2. The hand wheel drive must be mechanically independent of the motor drive, and any gearing should be such as to permit emergency manual operation in a reasonable time. Clockwise operation of the hand wheel shall give closing movement of the valve unless otherwise stated in the job specification. For safety purposes, it shall be possible to disengage the electric drive with the declutch lever. This disengagement and any subsequent reengagement shall not cause any damage to the valve or operator, even with the motor running.

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- F. Drive Bushing:
1. The actuator shall be furnished with a drive bushing easily detachable for machining to suit the valve stem or gearbox input shaft. Normally, the drive bush shall be positioned in a detachable base of the actuator. Thrust bearings, when housed in a separate thrust base, should be of the sealed-for-life type.
- G. Torque and Turns Limitations:
1. Torque and turns limitation to be adjustable as follows:
 - a. Position setting range: 2.5 to 100,000 turns, with resolution to 7.5 degrees of actuator output. Torque setting: 40 to 100 percent rated torque. Torque sensing must be affected directly electrically or electronically. Extrapolating torque from mechanically measured motor speed is not acceptable due to response time. Torque measurement shall be independent of variations in frequency, voltage, or temperature.
 - b. "Latching" to be provided for the torque sensing system to inhibit torque off during unseating or during starting in mid-travel against high inertia loads.
 - c. The electric circuit diagram of the actuator should not vary with valve type remaining identical regardless of whether the valve is to open or close on torque or position limit. An inexpensive setting tool is required for non-intrusive calibration and interrogation of the actuator. This setting tool will provide speedy interrogation capabilities as well as security in a non-intrusive intrinsically safe watertight casing.
- H. Remote Valve Position and Actuator Status Indication:
1. In the event of a (main) power (supply) loss or failure, the position contacts must continue to be able to supply remote position feedback and maintain interlock capabilities. If batteries are required to maintain contact functionality, then the actuator vendor shall provide a supply sufficient for 30 continuous days of unpowered operation with one complete valve cycle every hour. A backup power source must be provided in the actuator to ensure correct remote indication should the actuator be moved manually when the power supply is interrupted. Four contacts shall be provided which can be selected to indicate any position of the valve with each contact externally selectable as normally open or normally closed. The contacts shall be rated at 5-ampere, 250-VAC, 30-VDC.
 2. At a minimum, the following contact outputs shall be provided for each open/close service valve actuator:
 - a. Open.
 - b. Closed.
 - c. Remote Selected.
 - d. Fault.
 3. At a minimum, the following signals shall be accepted from the control panel for open/close service valve actuator control:

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- a. Open Command.
- b. Close Command.
4. At a minimum, the following status signals shall be provided for each modulating valve actuator:
 - a. Position Feedback, analog 4-20mA.
 - b. Fault, discrete contact.
 - c. Remote, discrete contact.
5. At a minimum, the following signals shall be accepted from the control panel for modulating service valve actuator control:
 - a. Position Command, analog 4-20mA.
- I. Local Position Indication:

The actuator must provide a local display of the position of the valve, even when the power supply is not present. The display shall be able to be rotated in 90-degree increments so as to provide easy viewing regardless of mounting position. The actuator shall include a digital position indicator with a display from fully open to fully closed in one percent increments. Green and red lights corresponding to open (green) and closed (red) positions shall be included on the actuator with both lights on indicating mid-travel position
- J. Integral Starter and Transformer:
 1. The reversing starter, control transformer, and local controls shall be integral with the valve actuator, suitably housed to prevent breathing and condensation buildup. For "On/Off" service, this starter shall be an electromechanical-type suitable for 60 starts per hour and of rating appropriate to motor size. For modulating duty, the starter shall be suitable for up to a maximum of 1,200 starts per hour. The controls supply transformer shall be fed from two of the incoming three phases. It shall have the necessary tapings and be adequately rated to provide power for the following functions:
 - a. 120-VAC energization of the contactor coils;
 - b. 24-VDC output where required for remote controls; and
 - c. Supply for all the internal electrical circuits.
 2. Easily replaceable fuses shall protect the primary and secondary windings.
- K. Integral Push Buttons and Selector:
 1. Integral to the actuator shall be local controls for open, close, and stop, and a local/remote selector switch, pad lockable in any one of the following three positions:
 - a. Local Control Only;
 - b. Off (No Electrical Operation); and
 - c. Remote Control plus Local Stop Only.
 2. It shall be possible to select maintained or non-maintained local control. The

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local controls shall be arranged so that the direction of valve travel can be reversed without the necessity of stopping the actuator.

L. Wiring and Terminals:

1. Internal wiring shall be of tropical grade PVC insulated stranded cable of appropriate size for the control and three- phase power. Each wire shall be clearly identified at each end. The terminals shall be embedded in a terminal block of high tracking resistance compound. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal.
2. The terminal compartment of the actuator shall be provided with a minimum of three threaded cable entries. When required, a fourth cable entry shall be provided. All wiring supplied as part of the actuator to be contained within the main enclosure for physical and environmental protection. External conduit connections between components are not acceptable. Control logic circuit boards and relay boards must be mounted on plastic mounts to comply with double insulated standards. No more than a single primary size fuse shall be provided to minimize the need to remove single covers for replacement. A durable terminal identification card showing plan of terminals shall be provided attached to the inside of the terminal box cover indicating:
 - a. Serial Number;
 - b. External Voltage Values;
 - c. Wiring Diagram Number; and
 - d. Terminal Layout.
3. This must be suitable for the contractor to inscribe cable core identification beside terminal numbers.

M. Enclosure:

1. Actuators shall be O-ring sealed and listed IP68 and NEMA 4X/6 for submergence to 7 meters for 72 hours. Actuators shall have an inner watertight and dustproof O-ring seal between the terminal compartment and the internal electrical elements of the actuator that fully protects the motor and all other internal electrical elements of the actuator from ingress of moisture and dust when the terminal cover is removed on site for cabling. Enclosure protection of NEMA 6, IP68, shall be guaranteed without the need of suitable cable glands. The enclosure shall allow for temporary site storage without the need for an electrical supply connection.
2. All external fasteners shall be stainless steel.
3. Actuators for explosion/hazardous applications shall be certified flameproof for Zones 1 and 2 (Divisions 1 and 2) Group A, B, C, and D gases.

N. Startup Kit: Each actuator shall be supplied with a startup kit comprised of installation instructions, electrical wiring diagrams, and spare cover screws and seals.

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- O. Manufacturer:
 - 1. Auma.
 - 2. Rotork.
 - 3. Beck.

2.14 LED Lighting

- A. Provide LED lighting for each liftstation.
- B. Features:
 - 1. Two Light Engines, 40 LEDs minimum.
 - 2. Color Temperature: 40K.
 - 3. Distribution: Medium of appropriate type.
 - 4. Power: 120Vac.
 - 5. Provide with motion control and photocell. Wire to On/Off/Motion handswitch.
 - 6. Mounting: Pole Mounted. Mount to 140MPH rated light pole or alternatively extend aluminum H-beam to mounting height and mount light to H-beam.
 - 7. Finish, dark bronze to match light pole or natural aluminum to match H-beam.
- C. Manufacturer:
 - 1. Lithonia; DSX1 series.
 - 2. Approved equal.

PART 3 - EXECUTION – TESTING, SERVICE, AND WARRANTY

3.01 GENERAL

- A. All installed work shall comply with NECA installation standards.
- B. Provide arc flash labeling for all electrical enclosures in accordance with the NEC and NFPA 70E.
- C. Face all transmitters and displays north where feasible.
- D. The CONTRACTOR shall provide conduit and wire from all signal instruments to the control panel:
 - a. Analog signals and other DC voltage signals shall be run in a separate conduit from AC voltage wiring to minimize interference.
 - b. Ground all shielded conductor shields at one end only.

3.02 TESTING

- A. Provide lift station startup as specified in the Section 550-B entitled “Testing and Inspection for Acceptance (Lift Stations).”

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- B. The grounding system shall be tested to less than five ohms of resistance. Testing results by a certified testing agency using 3-point fall of potential testing as described by ANSI/IEEE Standard 81, or approved equivalent testing, and documented as described by NETA (International Electrical Testing Association), shall be provided to PCU during lift station startup.
- C. Generator and Transfer Switch Testing:
 - 1. Equipment shall be completely assembled and tested at the factory prior to shipment. Certified copies of the data obtained during these tests shall be submitted to PCU.
 - 2. Final tests shall be conducted at the site, after installation has been completed, in the presence of a PCU representative. The emergency generator manufacturer shall furnish a service representative to operate the engine during the tests, to check all details of the installation and to instruct PCU representatives in proper equipment operation.
 - 3. Field tests shall include operating the diesel generating set for carrying normal lift station loads. A full load bank test shall be required unless otherwise noted by PCU. The CONTRACTOR shall fill the main fuel tank at the completion of the tests to 90 percent of tank capacity.
 - 4. The rating of the generator shall be as required to meet the specifications. The generator rating must be substantiated by the manufacturer's standard published curves. Special ratings shall not be acceptable. The set shall be capable of supplying the specified usable kilowatts for the specified duration, including the power required for the pump start-up, without exceeding its safe operating temperature. The generator shall be sized to run all pumps.
 - 5. Transfer switches shall be tested for proper switching operation with the installed generator or with a PCU supplied portable generator in the case of manual transfer switches and breakers.
- E. Actuator Testing:
 - 1. Actuator testing shall be performance tested and individual test certificates shall be supplied free-of-charge. The test equipment should simulate a typical valve load and the following parameters should be recorded:
 - a. Current at Maximum Torque Setting.
 - b. Torque at Maximum Torque Setting.
 - c. Flash Test Voltage.
 - d. Actuator Output Speed or Operating Time.
 - 2. In addition, the test certificate should record details of specification, such as gear ratios for both manual and automatic drive, closing direction, and wiring diagram code number.

3.03 SERVICE

- A. Generator service:

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1. Warranty and service center for the generator shall be located in Orange, Lake, Polk, Hillsborough, or Osceola Counties and service response shall be within two hours during normal working hours, and provide emergency service 24 hours 7 days a week.
 2. The CONTRACTOR shall submit a written one-year manufacturer's standard service contract for the diesel engine generator and essential support systems, commencing on the date of acceptance of the unit to PCU at the time of acceptance of the unit(s). Contract shall include one preventative maintenance inspection of the installation prior to expiration of the warranty period to assure the safe and dependable operation of the system.
- C. Provide one set of all special tools that are required for the normal operation and maintenance of the engine driven generator unit.

3.04 WARRANTY

A. General:

Equipment installed under this Section shall have a minimum one calendar year warranty against defects in materials and workmanship covering parts and labor from the date of PCU acceptance unless otherwise noted below.

B. Generator:

The generator manufacturer shall provide a 36 calendar month non-prorated certified written warranty cover materials, labor, and workmanship.

C. Generator Batteries:

The generator batteries shall be provided with a 48 calendar month warranty for the replacement of the battery if found to be defective.

D. Actuators shall be warranted for 24 calendar months from date of lift station acceptance.

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PART 1 - GENERAL

1.01 SUMMARY

- A. This section provides minimum requirements for the design and construction of County lift station and reclaim water site control panels and related SCADA system requirements. The purpose of this section is to establish conventions and standards used in the selection of instrumentation, hardware, programming, and configuration of lift station control systems to ensure uniformity across all County lift station SCADA and control systems. The County reserves the right to approve changes based on site specific design requirements to ensure consistency with these standards.
- B. Unless otherwise noted, the latest version of the following standards shall be used for the design and construction of County SCADA and control systems.
1. Institute of Electrical and Electronics Engineers (IEEE).
 - i. Standards as applicable for design and implementation.
 2. International Society of Automation (ISA):
 - i. S5.1, Instrumentation Symbols and Identification.
 - ii. S5.4, Instrument Loop Diagrams.
 - iii. S50.1, Compatibility of Analog Signals for Electronic Industrial Process Instruments.
 - iv. TR20.00.01, Specification Forms for Process Measurement and Control Instruments.
 - v. IEC62443 (ISA-99), Industrial Automation and Control System Security.
 3. National Electrical Manufacturers Association (NEMA).
 - i. Standards as applicable for design and implementation.
 4. National Fire Protection Association (NFPA):
 - i. 70 – National Electrical Code.
 - ii. 70E - Standard for Electrical Safety in the Workplace.
 - iii. 820 – Standard for Fire Protection in Wastewater Treatment and Collection Facilities.
 5. National Institute of Standards and Technology:
 - i. SP-800 series.
 6. Underwriters Laboratory, Inc.
 - i. 508, Standards for Safety, Industrial Control Equipment.
 - ii. 698, Industrial Control Equipment for Use in Hazardous (Classified) Locations.
 - iii. Component specific standards as applicable.
- C. The CONTRACTOR shall provide and install a control panel and integrate this unit into the County SCADA system as described within this Section. Lift station SCADA monitoring and control components shall consist of a Programmable Automation Controller (PAC), local Operator Interface Terminal (OIT), Ethernet-based radio or digital cellular modem, and central Human-Machine Interface (HMI) graphic screens.
- D. At a minimum, the following documents shall be provided for each facility design and construction project:

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1. Piping and Instrumentation Diagrams (P&IDs) or detailed control panel shop drawings containing the following:
 - i. Process piping and valves, as appropriate.
 - ii. Instrumentation.
 - iii. Motors and motor control equipment.
 - iv. All I/O shall be clearly labeled on the P&IDs and/or wiring diagrams noting whether each point is a Discrete or Analog input or output. All termination locations shall be shown. For Fieldbus or Ethernet I/O, appropriate tables shall be used to list minimum I/O exchange requirements.
 - v. Equipment and instrument voltages.
 - vi. Equipment and instrument tag numbers.
 2. Network block diagrams.
 3. Loop specifications and control descriptions outlining all major process control functions and PLC / HMI programming requirements.
 4. Design specifications noting all equipment, workmanship, installation, and testing requirements.
 5. Construction submittals for all components.
 6. As-built construction drawings.
 7. Testing documentation.
- E. SCADA Panel Types:
1. Type 1 Control Panels provide monitoring and control of reclaimed water sites.
 2. Type 2 Control Panels are integrated SCADA RTU and pump control panels providing monitoring, control, and power distribution for lift stations with integrally mounted motor controllers.
 3. Type 3 Control Panels are SCADA RTU control panels providing monitoring and control of lift stations having separately mounted motor controllers.
 4. See Attachment "A" for typical I/O requirements for Type 1, Type 2 and Type 3 Control Panels with constant speed and variable speed motor controllers.
- F. The CONTRACTOR shall integrate lift station monitoring and control into the County's existing central Trihedral VTScada HMI system.

1.02 APPROVED SUPPLIERS

- A. The SCADA and control panel supplier shall be one the following approved suppliers (listed alphabetically):
1. Curry Controls Company
 2. DCR Engineering
 3. Revere Control Systems
 4. Rocha Controls
 5. Unitron Controls

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PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide equipment compatible with the County's existing central SCADA system to ensure proper communications and data transfer. Components listed in this section are based on the latest manufacturer's models and specifications at the time the standard was developed. Provide the manufacturer's equivalent state of the art model at the time of construction for each item specified.
- B. Equipment shall be in conformance with the appropriate "Approved Materials Checklist" found in Section 550-C. Equipment suppliers shall provide a minimum one year system warranty for all control panel components.
- C. Use products of a single manufacturer of the same series device to achieve standardization.
- D. Provide nameplates and service legends for all panels and components and provide stainless steel tags for all field devices.
- E. All components used shall be UL listed or recognized for their intended use and bear the appropriate UL mark.
- F. Number and tag each wire with machine printed heat shrink wire tags. Numbers shall match panel drawings and include field device tag number where applicable.
- G. Grounding:
 1. Ground all devices and instrumentation in accordance with manufacturer's instructions, the National Electrical Code, and IEEE 142-2007 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 2. Furnish separate copper bus bars for signal and shield ground connections.
 3. Furnish and install door grounding kit for enclosures.
 4. Ground all DIN Rail.
 5. Ground surge suppressors with the shortest possible ground conductor length.
 6. Ground bus bars at a single ground point.

2.02 PANEL CONSTRUCTION

- A. This section outlines general panel construction requirements for Type 1, 2, and 3 Control Panels.
- B. Design and fabricate all control panels in accordance with UL 508A and UL 698A as appropriate for the installation. All panels shall bear the UL listing mark for enclosures stating "Listed Enclosed Industrial Control Panel" per UL 508A or UL 698A.
- C. The control panel shall be manufactured using quality workmanship and components, and upon completion shall be completely factory tested using the three phase line voltage source for which the panel is intended. All control and alarm operations shall be performed using external, simulated signals to ensure proper operation.
- D. Control panels shall be designed to be similar to other County control panels designed to the requirements specified herein. The intent of this standard and specification is to provide consistent design and construction of lift station and

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- reclaim water control panels. Components provided and control panel layouts and wiring shall closely match existing County control panels of similar type.
- E. All wiring in panels shall be in duct type wireway or a flexible protective sleeve where a wireway is not practical. All wire shall be terminated to the terminal block. The use of wire nuts or similar connections is prohibited.
 - F. Provide white powder-coated mild steel back panel. All components shall be mounted on the plane of the back panel with backup power and UPS batteries mounted near the bottom of the panel enclosure on a separate shelf with a plug-in wiring harness for easy removal.
 - G. All panel components shall be rated for the maximum expected temperature of the control enclosure including solar heat gains.
 - H. At a minimum, all outdoor panel enclosures shall be NEMA 4X white painted 304 Stainless Steel with a top mounted white painted solar shield. All indoor panel enclosures shall be NEMA 12 painted steel.
 - a. Outdoor enclosures shall be provided with all control interface components, including displays and hand switches accessible from behind the front door of the panel on a dead-front to allow operation without exposure to live circuits of any voltage and to prevent outdoor exposure to these components. All adjustments shall be accommodated from the dead-front of the panel including breaker operation to de-energize the enclosure, individual pumps, and control sections. Aluminum dead-front construction shall be either powder coated black with laser etched tagging or unfinished brushed aluminum with phenolic nameplates.
 - b. Indoor enclosures shall be provided with all control interface components, including displays and hand switches accessible from outside of the front door. Indoor enclosures shall be provided with separately mounted motor control equipment. Dead-front construction is not required for these control panels.
 - c. Size enclosures to adequately house all components with sufficient space to allow for maintenance. All panels shall be provided with the appropriate quantity of corrosion-inhibiting vapor capsules.
 - I. Nameplates: All equipment enclosures, circuit breakers, control switches, indicator pilot lights and other control devices shall be identified with laser etched naming on dead-fronts or permanently affixed legend plates and phenolic-type engraved nameplates.
 - J. Provide outdoor mounted enclosures with breather and drain as manufactured by:
 - a. Hoffman, H2Omit.
 - b. Cooper Crouse-Hinds, ECD Type 4X Drain and Breather.
 - c. Approved equal.
 - K. Lighting: Door switched fluorescent or LED lighting with protective lighting cover.
 - L. Receptacles: DIN Rail mounted as manufactured by Allen-Bradley, Weidmuller, or Phoenix Contact.

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- M. All enclosures shall be equipped with a lockable 3-point latching system that maintains enclosure NEMA rating without the use of clamps.
- N. All exterior hardware and hinges shall be stainless steel.
- O. There shall be permanently affixed to the interior side of the enclosure door both a nameplate and a 10-inch by 12-inch pocket for log sheet storage. The nameplate shall contain the following information: voltage, phase, rated horsepower, rpm, date manufactured, pump and control panel manufacturer's name, pump data, including impeller data, operating point and head, kilowatt input, amperes at the operating point and at least two other points on the pump curve, and pump serial numbers. There shall be a permanently affixed document pocket in the interior side of the exterior enclosure door to include a laminated wiring diagram and bill of materials.
- P. Control panel enclosure manufacturers:
 - a. Hoffman.
 - b. Rittal.
 - c. Schaefer.
- Q. Type 1 and 3 Control Panels without Integral Motor Controllers:
 - a. Type 1 and 3 control panels are powered by 120Vac circuits and do not require panel mounted generator receptacles. Power these control panels from a source having generator backup power.
 - b. Control panels shall include PAC, OIT, communication, and control components only.
 - c. Furnish main circuit breaker for 120Vac power feed and a circuit breaker on each individual 120Vac branch circuit distributed from the power panel. Provide a fused disconnect type terminal block for all 24Vdc power distribution.
 - d. Provide outdoor enclosures with dead-front construction with access to HMI, control switches and indicators from behind the front door.
- R. Type 2 Control Panels with Integral Motor Controllers:
 - a. Control panels shall include both SCADA controls and pump motor controls in the same enclosure with higher voltage pump power distribution and lower voltage SCADA controls fully separated by a full and continuous metal barrier. SCADA control sections and pump power distribution sections shall have separate dead-fronts to allow work on isolated sections of the enclosure.
 - b. Provide enclosures with dead-front construction with access to HMI, control switches and indicators from behind the front door as well as all major breakers for main panel feed, control power, and individual pump breakers.
 - c. Provide multi-lug power distribution block assemblies for parallel tapped 3-phase power distribution.
 - d. Circuit Breakers:
 - i. Main power feed and each pump motor shall be protected by a 3-pole molded case circuit breaker in accordance with the

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- “Approved Materials Checklist”.
- ii. Coordinate required breakers with provision of manual transfer switch to determine if only a main breaker or main and generator breakers with mechanical interlock are required.
 - iii. Provide breakers in accordance with NEMA AB 1.
 - iv. Provide breakers with minimum 22,000-ampere RMS symmetrical rating, minimum at 480 volts, unless otherwise required.
 - v. Tripping: Indicate with operator handle position.
- e. Power Control Transformer:
- i. On 480-volt control panels, provide a control power transformer with a minimum size of 2.0KVA to supply 120 Vac power for starter coils, 20 ampere duplex receptacle, indicator pilot lights, alarm horn, alarm light, PAC, OIT, etc.
 - ii. The primary side shall have both legs fused. The secondary side shall have one leg fused and the other grounded.
 - iii. Provide transformer with sufficient capacity to power connected load.
- f. Motor Control Components:
- i. The panel shall contain a motor starter for each motor. The motor starter shall be an across the line non reversing magnetic starter with individual solid state smart overload protection. Provide a solid-state soft-start motor starter with a shorting contactor for motors greater than 25 horsepower. Local power company regulations shall govern.
 - ii. Selector switches shall be installed on the face of the inner dead front door unit. Selector switches shall be a heavy-duty oil tight “Hand-Off-Auto” three-position switch to control the operation mode of each pump motor starter.
 - iii. Magnetic Starters:
 - 1. NEMA Type Open Enclosure motor starter.
 - 2. Starter Type: Non-reversing.
 - 3. NEMA Size: As required, size 1 minimum.
 - 4. Manufacturer: Schneider Electric/Square D.
 - iv. Solid State Smart Overload:
 - 1. Provide solid state overloads for use with across the line magnetic motor starters.
 - 2. Monitors, controls, and protects pump motors.
 - 3. Communication:
 - a. Ethernet Modbus TCP.
 - b. Built in webserver.
 - c. All I/O available via Ethernet.
 - d. Coordinate IP addressing with the County.
 - 4. Modules: Main controller and expansion module for voltage and power monitoring.

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5. Provide the following hardwired I/O for each motor:
 - a. Run Command.
 - b. On Status.
 - c. Remote Status.
 - d. Fail Status.
6. Protection Functions:
 - a. Thermal overload.
 - b. Phase imbalance and overload.
 - c. Phase reversal.
 - d. Ground fault.
 - e. Stalling.
 - f. High and low power, voltage, and amps.
 - g. Coordinate all protection functions with pump and motor supplier. Adjust parameters based on actual running conditions to prevent nuisance tripping.
7. Metering Functions:
 - a. Current, all phases.
 - b. Voltage, all phases.
 - c. Motor temperature.
 - d. Frequency.
 - e. Power.
 - f. Power factor.
8. Manufacturer: Schneider Electric, TeSys T.
- v. Solid State Reduced Voltage Soft Starter
 1. Provide solid state reduced voltage soft starter for all motors 25HP and larger.
 2. Enclosure: NEMA 1.
 3. UL 508 Listed.
 4. Sized as required for motor FLA plus service factor.
 5. Adjust starting parameters based on soft starter and pump supplier recommendations and requirements to ensure smooth starting and stopping and to meet generator starting requirements.
 6. Provides integral motor protection.
 7. Provide feeder breaker with shunt trip or isolation contactor as required by manufacturer for positive power shutoff during a starter fault condition.
 8. Communication:
 - a. Ethernet Modbus TCP.
 - b. Built in webserver.
 - c. All I/O available via Ethernet.
 - d. Coordinate IP addressing with the County.
 9. Provide the following hardwired I/O (at a minimum):
 - a. Run Command.

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- b. On Status.
 - c. Remote Status.
 - d. Fail Status.
 10. Provide the following additional I/O via the Ethernet interface (at a minimum):
 - a. Current, all phases.
 - b. Voltage, all phases.
 - c. Motor temperature.
 - d. Frequency.
 - e. Power.
 - f. Power factor.
 - g. Fault condition.
 11. Manufacturer: Schneider Electric, Altistart 48.
 - vi. Variable Frequency Drives (VFD's):
 1. Provide VFD's where required by the County or the design ENGINEER.
 2. Enclosure: NEMA 1.
 3. UL 508 Listed.
 4. Sized as required for motor FLA plus service factor.
 5. Adjust starting parameters and minimum speed based on VFD and pump supplier recommendations and requirements to ensure smooth starting and stopping.
 6. Provides integral motor protection.
 7. Provide VFD inverter technology and required filters to meet IEEE 519 harmonic distortion requirements and pump motor protection requirements.
 8. Communication:
 - a. Ethernet Modbus TCP.
 - b. Built in webserver.
 - c. All I/O available via Ethernet.
 - d. Coordinate IP addressing with the County.
 9. Provide the following hardwired I/O (at a minimum):
 - a. Run Command.
 - b. On Status.
 - c. Remote Status.
 - d. Fail Status.
 - e. Speed Command.
 - f. Speed Feedback.
 10. Provide the following additional I/O via the Ethernet interface (at a minimum):
 - a. Current, all phases.
 - b. Voltage, all phases.
 - c. Motor temperature.
 - d. Frequency.

