Collier County

Growth Management Community Development

Development Services Advisory Committee

Utilities Subcommittee

Monday, November 18, 2024
2:00 pm

2800 N. Horseshoe Dr.
Naples, FL 34104
Growth Management Community Development Department
Conference Room 609/610

If you have any questions or wish to meet with staff, please contact,

Rey Torres Fuentes at (239) 252-5727 or
Rey.TorresFuentes@colliercountyfl.gov

Collier County

Development Services Advisory Committee

Utilities Subcommittee

Agenda
Monday, November 18, 2024
2:00 pm
2800 N. Horseshoe Dr., Naples, FL 34104
Growth Management Community Development, Conference Rooms 609/610

NOTICE:
Persons wishing to speak on any Agenda item will receive up to three (3) minutes unless the Chairman adjusts the time. Speakers are required to fill out a "Speaker Registration Form", list the topic they wish to address, and hand it to the Staff member before the meeting begins. Please wait to be recognized by the Chairman and speak into a microphone. State your name and affiliation before commenting. During the discussion, Committee Members may direct questions to the speaker.

Please silence cell phones and digital devices. There may not be a break in this meeting. Please leave the room to conduct any personal business. All parties participating in the public meeting are to observe Roberts Rules of Order and wait to be recognized by the Chairman. Please speak one at a time and into the microphone so the Hearing Reporter can record all statements being made.

1. Call to order - Chairman.
2. Approval of Agenda
3. New Business
4. Old Business
    a. Revision to the Utilities Standard Manual
5. Public Speakers
6. Adjourn

For more information, please contact Rey Torres Fuentes at (239) 252-5727
or at Rey.TorresFuentes@colliercountyfl.gov

INTRODUCTION

This Manual has been established by action of the Board of County Commissioners and is authorized by County Ordinance 2004-31, as amended.

This Utilities Standards Manual has been prepared to guide the design, construction, and asset management of potable water, non-potable irrigation water, and wastewater system extensions to Collier County Water-Sewer District (COUNTY) utilities; the Manual applies to utilities in new developments in the County, as well as County Projects involving utilities.

The following standards shall be included in the design and preparation of plans and specifications for all utilities construction projects for Collier County, including utilities and services connected to the COUNTY's utilities systems or constructed for future transfer of ownership to the COUNTY. These standards are provided for uniformity in utilities construction within Collier County, and represent MINIMUM standards acceptable to the COUNTY. The Engineer of Record shall review these MINIMUM standards for applicability and acceptance for the proposed construction project. Where necessary, additional design features shall be provided to prevent system failures, severe damage to other property or serious injury to persons. The Engineer of Record shall be responsible for the specific project under their control.

Not all specification details may apply to an individual project; however, approval of utilities construction within Collier County will require conformance to applicable requirements of these specifications. Approval of any deviation from the specifications must be obtained utilizing the appropriate form included in Appendix A, Utility Deviation Form.

NOTE: Go to Collier County Public Utilities Engineering and Project Management Resources Webpage ~~https://www.colliercountyfl.gov/your-government/divisions-f-r/public-utilities-planning-and-project-management/utilities-standards-manual~~ for the latest revisions to the Utilities Standards Manual.

REVISED STRIKETHROUGH

The following standards shall be included in the design and preparation of plans and specifications for all utilities construction projects for Collier County, including utilities and services connected to the COUNTY's utilities systems or constructed for future transfer of ownership to the COUNTY. These standards are provided for uniformity in utilities construction within Collier County, and represent MINIMUM standards acceptable to the COUNTY. The Engineer of Record shall review these MINIMUM standards for applicability and acceptance for the proposed construction project. Where necessary, additional design features may be required to meet specific project requirements. The Engineer of Record shall be responsible for the specific project under their control.

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DESIGN CRITERIA

SECTION 1

DESIGN CRITERIA

For the latest revisions to the Design Criteria, please visit:

~~https://www.colliercountyfl.gov/your-government/divisions-f-r/public-utilities-planning-and-project-management/utilities-standards-manual~~

Collier County Public Utilities
Engineering and Project Management Resources Webpage.

COLLIER COUNTY WATER-SEWER DISTRICT
UTILITIES STANDARDS MANUAL

SECTION 1

DESIGN CRITERIA

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Minimum cover for force mains shall be 30 inches. Maximum cover shall be 48 inches after final project grading is complete except when dipping under conflicts in which case the force main shall be returned to normal depth within 10 feet on either side of the conflict or as soon as possible using a fitting of 45 degrees or less. The design engineer shall strive to minimize the number and frequency of dips (maintaining a horizontal run line through intermittent grade changes, by deviation). An air release valve is required at all dips. Engineers should evaluate possibilities of lowering storm drainage piping or dipping potable water and non-potable irrigation water main to avoid dips in the force main.

When force mains are interconnected with a gravity sewer system, for transmission purposes through that system, interconnection shall be as shown in the Utility Standard Drawings. No force main laterals shall be core bored into manholes.

3.2.3 Valves

All connections of privately-owned and maintained wastewater force mains to the Wastewater Department's force mains shall be connected through a check valve housed in a structure as shown in the Utilities Detail Drawings which shall allow performance of required maintenance, and shall be owned and maintained by the property owner.

Sufficient plug valves shall be provided to allow for zone isolation of wastewater transmission areas in order to limit the impact of line breaks. In-line plug valves shall be provided at no greater than 1,000 foot intervals per COUNTY requirements.

3.2.4 Force Main Extension Stubs

All main-line extension stubs to future developments and/or parcels shall terminate in a stub-out if it is part of a phased project. The stub-out shall end with a valve and cap/plug.

3.2.5 Air Release Assemblies

Air release assemblies shall be provided at all high points and on the upstream side of conflict crossings at which the force main passes under the conflict (unless it can be demonstrated by hydraulic analysis that air pockets will not accumulate at individual high points). A high point is defined by the hydraulic gradient and is considered the upper end of any pipe segment that slopes up to the hydraulic gradient or runs parallel to it. Air valves (see County Approved Product List, Appendix F) utilized on raw sewage facilities shall be designed and manufactured specifically for use with domestic sewage. The design engineer shall review and apply the pertinent provisions of AWWA-C512 and AWWA Manual of Water Supply Practices M51, "Air-Release, Air Vacuum, and Combination Air Valves". When installed, the air valve shall be provided with a shut-off valve to allow isolation and removal of the valve assembly. All air release assemblies shall be installed as shown in the Utilities Detail Drawings.

3.3 Wastewater Pump Stations

Wastewater pump stations shall be designed and constructed in accordance with FDEP regulatory requirements, Section 2 Technical Specifications, National Electrical Code (NEC) Requirements, and Section 3 Utilities Detail Drawings.

Pump Station wetwells shall be designed to withstand flotation forces with the assumption that the structures are empty and ground/flood water elevation is at the top of the structures. The design shall consider the potential for damage or interruption of operation due to flooding. Pump

station structures and electrical and mechanical equipment shall be designed to be protected from physical damage by the 100-year flood event. Pump stations shall be designed to remain fully operational and accessible during the 25-year flood event. Pump stations shall be designed to avoid operational problems from the accumulation of grit.

Pump stations shall be designed to be readily accessible by maintenance vehicles, including pumper trucks, during all weather conditions. Pump stations shall be designed and located on the site to minimize adverse effects from odors, noise, and lighting. Pump stations shall be located on the site to have a minimum separation of 20 feet from the edge of the CUE for the pump station to edge of a body of water and 15 feet from the edge of the CUE for the pump station to a residential structure (including appurtenances).

The effective volume of wet wells shall be based on design average flows and a filling time not to exceed 30 minutes unless the facility is designed to provide flow equalization. The pump manufacturer's duty cycle recommendations shall be utilized in selecting the minimum cycling time. Pump stations requiring a pump motor of twenty horsepower or greater shall operate by a VFD (variable frequency drive) that varies the operating speed of the pump based on wet well water levels. Pump stations shall have a compacted earth berm on three sides with 3:1 slopes to divert liquid toward the ROW. Top of berm shall be 12 inches wide and six inches higher than back of curb (with curb) or edge of pavement (without curb). Minimum berm height shall be six inches.

Emergency pumping capability shall be provided for all pump stations. A pump station that is connected directly to the County transmission force main from a development (Community Pump Station) and any pump station that receives flow from one or more upstream pump stations or discharges through a force main 12 inches or larger (see FAC 62-604.400 (2)(a)1) shall have uninterrupted pumping capability (standby Diesel pump or generator) with three days of fuel storage (compliant with Technical Specification 263213) and a concrete pad for a future odor control system.

Alternatively, emergency pumping capability may be achieved by connecting the pump station to at least two independent utility substations, each capable of starting and operating the pump station at its rated capacity. Regardless of the type of emergency standby system provided, a force main riser with rapid connection capabilities and appropriate valving shall be provided for connecting a portable pump. All pump stations shall conform to these standards and shall be conveyed to the Collier County Water-Sewer District in accordance with the utilities conveyance policies and procedures outlined in the Collier County Utilities Standards and Procedures Ordinance (Ord. No. 2004-31 as amended), unless approved for private ownership and maintenance by Deviation and in accordance with Section 3.3.1 below.

All pump stations shall be protected from lightning and transient voltage surges.
All pump stations shall be located at least 100 feet from a public drinking water supply well and 75 feet from a private drinking water well. The design and siting of new private pumping stations shall minimize adverse effects resulting from odors, noise, and lighting.

All pump stations shall have water available to them. Available water means a water main is accessible in the adjacent ROW or CUE.

Landscaping is not required, per these standards, to be installed around wastewater pump stations. If landscaping is provided, it shall be maintained by the developer, homeowners association, or land owner and shall NOT be located in the CUE. Landscaping, if provided, shall be located as to not block access or interfere with operations. If plant material dies, it is the

responsibility of the landscaping owner to replace it. The landscaping shall be maintained to not block telemetry antenna line of site.