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- e. Power.
- f. Power factor.
- g. Fault condition.
- h. Torque.
- 11. Manufacturer: Schneider Electric, Altivar 61/71.
- vii. Temperature and Seal Fail Relays:
 - 1. Provide relay module for submersible pumps to monitor high motor temperature and seal failure/moisture detection.
 - 2. Provide dry relay contact outputs, rated 8 Amps at 120Vac, for thermal overload and seal leakage conditions.
 - 3. Selectable automatic and manual reset for temperature condition.
 - 4. Local indication of overtemp or seal leakage.
 - 5. Mount accessible through dead-front or panel front for non-dead-front construction.
 - 6. Operating Temperature: -20 to +55 degrees C.
 - 7. Manufacturers:
 - a. MPE, Pump Monitor Relay.
 - b. Xylem/Flygt, Mini-CAS.
 - c. ATC Diversified Electronics.
- S. Control Panel General Equipment (select all exact component types as required for application):
 - a. Wiring:
 - i. All power wires shall be THW or THWN 75 degree Celsius insulated stranded copper conductors and shall be appropriately sized for the given load application. All control circuit wire shall be type THW/THWN stranded. All wiring within the enclosure shall be neatly routed by the use of slotted type wiring duct with snap on type covers.
 - ii. Interior wiring shall be neatly bundled with nylon ties and include sufficient looping across the hinges to prevent wire damage, with each end of conductor marked (ID'd) and color coded in accordance with UL Standard 508A.
 - iii. All wiring shall be numbered and tagged so that each wire corresponds with the lift station's electrical schematic. Terminal points of all terminal strips shall be permanently identified. All terminal numbers and identifying nomenclature shall correspond to and be shown on electrical diagrams. All wiring shall be permanently identified with heat shrink preprinted labels or permanent clip-on labels and be shown on electrical schematic diagrams.
 - iv. Surge suppressor leads to be as short as practical.

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- v. Control wiring shall be no smaller than #14 AWG.
- b. Control Circuit Breakers:
 - i. UL 489 listed.
 - ii. DIN rail mounting.
 - iii. Manufacturers:
 - 1. Schneider Electric/Square D; Multi 9 Series.
 - 2. Allen-Bradley; 1489-A series.
 - 3. Weidmuller.
 - 4. Phoenix Contact.
- c. Terminal Block:
 - i. Screw compression clamp.
 - ii. Single level.
 - iii. Provide 20 percent spare installed terminal block.
 - iv. Rated for minus 55 to 110 degree C.
 - v. DIN rail mounting.
 - vi. Label all terminal block with appropriate numbers.
 - vii. Rated 600Vac.
 - viii. Manufacturers:
 - 1. Schneider Electric/Square D.
 - 2. Allen-Bradley.
 - 3. Weidmuller.
 - 4. Phoenix Contact.
- d. Control Relays:
 - i. Plug-in socket type.
 - ii. Rail mounted.
 - iii. LED indicator.
 - iv. Push-to-test type.
 - v. Rated for minus 25 to 40 degree C.
 - vi. Provide hold-down clips.
 - vii. Manufacturers:
 - 1. Schneider Electric/Square D.
 - 2. Allen-Bradley.
 - 3. Weidmuller.
 - 4. Phoenix Contact.
- e. Pilot Lights and Hand switches:
 - i. Indicating Lights, Watertight:
 - 1. Heavy-duty, push-to-test type, NEMA 250, Type 4X watertight, industrial type with integral transformer for 120Vac applications and corrosion-resistant service.
 - 2. Screwed on prismatic lenses and factory engraved legend plates for service legend.
 - 3. Manufacturers and products:
 - a. Square D; Type SK.
 - b. Allen-Bradley; Type 800H.

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- c. Approved equal.
 - ii. Pushbutton, Momentary, Watertight:
 - 1. Heavy-duty, NEMA 250, Type 4X watertight, industrial type with momentary contacts rated for 120Vac service at 10 amperes continuous and corrosion-resistant service.
 - 2. Standard size, black field, legend plates with white markings for service legend.
 - 3. Manufacturers and products:
 - a. Square D; Type SK.
 - b. Allen-Bradley; Type 800H.
 - c. Approved equal.
 - iii. Selector Switch, Watertight:
 - 1. Heavy-duty, NEMA 250, Type 4X watertight, industrial type with contacts rated for 120Vac service at 10 amperes continuous and corrosion-resistant service.
 - 2. Standard size, black field, legend plates with white markings, for service legend.
 - 3. Operators: Black knob type.
 - 4. Single-hole mounting, accommodating panel thicknesses from 1/16 to 1/4 inch.
 - 5. Manufacturer and Products:
 - a. Square D; Class 9001, Type SK.
 - b. Allen-Bradley; Type 800H.
 - c. Approved equal.
 - f. Alarm Horn (enclosure mounted):
 - i. Provide a vapor proof horn mounted on the side of the control panel for local high-level alarm annunciation.
 - ii. Provide an alarm silence pushbutton on the exterior of the control panel enclosure which will silence the horn without turning off the alarm light. Automatically reset the circuit when the alarm condition resets to normal.
 - iii. Function: Audible alarm. Produces sound by electro-mechanical vibration of a diaphragm.
 - iv. Sound Output Level: 99 dB nominal at 10 feet, adjustable.
 - v. Enclosure: Cast aluminum, NEMA 4X with panel mount gasket.
 - vi. Power: 24Vdc.
 - vii. UL Listed.
 - viii. Manufacturer:
 - 1. Federal Signal, 450 Vibratone Horn.
 - 2. Approved Equal.
 - g. Enclosure Surge Suppression:
 - i. IP 20 DIN rail mounted.
 - ii. Pluggable surge device with base socket.
 - iii. Grounded via DIN rail.

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- iv. LED indication where available.
- v. UL 1449 listed.
- vi. Provide surge suppression for the following external connections:
 - 1. Incoming power connections.
 - 2. Analog signal lines.
 - 3. Communication signal lines.
- vii. Manufacturers:
 - 1. Phoenix Contact.
 - 2. Emerson/Edco.
 - 3. Citel.
- h. Power Supplies:
 - i. IP20 DIN rail mounted.
 - ii. Provide separate power supplies to power panel components and field devices.
 - iii. UL 508 listed.
 - iv. Manufacturers:
 - 1. Allen-Bradley.
 - 2. Weidmuller.
 - 3. Phoenix Contact.
 - 4. IDEC.
 - i. Uninterruptible Power Supply (UPS):
 - i. 24Vdc Input/Output UPS with separately mounted batteries.
 - ii. UL508 listed.
 - iii. Minimum backup runtime: 30 minutes.
 - iv. DIN rail mounted.
 - v. Manufacturers:
 - 1. UPS: Transtronics BVUPS or approved equal.
 - 2. Batteries: Werker or approved equal.

2.03 PAC, I/O, AND OIT REQUIREMENTS

- A. Provide equipment compatible with the County's existing central SCADA system to ensure proper communications and data transfer. Remote PAC's shall communicate to the central VTScada server via Ethernet DNP3 communications utilizing poll by exception and general polling loop controlled by the VTScada system. DNP3 communications shall be configured to locally store variables with date and time stamp to allow backfilling of data to the central VTScada system in the case of communication failure.
- B. Local lift station control system communications shall be via Modbus TCP to equipment and I/O devices. Configure PAC NOE modules to store and restore smart overload, soft starter, and VFD configuration settings.
- C. Configure OITs to store major analog process variables and pump start/stop change of states and trend.
- D. Provide all PAC system components, cables, and additional ancillary equipment required for a completely functional PAC system.
- E. PAC systems shall be based on the following:

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- a. Schneider Electric Modicon M340 PACs.
- F. PAC I/O
 - a. Provide PAC I/O layout similar to other County lift station control panels for similarity between I/O wiring and PAC I/O addressing in the PAC program.
 - b. Provide each PAC with a minimum of 20 percent (minimum 2 points) installed spare I/O, of each I/O type, including the necessary terminal block, interposing relays, and surge protection. Pre-wire all I/O to field terminal blocks. Spare I/O is in addition to I/O provided for planned future additions such as planned future pumps or odor control.
 - c. Provide at least 20% and a minimum of 2 spare slots in each PAC chassis to accommodate future I/O cards. If the number of spare slots required exceeds the PAC chassis capacity, provide subpanel space and wireway to accommodate a future chassis. Provide empty DIN rail space required to accommodate the future terminal block to support the spare slots.
 - d. Use separate I/O modules for parallel controlled equipment such as multiple pumps where feasible. Pumps should be split across multiple I/O cards such that the failure of a single I/O card does not impact the operation of all pumps.
 - e. Provide interposing relays for all discrete outputs.
- G. PAC Requirements:
 - a. Provide complete microprocessor-based programmable device plug-in power supply, communications, and I/O modules for process control and monitoring. Provide all components as necessary for a complete system.
 - b. Chassis:
 - i. Type: Modicon M340, BMX series.
 - ii. Number of Slots: Sufficient for the number of modules required, including spares, plus the required number of empty slots, minimum of 8. Provide expansion bases as required.
 - iii. Provide cover on empty slots.
 - c. Processor Modules (CPU):
 - i. Type: Modicon M340, BMXP342020.
 - ii. Supports 1024 discrete and 256 analog I/O.
 - iii. Supports up to 4 racks.
 - iv. USB and Modbus communication ports, minimum.
 - v. Memory: 2 Mbyte internal RAM with supplied compact flash memory card for backup of programs, minimum.
 - d. Power Supply Modules:
 - i. Type: Modicon M340, BMXCPS2010.
 - ii. Input Voltage: 24V dc.
 - iii. Quantity: One for each processor chassis and one for each expansion I/O chassis. Include sufficient capacity to power future expansion of all spare (empty) chassis slots.
 - e. Network Communications Modules:

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- i. Type: Ethernet and Fast Ethernet, 100 Mbps.
 - ii. Communications Module: Modicon M340, BMXNOE100.
 - 1. Memory: Supplied Flash Memory Card.
 - 2. Configure to scan motor controller I/O and backup motor controller and overload device settings.
 - iii. RTU Module: Modicon M340, BMXNOR0200H.
 - 1. Memory: 128MB Flash Card.
 - 2. DNP3 over Ethernet.
 - 3. Modbus TCP.
 - f. Discrete Input, ac (DI):
 - i. Voltage: 24Vdc.
 - ii. Points per Modules: 16, isolated.
 - iii. Modicon M340, BMXDDI1602.
 - g. Discrete Output (DO):
 - i. Relay Output, 2A.
 - ii. Points per Module: 8.
 - iii. Modicon M340, BMXDRA0805.
 - h. Analog Input (AI):
 - i. Signal: 4 to 20 mA at 24V dc.
 - ii. Analog Input Points per Module: 4 or 8, isolated.
 - iii. Modicon M340, BMXAMI0410 or BMXAMI0810.
 - i. Analog Output (AO):
 - i. Signal: 4 to 20 mA at 24V dc.
 - ii. Analog Output Points per Module: 4, isolated.
 - iii. Modicon M340, BMXAMO0410.
 - j. Software: Compatible with Modicon Unity Pro.
 - H. Operator Interface Touchscreen:
 - a. Provide industrial touchscreen mounted to front or deadfront of control panel as required. At a minimum, the following shall be displayed on touchscreens:
 - i. Wetwell Level (Trended) and appropriate alarms.
 - ii. Wetwell Setpoint operation.
 - iii. Wetwell Level switch status and appropriate alarms.
 - iv. Pump Running (Trended), Fault, and Remote status.
 - v. Pump Amps (Trended).
 - vi. Pump Runtime Counter.
 - vii. Pump Phase Monitor Alarm.
 - viii. Flow (Trended), if required.
 - ix. Flow totalized; Current Day, Previous Day.
 - x. Pressure (Trended), if required.
 - xi. Alarm Silence Pushbutton.
 - b. Memory: Minimum 512kB RAM internal with 1GB or larger compact flash or SD card installed for data logging.
 - c. Ports: USB and Ethernet TCP/IP.

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- d. Power: 24Vdc
- e. Software: Compatible with Vijeo Designer.
- f. Resolution: 320 x 240 pixels (minimum).
- g. Display: 5.7-inch (minimum).
- h. Manufacturers:
 - i. Modicon Magelis.

2.04 COMMUNICATION

A. General:

- a. Provide both local and remote communications for lift stations. External communications from lift station to County SCADA system Wide Area Network (WAN) shall be Ethernet-based communications via either digital cellular or 900MHz digital radio systems. Coordinate with County for communications connection between facility and the County WAN. Coordinate with the County to determine radio communications infrastructure necessary to establish reliable communications for each facility. Consult the County on required components for each specific site. Coordinate and test all communications with County Utilities SCADA and Public Safety Radio Shop groups.
- b. Provide local Ethernet and digital communications between controllers, OITs, and smart field components (such as intelligent MCCs, generators, automatic transfer switches, and packaged control systems) via Ethernet Modbus TCP.
- c. Design networks for fault tolerance and for management utilizing SNMP. All general networks shall be a 10/100BASE-TX and Fast Ethernet Fiber where required. Configure all ports to match speed and negotiation of connected equipment.
- d. Design of network systems shall include IP address and VLAN assignments coordinated with the County and existing County infrastructure. VPN tunnels and TCP/IP port based security shall be determined to ensure proper communications and security between facilities.
- e. Network components specified shall be the state of the art at the time of design and construction. Contractor shall provide the latest state of the art hardware available during the submittal process, and shall upgrade features as necessary to meet functional requirements. Network components listed shall outline minimum requirements for each component.
- f. Provide surge suppression for network connected equipment located in vulnerable locations such as connections between buildings or near AC power lines. Provide adequate separation or shielding between communications cabling and other types of cable systems that could interfere with communications.

B. Ethernet Network Hardware Components:

- a. Select network components to meet requirements for each facility for

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proper communications and security in accordance with Industry Standards. The following general components shall be used within the SCADA system.

- b. Industrial Network Layer 2 Switch, Ethernet, DIN Rail:
 - i. Function: Network communications between PLCs, Ethernet connected field components, and HMI's within a lift station.
 - ii. Minimum of 8 RJ-45 ports. Provide and select switches with SFP modules as required for fiber connections. Provide ports as required for each site including a minimum of 2 spare ports.
 - iii. Support 10/100BASE-TX and Fast Ethernet fiber where required.
 - iv. Layer 2 software.
 - v. Supports SNMP, IEEE 802.1D, IEEE 802.1Q, Multicast IGMP, IEEE 802.3x.
 - vi. Power: 24Vdc.
 - vii. IP 20 enclosure.
 - viii. Temperature rating: 0 to 60 degrees C.
 - ix. UL 508 Listed.
 - x. DIN rail mounted.
 - xi. Manufacturers:
 - 1. N-Tron 700 Series.
 - 2. Hirschmann RS20 series.
 - 3. Moxa EDS series.

- C. Remote Wireless Communications:
 - a. Coordinate with County on type of remote communication solution to provide. Remote communications shall be via Verizon Digital Cellular or 900MHz digital radio system as directed by the County.
 - b. Digital Cellular Requirements:
 - i. Where directed by the County, provide CalAmp Vanguard 3000 Multi-Carrier 3G Cellular Broadband Router Model 140-7230-000.
 - ii. Provide multi-band high gain Omni antenna Wilson Electronics Model 301202 and connect with outdoor rated 50-ohm LMR-400 cable with appropriate connectors. Locate and mount antenna to lift station equipment rack or on outside of building in a location to maximize received signal strength.
 - iii. Provide PolyPhaser DSXL RF surge protector.
 - c. 900MHz digital Ethernet Radio Requirements:
 - i. Where directed by the County, provide a Cambium PMP 100 Canopy Connectorized Subscriber Module 9000SMCDD with a KP Performance 900MHz 36-inch yagi antenna Model YA14KPPD mounted approximately 25-feet above grade or as directed by the County and connected with outdoor rated 50-ohm LMR-400 cable with appropriate connectors.
 - ii. Provide PolyPhaser inline gas surge protection GT-NFM-AL.

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- iii. Antenna mast shall be aluminum construction and rated for Florida Building Code wind speed with the attached load. Provide bitumastic or manufacturer recommended coating where aluminum will be in contact with the earth or concrete.

2.05 CONTROL FUNCTIONS

- A. Provide the following general control and display functions for PAC's and VTScada HMI interface for all control panels:
 1. Configure remote PAC for DNP3 communications to allow store and forward of all data with date and time stamp to ensure all data is communicated if communications are lost and restored. Configure DNP3 for poll by exception to send data to the central HMI when there is a change in state. Configure change of state for all variables.
 2. Refer to I/O lists following this section for a listing of all hardwired I/O generally associated with each type of control panel. Modify I/O as required when automatic transfer switches are provided and other special equipment to ensure all equipment is monitored and controlled appropriately. Coordinate all items and I/O not specifically listed with the County.
 3. Coordinate remote notification of all alarms with the County.
 4. Provide UPS backup of I/O where practical.
 5. Display all discrete and all analog variables. Display all variables on appropriate HMI displays. Display status for discrete variables such as ON/OFF/FAIL status for motors and OPEN/CLOSE/FAIL status for valves. Display value and totalizer value when appropriate for analog variables such as process variables, set points, drive speeds, and valve positions. To prevent clutter and to ease operation, some displayed variables will not normally appear on displays but will be accessible through easily identifiable point-and-click targets. Runtime and totalizer counters are an example of variables that might not normally appear on the HMI display.
 6. Sound the alarm tone, indicate the alarm condition on appropriate HMI displays, and add to the HMI alarm summary display. Upon acknowledgement, silence the alarm tone and indicate the alarm condition on appropriate HMI displays and the alarm summary display. Remove acknowledged alarms from the alarm summary once they are cleared. Log alarm occurrence, acknowledgement, and clearance in the alarm log file. Coordinate with County as to which alarms will receive remote signaling via autodialer function of the SCADA system.
 7. Provide Pump Fail to Run logic and alarms and Valve Fail to Open/Close logic and alarms.
 8. Calculate Elapsed Run Time for all motors in the PAC and display on local OIT and HMI.

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9. Totalize all flows, in the PAC, for Current Day, Previous Day, Month, and Year and display on local OIT and HMI.
10. Display Daily Max, Min, and Average for all analog process variables.
11. Provide cycle counters for all motors and valves. One cycle is defined as transition from OFF to ON. For valves, one cycle is defined as transition from CLOSED to OPEN.
12. Provide bumpless transfer for all manual to auto and auto to manual PLC modes of operation.
13. Power outage and utility/generator power transitions:
 - a. Suppress all nuisance alarms during power outages.
 - b. Reset all equipment so that it is available after a power transition.
 - c. Provide delays before restarting pumps to ensure pumps do not block load generator or utility.
 - d. Monitor power status and transfer switch positions.
14. Provide nuisance alarm suppression to suppress alarms such as low flow when a pump is not running.
15. Coordinate user level security access groups and adjustable parameters with the County.
16. Provide analyzer fail alarm when the analyzer 4-20mA signal is out of range.
17. Provide a communication alarm between the PAC and HMI when communications are lost. To prevent nuisance alarming, the preset delay shall be at least three times the nominal update or polling period of the specific device. For PLC controlled equipment operating under HMI manual control, maintain equipment in the last state following a loss of communications. For PLC controlled equipment under automatic PLC control, maintain automatic equipment control and sequencing during a loss of communications.
18. Provide automatic alternation of lead and lag pumps for lift stations. Auto alternate when all pumps are off. For pumps that normally operate continuously, provide alternation on a daily basis starting at 8 a.m. and provide a manual forced alternate button.
19. Provide high and low alarms for all analog transmitters. Provide high-high, high, and low-low alarms for all level transmitters.
20. A fail-safe input shall be provided indicating intrusion into the control panel. Upon loss of this signal, or a series of devices providing this signal, the RTU shall report an alarm to the central HMI's.
21. Pump Fault hardwired contacts shall include pump leak and temperature alarms from submersible pump monitoring relays.

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22. Provide odor control system monitoring, where required.
23. Provide power monitoring, via Ethernet communications, of each smart overload device, solid state soft starter and variable frequency drive to monitor the following parameters:
 - a. Fault Status (Alarm).
 - b. Loss of Phase (Alarm).
 - c. Phase Reversal (Alarm).
 - d. Phase Unbalance (Alarm).
 - e. Phase A, B, C current in Amps.
 - f. Phase-to-Phase Voltage in Volts.
 - g. Power in kVA.
 - h. Power in kW.
 - i. Power Factor.
 - j. Monitor or generate alarms for Amps and Voltage out of typical range.
24. Tag Numbering:

SCADA tag numbering shall be as follows for either analog or digital functions:

FAC_TAG_X_Y_BFN
e.g., LS123_LIT_001_02_LAHH

FAC Facility/Lift Station Identifier (6 characters/digits max): Obtain facility identifier from the County for each facility.

TAG Instrument Tag (4 characters max): This is the instrument or control loop tag as indicated on the P&ID's or Field Tag. Follow ISA designation from Table 1 in ISA Standard 5.1.

X Loop Number (3 digits max): This is the loop number indicated on the P&ID's and field device tag.

Y Unit Number (2 digits max): Where applicable, use where multiple sets of units are provided for the same control loop.

BFN Block Function or Clarifying Abbreviation (4 characters max): In some cases a block function is required to further identify the block or I/O point, e.g. the tag for a level transmitter high-high alarm would be FAC_TAG_X_Y_LAHH. Coordinate abbreviations with the County.

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- B. Type 1 Control Panel Requirements:
1. A Type 1 SCADA Control Panel shall be used for reclaimed water sites without pumps, such as remote metering sites for irrigation and ground water recharge. The panel shall accommodate both monitoring and control functions.
 2. These sites require analog signal monitoring of flow and pressure. Some stations may require motorized valve control to modulate flow through the site.
 3. Design, furnish and install a solar power pack when a 120 VAC, 8-amp power supply is not readily available.
 4. Refer to Attachments for Type 1 Control Panel Typical I/O.
 5. Where required, provide control of reclaim water stations as follows:
 - a. Manual Operation of Flow Control Valve: If local switch at the valve is in LOCAL position, then the valve can be opened and closed using local open and close pushbuttons. If local switch at the valve is in OFF position, then the valve will stay in current position. Show the current position of the valve and show the valve as LOCAL and UNAVAILABLE at the HMI/OIT.
 - b. Manual Operation from HMI/OIT: If local switch at the Flow Control Valve is in REMOTE position, and the soft switch at the HMI/OIT is in MANUAL, then the valve can be opened to an operator entered percent position using the soft switches at the HMI/OIT. Show the valve as REMOTE and AVAILABLE.
 - c. Automatic Operation from HMI/OIT: If local switch at the Flow Control Valve is in REMOTE position, and the soft switch at the HMI/OIT is in AUTOMATIC, then provide proportional and integral action control of valve position as follows to maintain an operator input flow rate:
 - i. Process variable is Reclaim Water Flow.
 - ii. Set Point is operator entered flow rate in GPM.
 - iii. Controlled device is Flow Control Valve Position.
 - iv. Provide set point deviation alarm if flow cannot be maintained within +/- 10 percent of set point.
- C. Type 2 and 3 Control Panels with Constant Speed Pumps:
1. This section outlines control requirements for Type 2 and 3 control panels for constant speed lift station pumps.
 2. Provide all general control and monitoring functions as specified in the general requirements of Control Functions and to meet the functional intent of lift station operation as outlined by all lift station specifications.
 3. Pumps having MCC (non-panel mounted) motor starters shall have hand switches located at the MCC in lieu of switches mounted at the control panel. However, the same functional requirements apply to both integral and non-integral motor starter installations.

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4. Refer to Attachments for Type 2 and 3 control panels with constant speed pumps Typical I/O. Pump solid state smart overloads and solid state reduced voltage soft starters shall have hardwired and Ethernet I/O as shown in the attached Typical I/O list.
5. Provide float type level switches for low-low level, high level, and high-high level annunciation and associated control. Coordinate switch actuation heights with default level set points to prevent interferences.
6. Local, remote, and automatic controls are required for Type 2 and 3 control panels with constant speed pumps. The following outlines general control requirements:
 - a. Manual operation of each constant speed pump: If local dead-front mounted hand switch is in HAND then the pump will start and run continuously. Show the pump as LOCAL and UNAVAILABLE at the HMI/OIT.
 - b. Manual operation from HMI/OIT: If local hand switch on the dead-front is in REMOTE position, and the soft switch at the HMI/OIT is in MANUAL, then the pump can be started or stopped using the soft switch at the HMI/OIT. Show the pump as REMOTE and AVAILABLE.
 - c. Automatic operation of constant speed pump: If local hand switch on the dead-front is in REMOTE position, and the soft switch at the HMI/OIT is in AUTOMATIC, then provide automatic operation as follows:
 - i. Provide primary control using the wet well level transmitter.
 - ii. Operator enters the following set points:
 - i) Low-Low level Alarm.
 - ii) Low level shutoff.
 - iii) Lead pump start.
 - iv) Lag pump start.
 - v) Lag-lag pump start etc. dependent on number of pumps.
 - vi) High-High level Alarm.
 - iii. Pumps start when their associated set point is exceeded. Provide 30 second delay between starting pumps if more than one pump is called to start at the same time.
 - iv. All pumps stop when the level falls below the Low Level Shutoff set point.
 - v. Alarm on High-High Level transmitter level. Provide remote alarm notification on this alarm.
 - vi. Provide pump alternation when all pumps are off.
 - vii. Provide the following overrides:

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4. Refer to Attachments for Type 2 and 3 control panels with variable speed pumps Typical I/O. Pump VFD's shall have hardwired and Ethernet I/O as shown in the attached Typical I/O list.
5. Provide float type level switches for low-low level, high level, and high-high level annunciation and associated control. Coordinate switch actuation heights with default level set points to prevent interferences.
6. Local, remote, and automatic controls are required for Type 2 and 3 Control Panels with VFD's. The following outlines general control requirements:
 - a. Manual operation of each variable speed pump: If local dead-front mounted hand switch is in HAND, then the pump will start and run continuously. Speed shall be adjusted via local potentiometer. Show the pump as LOCAL and UNAVAILABLE at the HMI/OIT.
 - b. Manual operation from HMI/OIT: If local hand switch on the dead-front is in REMOTE position, and the soft switch at the HMI/OIT is in MANUAL, then the pump can be started or stopped using the soft switch at the HMI/OIT and speed adjusted via an operator entered speed at the HMI/OIT. Show the pump as REMOTE and AVAILABLE.
 - c. Automatic operation of constant speed pump: If local hand switch on the dead-front is in REMOTE position, and the soft switch at the HMI/OIT is in AUTOMATIC, then provide automatic operation as follows:
 - i. Provide primary control using the wet well level transmitter.
 - ii. Operator enters the following set points:
 - i) Low-Low level alarm
 - ii) Low level shutoff
 - iii) Pump Start Level
 - iv) Pump Control Level set point
 - v) High-High level alarm
 - iii. The lead pump starts when the level is above the Pump Start Level.
 - iv. The running pump(s) modulates speed to maintain the Pump Control Level set point via PID control algorithm. PID controller shall be properly tuned for smooth control.
 - v. If the running pumps reach 100% speed for an adjustable delay initially set at 2 minutes, then the next lag pump shall start. Adjust the speed of all running pumps together to maintain the level set point.
 - vi. If all running pumps reach a minimum operating speed for an adjustable delay initially set at 1 minute, then shut off the last pump started. Determine minimum pump run speed during startup based on pump operation and pump operational curves to ensure pumps run on their published curves of operation.