3.3.1 Private Pump Stations

~~Pump stations with flows less than 80 gpm and which do not~~ Private pump stations shall not receive flow from any other pump station and shall only serve one property parcel. All private pump stations may be privately monitored and maintained by deviation. ~~may be privately owned and maintained.~~ All new private pump stations shall be grinder pump stations. Positive or semi-positive displacement grinder pumps equipped with thermal overload protection shall be standard on all private grinder pump stations. All new private pump stations shall conform to the design criteria specified in Subsection 3.3 above, unless otherwise specified in this subsection, and shall be configured to facilitate routine maintenance without entering the wet well.

Except in the case of a simplex station serving a single-family residence, private pump stations shall have multiple pumps capable of handling peak flow with one pump out of service. Peak flow shall be calculated as the peak hour flow (per Part 3) divided by a factor of 0.7. This is based on peak hour flow typically being around 70 percent of the peak flow over a briefer (approximately 15-minute) time period[1]. Where possible, pumps shall be selected so that the design operating range is within ten percent (10%) (on a flow basis) of the maximum efficiency point identified by the manufacturer. Otherwise, the pump model that would operate closest to its maximum efficiency point should be selected based on the average head condition.

Design flow shall be calculated in accordance with Part 3, except that average daily flow for a residential project shall be determined from Table I in paragraph 62-6.008(1)(b), F.A.C., based on the number of bedrooms and building area. An assumption of 350 gallons per day per residential unit shall be used if bedroom count and building area are unknown.

The table below defines volumetric terms used in this subsection based on the demarcating design elevations (e.g., storage volume is between the pump on and alarm elevations):

<table>
<tr><th>Elevation</th><th colspan="2">Terms</th></tr>
<tr><td rowspan="2">Top/Overflow</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Reserve Volume</td><td rowspan="3">Reserve Capacity</td></tr>
<tr><td>Alarm</td></tr>
<tr><td rowspan="2">Storage Volume</td><td rowspan="2">On</td></tr>
<tr><td rowspan="2">Effective Volume</td></tr>
<tr><td>Off</td><td></td></tr>
</table>

Residential private pump stations shall have a sufficient combination of storage volume and pump rate to avoid an alarm condition during a peak flow of 46 gallons over a 2-minute period, which represents simultaneous discharge from a bathtub and clothes washer with a high probability of occurrence[2], assuming the basin level is at the pump on elevation just prior to the peak flow occurring.

Non-residential private pump stations shall be designed for simultaneous discharge from

[1] Water Pollution Control Federation. (1986). *Alternative Sewer Systems* (Manual of Practice No. FD-12, Facilities Development).
[2] American Society of Civil Engineers. (1969). *Combined Sewer Separation Using Pressure Sewers* (FWPCA Report ORD-4).

multiple plumbing fixtures as determined by the plumbing system designer. Check pump station capacity using the equation, Q = (V-S)/t, where Q is the minimum pump discharge rate (gpm), V is the volume of peak flow (gal), S is storage volume (gal), and t is the time window (duration) of peak flow (minutes).

The minimum storage volume required to attenuate peak flows is 25 gallons. In no case shall the pump rate be less than 5 to 10 gpm, depending on the storage volume. If the storage volume is 25 gallons, the minimum for attenuation, the pump rate shall be no less than 10 gpm. For storage volumes equal to or greater than 50 gallons, the pump rate shall be no less than 5 gpm. Interpolate the minimum pump rate accordingly if the storage volume is between 25 and 50 gallons.

In-ground installation of a grinder pump station may require a ballast or concrete anchor of proper dimensions and weight to counteract the buoyant forces exerted on the station. Designers of privately-owned pump stations shall adhere to the manufacturer's guidelines and sound engineering practice for counteracting buoyancy.

Unless a standby power generator is connected to the pump station, every private pump station shall have a standard generator receptacle (see Appendix F) and a minimum reserve capacity of half the average daily flow volume, but no less than 50 gallons, as contingency for a power outage or equipment malfunction.

In instances where the reserve capacity (i.e., volume above the pump-on elevation) is less than double the peak hour flow, the private pump station shall be furnished with an external pump-out connection.

New private pumping stations shall be enclosed with a fence or otherwise designed with appropriate features to prohibit the entry of animals and unauthorized persons.

All private pump stations connected with the County's wastewater collection system are required to be inspected, maintained, and repaired on a routine basis. The station's owner shall continuously retain (contract with) an operator qualified under Florida laws, rules, and regulations to perform preventive maintenance and respond to any service interruption. In accordance with 62-604.400(2)(d), F.A.C., the operator's emergency telephone number shall be displayed on an unobstructed sign made of durable, weather-resistant material and posted at a location visible to the public.

3.4 Connections to Collier County Facilities

Connections to existing COUNTY wastewater mains shall be constructed as described in the Technical Specifications and shown in the Utilities Detail Drawings. These details shall apply to all connections to existing systems.

All projects shall be designed with no physical connections between a public or private potable water supply system and a sewer or force main and with no water mains passing through or coming into contact with any part of a sewer manhole.

3.5 Tests and Inspections

Tests and inspections of all wastewater systems or portion(s) thereof shall be performed in accordance with the Technical Specifications before acceptance of the systems or portions thereof by Collier County.

USM SECTIONS

SECTION 2

TECHNICAL SPECIFICATIONS

~~Go to the Collier County website below for the latest revision of the Technical Specifications:~~

For the latest revisions to the Technical Specifications, please visit:

~~https://www.colliercountyfl.gov/your-government/divisions-f-r/public-utilities-planning-and-project-management/utilities-standards-manual~~

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COLLIER COUNTY WATER-SEWER DISTRICT
UTILITIES STANDARDS MANUAL

SECTION 2

TECHNICAL SPECIFICATIONS

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SECTION 017839

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

Requirements for preparation, maintenance and submittal of project record documents. The Contractor's attention is specifically directed to Part 3.2.B. of this Section, which requires use of a Florida licensed surveyor to sign and seal all record drawings.

1.2 RELATED SECTIONS

A. Section 014500 – Quality Control

B. Section 022100 – Lines and Grades

1.3 SUBMITTALS

A. General: Provide all submittals as specified.

B. At Contract close out, three (3) sets of signed and sealed Record Drawings for the potable water OR non-potable irrigation water OR wastewater systems to be conveyed shall be submitted to the County or District. If potable water AND wastewater, AND/OR non-potable irrigation water systems or portion(s) thereof are being conveyed, five (5) sets of signed and sealed Record Drawings shall be submitted to the County.

C. Provide electronic submittal as specified in Part 3.02.B of this Section.

1.4 REQUIREMENTS (For County Capital Projects Only)

Contractor shall maintain at the site for the County one record copy of:

A. Drawings

B. Specifications

C. Addenda

D. Change orders and other modifications to the Contract

E. Design Engineer’s field orders or written instructions

F. Approved shop drawings, working drawings and samples

G. Field test records

PART 2 PRODUCTS (not used)

PART 3 EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Project record documents shall be stored in Contractor's field office or other location approved by the County apart from documents used for construction

B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.

C. Make documents and samples available at all times for inspection by the County.

3.2 RECORDING

A. General

1. Record Drawings shall accurately depict the constructed configuration of all potable water, non-potable irrigation water and/or wastewater systems or portion(s) thereof. All revisions to County staff approved construction drawings shall be precisely identified and illustrated on the Record Drawings. All Record Drawings of utility systems or portion(s) thereof that are not being conveyed to the Board shall bear, on the cover sheet, a prominently displayed DISCLAIMER, in bold lettering at least one-quarter (1/4) inch high, stating: "All on-site potable water, non-potable irrigation and/or wastewater systems shall be owned, operated and maintained by the private owner(s) and/or the master condominium/homeowners' association, successors or assigns" (or other comparable private ownership).
2. Label each document "PROJECT RECORD" or similar text in neat, large printed letters.
3. Survey information can be obtained as needed by the use of 2-inch PVC labeled pipes installed over underground improvements by the contractor during construction. This method is an adequate process for obtaining record information.
4. Record information in red ink.

B. Record Drawings

1. The Record Drawings require signed and sealed as-built information, including above and below ground improvements including underground piping, valves and ductbanks, by a Florida Licensed Land Surveyor.
2. The Record Drawings shall identify the entity that provided the record data.
3. Drawings shall be referenced to and tie-in with the state plane coordinate system, with a Florida East Projection, and a North American Datum 1983/1990 (NAD 83/90 datum), and with United States Survey Feet (USFEET) units, and North American Vertical Datum 1988 (NAVD 88), as established by a registered Florida surveyor and mapper.

4. Files shall be also submitted in two digital file formats, specifically Drawing File (DWG) format in AutoCAD Release 2004 or later version as well as PDF format (latest version).

5. Record drawings shall be submitted to the County staff within 60 days of the final construction completion date.

6. The following items shall be accurately depicted in vertical and horizontal directions on the Record Drawings:

   a) All associated rights-of-way and utility easements whether shown on the Contract Drawings, found during construction or added during the Work.

   b) Sewer system inverts, pipe slopes, manhole rims and run lengths.

   c) Sewer lateral locations stationed from the nearest downstream manhole.

   d) Sewer main stub extension inverts at both ends, pipe slope, run length and location.

   e) Tie-ins to all valves, air release assemblies, fire hydrants, manholes, blowoffs, etc.

   f) Top elevations of treatment plant structures and tanks.

   g) Manhole center for sanitary sewers and storm sewers as related to utility improvements.

   h) Pipe changes in direction or slope.

   i) Buried valves, tees and fittings.

   j) Pipe invert, or centerline, elevations at crossing with other pipe.

   k) Invert, or centerline, elevations and coordinates of existing exposed pipe at crossing with underground pipe installed under this project.

   l) Other horizontal and vertical record data pertinent to completed Work.

   m) Water meter box locations

   n) Locations of direct bury, conduits, handholes, junction boxes and vaults for buried electric and communication cables shall be depicted from source to County asset found in associated rights-of-way and utility easements.

REVISED STRIKETHROUGH

   k) Invert, or centerline, elevations and coordinates of existing exposed pipe at crossing with underground pipe installed under this project.

   l) Other horizontal and vertical record data pertinent to completed Work.

   m) Water meter box locations

   n) Locations of direct bury, conduits, handholes, junction boxes and vaults for buried electric and communication cables that will be conveyed to the County shall be depicted.