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- vii. When only one pump is running at its minimum speed and the level is below the level set point, then continue to run this pump until the low level shutoff is reached. Stop all running pumps when the low level shutoff is reached.
- viii. Alternate pump operation on a 24-hour basis or when all pumps are off.
- ix. Alarm on High-High Level Transmitter level. Provide remote alarm notification on this alarm.
- x. Provide the following overrides:
 - i) Start all pumps at 100% speed via the PAC with a 30 second delay between pump starts when the High Level float switch is activated. This alarm level should be alarmed and provide remote alarm notification.
 - ii) Start all pumps at 100% speed via hardwired logic with a 30 second delay between pump starts when the High-High Level float switch is activated. This operation overrides PAC control. Provide notification of this alarm via SCADA, remote alarm notification, and actuate local alarm horn and light. Allow for remote silencing of alarm horn via SCADA HMI/OIT and provide a local hardwired silence switch on the control panel dead-front. Pumps do not alternate when on hardwired controls.
 - iii) Stop all pumps when the low level float switch is activated. Provide notification of this alarm via SCADA and remote alarm notification.
 - iv) Provide alarm at SCADA and remote alarm notification when there are level sensor and float mismatches. For example provide an alarm when the low level float switch is actuated but the level transmitter is reading high level.
- d. Configure all Variable Frequency Drives (VFD's) to have configuration settings backed up by PAC NOE cards. Give each motor control device a unique name identified as LSXXX_VFD_YY (Lift Station Number Variable Frequency Drive unit number). For example, Lift Station No. 127 Pump 1 would read LS127_VFD_01.
- e. Monitor generator and related systems where provided. Ensure that the appropriate delays are provided to prevent multiple pumps from starting at the same time under generator power. This includes high level situations where multiple pumps may be called during a switchover from utility to generator power. Provide the required delays in the PAC and for hardwired control overrides. Pump alternation strategies do not apply when on generator power.

PART 3 - EXECUTION

3.01 FACTORY TESTING

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- A. Assemble and test all controls panels at the supplier's factory. Notify County of factory testing a minimum of 2 weeks in advance (in County) and 4 weeks in advance (outside County) to allow County personnel the opportunity to witness testing. The County reserves the right to witness factory testing of all control panels.
- B. Control panel supplier shall completely factory test control panels prior to shipment to ensure it is operational and ready for field installation. At a minimum, the following shall be verified:
 1. Construction matches approved drawings and County standards.
 2. Test all I/O. Simulate all I/O external to control panels and verify PLC and HMI receives I/O.
 3. Correct deficiencies prior to shipping control panel.

3.02 INSTALLATION OF CONTROL PANEL

- A. It shall be the responsibility of the Contractor to mount the control panel. All required hardware and software components necessary for a complete and functional SCADA and control panel system shall be provided. A Florida certified electrical Contractor shall perform the installation. All work shall be in accordance with the current edition of the NEC and UL Standards.
- B. Protect enclosures and other equipment containing electrical, instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules.

3.03 GENERAL INSTALLATION

- A. Provide all required installation and work for a completely functional lift station control and monitoring system including power and signal wiring for all field instrumentation and between the control panel and all remotely mounted I/O interfaces including motor controllers and packaged control systems.
- B. Install all equipment in accordance with manufacturer's instructions.
- C. All enclosures, ground busses, antenna masts and surge arrestors shall be grounded and bonded to the lift station ground system in accordance with national standards and manufacturer's instructions.
- D. All hardware and brackets used to mount the control panel shall be stainless steel.
- E. Provide a radio survey to verify required antenna height for reliable radio communication.
- F. Upon completion of work, thoroughly clean the work area and interior of the control panel. Ensure fresh corrosion inhibiting vapor capsules have been provided.

3.04 FIELD TESTING, STARTUP, AND ACCEPTANCE

- A. Notify County of field testing and startup schedule a minimum of 2 weeks in advance. The County reserves the right to witness all field testing and County acceptance is required before any lift station is considered complete. Refer to Section

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entitled “Testing and Inspection for Acceptance of Lift Stations” for additional requirements.

- B. At a minimum, the following tests shall be completed:
1. Test all I/O between field devices and lift station PAC controller. Where possible, real process variables and operations shall be used. When real operation is not feasible, I/O points shall be simulated to show proper operation.
 2. Test all field and in-panel communications via Ethernet and serial communications as applicable.
 3. Demonstrate all control functions operate properly under all operating scenarios. Where feasible, operation shall be tested under actual operating conditions.
 4. Test all monitoring, logging, and control functions from the local OIT.
 5. Communication between the control panel and remote SCADA server(s) shall be tested and communication signal strength documented.
 6. Test all monitoring, logging, and control functions from the central VTScada system. All change of state and polling functions shall be verified and adjusted as required. I/O exchange after loss of communication shall be tested to ensure all data is correctly logged and time stamped after communications are restored.
 7. Test operation of all starting/stopping scenarios for pumps for all control modes on utility and generator power sources. Test generator switching functions in conjunction with pump operation.
- C. All field testing shall be documented on PCU approved test forms and signed by the Contractor and control panel supplier.

3.05 SERVICE

- A. The SCADA and control panel system supplier shall have four or more factory trained support personnel available within four hours. The system supplier shall have the capability to supply replacement parts and equipment within six business hours of notification from PCU. PCU shall have 24-hour per day access to service personnel by a cell phone or pager. The SCADA and control panel supplier shall maintain a 24-hour answering service that can direct emergency calls to the appropriate service technician. Service representatives who are not specifically trained in the service of PCU’s SCADA system are unacceptable.

3.06 DOCUMENTATION

- A. The following documents shall be provided prior to acceptance of the lift station by PCU:

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1. Complete schematic and wiring diagram, in the latest version of AutoCAD, and bill of materials on compact disc or similar electronic media.
2. Two (2) maintenance manuals with above drawings and manufacturer's maintenance literature bound in three-ring binders;
3. A laminated copy of the schematic and wiring diagram shall be permanently affixed to the interior side of the exterior enclosure door or in control panel door pocket.
4. Documented PAC controller, OIT, and HMI application programs suitable for programming updates to the control system and reuse for standardization of the lift station control system.

3.07 WARRANTY

- A. The control panel, including all applications programming, shall have a one calendar year warranty against defects in materials and workmanship covering parts and labor from the date of PCU acceptance. The control panel supplier shall provide all material and labor to repair or replace failed components at no cost to PCU.
- B. Warranty service shall be completed within the following period of time:
 1. Major issues rendering the control panel non-functional shall have on site response with qualified personnel within one business day.
 2. Minor issues involving a failure of the control panel or any of its components shall have on site response within qualified personnel within two business days.
 3. PCU will have the option to proclaim any hardware or software failure an emergency if in the opinion of PCU the failure could result in a public health or safety concern.

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convenience of operation, and the placement of chemical storage and feed equipment in a separate room to reduce hazards and dust problems. Main electrical control equipment shall be located above grade and above the 100 year flood prone elevation. Adequate facilities shall be included for shop space and storage consistent with the needs of the designed facilities.

- C. All buildings shall be of concrete masonry unit construction with either engineered trusses and coated metal roof systems or hollow core concrete slab based roofs. All structures shall be painted with colors in accordance with PCU standards, unless otherwise approved by PCU. All exterior doors shall be of steel construction and interior doors shall be of wood or steel construction.
- D. A permanently mounted standby power generator system of sufficient size shall be required so that potable water may be treated and/or pumped to the distribution system during power outages to meet the average day demand.
- E. Adequate monitoring equipment, sample taps, flow meters, and pipe color coding shall be provided.
- F. An operation and maintenance manual including a parts list and parts order form, operator safety procedures, and operational trouble shooting section shall be supplied for any proprietary unit installed in the facility.
- G. Consideration shall be given to the safety of plant personnel and visitors. The design must comply with all applicable safety codes and regulations that may include the Florida Building Code, Uniform Fire Code, National Fire Protection Association Standards, and OSHA standards.
- H. Security measures shall be installed and instituted in accordance with this MANUAL. Appropriate design measures to help ensure the security of water system facilities shall be incorporated. Such measures, as a minimum, shall include heavy duty type locks for exterior doorways, windows, gates, and other entrances to sources, treatment, and water storage facilities, signage, intrusion alarms, motion sensitive flood lighting, and 6 foot high security type fencing topped with 3 strands of barb wire. Facilities secured with electrically operated gates shall include key switches in accordance with the appropriate "Approved Materials Checklist" (See Wastewater Checklist). Other measures may include close circuit monitoring and real time water quality monitoring.
- I. Electrical supply to the facility shall be placed underground onsite of the plant property.
- J. Other than pipes, conduits, foundations, and footings, the wastewater treatment facility shall be constructed above ground.

Table 550-A-1. Allowable Leakage - Low Pressure Air Test

Nominal Pipe Size (inches)	Minimum Test Time (min/ 100 feet)
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8
36	6.0

7. Record the drop in pressure during the test period. If the air pressure has dropped more than 1.0 psig during the test period, the section of main being tested has failed. Otherwise, the section of main being tested has passed.
8. When a section of main fails the test, the CONTRACTOR shall determine the source of the air leakage, make the appropriate corrections, and retest. If necessary, testing shall be conducted incrementally by individual pipe sections until all leaks are isolated. After all leaks are repaired, the CONTRACTOR shall retest the entire section of the main between manholes.
9. All testing results, including the quantity of acceptable leakage, shall be documented and certified using the PCU approved Low Pressure Air Test Form.

3.02 CAUSES FOR REJECTION OF GRAVITY MAINS

- A. The CONTRACTOR shall be required to replace the pipeline if the acceptance or bond CCTV inspection reveals cracked, broken, or defective pipe, and/or in the case of PVC pipe a ring deflection in excess of five percent.
- B. After backfilling of trenches, all PVC sewer pipe shall be tested by the CONTRACTOR for initial diametric deflections by the use of a Go-No-Go type mandrel which is acceptable to PCU. The initial diametric deflection shall not exceed five percent (5%) of the base inside diameter as defined by ASTM D-3034. ~~Deflection tests will be performed after the trench is no longer subject to construction traffic loading and a minimum of 30 calendar days after completion of the trench backfill. The mandrel shall be pulled through each section of pipe from manhole to manhole. The mandrel must slide freely through the pipe with only a nominal hand force applied. No mechanical device shall be used in pulling the mandrel. Any pipe which refuses the mandrel shall be removed and replaced by the CONTRACTOR. Such sections shall be re-tested by~~

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~~the CONTRACTOR for deflection after completion of backfill.~~

- C. Joint separation shall be no greater than two inch between the spigot and bell of the pipe.
- D. No evidence of leakage will be acceptable for private gravity mains connecting to the PCU collection system.
- E. The following NASSCO PACP codes or notes shall be cause for rejection of gravity sewer systems
 - 1. PACP coding of “Line” (L) shall be accompanied by a measurement of the line, grade or angular deviation. Variance of established line and grade at any point along the length of the pipe shall not be greater than 1-1/2 inches, provided such variation does not result in a level or reverse sloping invert. An approved method shall be used to determine this deviation. A PACP coding of MWLS with a percentage of pipe greater than 18.75% on 8-inch sewer, 15% on 10-inch sewer etc. will be corrected by excavation and repair.
 - 2. PACP coding of “Infiltration” (I) for pipe joints shall be replaced or the pipe joint shall be reseated at the joint. Grouting shall not be considered a method of repair and will not be accepted. Replace the leaking gravity main segment if there is visible infiltration at any point other than the pipe joint.
 - 3. Any PACP coding in the category of “Structural Family”.
 - 4. PVC pipe having ID tears will be rejected.
 - 5. PACP condition grading of “OB” (obstruction) in pipe shall be rejected, the obstruction shall be removed and the line cleaned and re-televised.

3.03 ACCEPTANCE OF GRAVITY MAINS

- A. Successful passage of both the leakage test and CCTV inspection is required before acceptance by PCU.
- B. Prior to repair or replacement of failed sewer pipe, the method of repair or replacement shall be submitted to PCU for review and consideration for approval. Pressure grouting of pipe or manholes shall not be considered as an acceptable method of repair.

PART 4 - MAINHOLE TESTING

4.01 TESTING AND INSPECTION OF MANHOLES

- A. Leakage Test:
There shall be no visible leakage through the walls or pipe connections.
- B. Vacuum Test:
All manholes shall be required to meet the requirements of the vacuum test as per the current ASTM C 1244 “Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test” prior to acceptance.

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ASTM C1244 states that a vacuum test is intended to be used as a preliminary test to enable the installer to demonstrate the condition of the concrete manhole prior to backfill.

ASTM C1244 requires that a vacuum of 10 inches Hg to be drawn on the manhole after all lift holes are plugged and pipes entering the manhole are temporarily plugged and securely braced. The time is measured for the vacuum to drop to 9 inches Hg. The manhole is accepted if the measured time meets or exceeds the values presented in Table 550-A-2 below or Table 1 of ASTM C1244, whichever is more restrictive. If the manhole fails the initial test, it may be repaired by an approved method until a satisfactory test is obtained.

Table 550-A-2. Minimum Duration – Manhole Vacuum Test

Manhole Diameter (Feet)	Test Period (Seconds)
4	60
5	75
6	90

Vacuum testing after backfilling should be performed only after a successful non-backfill test has been completed in accordance with ASTM C1244.

Vacuum testing backfilled manhole systems is not recommended, especially in the presence of ground water as the hydrostatic pressure may exceed the design limits of critical flexible connectors leading to a system failure.

All testing shall be documented and certified using the PCU approved Vacuum Test Form.

C. Manhole Inspections:

1. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by PCU. Such inspection may be made at the place of manufacture and/or at the site after delivery, or at both places. The sections shall be subject to rejection at any time on account of failure to meet any of the specification requirements; even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the job shall be marked for identification and shall be immediately removed from the job. All sections, which have been damaged, will be rejected. If already installed, rejected section shall be removed and replaced entirely at the CONTRACTOR's expense.
2. At the time of inspection, the sections will be carefully examined for compliance with the specified ASTM designation, and with the approved manufacturer's drawings. All sections shall be inspected for general appearance, dimension,

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Section 550-A

Testing & Inspection for Acceptance

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“scratch-strength” blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured. Installed manholes shall be inspected for proper filling and coating of the lifting holes and proper installation of any liner, coating or shrink-wrap.

PART 5 TESTING OF WASTEWATER FORCE MAINS

A. **Locating** Wire System:

All wastewater force mains shall be installed with a continuous green insulated copper locating wire. Locating wire shall be installed in accordance with the STANDARD DRAWINGS and pass a continuity check with an approved tracing system before acceptance by PCU.

B. Inspection of Automatic Combination Air and Vacuum Release Valves:

After completion of the pressure test the ARV shutoff valve shall be opened and PCU shall test the ARV for proper connection and operation.

C. Inspection of Valves and Valve Boxes:

Valves shall be opened wide, then tightly closed, and the various nut and bolts shall be tested for tightness. Any valve that does not operate correctly shall be replaced. Buried valves shall have an operating nut within two feet of finished grade. Valve boxes shall be properly marked and checked for installation in accordance with the STANDARD DRAWINGS. Operating nuts, extensions, and upper guides shall not interfere with valve operation. Before acceptance by PCU valve boxes shall be adjusted to finished grade with the operating nut properly centered and shall have a “V” notched in the curb or street in the absence of a curb directly opposite the valve box.

D. Swabbing:

1. All mains shall be hydraulically cleaned with a polypropylene swabbing (also known as pigging) device to remove dirt, sand, and debris from main.
2. If swabbing access and egress points are not provided in the design drawings, it will be the responsibility of the CONTRACTOR to provide and remove temporary access and egress points for the cleaning, as required.
3. Passage of cleaning poly swabs through the system shall be constantly monitored, controlled, and all poly swabs entered into the system shall be individually marked and identified so that the exiting of the poly swabs from the system can be confirmed.
4. Cleaning of the system shall be done in conjunction with the initial filling of the system for its hydrostatic test.
5. The line to be cleaned shall only be connected to the existing distribution system at a single connection point.
6. The CONTRACTOR shall locate and open all new in-line valves beyond the point of connection on the pipeline to be cleaned during the swabbing operation.

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PLEASE TYPE OR PRINT CLEARLY IN BLACK INK

Project Name: _____

PCU Project File Number: _____

Contractor's Name: _____

Contractor's Address: _____

Contractor's Signature: _____

Engineer's Name: _____

Engineer's Address: _____

PCU Reviewer: _____	Date: _____
Approved: ____	Denied/Resubmit: ____
Comments:	

With the submission of this document, the CONTRACTOR understands that the use of the following selected items, as individually indicated by the use of an "X", is mandatory.

Substitutions using other items contained within this Checklist shall be initiated by the CONTRACTOR submitting a revised Checklist to PCU for its review and approval at least 10 calendar days in advance of need.

It is also understood by the CONTRACTOR that PCU shall reject materials and products not in accordance with this document and the MANUAL. Any material or product not contained within this Checklist shall be approved in advance by the Utilities Code Committee in accordance with the provisions of the Utilities Code.

Shop drawings shall be required for all structures and similar items not contained within this checklist, such as manholes, wet wells, and other castings.

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	LMK Enterprises	Performance Liner	
	Steven's Technologies	CIP Liner 2 part 100% epoxy	
	Inner Cure Technologies	Reichhold/DION CIP Liner	
	Lanzo Lining	Lanzo CIP Lining System	
	Reynolds Inliner	Reichhold/Intech	
	FirstLiner	FirstLiner CIP Lining System	
	Premier Pipe	Premier Pipe CIP Lining System	
Force Main Identification Tape (Light Green, 6-Inches Wide, 2-inches High Black Lettering, Adhesive Backed):			
Buried Force Main Warning Tape (Light Green, 3-inches Wide, 1-Inch High Black Lettering, Non-Adhesive Backed):			
Force Main Locating Wire (Single Strand 14-Gauge Solid Copper Wire with Light Green Colored Insulated Covering):			
	Copperhead	Reinforced Tracer Locating Wire	Alternative
Locating Marker Systems (Force Main) (Green In Color):			
	3M	Scotch Mark EMSII Electronic Marker Locator #1265	
	3M	Scotch Marker Electronic Ball Marker #1404	
Curb and Pavement Markers (Green in Color, Imprinted With The Words "POLK COUNTY UTILITIES" And "CALL 811 BEFORE YOU DIG" With "SANITARY SEWER SERVICE" or "FORCE MAIN VALVE" As Applicable):			

Comment [EWP1]: Previously approved by UCC 5/2/2014

Wastewater Category 3 of 5: PIPE FITTINGS			
ITEM TO BE USED	Manufacturer	Part Number	Comments
Expansion Joints			
	EBAA Iron Inc.		
	Fernco		

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Surface Coatings – Interior (Light Colors) (Manholes, Wet Wells, and Valve Vaults)			
	Sauereisen	SewerGuard 210	
	Sauereisen	F-170	
	Kerneos Aluminates Technologies	Sewpercoat	
	CCI Spectrum, Inc.	Spectrashield	
	Strong Company	Strong-Seal Systems	
	Sherwin-Williams	Cor-Cote SC	Sewer Cote Epoxy
	Sherwin-Williams	Sherflex	Polyurethane Elastomer
	Raven Lining	Raven 404	
	Raven Lining	Raven 405	
Top Adjusting Rings (Use Must Be Approved In Advance By FDOT Or Polk County Transportation):			
	Ladtech, Inc.		HDPE
	Cretex	Pro-Ring	Expanded Polypropylene (EPP)
			Reinforced Concrete
Lining Systems (Light Colors) (Master Manholes, Wet Wells, and Valve Vaults)			
	AGRU Liner	HDPE Liner	Factory Installed
	GSE Studliner	HDPE Liner	Factory Installed
	GU Liner	Polypropylene (PP) Liner	Factory Installed

Comment [EWP2]: Previously approved by UCC 5/2/2014

Wastewater Category 5 of 5: LIFT STATION MATERIALS AND ACCESSORIES			
ITEM TO BE USED	Manufacturer	Part Number	Comments
Odor Control System and Equipment:			
	Premier Chemicals	Thioguard	
Alarm Horn (AH)			
	<u>Federal Signal</u>	<u>450 series</u>	
	Edwards	<u>8710P-G1N5</u>	
	Wheelock	<u>3IT-115-R</u>	
Alarm Light (AL)			
	<u>American Electric Federal Signal</u>	<u>225 XSTF32552</u>	
	<u>Red Dot Edwards</u>	<u>899B</u>	
Block Walls - Anti-Graffiti Paint			
	American Building	Polyshield Restoration	

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	Richard's Paint	Professional Water Seal & Graffiti	
	Environmental Products	Graffiti-Proof	
Control Panels (CP)			
	<u>Curry Controls Company</u>		
	<u>Unitron Controls, Inc.DCR Engineering</u>		
	<u>Revere Control Systems</u>		
	<u>Rocha Controls</u>		
	<u>Revere System</u> <u>Unitron Controls</u>		
Control Panel - Control Circuit Breaker			
	Square D	QOU120 <u>or Multi-9 series</u>	
Control Panel - Control Circuit Transformer			
	Square D	EO-18	
Control Panel - Duplex Receptacle/GFI (DR)			
	Square D	GFSR 115-1C	
Control Panel - Elapse Time Meter (EMT)			
	Engler	AC 200 10 NG7	
	Hecon	TO621134	
Control Panel - Electric Box Mounts			
	Unistrut	P1110T	
Control Panel - Emergency Circuit Breaker (ECB)			
	Square D		<u>Required where transfer switch is not provided.</u>
Control Panel - Enclosure (with the appropriate Arc Flash Label on Panel Door)			
	Hoffman		
	<u>Rittal</u>		
	<u>Tanco</u> <u>Schaefer</u>		
Control Panel - Explosion-Proof Seal- Off			
	<u>Crouse-Hinds</u>		
	OZ/Gedney	1.2 inch EY 200	
Control Panel - Flasher (FL)			
	Sta-Con, Inc.	008-24-13SP	
	SSAC	FS-126	
Control Panel - Float Regulator (FR)			

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	<u>Roto-Float</u> <u>Anchor Scientific</u>	<u>Roto-Float</u>	<u>Mount floats to stainless steel cable with 15 lbs. anchor using stainless steel cable ties/clamps.</u>
	<u>Siemens</u>	<u>9G</u>	
	<u>Contegra</u>	<u>FS 96</u>	
Control Panel - Fuses (F)			
	Bussmann		
Control Panel - Hand-Auto-Off Selector (HOA)			
	Square D	9001-SKS	
Control Panel - Horn Silence Button (HSS)			
	Square D	9001-SKR-IU	
Control Panel - Moisture and Temperature Failure Light (MT) Relays			
	<u>MPE</u> <u>Dialeo</u>	<u>803-1710</u> <u>PMR</u>	
	<u>LC & D</u> <u>Flygt</u>	<u>Little Light 930407X</u> <u>Mini-</u> <u>CAS</u>	
	<u>ATC Diversified</u>	<u>SPM</u>	
Control Panel - Motor Circuit Breaker (MB)			
	Square D		
Control Panel - Motor Starter (MS)			
	Square D		
Control Panel - Overload Heater (OL) Solid State Overload			
	Square D	<u>TeSysT</u>	
Control Panel - Phase Monitor (PM)			
	Diversified		
Control Panel - Pilot Light (PL)			
	Dialeo	803-1710	
	LC & D	Littlelight 930407X	
Control Panel - Pump Automatic Alternator (PAA)			
	MPE	008-120-13N	
	Diversified	ARA-120-ACA	
Control Panel - Relay (R)			
	Porter Brumfield	KRPA-11AN	
	Eagle Signal	22 Series	
Control Panel - Resistor (RE) - 5 watt, 2500 ohms:			
	Reekwood		
Control Panel - Run Indicator (RL)			

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	Dialeo	803-1710	
	LC & D	Littlelight 930407X	
Control Panel - Supplemental Protector Breaker – 3-pole, 1-amp			
	Square D	MG24532	
Control Panel - Surge Protector (UL 1449, 2nd-Latest Edition Listed And Labeled), (NEMA LS 1 And IEEE C62.41 Tested) With NEMA 4X Enclosure, Internal Fusing, Voltage, and Phase To Match Service, Rated 80,000-amps Per Mode (Minimum 10-Year Warranty).			
	Eaton	SPD	
	Innovative Technologies	PTEx 160	
	Surge Suppressors, Inc. Approved Equal	LSE Series or SHL	
	Current Technology	XN80	
	Joslyn	ST 160 Series	Total Protection Solutions
Control Panel - Terminal Strip (TS)			
	Square D	9070GR6	
Flow Meters With Replaceable Sensors (Pipe Length Before And After Meter Is To Be 5 Times The Diameter Of The Pipe.)			
	Yokogawa Foxboro		
	Endress Hauser Siemens		
	Foxboro ABB		
Generator Circuit Breaker			
	Square D		
Generator Fuel Tanks (Double Walled And For Fixed Generator Systems Only)			
	Convault		
	Modern Welding		
	Phoenix		
Generator Systems, Fixed			
	Caterpillar/Olympian		
	Onan (Cummins)		
	Kohler		
	Tradeswinds		
Generator Systems, Portable			
	Caterpillar Kohler		
	Cummins Caterpillar/Olympian		
	Kohler Onan (Cummins)		
Generator Receptacle (GR)			

Comment [EWP3]: Previously approved by UCC 5/2/2014

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	Russelstoll	JRSB 1044 FR (100 amp)	For ≤ 25 Hp Pumps. <u>Required when transfer switch not provided.</u>
	Russelstoll	JRSB 2044 (200 amp)	For 25 Hp > Pumps. <u>Required when transfer switch not provided.</u>
Generator <u>Automatic</u> Transfer Switch			
	Onan Emerson/ASCO.		
	Cummins.		
	Russelectric.		
	Eaton/Cutler-Hammer		
Generator <u>Manual</u> Transfer Switch			
	<u>ESL Power Systems</u>	<u>Stormswitch</u>	<u>Replaces service entrance breaker and generator breaker and receptacle.</u>
Human Machine Interface (HMI)			
	Maple Systems Electric	Schneider HMI 5070TH	Magelis
Main Service Disconnect Breaker			
	Square D		
Main Circuit Breaker (MCB)			
	Square D		
Main Circuit Transformer (MCT)			
	Square D	500SV43F	
Odor Control Monitoring Instrument			
	Precision Control	Model SRC-1	
Pressure Gauges:			
	Ashcroft	40-1009 <u>1279</u> 0-60 PSI	<u>0-60 PSI</u>
	Ametek H.O. Trerice Company	700 LFSS-G 40-FSL-250 PSI 100 <u>1980</u>	
	Winter Gauges Palmer Gauges	Wika <u>XSEL</u> Q770 0-60 PSI 45-S-W-Q-60#-J	
Pressure Gauges (Diaphragm Seals)			
	Ashcroft	Type 20 <u>10</u>	
	H.O. Trerice	01FF	

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	Winters	D950 top-D954 Bottom	
Level Hydrostatic Pressure Transducers- 0 To 15 psi Range			
	Blue-Ribbon Ind.	Birdcage Pressure Transducer	
	Endress Hauser/KPSI	FMX 21750-14D-40015	42mm Heavy Duty version.
	Endress Hauser/Keller America	FMX 175LevelRat	
	Blue Ribbon Ind.	Birdcage Pressure Transducer	
SCADA Panels Type 1			
	Motorola	ACE 3600 RTU	1 each
	Motorola	ACE 3600 DI Module	1 each
	Motorola	ACE 3600 6AI Module	1 each
	Eurobex	NEMA 4X Enclosure 5412 ESSP302412	1 each
	Motorola	ACE 3600 Analog Output	1 each
	Microswitch/Honeywell	Tamper Switch 1DM401	1 each
	Antenex	Type N Antenna Connectors (CN400S)	1 each
	Antenex	Phantom 3db Dome Antenna (TRAB8063)	1 each
	Antenex	Dome Mount with 17' cable (MAB8)	1 each
	Phoenix Instrument	PC21 Plugrab Surge Arrestor (Analog I.O.)	5 each
	Square D	QOU 10 AMP Breaker	2 each
Surge Suppressors for SCADA 120VAC TVSS (select either a, b, or c below)			
	a) Surge Suppression Ine	SSLA1S1	
	b) PSI	120HWCP-15	
	c) Innovative Technology	XT40-1P101	
Application information only additional materials			
Supplemental Grounding Systems, Rods, Cadwelds & Cable			
SCADA Panels Type 2			
	Motorola	ACE 3600 RTU	1 each
	Motorola	ACE 3600 DI Module	1 each
	Motorola	ACE 3600 6AI Module	1 each
	Eurobex	NEMA 4X Enclosure 5412 ESSP302412	1 each
	Microswitch/Honeywell	Tamper Switch 1DM401	1 each

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	Antenex	Type N Antenna Connectors (CN400S)	1 each
	Antenex	Phantom 3db Dome Antenna (TRAB8063)	1 each
	Antenex	Dome Mount with 17' cable (MAB8)	1 each
	Square D	QOU 10 AMP Breaker	2 each
	Allen Bradley	24vdc relay and base 700-HK36Z24	1 each
	Surge Suppressors for SCADA 120VAC TVSS (select either a, b, or c below)		
	a) Surge Suppression Inc	SSLA1S1	
	b) PSI	120HWCP-15	
	e) Innovative Technology	XT40-1P101	
	Application information only additional materials		
	Supplemental Grounding Systems, Rods, Cadwelds & Cable		
	SCADA Panels Type 3		
	Motorola	ACE 3600 RTU	1 each
	Motorola	ACE 3600 Module (8Di,2Do,2Ai)	3 each
	Eurobex	NEMA 4X Enclosure 5412 ESSP363012	1 each
	Motorola	ACE 3600 Analog Output	1 each
	Microswitch/Honeywell	Tamper Switch 1DM401	1 each
	Antenex	Type N Antenna Connectors (CN400S)	1 each
	Antenex	Phantom 3db Dome Antenna (TRAB8063)	1 each
	Antenex	Dome Mount with 17' cable (MAB8)	1 each
	Phoenix Instrument	Plugrab Surge Arrestor	4 each
	Square D	QOU 10 AMP Breaker	2 each
	Allen Bradley	24vdc relay and base 700-HK36Z24	5 each
	Surge Suppressors for SCADA 120VAC TVSS (select either a, b, or c below)		
	a) Surge Suppression Inc	SSLA1S1	
	b) PSI	120HWCP-15	
	e) Innovative Technology	XT40-1P101	
	Application information only additional materials		
	Supplemental Grounding Systems, Rods, Cadwelds & Cable		
	Sluice Gate For Wet Well		
	BNW	Model 77	316 ss

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	Fontaine	Model 20	316 ss
Submersible Pumps With Enclosed Impellers			
	Flygt Hydromatic		
	Hydromatic Flygt		
Check Valves 4-inch And Larger (8 mil Epoxy Lined)			
	M & H	159	
	Mueller	Series 2600 (Up to 12 inches)	
	Mueller	Series 8001 (16" and Larger)	
	American Flow Control	Series 600 or 50 line	
Cushion Check Valves (Oil Filled)			
	GA		
	APCO		
	CCNE		
Variable Frequency Drives			
	Schneider-Electric Square D	Altivar	
	Allen Bradley		
	General Electric		
Variable Frequency Motors			
	U.S. Motors	Rated for inverter duty only	
	Baldor	Rated for inverter duty only	
	Reliance	Rated for inverter duty only	
	Dayton	Rated for inverter duty only	
Wet Well and Valve Vault Access Frames and Covers (A minimum non-traffic bearing load rating of 300 PSF or, if subject to vehicular traffic, a H-20 traffic bearing load rating)			
	Halliday Products		
	Bilco Company		
	USF Fabrication, Inc.		
Lift Station Wet Well Fall Protection System			
	Halliday Products	Retro Grate Fall Thru Protection System	
	Bilco	Fall Protection Grating System	
	USF Fabrication, Inc.	Hinged Hatch Safety Grate	
	USF Fabrication, Inc.	Hatch Net System	
Pad Locks (Two CK-RCG Keys must be provided with each Pad Lock)			

Comment [EWP4]: Previously approved by UCC 5/2/2014

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	Videx CyberLock	PL-01KR, PL-02KR, PL-03KR (Key Retaining)	CL-6P3WR (Installed in Schlage Pad Lock w/ 1" or 2" or 3" SS Shackle, as appropriate for each application)
	Videx CyberLock	PL-01, PL-02, PL-03 (Non-Key Retaining)	CL-6P3WR (Installed in Schlage Pad Lock w/ 1" or 2" or 3" SS Shackle, as appropriate for each application)
	Videx CyberLock	CKS-010 (Recharging Station) and AK-01 (Authorizer Keypoint)	Both items shall be installed as part of any building constructed for PCU.
Uninterruptable Power Supply (UAPS)			
	Tripp Lite <u>Transtronics</u>	3000 VA <u>BVUPS</u>	Standard Size <u>Provide with (2) werker batteries or equal</u>
	Tripp Lite	2000 VA	For Use In Compact Control Panel Situations
<u>Electric Override Key Switch</u>			
	<u>Knox Key Switch</u>	<u>3500 Series</u>	<u>For Use with Facilities with Electrically Operated Gated Access</u>

Comment [EWP5]: Previously approved by UCC 5/2/2014

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SCADA Panel I/O Listing

2014

Type 1 Control Panel				
Typical Hardwired I/O Description	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
Control Power Alarm	1			
Control Valve Closed	1			
Control Valve Open	1			
Station Power Alarm	1			
Intrusion Alarm	1			
Main Surge Suppressor Fail	1			
Control Panel Surge Suppressor Fail	1			
UPS Fail	1			
Flow			1	
Pressure Influent			1	
Pressure Effluent			1	
Control Valve Position Feedback			1	
Control Valve Position Command				1
Used I/O	8	0	4	1
Estimated Spare I/O	8	0	4	3
TOTAL HARDWIRED I/O	16	0	8	4

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SCADA Panel I/O Listing

2014

Type 2 Control Panel: Constant Speed Pump Lift Station				
Typical Hardwired I/O Description	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
Control Power Alarm	1			
Low-Low Level, All Pumps Off (ball float)	1			
High Level Alarm, All Pump Start PLC (ball float)	1			
High-High Level Alarm, All Pump Start Hardwired Override (ball float)	1			
Station Power Alarm	1			
Intrusion Alarm	1			
Main Surge Suppressor Fail	1			
Control Panel Surge Suppressor Fail	1			
UPS Fail	1			
Pump 1 Run Status	1			
Pump 2 Run Status	1			
Pump 3 Run Status, etc.	1			
Pump 1 Fault Status	1			
Pump 2 Fault Status	1			
Pump 3 Fault Status, etc.	1			
Pump 1 Remote Status	1			
Pump 2 Remote Status	1			
Pump 3 Remote Status, etc.	1			
Manual Transfer Switch Utility Power Available, Where Available*	1			
Generator Running Status, Where available*	1			
Generator Fault, Where Available*	1			
Fuel Tank Low-Low Level*	1			
Fuel Tank High-High Level*	1			
Fuel Transmitter Fault*	1			
Pump 1 Run Command		1		
Pump 2 Run Command		1		
Pump 3 Run Command, etc.		1		
Alarm Horn Silence		1		
Wet Well Level			1	
Generator Fuel Tank Level*			1	
Flow, Where Required			1	
Pressure, Where Required			1	

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SCADA Panel I/O Listing

2014

Used I/O	24	4	4	0
Estimated Spare I/O	8	12	0	0
TOTAL HARDWIRED I/O	32	16	4	0

Notes:

* Provide additional generator, transfer switch, and fuel system monitoring where available and as specified in other Utility Code Sections such as generator oil, temperature and cranking faults, and transfer switch position status and fail alarms. At the option of the Contractor, these signals may be communicated via digital communications such as Ethernet or serial Modbus.

1. Provide specific I/O as required for each individual site and modify total quantities as necessary.

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SCADA Panel I/O Listing

2014

Type 2 Control Panel: Constant Speed Pump Lift Station				
Typical Ethernet I/O Description	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
Power Phase Monitor Alarm Pump 1	1			
Power Phase Monitor Alarm Pump 2	1			
Power Phase Monitor Alarm Pump 3, etc.	1			
Motor Controller General Fail Pump 1	1			
Motor Controller General Fail Pump 2	1			
Motor Controller General Fail Pump 3, etc.	1			
Motor Controller Reset Pump 1		1		
Motor Controller Reset Pump 2		1		
Motor Controller Reset Pump 3, etc.		1		
Amps Pump 1			1	
Amps Pump 2			1	
Amps Pump 3, etc.			1	
Power Pump 1, Where Available			1	
Power Pump 2, Where Available			1	
Power Pump 3, etc., Where Available			1	
TOTAL ETHERNET I/O	6	3	6	0

Notes:

1. Provide Generator related I/O in this category where I/O is communicated via digital communications.
2. Motor controller resets are automatic for the first failure and manual for all other occurrences as required.

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SCADA Panel I/O Listing

2014

Type 3 Control Panel: Variable Speed Pump Lift Station				
Typical Hardwired I/O Description	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
Control Power Alarm	1			
Low-Low Level, All Pumps Off (ball float)	1			
High Level Alarm, All Pump Start PLC (ball float)	1			
High-High Level Alarm, All Pump Start Hardwired Override (ball float)	1			
Station Power Alarm	1			
Intrusion Alarm	1			
Main Surge Suppressor Fail	1			
Control Panel Surge Suppressor Fail	1			
UPS Fail	1			
Pump 1 Run Status	1			
Pump 2 Run Status	1			
Pump 3 Run Status, etc.	1			
Pump 1 Fault Status	1			
Pump 2 Fault Status	1			
Pump 3 Fault Status, etc.	1			
Pump 1 Remote Status	1			
Pump 2 Remote Status	1			
Pump 3 Remote Status, etc.	1			
Manual Transfer Switch Utility Power Available, where available*	1			
Generator Running Status, Where Available*	1			
Generator Fault, Where Available*	1			
Fuel Tank Low-Low Level*	1			
Fuel Tank High-High Level*	1			
Fuel Transmitter Fault*	1			
Pump 1 Run Command		1		
Pump 2 Run Command		1		
Pump 3 Run Command, etc.		1		
Alarm Horn Silence		1		
Wet Well Level			1	
Generator Fuel Tank Level*			1	
Flow, Where Required			1	
Pressure, Where Required			1	
Pump 1 Speed Command				1

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SCADA Panel I/O Listing

2014

Pump 2 Speed Command				1
Pump 3 Speed Command, etc.				1
Used I/O	24	4	4	3
Estimated Spare I/O	8	12	1	1
TOTAL HARDWIRED I/O	32	16	5	4

Notes:

* Provide additional generator, transfer switch, and fuel system monitoring where available and as specified in other Utility Code Sections such as generator oil, temperature and cranking faults, and transfer switch position status and fail alarms. At the option of the Contractor, these signals may be communicated via digital communications such as Ethernet or serial Modbus.

1. Provide specific I/O as required for each individual site and modify total quantities as necessary.

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WASTEWATER

Section 550-K

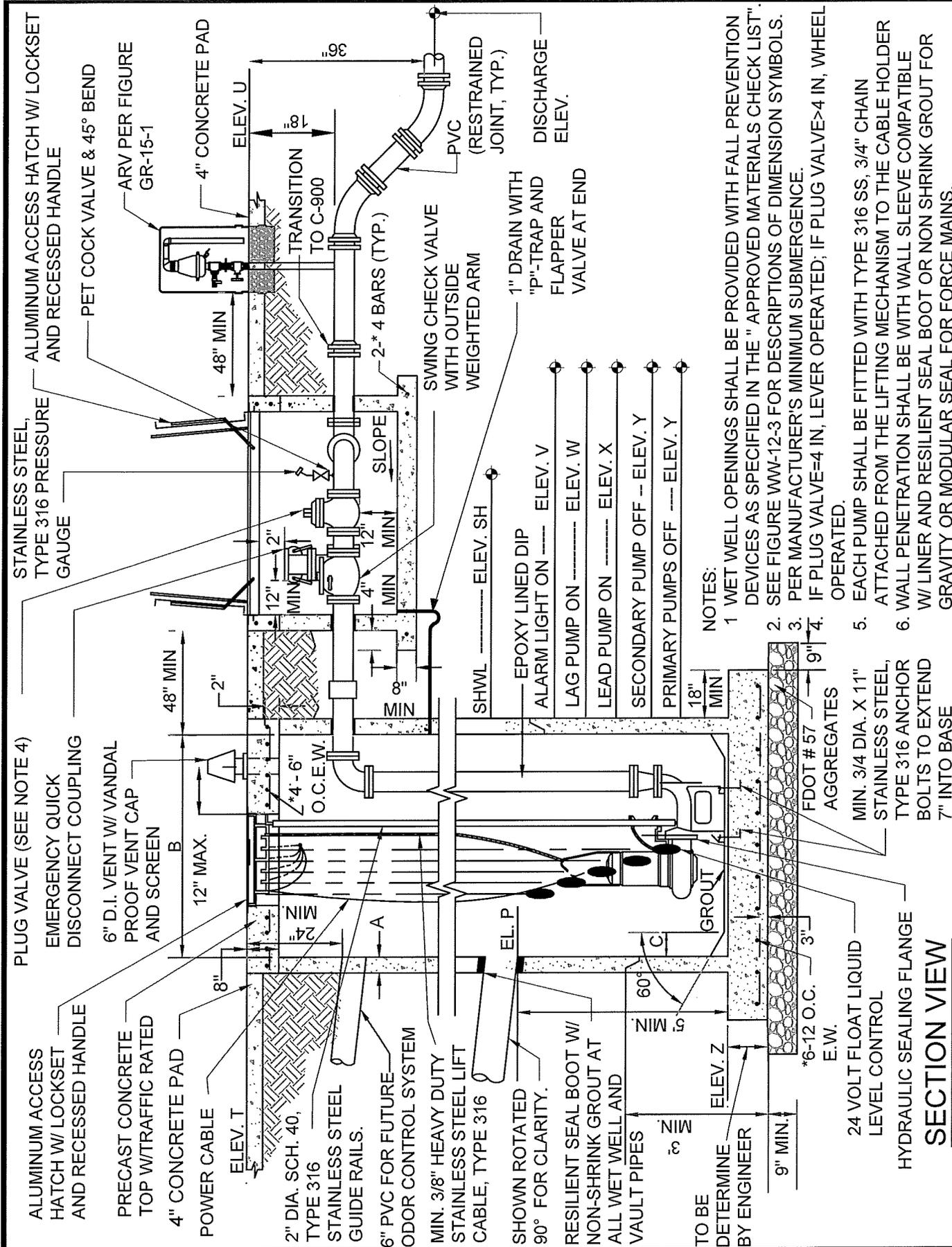
SCADA Panel I/O Listing

2014

Type 3 Control Panel: Variable Speed Pump Lift Station				
Typical Ethernet I/O Description	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs
Power Phase Monitor Alarm Pump 1	1			
Power Phase Monitor Alarm Pump 2	1			
Power Phase Monitor Alarm Pump 3, etc.	1			
Motor Controller General Fail Pump 1	1			
Motor Controller General Fail Pump 2	1			
Motor Controller General Fail Pump 3, etc.	1			
Motor Controller Reset Pump 1		1		
Motor Controller Reset Pump 2		1		
Motor Controller Reset Pump 3, etc.		1		
Pump 1 Speed Feedback			1	
Pump 2 Speed Feedback			1	
Pump 3 Speed Feedback, etc.			1	
Amps Pump 1			1	
Amps Pump 2			1	
Amps Pump 3, etc.			1	
Power Pump 1			1	
Power Pump 2			1	
Power Pump 3, etc.			1	
Torque Pump 1			1	
Torque Pump 2			1	
Torque Pump 3, etc.			1	
Total Ethernet I/O	6	3	12	0

Notes:

1. Provide Generator related I/O in this category where I/O is communicated via digital communications.
2. Motor controller resets are automatic for the first failure and manual for all other occurrences as required.



- NOTES:**
- 1 WET WELL OPENINGS SHALL BE PROVIDED WITH FALL PREVENTION DEVICES AS SPECIFIED IN THE "APPROVED MATERIALS CHECK LIST".
 2. SEE FIGURE WW-12-3 FOR DESCRIPTIONS OF DIMENSION SYMBOLS.
 3. PER MANUFACTURER'S MINIMUM SUBMERGENCE.
 4. IF PLUG VALVE=4 IN, LEVER OPERATED; IF PLUG VALVE>4 IN, WHEEL OPERATED.
 5. EACH PUMP SHALL BE FITTED WITH TYPE 316 SS, 3/4" CHAIN ATTACHED FROM THE LIFTING MECHANISM TO THE CABLE HOLDER
 6. WALL PENETRATION SHALL BE WITH WALL SLEEVE COMPATIBLE W/ LINER AND RESILIENT SEAL BOOT OR NON SHRINK GROUT FOR GRAVITY OR MODULAR SEAL FOR FORCE MAINS.

SECTION VIEW

**DUPLEX LIFT STATION WITH VALVE VAULT
SECTION VIEW**

**FIGURE
WW-12-2**

POLK COUNTY UTILITIES, FLORIDA

DECEMBER, 2010

DESCRIPTION	SYMBOL	DIMENSION	ELEVATION
THICKNESS OF WALL (8" MIN.)	A		—
DIAMETER OF WET WELL (6' MIN.)	B		—
WIDTH OF BOTTOM FILLET	C	SEE NOTE 1	—
C/L TO C/L OF PUMPS	D	SEE NOTE 1	—
LENGTH OF PUMP ACCESS OPENING	E	SEE NOTE 1	—
WIDTH OF PUMP ACCESS OPENING	F	SEE NOTE 1	—
BASE ELBOW TO EDGE OF PIT	G	SEE NOTE 1	—
VALVE BOX HATCH OPENING	H		—
VALVE BOX HATCH OPENING	I		—
TOP OF WET WELL	T	—	
FINISHED GRADE	U	—	
INVERT OF GRAVITY PIPE	P	—	
HIGH LEVEL ALARM, (P-6")	V	—	
LAG PUMP ON	W	—	
LEAD PUMP ON (SEE NOTE 2)	X	—	
PUMPS OFF (TOP OF PUMP VOLUTE)	Y	—	
FLOOR OF WET WELL	Z	—	
SEASONAL HIGH WATER ELEVATION (SEE NOTE 4)	SH	—	

NOTE:

1. PER PUMP MANUFACTURER'S REQUIREMENTS
2. ELEVATION X - ELEVATION Y \geq 4.5 FEET MINIMUM.
3. TOP OF PUMP STATION SHALL BE NO LOWER THAN THE 25 YEAR FLOOD 24 HOUR ELEVATION. THE BOTTOM OF STATION CONTROL AND ELECTRICAL BOXES SHALL BE NO LOWER THAN THE 100 YEAR 24-HOUR FLOOD ELEVATION.
4. SEASONAL HIGH GROUND WATER ELEVATION 'SH' SHALL BE CONSIDERED THE SAME AS THE TOP OF WET WELL ELEVATION.

**DUPLEX LIFT STATION
DIMENSIONS AND ELEVATIONS TABLE**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-12-3**

DECEMBER, 2010

PROPOSED

DESCRIPTION	SYMBOL	DIMENSION	ELEVATION
THICKNESS OF WALL (8" MIN.)	A		—
DIAMETER OF WET WELL (6' MIN.)	B		—
WIDTH OF BOTTOM FILLET	C	SEE NOTE 1	—
C/L TO C/L OF PUMPS	D	SEE NOTE 1	—
LENGTH OF PUMP ACCESS OPENING	E	SEE NOTE 1	—
WIDTH OF PUMP ACCESS OPENING	F	SEE NOTE 1	—
BASE ELBOW TO EDGE OF PIT	G	SEE NOTE 1	—
VALVE BOX HATCH OPENING	H		—
VALVE BOX HATCH OPENING	I		—
TOP OF WET WELL	T	—	
FINISHED GRADE	U	—	
INVERT OF GRAVITY PIPE	P	—	
HIGH-HIGH LEVEL ALARM, (P-6")	V	—	
HIGH LEVEL PUMPS ON	W	—	
LOW LEVEL PUMPS OFF (TOP OF PUMP VOLUTE)	Y	—	
FLOOR OF WET WELL	Z	—	
SEASONAL HIGH WATER ELEVATION (SEE NOTE 4)	SH	—	

NOTE:

1. PER PUMP MANUFACTURER'S REQUIREMENTS
2. ELEVATION X - ELEVATION Y \geq 4.5 FEET MINIMUM.
3. TOP OF PUMP STATION SHALL BE NO LOWER THAN THE 25 YEAR FLOOD 24 HOUR ELEVATION. THE BOTTOM OF STATION CONTROL AND ELECTRICAL BOXES SHALL BE NO LOWER THAN THE 100 YEAR 24-HOUR FLOOD ELEVATION.
4. SEASONAL HIGH GROUND WATER ELEVATION 'SH' SHALL BE CONSIDERED THE SAME AS THE TOP OF WET WELL ELEVATION.