C. Specifications and Addenda (For County Capital Projects Only)

Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.

2. Changes made by Field Order or Change Order.

D. Shop Drawings (For County Capital Projects Only)

1. Keep one copy of the final, approved shop drawing with the Record Documents.
2. Record documents should include all shop drawing information submitted. Additional information submitted during the review process should be filed with the appropriate submittal.

END OF SECTION

SECTION 020500

CONNECTIONS TO EXISTING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General Requirements

B. Submittals

C. Scheduling of Shutdown

1.2 RELATED SECTIONS

A. Section 011000 – Summary of Work

B. Section 015000 – Construction Facilities and Temporary Controls

C. Section 015526 – Traffic Regulations and Public Safety

D. Section 320117 – Pavement Repair and Restoration

1.3 GENERAL REQUIREMENTS

A. Be responsible for all connection to existing systems, cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:

1. Make its several parts fit together properly.

2. Uncover portions of the work to provide for installation of ill-timed work.

3. Remove and replace defective work.

4. Remove and replace work not conforming to requirements of Contract Documents.

B. Coordination: Before connection is performed, verify and provide for any pipe restraint that may be required for the new connection. Perform all cutting, fitting or patching of the Work that may be required to make the several parts thereof join in accordance with the Contract Documents. Perform restoration with competent workmen skilled in the trade.

C. If changes to a “looped” water distribution system occurring during construction result in dead ends to any new or relocated water mains, connect such dead

ends to the nearest water main. In cases where no nearby water main is available, provide a flushing device in coordination with the COUNTY at no additional cost to the COUNTY.

D. Improperly Timed Work: Perform all cutting and patching required to install improperly timed work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.

E. Limitations: Except when the cutting or removal of existing construction is specified or indicated, do not undertake any cutting or demolition, which may affect the structural stability of the Work or existing facilities without the ENGINEER's concurrence.

F. Collier County Damage Prevention Policy:

1. This policy has been put in place to avoid damage to Collier County underground utilities. A minimum distance of five feet (5') horizontally and eighteen inches (18") vertically must be maintained away from Collier County utilities (in accordance with pipe separation criteria located in the Design Criteria section). Any and all variations from this order must be approved by the Water or Wastewater Department.

2. **Before commencement of any excavation, the existing underground utilities in the area affected by the work must be marked by Sunshine One Call, in accordance with State Statute Chapter 556 "Underground Facility Damage Prevention and Safety", after proper notification to them by either calling 811 in Florida or toll free at 1-800-432-4770. Visit ~~www.callsunshine.com~~ www.sunshine811.com for more information. Before commencing excavation for the work, potholing of all potential conflicts must be performed.**

3. All lines in conflict must be physically located by the contractor Any conflict shall be reported to the utility and Collier County Public Utilities. ~~and verified by Collier County Locate Department personnel before performing work~~. Utilities under concrete or pavement may require soft dig vacuum locates which also is the contractor's responsibility to perform. All utilities will be field marked per Sunshine State One Call's statutes and guidelines. For line verification or any other information concerning locates, please call the Locate Department at 239- 252-5922 during normal business hours. For line verification or emergency locates after hours, call emergency number 239-825-1444. ~~numeric pager at 239-890-0809~~. **In the event the potholing and/or vacuum soft dig does not locate the marked utility, work must be stopped and the affected utility owner contacted.** Failure to comply with this policy and obtain required signature(s) may result in revocation of existing right-of-way permits. ~~delay or denial of permit~~.

1.4 SUBMITTALS

A. Submit a written request to the ENGINEER well in advance of executing any cutting or alteration which affects:

1. Work of the COUNTY or any separate contractor.

2. Structural value or integrity of any element of the project or work.

3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.

4. Efficiency, operational life, maintenance or safety of operational elements.

5. Visual qualities of sight-exposed elements.

B. Include in request:

1. Identification of the work.

2. Description of affected work.

3. The necessity for cutting, alteration or excavation.

4. Effect on work of the COUNTY or any separate contract, or on structural or weatherproof integrity of work.

5. Description of proposed work:

a. Scope of cutting, patching, alteration, or excavation.

b. Trades who will execute the work.

c. Products proposed to be used.

d. Extent of refinishing to be done.

6. Alternatives to cutting and patching.

7. Cost proposal, when applicable.

8. Written permission of any separate contractor whose work will be affected.

C. SUBMIT WRITTEN NOTICE TO THE ENGINEER DESIGNATING THE DATE AND THE TIME THE WORK WILL BE UNCOVERED.

1.5 SCHEDULING OF SHUTDOWN

A. Connections to Existing Facilities: If any connections, replacement, or other work

requiring the shutdown of an existing facility is necessary, schedule such work at times when the impact on the COUNTY's normal operation is minimal. If shutdown involves the water distribution or transmission system, provide notice to the COUNTY Water Department at least two (2) weeks prior to the proposed shutdown, including date, time and anticipated length of interruption of service. Overtime, night and weekend work without additional compensation from the COUNTY, may be required to make these connections, especially if the connections are made at times other than those specified. The connection of new or existing pipelines is prohibited from starting until CONTRACTOR assures that the system can receive the new flow.

B. Interruptions of Service: Perform cut-ins into lines at a time approved in writing by the County Manager or designee. Whenever it is required to turn off valves which may interrupt the water supply of residents or businesses, notify all concerned parties or agencies with personal contact, door hangers or written notice at least forty-eight (48) hours in advance of such cut-off, after having obtained the approval of the County Manager or designee. Provide a copy of the written notice to the Water Distribution Section by fax. ONLY COUNTY PERSONNEL MAY OPERATE COUNTY-OWNED VALVES. Maintain water service to existing connections during construction, under any and all conditions and at no additional cost to the COUNTY. Thoroughly clean and swab all pipe and fittings for cut-ins with a concentrated solution of calcium hypochlorite.

C. Request for Water System Shutdowns: When plans call for connection to existing water distribution facilities or the CONTRACTOR plans to shut down existing utilities or where damage to such facilities is likely in order to complete construction of items under this contract, furnish the County Manager or designee with a written request for connection. The COUNTY Water Distribution Section will identify the locations of all water valves needed to isolate the point of connection in the event that the existing facilities are damaged while making the connection. Identify in the request means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. No connections to existing utilities – or construction where shutdown of, or damage to, existing utilities may occur – shall commence prior to County Manager or designee approval of the connection and shutdown plan and schedule.

D. Request for Wastewater Diversion: Submit a request for each diversion necessary during construction to the County Manager or designee and the ENGINEER sufficiently in advance of any required diversion. Identify in the request the valves, bypass piping, portable pumper trucks or any other means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. No connections to existing utilities – or construction where shutdown of, or damage to, existing utilities may occur – shall commence prior to County Manager or designee approval of the connection and shutdown plan and schedule.

PART 2 PRODUCTS

2.1 MATERIALS

A. Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.1 INSPECTION

A. Inspect existing conditions of projects, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of products, or performance of the work.

C. Report unsatisfactory or questionable conditions to the ENGINEER in writing; do not proceed with work until the ENGINEER has provided further instructions.

3.2 PREPARATION

A. In cases where service to utility customers is interrupted, provide adequate equipment with backup onsite to assure prompt restoration of service.

B. Provide adequate temporary support as necessary to assure structural value or integrity or affected portion of work.

C. Provide devices and methods to protect other portions of project from damage.

D. Provide protection from elements for that portion of the project that may be exposed by cutting and patching work, and maintain excavations free from water.

E. Material Removal: Cut and remove all materials to the extent shown or as required to complete the work. Remove materials in a careful manner with no damage to adjacent facilities. Remove materials that are not salvageable from the site.

3.3 PERFORMANCE

A. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.

B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.

C. Employ original installer or fabricator to perform cutting and patching for:

1. Weather-exposed or moisture-resistant elements.

2. Sight-exposed finished surfaces.

D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.

E. Restore work, which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.

F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.

2. For an assembly, refinish entire unit.

3.4 PAVEMENT RESTORATION

A. Restore all pavement or roadway surfaces in accordance with Section 320117 – Pavement Repair and Restoration.

B. Restore, replace or rebuild existing street paving, including underdrains, if any are encountered, where damaged, using the same type of construction as was in the original. Be responsible for restoring all such work, including subgrade, base courses, curb and gutter or other appurtenances where present. The County Manager or designee will obtain the permits listed in the Contract Documents. Obtain and pay for at CONTRACTOR’s expense any additional local or other governmental permits as may be required for the opening of streets and be satisfied as to any requirements other than those herein set forth which may effect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.

C. This section does not describe the construction of new road surfaces or the complete resurfacing of existing pavements.

D. In all cases, the CONTRACTOR will be required to maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract for a period of 12 months after the acceptance of the Contract, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.

E. Perform all the final resurfacing or repaving of streets or roads, over the excavations made and be responsible for relaying paving surfaces of roads that have failed or been damaged at any time before the termination of the maintenance period on account of work done by him. Resurface or repave over any tunnel jacking, or boring excavation that settles or breaks the surface, repave to the satisfaction of the County Manager or designee and at the CONTRACTOR's expense. Conform backfilling of trenches and the preparation of subgrades to the requirements of excavation and backfilling of pipeline trenches.

F. Where pipeline construction crosses paved streets, driveways or sidewalks, the CONTRACTOR may elect, at no additional cost to the COUNTY, to place the pipe by the jacking and boring, horizontal direction drilling, or tunneling method in lieu of cutting and patching of the paved surfaces. Such work shall be accomplished in accordance with all applicable sections of the Contract Documents.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 221336

DIESEL BACKUP PUMP

PART 1 GENERAL

1.1 SCOPE

A. Requirements for providing a permanently installed automatically starting pump station back-up pumpset.

B. Elevated platforms shall be provided where necessary to provide access to the diesel backup pump for operation and maintenance. Typically, these platforms shall be limited to locations with existing grades requiring equipment to be located at a higher elevation due to the Florida Building Code (FBC), FEMA, and the ASCE Standard 7 and 24 requirements.