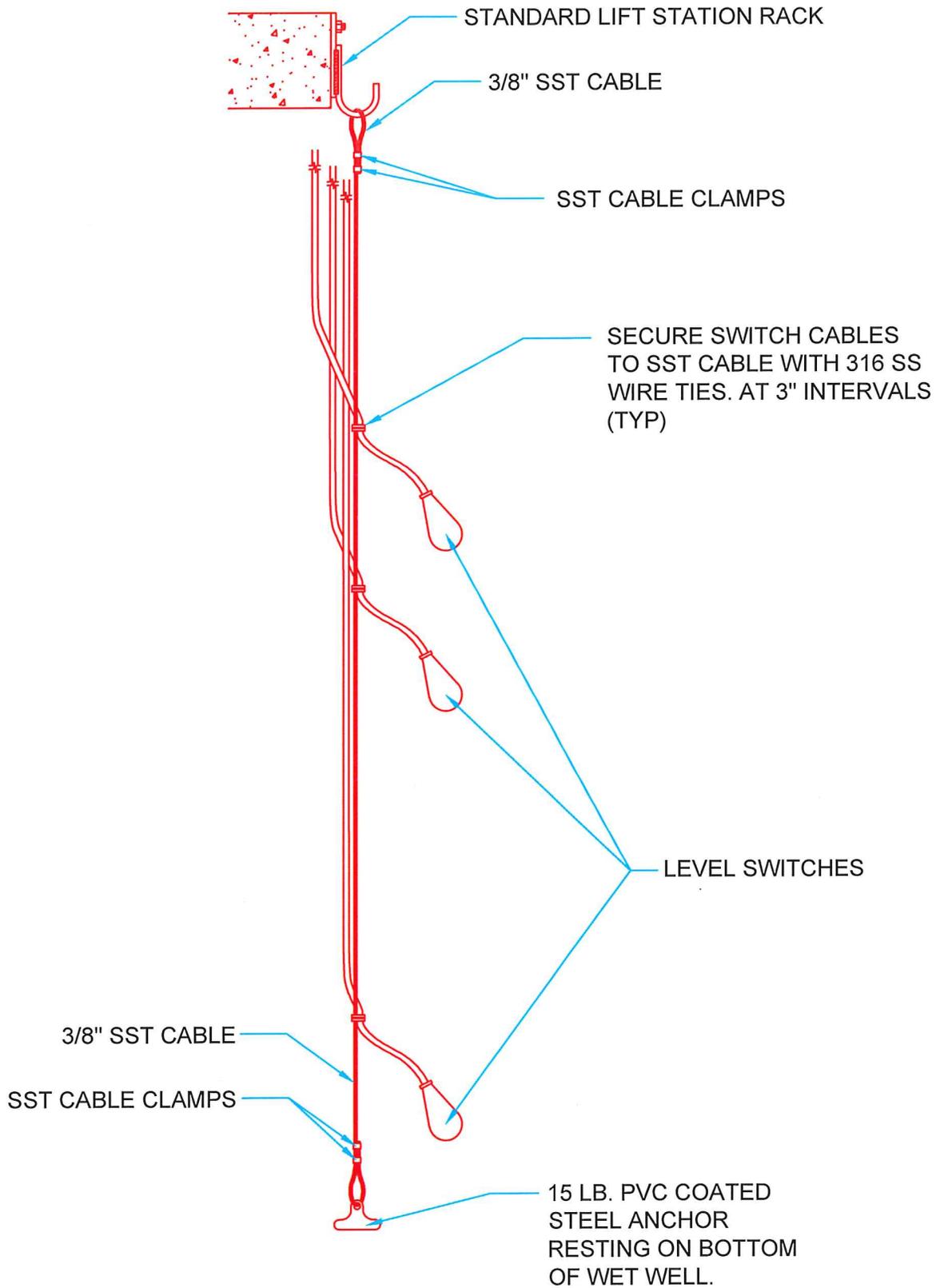
**DUPLEX LIFT STATION
DIMENSIONS AND ELEVATIONS TABLE**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-12-3**

DECEMBER, 2010

PROPOSED



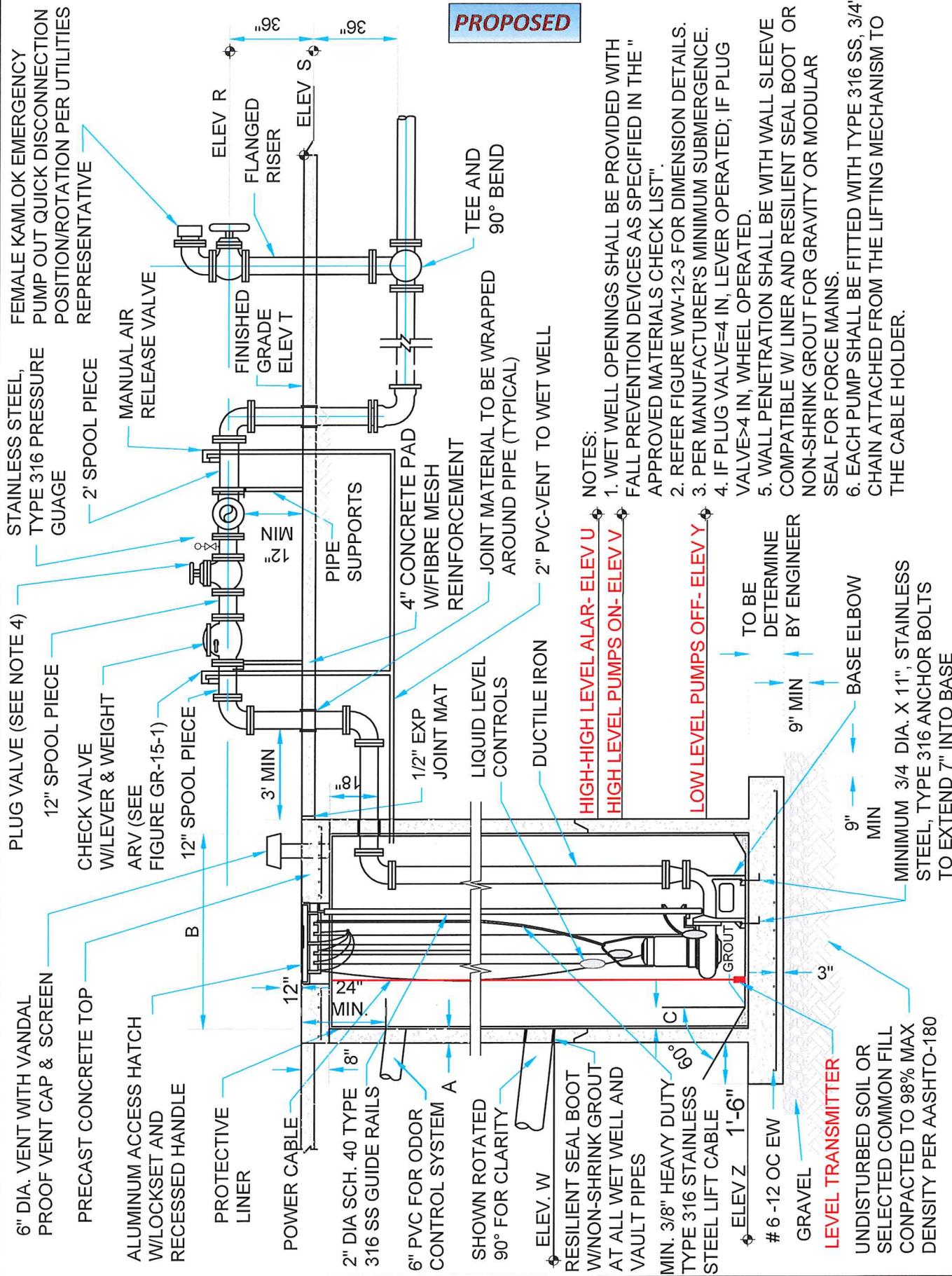
NOTES:

1. HANG FROM STANDARD LIFT STATION RACK

TYPICAL FLOAT TYPE LEVEL SWITCH INSTALLATION

**FIGURE
WW-12-4**

PROPOSED



6" DIA. VENT WITH VANDAL PROOF VENT CAP & SCREEN
 PRECAST CONCRETE TOP
 ALUMINUM ACCESS HATCH W/LOCKSET AND RECESSED HANDLE
 PROTECTIVE LINER
 POWER CABLE
 2" DIA SCH. 40 TYPE 316 SS GUIDE RAILS
 6" PVC FOR ODOR CONTROL SYSTEM
 SHOWN ROTATED 90° FOR CLARITY
 ELEV. W
 RESILIENT SEAL BOOT W/NON-SHRINK GROUT AT ALL WET WELL AND VAULT PIPES
 MIN. 3/8" HEAVY DUTY TYPE 316 STAINLESS STEEL LIFT CABLE
 ELEV Z 1'-6"

PLUG VALVE (SEE NOTE 4)
 12" SPOOL PIECE
 CHECK VALVE W/WEVER & WEIGHT ARV (SEE FIGURE GR-15-1)
 12" SPOOL PIECE
 STAINLESS STEEL, TYPE 316 PRESSURE GAUGE
 2' SPOOL PIECE
 MANUAL AIR RELEASE VALVE
 FINISHED GRADE ELEV T
 PIPE SUPPORTS
 4" CONCRETE PAD W/FIBRE MESH REINFORCEMENT
 JOINT MATERIAL TO BE WRAPPED AROUND PIPE (TYPICAL)
 2" PVC-VENT TO WET WELL

3' MIN
 1/2" EXP JOINT MAT
 LIQUID LEVEL CONTROLS
 DUCTILE IRON
 HIGH-HIGH LEVEL ALAR- ELEV U
 HIGH LEVEL PUMPS ON- ELEV V
 LOW LEVEL PUMPS OFF- ELEV Y
 TO BE DETERMINE BY ENGINEER
 9" MIN
 BASE ELBOW
 9" MIN
 MINIMUM 3/4 DIA. X 11", STAINLESS STEEL, TYPE 316 ANCHOR BOLTS TO EXTEND 7" INTO BASE

TEE AND 90° BEND
 TEE AND 90° BEND
 TEE AND 90° BEND

NOTES:
 1. WET WELL OPENINGS SHALL BE PROVIDED WITH FALL PREVENTION DEVICES AS SPECIFIED IN THE "APPROVED MATERIALS CHECK LIST".
 2. REFER FIGURE WW-12-3 FOR DIMENSION DETAILS.
 3. PER MANUFACTURER'S MINIMUM SUBMERGENCE.
 4. IF PLUG VALVE=4 IN, LEVER OPERATED; IF PLUG VALVE=4 IN, WHEEL OPERATED.
 5. WALL PENETRATION SHALL BE WITH WALL SLEEVE COMPATIBLE W/ LINER AND RESILIENT SEAL BOOT OR NON-SHRINK GROUT FOR GRAVITY OR MODULAR SEAL FOR FORCE MAINS.
 6. EACH PUMP SHALL BE FITTED WITH TYPE 316 SS, 3/4" CHAIN ATTACHED FROM THE LIFTING MECHANISM TO THE CABLE HOLDER.

DUPLEX OR TRIPLEX LIFT STATION (ABOVE GROUND PIPING) SECTION VIEW

FIGURE WW-14-2

DESCRIPTION	SYMBOLS	DIMENSIONS	ELEVATIONS
THICKNESS OF WALL 8" (MIN)	A		----
DIAMETER OF WET WELL 10' (MIN)	B		----
WIDTH OF BOTTOM FILLET	C	SEE NOTE 1	----
C/L TO C/L OF PUMPS	D	SEE NOTE 1	----
LENGTH OF PUMP ACCESS	E	SEE NOTE 1	----
WIDTH OF PUMP ACCESS	F	SEE NOTE 1	----
BASE ELBOW TO EDGE OF PIT	G	SEE NOTE 1	----
CENTERLINE OF HEADER PIPE	R	----	
TOP OF WELL	S	----	
FINISH GRADE	T	----	
INVERT OF GRAVITY PIPE	P	----	
HIGH LEVEL ALARM (P-6")	U	----	
LAG PUMP ON	V	----	
LAG PUMP ON (INVERT OF GRAVITY PIPE)	W	----	
LEAD PUMP ON (INVERT OF GRAVITY PIPE) (SEE NOTE 2)	X	----	
PUMPS OFF (TOP OF PUMP VOLUTE)	Y	----	
FLOOR OF WET WELL	Z	----	
SEASONAL HIGH WATER ELEVATION (SEE NOTE 4)	SH	----	

NOTE:

1. THESE DIMENSIONS SHALL BE SET AS PER PUMP MANUFACTURERS REQUIREMENTS.
2. ELEVATION W - ELEVATION Y \geq 5.5' MINIMUM.
3. TOP OF PUMP STATION SHALL BE NO LOWER THAN THE 25 YEAR 24 HOUR FLOOD ELEVATION. THE BOTTOM OF STATION CONTROL AND ELECTRICAL BOXES SHALL BE NO LOWER THAN THE 100 YEAR 24 HOUR FLOOD ELEVATION.
4. SEASONAL HIGH GROUND WATER ELEVATION (SH) SHALL BE CONSIDERED THE SAME AS THE TOP OF WET WELL ELEVATION.

**TRIPLEX LIFT STATION
DIMENSIONS AND ELEVATIONS TABLE**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-14-3**

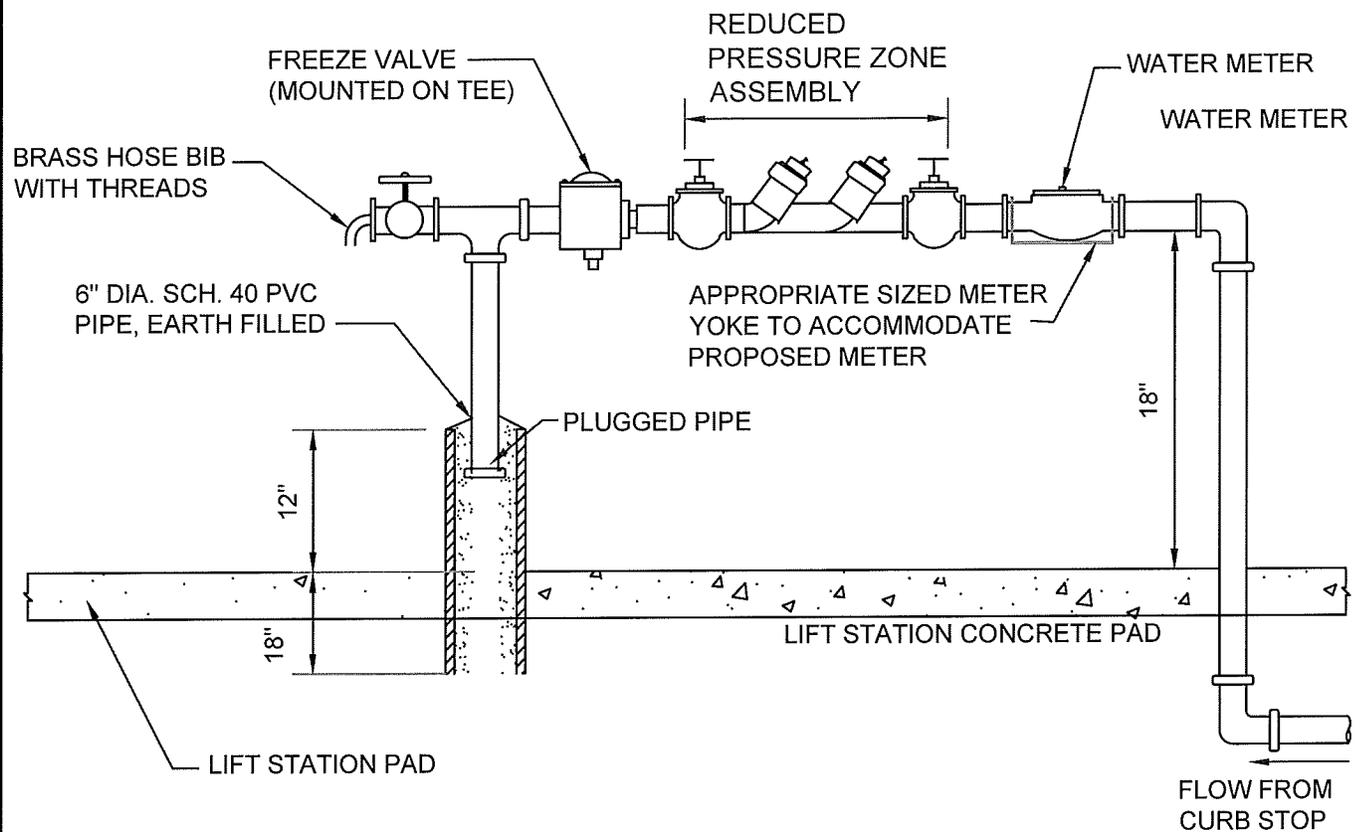
DECEMBER, 2010

PROPOSED

DESCRIPTION	SYMBOLS	DIMENSIONS	ELEVATIONS
THICKNESS OF WALL 8" (MIN)	A		----
DIAMETER OF WET WELL 10' (MIN)	B		----
WIDTH OF BOTTOM FILLET	C	SEE NOTE 1	----
C/L TO C/L OF PUMPS	D	SEE NOTE 1	----
LENGTH OF PUMP ACCESS	E	SEE NOTE 1	----
WIDTH OF PUMP ACCESS	F	SEE NOTE 1	----
BASE ELBOW TO EDGE OF PIT	G	SEE NOTE 1	----
CENTERLINE OF HEADER PIPE	R	----	
TOP OF WELL	S	----	
FINISH GRADE	T	----	
INVERT OF GRAVITY PIPE	P	----	
HIGH-HIGH LEVEL ALARM (P-6")	U	----	
HIGH LEVEL - PUMP ON	V	----	
LOW LEVEL PUMPS OFF (TOP OF PUMP VOLUTE)	Y	----	
FLOOR OF WET WELL	Z	----	
SEASONAL HIGH WATER ELEVATION (SEE NOTE 4)	SH	----	

NOTE:

1. THESE DIMENSIONS SHALL BE SET AS PER PUMP MANUFACTURERS REQUIREMENTS.
2. TOP OF PUMP STATION SHALL BE NO LOWER THAN THE 25 YEAR 24 HOUR FLOOD ELEVATION. THE BOTTOM OF STATION CONTROL AND ELECTRICAL BOXES SHALL BE NO LOWER THAN THE 100 YEAR 24 HOUR FLOOD ELEVATION.
3. SEASONAL HIGH GROUND WATER ELEVATION (SH) SHALL BE CONSIDERED THE SAME AS THE TOP OF WET WELL ELEVATION.



NOTES:

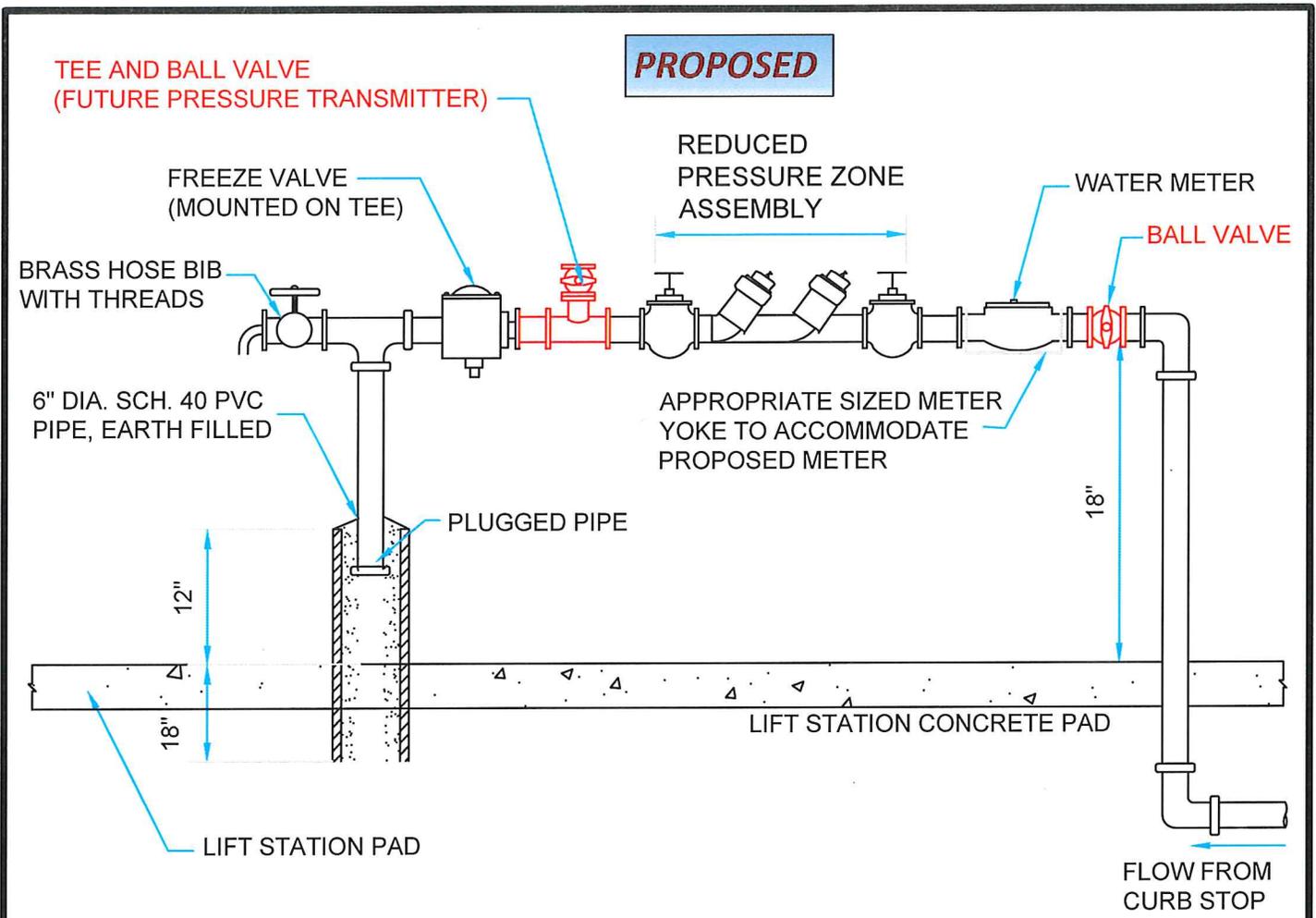
1. ALL ABOVE GROUND PIPING AND APPURTENANCES SHALL BE 3/4" SCH 40 BRASS PIPE.
2. AN APPROVED REDUCED PRESSURE ZONE ASSEMBLY SHALL BE SELECTED IN ACCORDANCE WITH PCU'S " APPROVED CROSS CONNECTION CONTROL ASSEMBLY LIST"
3. UNDERGROUND PIPING SHALL CONFORM TO POTABLE WATER SERVICE LATERAL SPECIFICATIONS FOR PE PIPE.
4. ALL ABOVE GRADE PIPING SHALL RECEIVE TWO COATS OF BLUE EPOXY PAINT.
5. METER SHALL BE FURNISHED AND INSTALLED BY PCU.
6. THE CONTRACTOR SHALL FURNISH AND INSTALL ENTIRE ASSEMBLY, INCLUDING METER YOKE.

**LIFT STATION WASH DOWN ASSEMBLY
(TYPICAL)**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-18**

DECEMBER, 2010

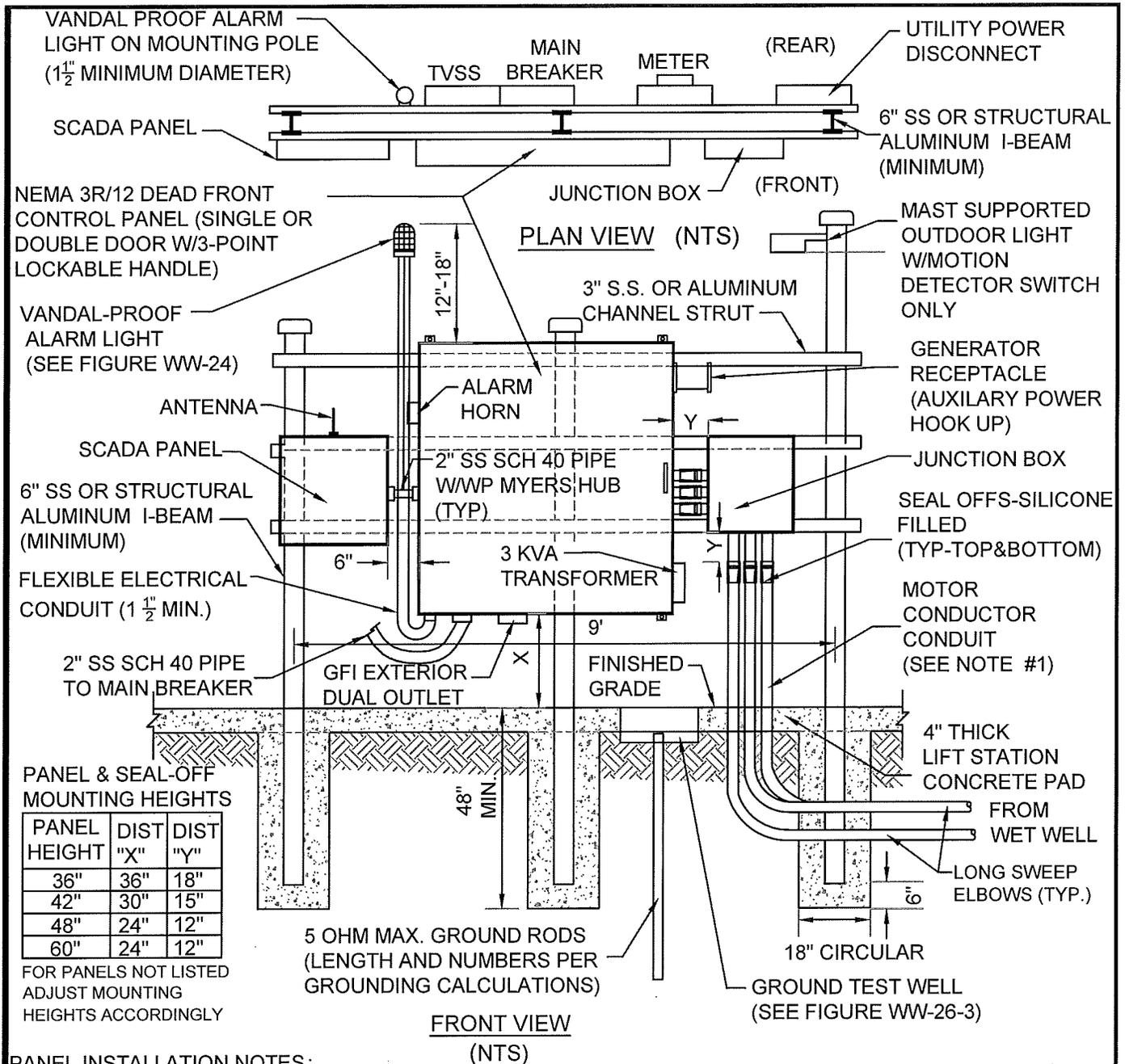


NOTES:

1. ALL ABOVE GROUND PIPING AND APPURTENANCES SHALL BE 3/4" SCH 40 BRASS PIPE.
2. AN APPROVED REDUCED PRESSURE ZONE ASSEMBLY SHALL BE SELECTED IN ACCORDANCE WITH PCU'S " APPROVED CROSS CONNECTION CONTROL ASSEMBLY LIST"
3. UNDERGROUND PIPING SHALL CONFORM TO POTABLE WATER SERVICE LATERAL SPECIFICATIONS FOR PE PIPE.
4. ALL ABOVE GRADE PIPING SHALL RECEIVE TWO COATS OF BLUE EPOXY PAINT.
5. METER SHALL BE FURNISHED AND INSTALLED BY PCU.
6. THE CONTRACTOR SHALL FURNISH AND INSTALL ENTIRE ASSEMBLY, INCLUDING METER YOKE.

**LIFT STATION WASH DOWN ASSEMBLY
(TYPICAL)**

**FIGURE
WW-18**



PANEL INSTALLATION NOTES:

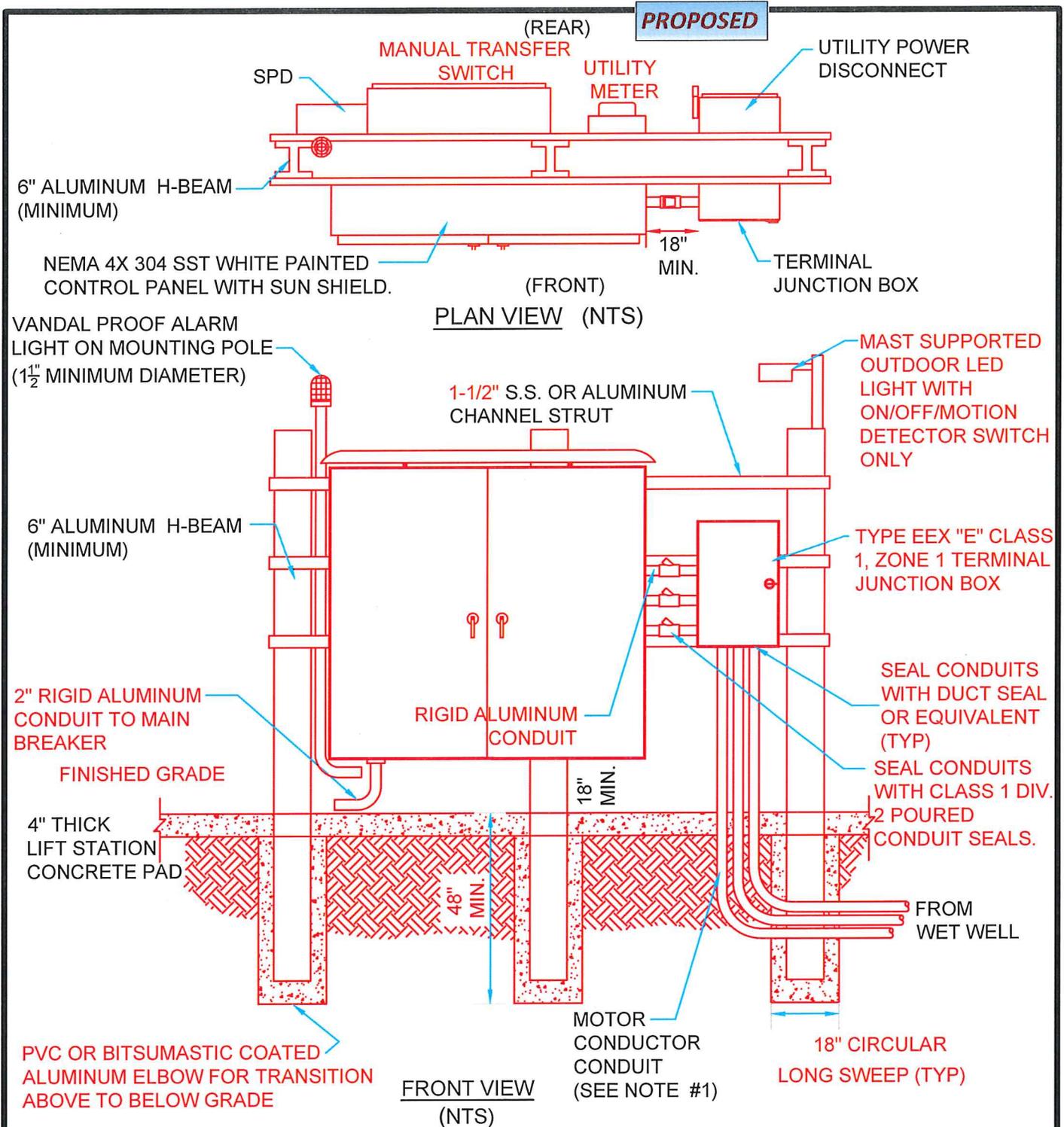
1. PUMP MOTOR CONDUIT SHALL BE SIZE TO ACCOMMODATE 40% CONDUIT FILL. MINIMUM CONDUIT SIZE TO BE 2" SCH 80 PVC.
2. POWER SUPPLY SHALL BE 3 PHASE AND UNDERGROUND FROM THE LIFT STATION METER BASE TO THE 3-PHASE SOURCE.
3. AN ELECTRICAL GROUNDING SYSTEM SHALL BE INSTALLED AS PER NEPA CHAPTER 780 AND THE NATIONAL ELECTRICAL CODE. AN UNDERGROUND PERIMETER CABLE GROUNDING SYSTEM SHALL BE INSTALLED WITH CONNECTIONS TO AT LEAST THE WET WELL COVER, VALVE VAULT COVER, CONTROL PANELS, GENERATOR, UTILITY COMPANY TRANSFORMER, MANUAL DISCONNECT SWITCH, AND METAL FENCE. SEE GROUNDING DETAILS.
4. THE STATION NAME, PCU I.D. NUMBER, AND ADDRESS SHALL BE AFFIXED TO THE FRONT OF THE PANEL CABINET AS SPECIFIED BY PCU.
5. ALL MOUNTING HARDWARE & BRACKETS SHALL BE 316 STAINLESS STEEL.
6. THE ENGINEER SHALL INCREASE THE SIZE OF THE VERTICAL SUPPORT MEMBERS DEPENDING ON WIND LOAD REQUIREMENTS.

**LIFT STATION CONTROL PANEL
FRONT VIEW**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-20-1**

DECEMBER, 2010



PANEL INSTALLATION NOTES:

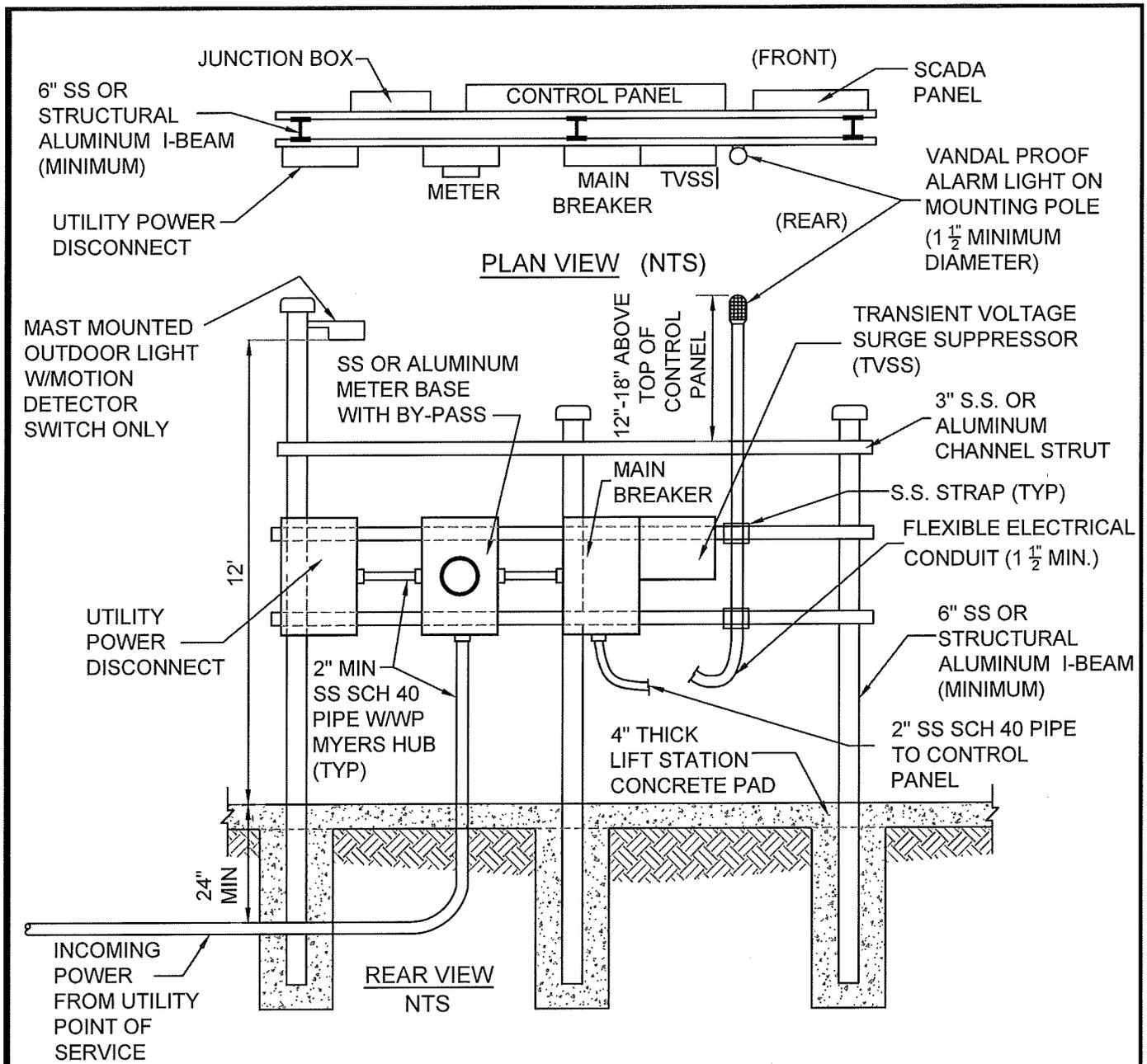
1. PUMP MOTOR CONDUIT SHALL BE SIZE TO ACCOMMODATE 40% CONDUIT FILL. MINIMUM CONDUIT SIZE TO BE 2" SCH 80 PVC.
2. POWER SUPPLY SHALL BE 3 PHASE AND UNDERGROUND FROM THE LIFT STATION METER BASE TO THE 3-PHASE SOURCE.
3. THE STATION NAME, PCU I.D. NUMBER, AND ADDRESS SHALL BE AFFIXED TO THE FRONT OF THE PANEL CABINET AS SPECIFIED BY PCU.
4. ALL MOUNTING HARDWARE & BRACKETS SHALL BE 316 STAINLESS STEEL.
5. THE ENGINEER SHALL INCREASE THE SIZE OF THE VERTICAL SUPPORT MEMBERS DEPENDING ON WIND LOAD REQUIREMENTS.

**LIFT STATION CONTROL PANEL
FRONT VIEW**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-20-1**

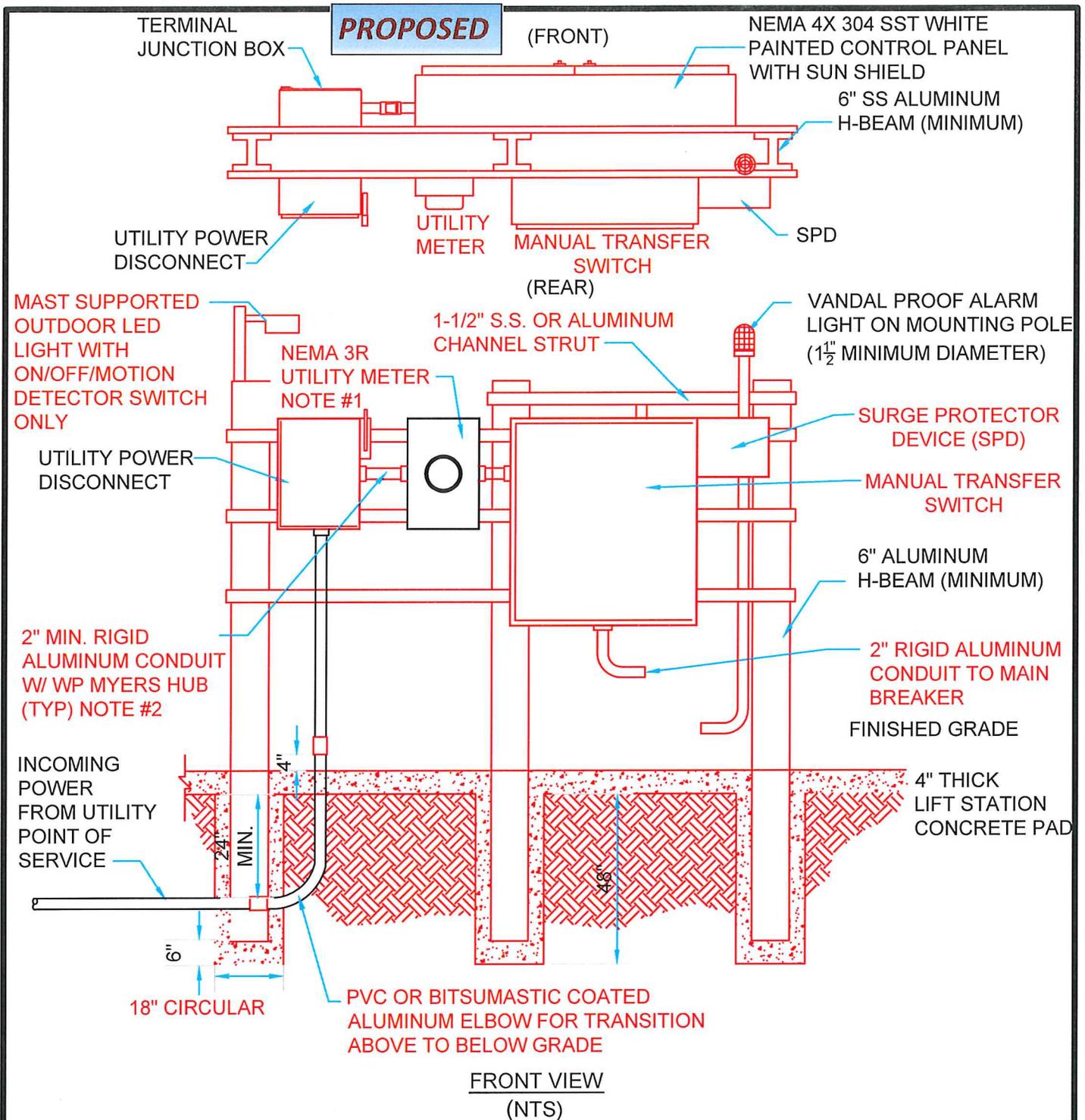
DECEMBER, 2010



PANEL INSTALLATION NOTES:

1. PUMP MOTOR CONDUIT SHALL BE SIZE TO ACCOMMODATE 40% CONDUIT FILL. MINIMUM CONDUIT SIZE TO BE 2" SCH 80 PVC.
2. POWER SUPPLY SHALL BE 3 PHASE AND UNDERGROUND FROM THE LIFT STATION PANEL TO THE 3-PHASE SOURCE.
3. AN ELECTRICAL GROUNDING SYSTEM SHALL BE INSTALLED AS PER NEPA CHAPTER 780 AND THE NATIONAL ELECTRICAL CODE. AN UNDERGROUND PERIMETER CABLE GROUNDING SYSTEM SHALL BE INSTALLED WITH CONNECTIONS TO AT LEAST THE WET WELL COVER, VALVE VAULT COVER, CONTROL PANELS, GENERATOR, UTILITY COMPANY TRANSFORMER, MANUAL DISCONNECT SWITCH, AND METAL FENCE. REFER TO GROUNDING DETAILS.
4. THE STATION NAME, PCU I.D. NUMBER, AND ADDRESS SHALL BE AFFIXED TO THE FRONT OF THE PANEL CABINET AS SPECIFIED BY PCU.
5. ALL MOUNTING HARDWARE & BRACKETS SHALL BE 316 STAINLESS STEEL.
6. THE ENGINEER SHALL INCREASE THE SIZE OF THE VERTICAL SUPPORT MEMBERS DEPENDING ON WIND LOAD REQUIREMENTS.

LIFT STATION CONTROL PANEL REAR VIEW	FIGURE WW-20-2
POLK COUNTY UTILITIES, FLORIDA	DECEMBER, 2010



PANEL INSTALLATION NOTES:

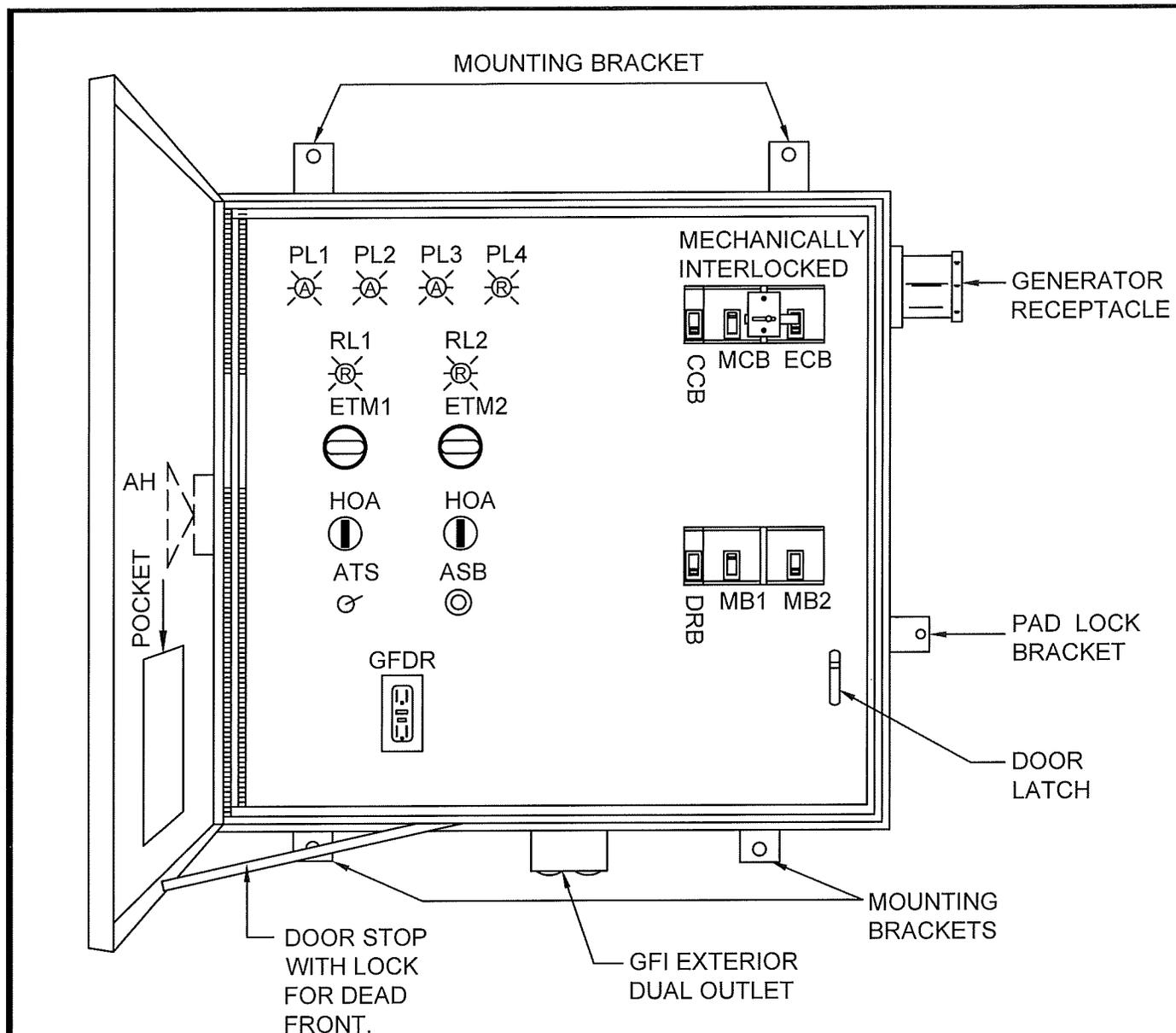
1. PROVIDE METER BASE AS REQUIRED BY THE ELECTRICAL UTILITY.
2. POWER SUPPLY SHALL BE 3 PHASE AND UNDERGROUND FROM THE LIFT STATION PANEL TO THE 3-PHASE SOURCE.
3. ALL MOUNTING HARDWARE & BRACKETS SHALL BE 316 STAINLESS STEEL.
4. THE ENGINEER SHALL INCREASE THE SIZE OF THE VERTICAL SUPPORT MEMBERS DEPENDING ON WIND LOAD REQUIREMENTS.

**LIFT STATION CONTROL PANEL
REAR VIEW**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-20-2**

DECEMBER, 2010



NOTES:

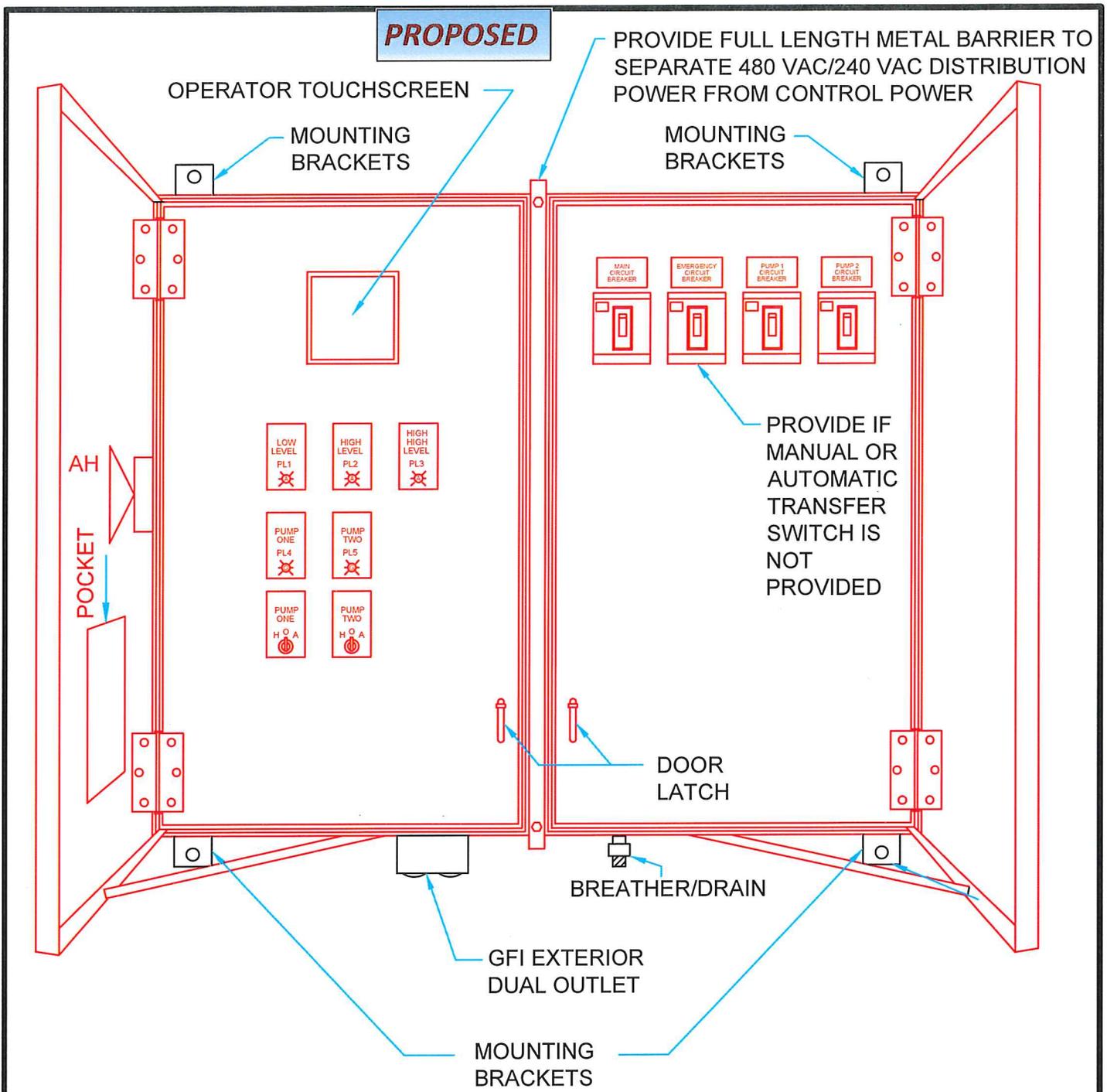
1. DEADFRONT LAYOUT NEMA TYPE 3R SS ENCLOSURE W/CONTINUOUS HINGE. ALL HARDWARE TYPE 316 SS TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER.
2. THIS CONTROL PANEL, INCLUDING THE GENERATOR RECEPTACLE SHALL COMPLY WITH THE STANDARD LIST OF COMPONENTS REQUIRED BY PCU.
3. ALL CONTROL WIRE TO BE #14 AWG MINIMUM.
4. CONTROL PANEL SHALL BE UL LISTED AND LABELED.
5. A VANDAL PROOF RED ALARM LIGHT SHALL BE LOCATED ON TOP OF A. 1½ INCH MINIMUM DIAMETER SCHEDULE 40 POLE THAT IS SECURELY ATTACHED TO THE HORIZONTAL CHANNEL STRUTS. THE TOP OF LIGHT SHALL BE 12 TO 18 INCHES ABOVE THE TOP OF THE CONTROL PANEL BOX. A FLEXIBLE 1½ INCH MINIMUM DIAMETER ELECTRICAL CONDUIT SHALL BE USED TO CONNECT THE BOTTOM OF THE MOUNTING POLE TO THE BOTTOM OF THE CONTROL PANEL.