1.2 GENERAL

A. The specifications herein state the minimum requirements of Collier County (the Owner). All bids must be regular in every respect. Unauthorized conditions, limitations, or provisions shall be cause for rejection. The Owner may consider as “irregular” or “non-responsive”, any bid not prepared and submitted in accordance with the bid documents and specification, or any bid lacking sufficient technical literature to enable the Owner to make a reasonable determination of compliance to the specification. It shall be the bidder’s responsibility to carefully examine each item of the specification. Failure to offer a completed bid or failure to respond to each section of the technical specification (exception yes or no) will cause the proposal to be rejected, without review, as “non-responsive”. All variances, exceptions, and/or deviations shall be fully described in the appropriate section. Deceit in responding to the specification will be cause for rejection.

B. INTERPRETATIONS: In order to be fair to all bidders, no oral interpretations will be given to any bidder as to the meaning of the specifications documents or any part thereof. Every request for each a consideration shall be made in writing to the Owner. Based upon such inquiry, the Owner may choose to issue an Addendum in accordance with local public contract laws.

C. GENERAL SPECIFICATIONS: Units described shall be new, unused, and of the current year’s production. The style of pump being bid must be in production for a minimum of 5 years (include users list). Unit shall be of the latest design and in current production completely serviced, ready for work and shall include all standard and optional equipment as specified herein. All bidders must have demonstrated the unit they are bidding, prior to bid date.

D. Bidders must have a fully stocked parts and service facility within 50 miles of the project site. The Owner shall have the right to inspect the office and shall be the sole judge of its adequacy to fulfill this requirement.

E. Bidders, on request of the Owner, must be prepared to review their specifications with the Owner and must, if requested, also be prepared to provide a unit for tangible evaluation purposes only. These services, if needed, are considered as part of the bidder's proposal and will be provided without cost or obligation to the Owner.

1.3 SYSTEM DESCRIPTION

A. The pumpset specified in this section will be used to pump wastewater from a Collier County pumping station (PS).

B. Pump shall be fitted with a fully automatic priming system capable of repeated priming from a completely dry pump casing.

C. The complete pump set shall be supplied by the pump manufacturer.

D. The pump offered shall be the manufacturer's standard production model. It shall have been in continuous use by municipal and industrial owners for a minimum of five years. A list of five user contacts including contact names and telephone numbers shall be provided with the bid submittal. Failure to supply a verifiable users list will be cause for rejection of the bid.

1.4 DESIGN REQUIREMENTS

1.4.1 All design requirements listed below must be clearly displayed on performance pump curves. These performance pump curves shall be based on testing standards established by the hydraulic institute.

DESIGN REQUIREMENTS	
OPERATING SPEED (MAXIMUM) (RPM)	
MAXIMUM SOLIDS HANDLING SIZE (INCHES)	
IMPELLER DIAMETER (INCHES)	
SUCTION SIZE (INCHES)	
DISCHARGE SIZE (INCHES)	
PRIMARY DUTY POINT (GPM @ TDH)	
MAXIMUM SUCTION LIFT AT PRIMARY DUTY POINT (FEET)	
MINUMUM EFFICENCY AT MAX DUTY POINT	
SECOND DUTY POINT (GPM @ TDH)	
MAXIMUM SUCTION LIFT AT SECOND DUTY POINT (FEET)	
MIMIMUM EFICENCY AT SECOND DUTY POINT	

1.5 REFERENCES

1. ANSI B16.1 - Standard for Cast Iron Pipe Flanges and Flanged Fittings.

PART 2 PRODUCTS

2.1 PRE-APPROVED ACCEPTABLE MANUFACTURERS:

1. GODWIN PUMPS OF AMERICA
2. THOMPSON PUMP & MANUFACTURING CO, INC.

A. All manufacturers shall be ISO 9001: 2008 certified. Certificates shall be made available to Collier County upon request. Bids will be accepted for consideration on any make and model that meets the requirements of the project specifications, as interpreted by the Owner. If a product proposed does not meet the requirements of this specification, the Contractor shall provide a unit which does, at no additional cost to the Owner. The Owner shall have the final decision on which products do and which products do not meet the project specifications.

2.2 EQUIPMENT

A. PUMPS: The pumps used in the diesel backup pump system shall be supplied directly by the manufacturer, not by a distributor. The pump itself and the diesel backup pump system as a whole shall come from a single manufacturer. “Packagers” of systems which incorporate pumps from a separate manufacturer to fabricate diesel backup pump systems shall not be allowed.

B. CASING, SUCTION COVER, SEPARATION TANK: Pump castings shall be cast iron or ductile iron with a minimum pressure rating of 100 psi. The pump casing shall be constructed so that the suction flow path is in axial alignment with the impeller eye. There shall be no turns, chambers, obstructions or straightening vanes between the suction line and the impeller. The pump casing shall be complete with a removable port for inspecting impeller/cut water area.