**DUPLEX CONTROL PANEL ENCLOSURE
DEAD FRONT LAYOUT (TYPICAL)**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-24**

DECEMBER, 2010



NOTES:

1. DEADFRONT LAYOUT NEMA TYPE 4X WHITE PAINTED 304 SS ENCLOSURE W/CONTINUOUS HINGE. ALL HARDWARE TYPE 316 SS TYPICAL, ACTUAL LAYOUT MAY VARY WITH HORSEPOWER.
2. SIZE LABEL AND MODIFY LAYOUT AS REQUIRED FOR PANEL TYPE AND NUMBER OF PUMPS.
3. ALL CONTROL WIRE TO BE #14 AWG MINIMUM.
4. CONTROL PANEL SHALL BE UL LISTED AND LABELED.

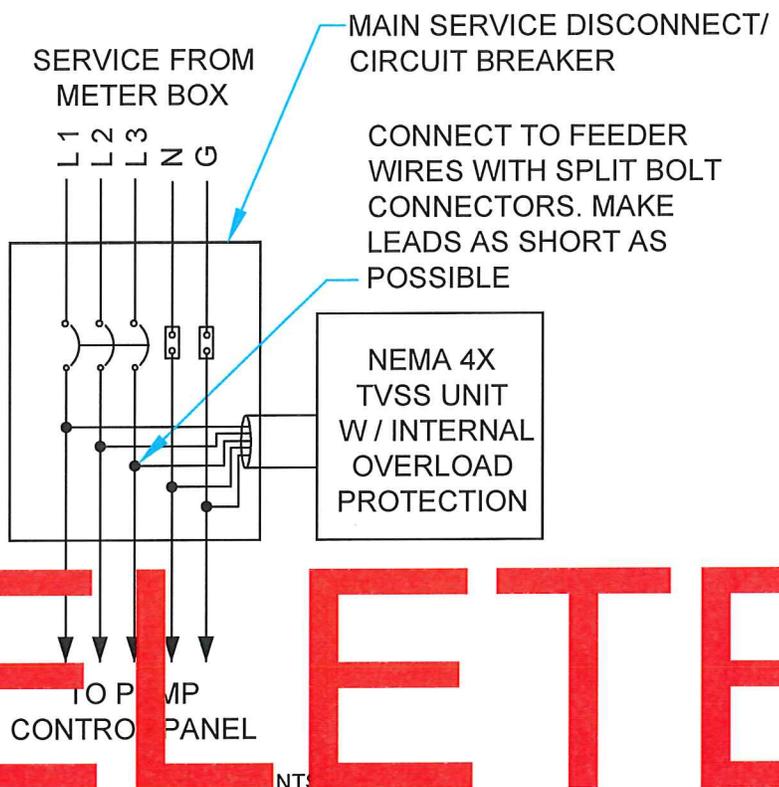
**DUPLEX CONTROL PANEL ENCLOSURE
DEAD FRONT LAYOUT (TYPICAL)**

POLK COUNTY UTILITIES, FLORIDA

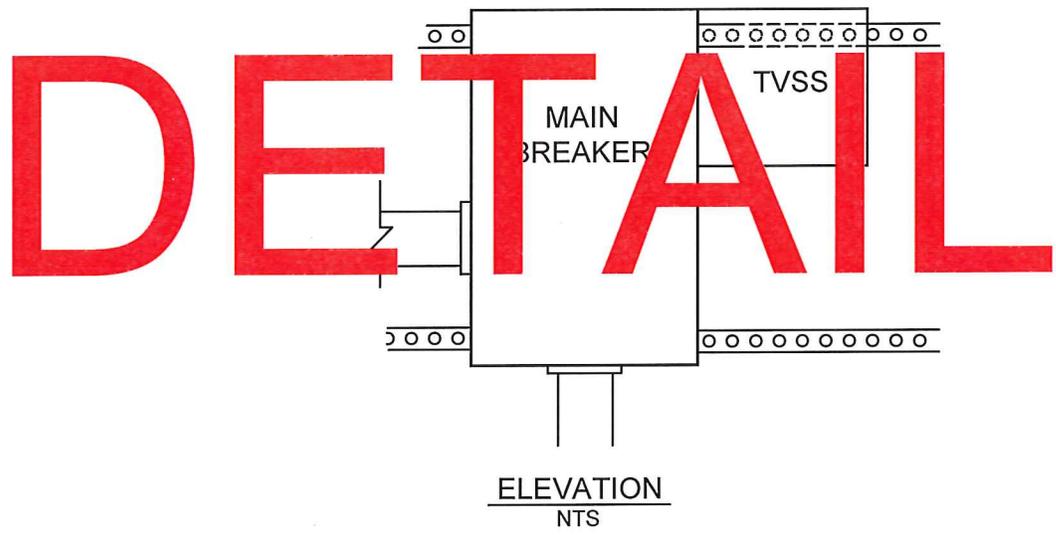
**FIGURE
WW-24**

DECEMBER, 2010

PROPOSED



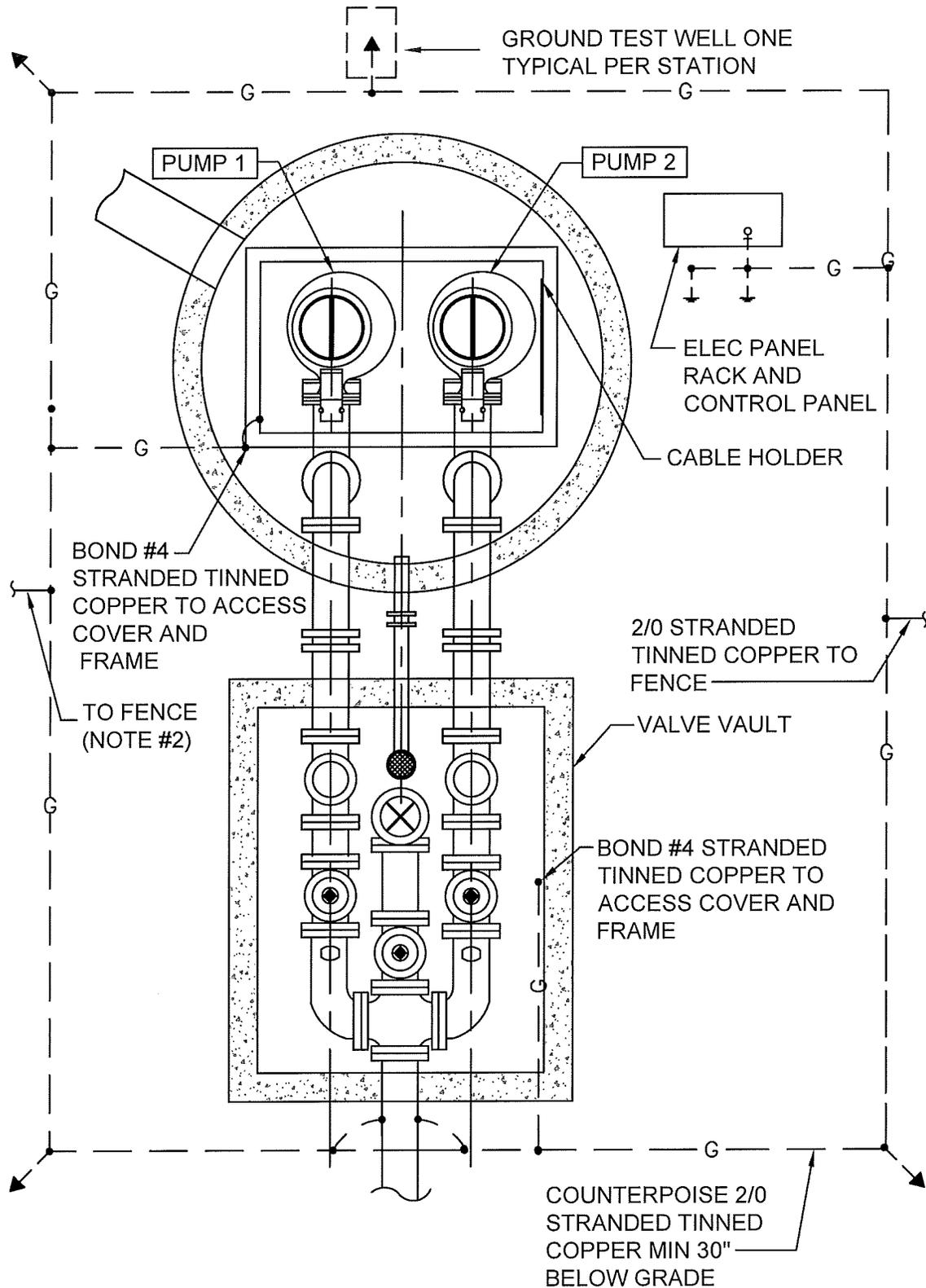
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LIFT STATION TVSS INSTALLATION (TYPICAL)

FIGURE
WW-25

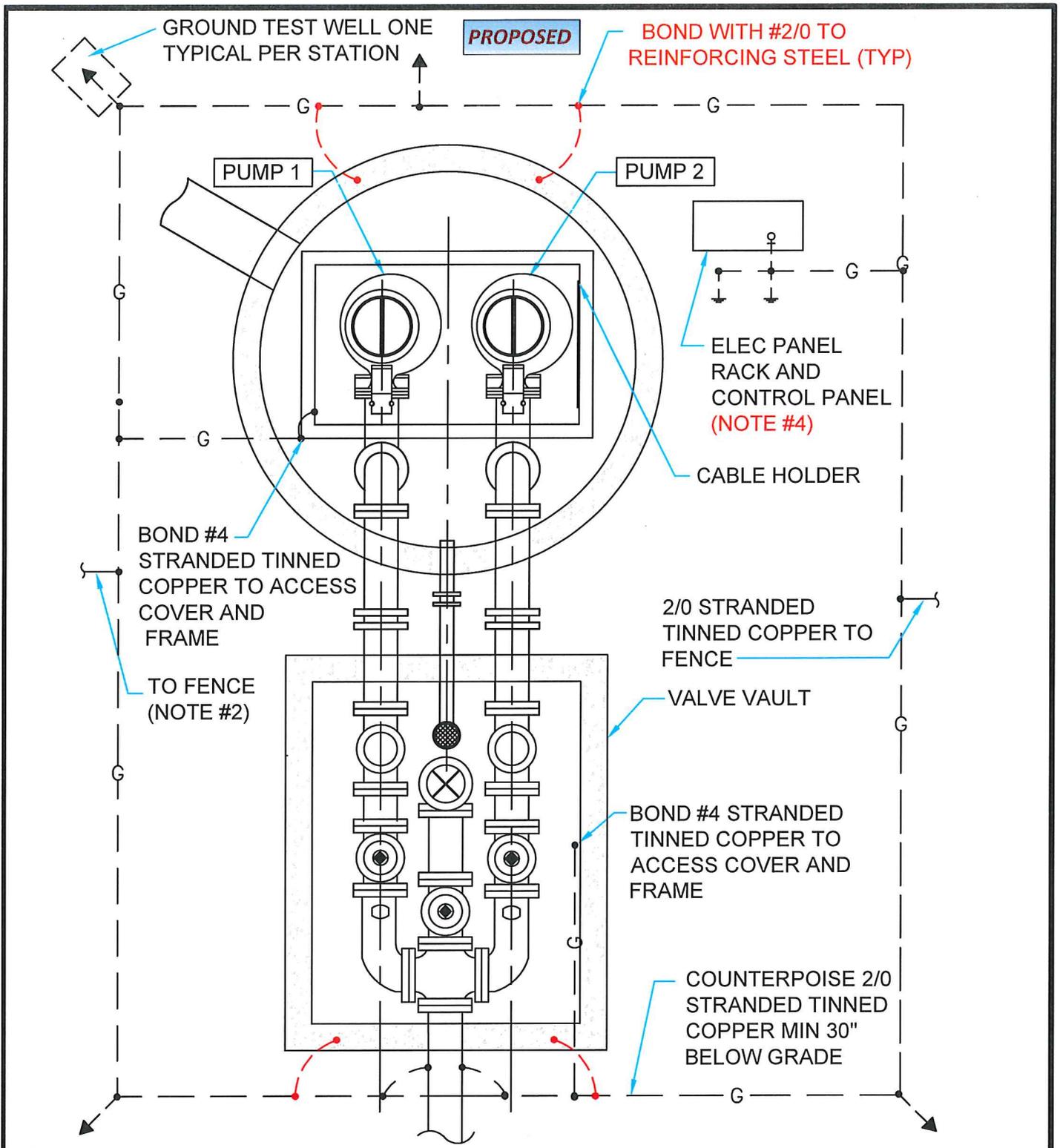


NOTES:

1. DETAIL IS GENERIC. SPECIFIC LOCATIONS OF EQUIPMENT MAY VARY.
2. TIE TO FENCE, MINIMUM 2 LOCATIONS. NOT REQUIRED WHERE BLOCK WALL OR WOOD FENCE IS INSTALLED.
3. PROVIDE EXOTHERMIC WELDS UNLESS NOTED OTHERWISE.

LIFT STATION GROUNDING (TYPICAL)

**FIGURE
WW-26-1**

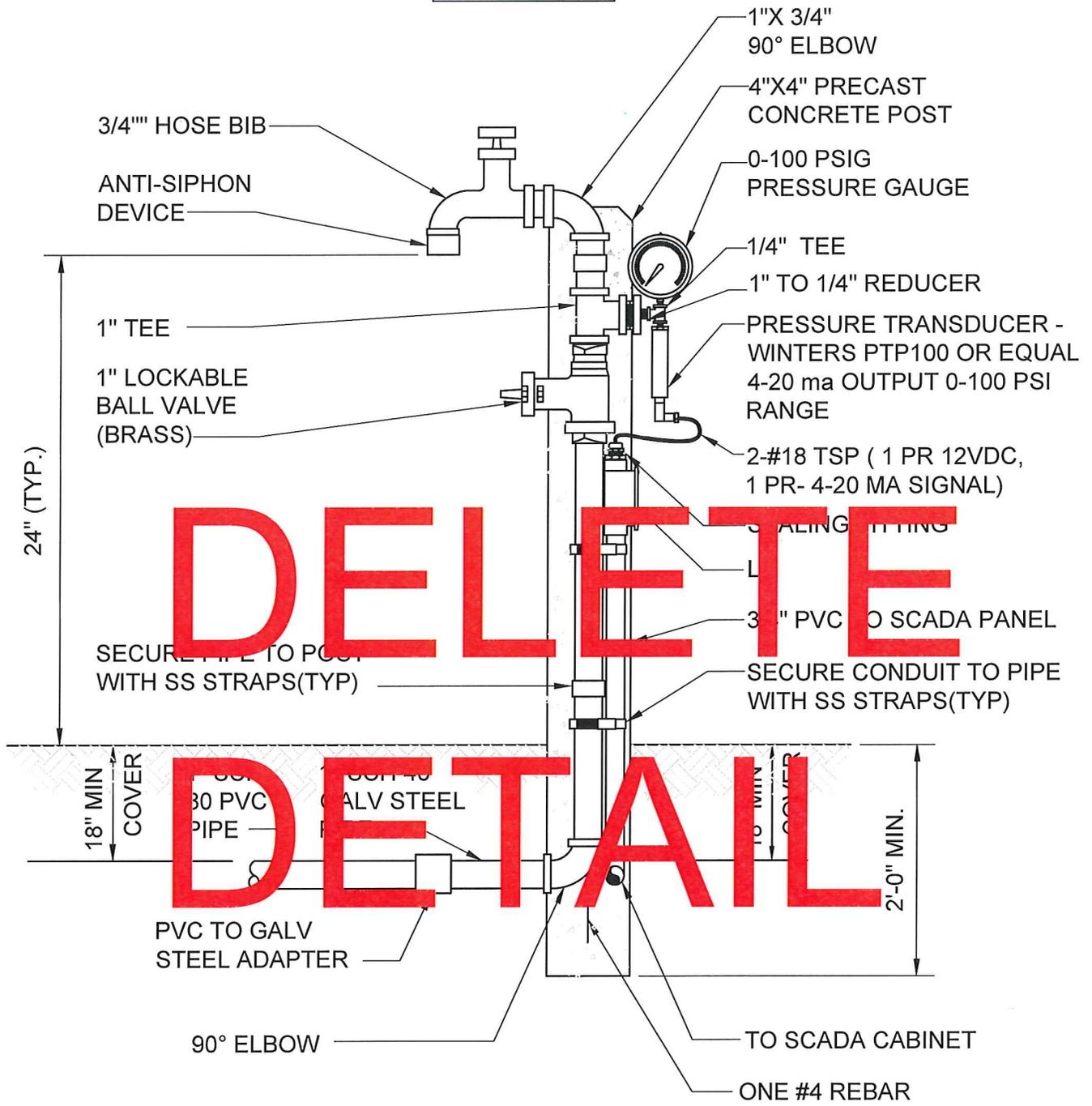


NOTES:

1. DETAIL IS GENERIC. SPECIFIC LOCATIONS OF EQUIPMENT MAY VARY.
2. TIE TO FENCE, MINIMUM 2 LOCATIONS. NOT REQUIRED WHERE BLOCK WALL OR WOOD FENCE IS INSTALLED.
3. PROVIDE EXOTHERMIC WELDS **FOR ALL BELOW GRADE AND STRUCTURAL STEEL CONNECTIONS** UNLESS NOTED OTHERWISE.
4. **PROVIDE MINIMUM #6 AWG XHHW INSULATED COPPER GROUND WIRE IN CONDUIT TO ALL ENCLOSURE BUS BARS FOR ENCLOSED GROUNDING. BOND MINIMUM #2 TINNED COPPER GROUND WIRE TO ALL ELECTRICAL SUPPORT RACKS.**

LIFT STATION GROUNDING (TYPICAL)	FIGURE WW-26-1
POLK COUNTY UTILITIES, FLORIDA	DECEMBER, 2010

PROPOSED



NOTE :

1. THIS WATER SERVICE SHALL BE USED AS A SUBSTITUTE FOR FIGURE WW-18 AS REQUIRED BY PCU WHEN IT IS NECESSARY TO REMOTELY MONITOR AREAS WITH CRITICAL WATER PRESSURE NEEDS.

**SCADA PRESSURE SENSOR
WATER SERVICE**

POLK COUNTY UTILITIES, FLORIDA

**FIGURE
WW-27**

DECEMBER, 2010

Chapter 6: (Section 650-B) Approved Materials Checklist (Reclaimed):

- Change “Tracer” to “Locating” (Cat 2, Cat 3)
- Updated specification to reference cast iron reader (Cat 2)

CHAPTER 6

RECLAIMED WATER

Section 650-B

Approved Materials Checklist

December 2010

PLEASE TYPE OR PRINT CLEARLY IN BLACK INK

Project Name: _____

PCU Project File Number: _____

Contractor's Name: _____

Contractor's Address: _____

Contractor's Signature: _____

Engineer's Name: _____

Engineer's Address: _____

PCU Reviewer: _____	Date: _____
Approved: _____	Denied/Resubmit: _____
Comments:	

With the submission of this document, the CONTRACTOR understands that the use of the following selected items, as individually indicated by the use of an "X", is mandatory.

Substitutions using other items contained within this Checklist shall be initiated by the CONTRACTOR submitting a revised Checklist to PCU for its review and approval at least 10 calendar days in advance of need.

It is also understood by the CONTRACTOR that PCU shall reject materials and products not in accordance with this document and the MANUAL. Any material or product not contained within this Checklist shall be approved in advance by the Utilities Code Committee in accordance with the provisions of the Utilities Code.

Shop drawings shall be required for all structures and similar items not contained within this checklist, such as manholes, wet wells, and other castings.

CHAPTER 6

RECLAIMED WATER

Section 650-B

Approved Materials Checklist

	Endot	PE-4710 EndoTrace	Alternative Pipe and Tracer - <u>Locating</u> Wire Combo
	Charter Plastics	PE-4710	
	ARNCO	PE-4710 Perma-Guard	
	ARNCO	PE-4710 Perma-Find	Alternative Pipe and Tracer - <u>Locating</u> Wire Combo
	ADS	CTS 200 PSI DR-9	Service Tubing
Service Saddles (Epoxy Or Nylon Coated Stainless Steel 18-8-Type 304 Straps, Iron Pipe Threads – 2-inch To Be Iron Pipe Threads Controlled OD Saddles To Be Used On C-900 And IPS OD PVC Pipe, Double Straps To Be 2-inch Minimum Width Each.):			
	Ford	Series FC202	
	JCM	Series 406	
	Mueller	DR2S, DR2SOD	
	McDonald	3835, 3855	
	Romac	202N-H	For Use With HDPE Pipe
Y Branch (1-inch By 2-inch):			
	Ford	U-48-43	
	Mueller	P15363	
	McDonald	08U2M	
Y Branch Assemblies With Angle Ball Valves (1-inch By 2-inch):			
	Ford	UVB43-42W	
	Mueller	P15363-05	
	McDonald	09U2BW	
Meter Boxes w/ Plastic-<u>Cast Iron</u> Lids (Pantone 522-C Purple, HDPE, with English and Spanish Identification and Warning Wording plus International “Do Not Drink” Symbol on Top):			
	Carson PolyPlastic	4015-12 <u>10152026</u> (Box) <u>10151019</u> (Combo)	4015-5 <u>10154008</u> (Lid)
	DFW Alliance	DFW-1200 D5-12-Body-12 (Box) —DFW 1200- 12.5R <u>D5-12-5C</u> (Combo Unit)	DFW-1200- 5C-LIDR (Lid)

CHAPTER 6

RECLAIMED WATER

Section 650-B

Approved Materials Checklist

December 2010

	NAPCO		North American Pipe Company
	Upinor ETI 9		
	Underground Solutions	Fusible PVC	<u>For Horizontal Directional Drill Use Only</u>
HDPE Pipe DR11 (Pantone 522-C Purple Striped):			
	Chevron/Phillips	Performance Pipe / ISCO Pipe	
	CSR	Polypipe/Charter Plastics	
	ARNCO		
	J-M Eagle		
	National Pipe		
Reclaimed Water Main Identification Tape (Pantone 522-C Purple, 6-Inches Wide, 2-Inches High Black Lettering, Adhesive Backed):			
Buried Reclaimed Water Main Warning Tape (Pantone 522-C Purple, 3-inches Wide, 1-Inch High Black Lettering, Non-Adhesive Backed):			
Reclaimed Water Locating Wire (Single Strand 14-Gauge Solid Copper Wire with Pantone 522-C Purple Colored Insulated Covering):			
	Copperhead	Reinforced <u>Locating</u> Tracer Wire	Alternative
Locating Marker Systems (Reclaimed Water) (Pantone 522-C Purple In Color):			
	3M	Scotch Mark EMSII Electronic Marker Purple Locator #1265	
	3M	Scotch Marker Electronic Ball Marker #1404	
Curb and Pavement Markers (Pantone 522-C Purple in Color, Imprinted With The Words "POLK COUNTY UTILITIES" And "CALL 811 BEFORE YOU DIG" With "RECLAIMED WATER SERVICE" or "RECLAIMED WATER VALVE" As Applicable):			
	Rhino	ATAGNCT-C (Custom Imprinting)	New Construction
	Rhino	ATAGRFT-C (Custom Imprinting)	Retrofit to Existing Improvements
	DAS Manufacturing	Reflective Duracast Style (Custom Imprinting)	New Construction or Retrofit

Cross Connection Control Policy Manual (6C)

- Update Definition of Master Meter Assembly

CROSS CONNECTION CONTROL POLICY MANUAL

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types of process waters and "used waters" originating from the public potable water system which may deteriorate in sanitary quality; chemicals in fluid form; plating acids and alkalis; circulated cooling water connected to an open cooling tower and/or cooling waters that are chemically or biologically treated or stabilized with toxic substances; contaminated natural water such as from wells, springs, streams, rivers, bays, harbors, seas, irrigation canals or systems, etc., oil, gases, glycerin, paraffins, caustic and acid solutions; and other liquid and gaseous fluids used in commercial/industrial type processes or for fire fighting purposes.

INDUSTRIAL PIPING SYSTEM (CUSTOMER'S): any system used by the CUSTOMER for transmission, confinement or storage of any liquid, solid or gaseous substance other than an approved potable water supply. An industrial piping system includes all pipes, conduits, tanks, receptacles, fixtures, equipment and appurtenances used to produce, convey or store substances that can pollute or contaminate potable water.

INTERNAL USE: the utilization of a device or devices within any premises on the CUSTOMER's side of a water supply meter and/or master meter assembly and beyond the primary Cross Connection Control Device that protects the public water supply.

LABORATORY (APPROVED FOR TESTING): the FCCCHR or other testing laboratory approved by PCU.

MANUAL: the most recent edition of the Cross Connection Control Policy Manual of Polk County, Florida.

MASTER METER ASSEMBLY: a meter and cross connection control assembly combination that serves two or more entities on a single non-single family or non-duplex residential premise, such as shopping centers, schools, office complexes, and multi-family developments. The assembly shall be used to provide potable water for either domestic use only or combined domestic and fire suppression use applications. The meter shall be an ~~an compound~~ **ultra sonic** type for domestic uses and a fire-line type for combined uses. The cross connection control assembly shall be a reduced pressure principle assembly type in all situations.

OWNER: the legally recognized owner, or authorized representative, of real property within Polk County.

PLUMBING OFFICIAL: the Polk County Building Official.

PLUMBING SYSTEM: the water supply and distribution pipes, plumbing fixtures and traps, soil, waste and vent pipes, building drains and sewers, including their respective connections, devices and appurtenances within the property line of the premises, and water-treating or water-using equipment.

Reclaimed Water Policy Manual (6D)

- 2.0 Definitions Add definition for “ACTIVE”
- Tweak “AVAILABLE”
- 4.0 Connection and Use
 - 4.1 Availability of Service
 - 4.3 Requirements to Connect
 - 6.0 Inspections

RECLAIMED WATER POLICY MANUAL

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1.0 INTRODUCTION

1.1 General

Potable water is a valuable resource which needs to be conserved, and reclaimed water is also a valuable water resource which can be used safely for irrigation and other non-potable purposes, thereby substantially contributing to the conservation of potable water. The COUNTY has determined to establish and construct a reclaimed water system which will make reclaimed water available in certain areas of the ~~COUNTY~~ county for irrigation and other authorized non-potable uses. This MANUAL establishes certain terms and conditions regarding the use of the reclaimed water system.

1.2 Intent

It shall be the policy of Polk County Utilities (PCU) to make reclaimed water available for irrigation purposes and other authorized non-potable uses in certain areas of the ~~COUNTY~~ county where it is determined that the construction of a reclaimed water transmission/distribution system is necessary, practical, and beneficial in accordance with the LAND DEVELOPMENT CODE and the COMPREHENSIVE PLAN. The reclaimed water system shall be constructed in sections to provide service to designated areas as determined by PCU pursuant to the terms and conditions set forth herein.

1.3 Purpose

It is the purpose of this MANUAL to promote the public health, safety, and welfare by the establishment of a Reclaimed Water Program, by regulating the construction of reclaimed water transmission/distribution systems determined to be necessary and beneficial, and by governing the use of reclaimed water.

1.4 Applicability

The provisions of this MANUAL shall apply to certain areas of the COUNTY where it is determined that the construction of a reclaimed water system is practical, necessary, and beneficial in accordance with the LAND DEVELOPMENT CODE and the COMPREHENSIVE PLAN. The reclaimed water distribution system shall be constructed to provide service to designated areas determined by ~~the Board~~ PCU pursuant to the terms and conditions set forth herein.

2.0 DEFINITIONS

The following words, terms, and phrases, when used in this MANUAL, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning.

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ACTIVE: ~~regarding the activation of reclaimed water service, the definition of this term is applicable to a developer or other potential CUSTOMER having property with an internal reclaimed water distribution system and using an automatic irrigation system, which has been connected to the main transmission system and reclaimed water is flowing through the system~~ **PCU owned line or system charged with reclaimed water.**

AVAILABLE: the definition of this term as utilized in the Polk County ~~Comprehensive Land Use Plan~~ **Development Code** regarding the availability of reclaimed water service.

BACKFLOW: the undesirable reversal of water flow or mixtures of water or other liquids, gases, or other substances into the distribution pipes of the potable water system from any source or sources as defined by rule 62-555 F.A.C.

COMPREHENSIVE PLAN: the Polk County Comprehensive Plan.

COUNTY: Polk County Board of County Commissioners, Polk County, Florida and/or its designated representative or the political subdivision of the State of Florida.

CROSS CONNECTION CONTROL ASSEMBLY (CCC): an assembly that has been manufactured in full conformance with AWWA standards and meets the laboratory and feed performance specifications of the FCCHR cross connection control assemblies that also comply with the requirement of Rule 62-555, F.A.C.

CROSS-CONNECTION: a connection or potential connection between any part of a potable water system and any other environment containing other substances in a manner that, under any circumstances would allow such substances to enter the potable water system. Other substances may be gases, liquids, or solids, such as chemicals, waste products, steam, water from other sources (potable or non-potable), or any matter that may change the color or add odor to the water.

CUSTOMER OR USER: any person, firm, or corporation, or governmental entity, using or receiving water from the PCU reclaimed water system. Reclaimed water customers are further classified as follows:

- **Retail:** any individual customer served by a single meter that is 3-inches or less in size, where access to another source of non-potable water for irrigation is unavailable. Includes but is not limited to: residential customers; individual commercial establishments such as small office and retail centers; common areas and greenways of subdivisions (billed to Homeowners Association or Property Owners Association); etc.
- **Bulk-Priority:** any commercial or industrial customer served by one or more meters 3-inches in size or greater, downstream of which there are no retail customers and where storage and/or access to another source of non-potable water

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for irrigation and other uses is unavailable. May include, but not limited to: certain multi-family residential complexes; commercial tracts occupied by more than one tenant; industrial users; parks and playgrounds; schools; cemeteries; etc.

- **Bulk-Interruptible:** any commercial or industrial user served by one or more meters 3-inches in size or greater, downstream of which there are no metered retail customers and where storage and/or access to another source of non-potable water for irrigation and other uses is available. May include, but not limited to: golf courses; certain multi-family residential complexes; industrial users; etc.

The difference between the two classes of Bulk users is the availability of an access to an alternate supply of non-potable water, which determines the degree of interruptibility of the two classes. Because Bulk-interruptible customers have storage capability and/or an alternate supply, they will be the first to be shut down in the event of a reclaimed water shortage. Therefore, they may expect to pay less for the service. Bulk-priority customers are less likely to be shut down in the event of a reclaimed water shortage than Bulk-interruptible customers, but more likely to be interrupted than Retail customers. Therefore, Bulk-priority customers may expect to pay more than Bulk-interruptible customers and less than Retail customers for the service.

Retail customers are the least interruptible class of customers. Therefore, retail customers will be the last customers to be shut down in the event of a reclaimed water shortage and may expect to pay higher rates for the service than the other two classes of customers.

DIRECTOR: the person who is responsible for the day to day administration and management of Polk County Utilities.

DISTRIBUTION MAINS: conduits used to supply reclaimed water from transmission mains to service lines.

DISTRICT: the Water Management District and/or Florida Department of Environmental Protection (FDEP) having jurisdiction within the Regional Utility Service Area.

ENGINEER: an individual currently licensed to practice engineering in the State of Florida.

LAND DEVELOPMENT CODE: the Polk County Land Development Code.

NON-RESIDENTIAL: a land development project intended for construction of infrastructure improvements for non-residential unit(s) and/or use. Non-residential units and/or uses include all units/uses that are not individually metered single family dwellings, including, but not limited to: commercial, industrial, institutional, short-term rental, and other business enterprises, and all master-metered residential developments, such as duplex, triplex, quadruplex, apartment, condominium, and other multi-family units/complexes, mobile home parts, recreational vehicle parks, etc.

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POLK COUNTY UTILITIES (PCU): the Polk County entity which has the responsibility of administering, operating, and maintaining the ~~PCU~~ Utility Systems.

POTABLE WATER: water from any source which has been approved for human consumption by the ~~County~~ COUNTY and appropriate regulatory agencies.

RECLAIMED WATER: in the context of this MANUAL, wastewater that has received at least advanced secondary treatment, high-level disinfection, and filtration after treatment and discharge from a domestic wastewater treatment facility as specified in Rule 62-610.460 Florida Administrative Code (FAC), for the purpose of reclaimed water in areas of unrestricted public access. Reclaimed water may also include non-potable water obtained from augmentation wells and other sources.

REFERENCE MANUAL 6(A): the Polk County Utilities Administration Manual, adopted by reference herein.

REFERENCE MANUAL 6(B): the Polk County Utilities Standards and Specifications Manual, adopted by reference herein.

REFERENCE MANUAL 6(C): the Polk County Utilities Cross-Connection Control Policy Manual, adopted by reference herein.

REFERENCE MANUAL 6(D): this Manual, the Polk County Utilities Reclaimed Water Policy Manual (MANUAL), adopted by reference herein.

REFERENCE MANUAL 6(E): the Polk County Industrial Wastewater Pre-Treatment Policy Manual, adopted by reference herein.

REFERENCE MANUAL 6(F): the Polk County Utilities Water Conservation Policy Manual, adopted by reference herein.

REFERENCE MANUAL 6(G): the Polk County Utilities Fats, Oils, and Grease Policy Manual, adopted by reference herein.

REGIONAL UTILITY SERVICE AREA: those designated portions of Polk County in which PCU maintains the exclusive right to provide public utility systems.

RESIDENTIAL: a user which is a single residential dwelling unit served by an individual meter, not including a short-term rental unit.

REUSE OR USE: in the context of reclaimed water, the deliberate application and use of reclaimed water, in compliance with FDEP and Water Management District rules.

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SERVICE CONNECTION: the point at which the customer's irrigation system is connected to the PCU reclaimed water system. For individual residential customers, the service connection shall be located inside a purple meter box as described in the "Utilities Standards and Specifications Manual". For commercial customers, the service connection shall be located immediately downstream of the reclaimed water meter and isolation valves.

SERVICE LINE: that conduit used to supply reclaimed water from the distribution main to the property line.

SHORT-TERM RENTAL: a dwelling unit which is made available more than three times a year for periods of fewer than 30 calendar days or one calendar month at a time, whichever is less, for use, occupancy or possession by the public, regardless of the form of ownership of the unit. Dwelling units commonly referred to as "timeshares," "vacation rentals," and "holiday rentals" which possess the above characteristics are included within this definition.

TRANSMISSION MAINS: those conduits used to supply reclaimed water from the pumping station or treatment plant to the distribution mains.

3.0 AUTHORITY

3.1 Authority to Adopt Rules and Regulations

The COUNTY shall have the authority to establish reasonable rules and regulations concerning the use of reclaimed water, or to amend existing rules and regulations so as to remain in compliance with applicable State and Federal regulations.

3.2 Authority to Adopt Rates, Fees, and Charges

The COUNTY shall have the authority to establish rates, fees, and charges for the reclaimed water system and to provide terms and conditions for the payment and collection of same.

3.3 Water Management Districts

The jurisdiction of the COUNTY includes lands located in both the Southwest Florida Water Management District and the South Florida Water Management District. It would be advantageous, under most hydrologic conditions, for the COUNTY's population to be subject to one consistent set of year-round water conservation measures, and when necessary, one consistent set of temporary water shortage restrictions on a countywide basis. Given that the majority of the population in the ~~COUNTY~~ county and the majority of the public water supplies and domestic wells that serve this population are currently located within the Southwest Florida Water Management District, the most logical set of related rules to follow would be those of the Southwest Florida Water Management District.

The COUNTY shall have the authority to adopt ordinances and policies to protect the water resources of the ~~COUNTY~~ county from inefficient use at all times and over-utilization during periods of water shortage by assisting the Southwest Florida Water Management District in the implementation of its Year-Round Water Conservation Measures and Water Shortage Plan.

4.0 CONNECTION AND USE

4.1 Availability of Service

Other than Bulk Users, reclaimed water service will not be provided to any customer that does not have an active potable water source in place, except as specified in Section 6.0 of this MANUAL. Single family residential lots shall have active potable water service prior to activation of reclaimed water service. A developer may submit a written request to the Growth Management Department Land Development Division for an exception to the requirement of this Section if the certificate of occupancy has not been issued, the developer has provided reasonable assurance to PCU that no people will be inside the structure(s) structures are unoccupied, and no irrigation well or alternative source of water exists for the establishment of new sod or grass seed landscaping in the development.

The required distance for a development to construct an off-site reclaimed water main in order to connect to an existing reclaimed water system with available capacity shall be as specified in the LAND DEVELOPMENT CODE and the COMPREHENSIVE PLAN. A developer or other interested person, after contacting the PCU Capacity Engineer, shall refer to the ~~effected Regional Utilities Service Area's~~ current Master Plan to determine the time frame of reclaimed water service availability within a particular Regional Utilities Service Area.

4.2 Requirement to Install Onsite Distribution and Irrigation Systems

Where a proposed development or any parcel of land is to be served by a wastewater treatment facility that has available capacity to produce public access quality reclaimed water suitable for reclaimed water in areas of unrestricted public access as stipulated in Chapter 62-610, Part III, FAC, PCU shall require a developer or user, in accordance with the provisions of the LAND DEVELOPMENT CODE and the COMPREHENSIVE PLAN, to install, at his cost, the necessary onsite and offsite mains, valves, pumps, meters, common area irrigation systems, signage, storage facilities, and other appropriate appurtenances for the reuse of reclaimed water. Such installation shall be a condition of system acceptance or development approval and shall be completed prior to issuance of certificate of occupancy.

A developer ~~ment~~ or other user may request to be excused from the requirement of reclaimed water usage only when he can establish to the satisfaction of PCU that reclaimed water is not reasonable for use on his property, such as proven environmental concerns or other considerations. A request for an exception from the requirements of this Section shall be in writing from the developer or property owner and shall set forth the reasons for the desired exception. In the event an exception is granted by PCU, which has been coordinated with the

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Growth Management Department, the developer or property owner may still be required, at their cost, to extend reclaimed water mains around or across his property and convey the necessary unencumbered Polk County Utilities Easements and/or public rights-of-way to the COUNTY to facilitate the transmission of reclaimed water to adjoining or nearby properties for reclaimed water reuse or disposal.

4.3 Requirements to Connect

It shall be unlawful to use the PCU potable water system for irrigation purposes after reclaimed water becomes ~~available to~~ **active at** a particular site. Customers with existing underground irrigation systems using the PCU potable water system shall be required to disconnect said systems from the PCU potable water system and connect to the reclaimed water system within 90 calendar days of written notice of ~~availability~~ **activation**.

All new irrigation systems constructed after the initial effective date of March 5, 2003 in areas where PCU plans to make reclaimed water available shall connect to the PCU reclaimed water system upon the earlier of the following two dates:

- A. When reclaimed water ~~is not available~~ **has not been activated** at the time of construction of the irrigation system, then connection shall be required within 90 days after receipt of written notice from PCU that reclaimed water **has been** ~~is available~~ **activated**.
- B. When reclaimed water is available **and active** at the time of construction of the irrigation system, then connection shall be required immediately and such connection shall be a condition to connection of the improvements on said property to the PCU potable water system.

Customers may continue to use existing irrigation wells for irrigation purposes after reclaimed water is available ~~if, -there is an existing valid permit for the well on the subject property. In such case, the customer may request and be granted permission in writing from PCU to wait until that permit expires before connecting to the active reclaimed water system. The irrigation well permit shall not be renewed. A copy of the permit shall be provided to PCU along with the request for an exception from the requirements of this Section.~~

Customers with existing irrigation wells who wish to connect to the reclaimed water system must first physically disconnect the irrigation system from the existing irrigation well and provide evidence of an air gap separation between the well and the irrigation system, or otherwise provide, at the customer's own expense, a cross connection control assembly and valving system between the irrigation well and the irrigation system meeting the specifications stipulated by PCU.

4.4 Application for Connection

Customers in designated Regional Utility Service Areas shall connect to the reclaimed water system when service is available and upon submission of a proper application in accordance with the “Utilities Administration Manual” and compliance with all PCU requirements. Compliance with this MANUAL in no way relieves the property owner or user from the responsibility for obtaining and fulfilling the requirements of construction or other permits required by and issued by agencies other than PCU.

Application for connection to the reclaimed water system shall be made to PCU on the form provided for that purpose. Such service charges and inspection fees as established by the Board shall be paid to PCU at the time the application is filed.

In accordance with the “Utilities Standards and Specifications Manual”, construction plans and hydraulic calculations for an irrigation system meeting the requirements of these regulations shall be submitted to PCU for approval for reclaimed water distribution systems, where required for new subdivisions and other new developments. The plans and calculations shall be prepared by a professional engineer licensed in the State of Florida and shall comply with the provisions of the “Utilities Standards and Specifications Manual”. FDEP construction permits, if applicable under current regulations, will be required for installation of reclaimed water distribution systems.

4.5 Limitations of Use

- A. Use of reclaimed water shall be limited to irrigation of residential lawns, golf courses, cemeteries, parks, greenways, common areas, open spaces, landscaped areas, decorative water features, highway medians, rights-of-ways, and other similar areas which the developer or user plans to irrigate; or other uses specifically approved by PCU and allowed under Chapter 62-610, FAC.
- B. Reclaimed water shall not be used inside any residential dwelling, or to fill swimming pools, hot tubs, spas, or wading pools or other open waters where human contact or immersion may occur.
- C. Reclaimed water shall not be applied to areas within 100 feet of any public outdoor eating, drinking, or bathing facility, unless aerosol formation is minimized.
- D. Reclaimed water shall not be applied to impervious surfaces that allow drainage to surface waters.
- E. Detailed limitations governing the use of Reclaimed Water are contained in the “Reclaimed Water Use Acknowledgment and Application,” that is located in the “Utilities Administration Manual.”

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- F. Reclaimed water shall not be utilized for toilet flushing or fire suppression except in extreme emergency situations as required by the Fire Marshall and approved by PCU in accordance with Chapter 62-610.476, FAC-.

4.6 Discontinuance of Service

PCU may discontinue reclaimed water service to any customer due to a violation of the provisions of this MANUAL or other COUNTY regulations, for non-payment of bills, for tampering with any service, for plumbing cross-connections with another water source, for acts detrimental to the system, or for the convenience of PCU. PCU has the right to cease service until the condition is corrected and all costs due PCU are paid. These costs may include delinquent billings and payment for any damage caused to the system. Should discontinued service be reconnected without authorization, then PCU shall remove the service and make such additional charges as are established by the COUNTY.

Reconnection of a reclaimed water system to a potable water system shall not be allowed except in extreme cases where PCU has made non-potable water service no longer available and there is a clear and necessary justification for doing so.

5.0 INSTALLATION OF IRRIGATION SYSTEMS

5.1 General

- A. All construction of reclaimed water facilities shall be in conformance with the “Utilities Standards and Specifications Manual”.
- B. Wells connected to existing irrigation systems shall be disconnected prior to connection to the reclaimed water system, except as specified in Section 4.3 of this MANUAL and in the “Reclaimed Water Use Acknowledgment and Application,” located in the “Utilities Administration Manual”.
- C. Existing irrigation systems shall be disconnected from potable water systems prior to connection to the reclaimed water system.
- D. Irrigation systems for single family residential customers shall be in-ground fully automatic type irrigation systems. Hose bibs or other hand operated irrigation devices shall not be present on irrigation systems connected to the reclaimed water system.
- E. Irrigation systems for multi-family residential customers shall be in-ground irrigation systems. Hose bibs or other hand operated irrigation devices shall not be present on irrigation systems connected to the reclaimed water system.

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- F. Reclaimed water meter boxes and valve boxes shall be of the size and design required by PCU and shall meet the labeling specifications in accordance with the “Utilities Standards and Specifications Manual”.
- G. Detailed requirements are contained in the “Reclaimed Water Use Acknowledgment and Application,” located in the “Utilities Administration Manual”.

5.2 Public Right-of-Way or Polk County Utilities Easements

No reclaimed water facilities will be accepted by PCU unless they are installed in a dedicated public right-of-way or approved Polk County Utilities Easement, in accordance with the “Utilities Standards and Specifications Manual”. Any new easement shall be adequately sized to accommodate construction and maintenance of any new reclaimed water system component.

5.3 Cross Connection Control

An approved testable cross connection control assembly shall be installed on the potable water supply to a property at the property owner’s or customer’s expense prior to connection to the reclaimed water system, in accordance with the “Cross-Connection Control Policy Manual”.

On new potable water service installations, PCU shall install as part of the service connection the necessary approved cross connection control assembly. In addition, an approved cross connection control assembly shall be installed on the customer’s irrigation system immediately downstream of the service connection at the property owner’s or customer’s expense to prevent the return of reclaimed water to PCU’s distribution system through backflow or back siphonage. Installation, operation, maintenance, and inspection of cross connection control assembly shall be in accordance with the “Cross Connection Control Policy Manual” and other applicable COUNTY regulations.

5.4 Color-Coding and Tagging

All reclaimed water air release and blow off assemblies shall be appropriately tagged or labeled with the words in English and Spanish: “Do Not Drink,” together with the equivalent standard international symbol to warn the public and employees that the water is not intended for drinking. All mains, tubing, valve covers, and meters shall be color coded using Pantone Purple 522C, or otherwise marked, to differentiate reclaimed water from domestic or other water. Irrigation piping shall be purple in color or color coded using Pantone Purple 522C paint applied to the exterior top of the piping. Individual residential service connections shall consist of a lockable curb-stop connection and shall be located in a purple meter box on the opposite property corner from the potable water service connection. The lid of the reclaimed water meter box shall be labeled bearing the words in English and Spanish: “Do Not Drink,” together with the equivalent standard international symbol.

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Underground pipe which is not manufactured of metallic materials shall be color coded for reclaimed water transmission and distribution systems using Pantone Purple 522C with light stable colorants. Underground metallic pipe shall be color coded or marked using purple as a prominent color. If tape is used to mark the pipe, the tape shall be permanently affixed along the axis of the pipe. Visible, above ground portions of the reclaimed water transmission and distribution system shall be clearly color coded or marked using purple as a prominent color. Materials and installation shall be in accordance with the "Utilities Standards and Specifications Manual".

5.5 Advisory Signs

The public shall be notified of the use of reclaimed water by the customer. This shall be accomplished by the posting of advisory signs designating the nature of the reclaimed water project where reuse is practiced. Advisory signs shall include the following text in English and Spanish: "Do Not Drink," together with the equivalent standard international symbol, and shall use purple as a prominent color as graphically specified within the "Utilities Standards and Specifications Manual". Advisory signs shall be posted at the following locations where reclaimed water is used:

- A. Adjacent to lakes or ponds used to store reclaimed water not located at the wastewater treatment facility, including golf course irrigation ponds. Advisory signs posted adjacent to ponds shall include the following text in English and Spanish: "Do Not Drink" and "Do Not Swim" together with the equivalent international symbols;
- B. At the 1st and 10th tees of golf courses;
- C. Adjacent to decorative water features using reclaimed water, such as waterfalls or fountains. Advisory signs posted adjacent to decorative water features shall include the following text in English and Spanish: "Do Not Drink" and "Do Not Swim" together with the equivalent international symbols;
- D. At each entrance to residential neighborhoods using reclaimed water;
- E. Along medians and rights-of-way where reclaimed water is used that are located outside residential neighborhoods; and
- F. At each entrance to parks, playgrounds, cemeteries, common areas, and schools using reclaimed water.

6.0 INSPECTIONS

Pursuant to Chapter 62-610.469(7)(h), FAC, in order to verify proper connections, monitor proper use of reclaimed water, and minimize the potential for cross-connections, PCU will

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inspect the customer's irrigation system at the time of connection to the reclaimed water system and periodically thereafter, as specified in the "Cross Connection Control Policy Manual". Exception may be made only for new irrigation systems installed by professional irrigation system installers at unoccupied dwellings under construction as outlined in the paragraph below.

For developers, contractors, and/or builders who wish to have temporary access to the reclaimed water supply for the purpose of installing, flushing and testing of new irrigation systems and/or to irrigate newly planted sod or grass seeds landscaping at unoccupied dwellings under construction ~~or at unoccupied dwellings prior to issuance of the certificate of occupancy~~, the following procedures and conditions apply:

- A. The builder/contractor will apply for reclaimed water service via the form provided by PCU for that purpose as specified in the "Utilities Administration Manual" at the same time application is made for the potable water meter set.
- B. PCU will set the reclaimed water meter and lock it off using a special lock.
- C. PCU will provide key(s) for the special locks to the construction superintendent on the job who is responsible for construction of the dwelling.
- D. The construction superintendent or developer shall assume responsibility for the control of the reclaimed water meter connection and shall agree to the following conditions, by means of a signed and dated form entitled "Reclaimed Water Use Acknowledgement and Application," located in the "Utilities Administration Manual".
 1. The new irrigation system will be constructed in accordance with applicable rules and regulations including, but not limited to:
 - a) Hose bibs, faucets, or other connections that could permit usage of reclaimed water for any other purpose than to supply in-ground irrigation systems are not allowed.
 - b) Irrigation systems may not be connected to any other source of water, including public or private potable water systems, lakes, streams, ponds, or private wells (potable or non-potable), etc. Interconnections to neighboring irrigation systems are not allowed unless approved specifically in writing by PCU.
 - c) The irrigation system must be maintained in good working condition and must be adjusted properly to minimize spray onto roads, common sidewalks (pivoting sprinkler heads may **NOT** be installed between sidewalks and street curbs), gutters, neighboring property, or impervious surfaces that allow run-off. Over spray into swimming or wading pools is not allowed.

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2. Only PCU, the construction superintendent, and the professional irrigation system installer under the superintendent's supervision shall have access to the reclaimed water meter connection.
3. Reclaimed water may **only** be used for construction, flushing, and testing of new irrigation systems at unoccupied dwellings under construction until such time as PCU conducts the initial inspection/activation.
4. The construction superintendent shall lock off the reclaimed water meter, using the same special lock, immediately upon completion of the irrigation system installation and shall call or fax PCU for the initial inspection/activation.
5. The construction superintendent shall send, on Friday of each calendar week via fax to PCU, a list of street addresses of dwelling construction sites in the PCU reclaimed water service areas where irrigation systems are scheduled for installation during the following week. In the absence of a street address in a new development, the construction superintendent may identify the location by subdivision name, phase, and lot number.
6. PCU will conduct the initial inspection and activation within one calendar week after notification by the construction superintendent that the irrigation system installation is complete.

7.0 OWNERSHIP AND MAINTENANCE RESPONSIBILITY

7.1 PCU Responsibilities

- A. PCU shall own and maintain all reclaimed water transmission and distribution systems within the public right-of-way and public easements.
- B. PCU will make a reasonable effort to inspect and maintain its reclaimed water system in good repair, but assumes no liability for any damage caused by the system that is beyond the control of normal maintenance.
- C. Production of reclaimed water is a function of wastewater treatment facility operational criteria and is controlled by PCU. PCU reserves the right to limit availability during certain hours, to temporarily shut off the system without notice for repairs, maintenance or operational reasons, and to limit supply quantities.

7.2 Customer Responsibilities

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- A. The property owner will be responsible for maintenance of the irrigation system on his property downstream (customer side) from the service connection.
- B. The property owner and/or customer shall be responsible for the operation of his reclaimed water irrigation system to prevent ponding or run-off from the irrigated area.
- C. The property owner and/or customer shall be responsible for the maintenance of all irrigation lines and appurtenances on the property served by PCU. PCU reserves the right to disconnect the service to any property when the irrigation system and appurtenances are not properly maintained. In addition, should the customer require reclaimed water at different pressures, or different quality, or in any way different from that normally supplied by PCU, he shall be responsible for the necessary devices to make these adjustments and for obtaining approval by PCU.