C. IMPELLERS: The pump impeller shall meet the criteria of one of the following:

1. An open, three-bladed, (or 2-bladed) non-clog type with pump-out vanes on the back shroud and fabricated from hardened cast- chromium steel construction (or other material to meet minimum Brinell Hardness 340 HB).

2. A high efficiency non-clog type, 2-vane, enclosed design with full front and rear shrouds, containing back pumpout vanes, constructed of high grade 65-45-12 ductile iron and capable of passing a 3” spherical solid.

D. WEARPLATES/WEAR RINGS: Shall be fully be replaceable, fabricated of cast iron. Wear plate/wear ring clearances shall have no relationship to the ability of the pump to achieve a prime.

E. BEARINGS AND SHAFTS: Pump shall be fitted with a bearing bracket to contain the shaft and bearings. Bearings shall be tapered roller bearings of adequate size to withstand imposed loads for sustained pumping at maximum duty points. Minimum ISO L_{10} bearing life to be 100,000 hours. Impeller shafts shall be fabricated of high strength alloy steel, accurately machined, polished, and of sufficient size to transmit full driver output without excessive flexing or stress.

F. SEALS: Pump shall be capable of running dry, with no damage, for periods up to twenty-four hours. The pump seals shall be the requirements of one of the following:

1. Seal shall be high pressure, mechanical self-adjusting type with silicon carbide faces capable of withstanding suction pressures to 87 psi. The mechanical seal shall be cooled and lubricated in an oil bath reservoir, requiring no maintenance or adjustment. All metal parts shall be of stainless steel. Elastomers shall be Viton.

2. Pump seal shall be an inside-mounted, self-cleaning John Crane type 2 component style mechanical seal with tungsten carbide rotating and silicon carbide stationary faces with Viton elastomers and stainless steel spring and hardware.

G. PUMP SUCTION AND DISCHARGE FLANGES: Shall be cast iron ANSI (B16.1) Class 150, raised faced.

H. PUMP GASKETS: Shall be compressed fiber and/or Teflon.

I. PUMP O RINGS: Shall be Buna-N.

J. PRIMING SYSTEM: Pump shall be fitted with a fully automatic priming system incorporating a air compressor, venturi (with lifetime warranty), priming chamber, and discharge check valve assembly. The compressor shall be installed on the engine auxiliary drive and shall be gear driven, lubricated and cooled from the engine. Installed system design shall prevent any carryover of the pumping fluid onto the ground. Priming system may require additional drainage pipelines to be constructed to re-circulate pumping fluid back to sump area. The pump must be capable of running totally dry for periods up to 24 hours, then re-priming and returning to normal pumping volumes. Pump and priming system is capable of priming the pump from a completely dry pump casing. The pump shall be capable of static suction lifts to 28 vertical feet, at sea level. It shall also be capable of operation using extended suction lines, and pump shall be capable of priming and re-priming without any user intervention. Equipment acceptance shall be contingent upon the pump's ability to run continuously at full speed in a completely dry condition. The engineer may require a demonstration. Priming systems that incorporate the use of a positive displacement diaphragms OR oil-cooled vacuum pumps will not be accepted.

K. CHECK VALVE: The priming system shall include a discharge check valve to prevent pulling air through the discharge line during priming and prevent in-line return of flow when the pump is shut off. Non-return check valve shall be constructed of cast iron with Nitrile rubber and shall be field replaceable. Check valve shall be vacuum-tested by the factory, and test results shall be provided.

L. DRIVE UNIT: The drive unit shall be a diesel water-cooled engine. The engine shall drive the pump by use of direct-connected intermediate drive plate. Starter shall be twelve-volt electric. Low oil pressure safety shutdown, high temperature shutdown, tachometer, and hour-meter shall be integrated into engine control panel. Battery shall have 180-amp hour rating. A certified continuous-duty engine curve shall be supplied to the owner/engineer.

M. GOVERNOR: Governor shall be an electronic or mechanical type. Engine speed shall be adjustable to operate the pump between maximum and minimum design operation speeds in manual mode. See section 2.3 for Automatic mode.

N. FUEL SOURCE: Integral skid fuel tank capacity shall be sufficient to provide at least seventy-two (72) hours of continuous operation at full load. The minimum tank size shall be 150 gallons and the maximum tank size shall be 550 gallons. The engine shall be capable of operating satisfactorily on a commercial grade of distilled No. 2 fuel oil.

O. EXHAUST: Exhaust system shall include a hospital grade muffler housed in a separate chamber within the enclosure. All exhaust piping and manifolds shall be encased in fitted acoustic blankets. They shall be constructed of high-density fiberglass material with waterproof jacketing.

P. SOUND ATTENUATED ENCLOSURE: The entire unit including the pump and engine shall be completely enclosed in a lockable enclosure. The enclosure shall be constructed with a modular galvanized steel frame and galvaneel panels. Acoustical material shall be installed as required to reduce pump and engine noise. Maximum sound ratings for specific pump sizes are shown in the table below. These sounds rating shall be the maximum dBA rating measured at 7 meters @ both duty points specified.

Pump Outlet Size	Maximum Sound Rating Allowed
4”	68 dBA
6”	70 dBA
8”	72 dBA
10”	72 dBA
12”	72 dBA

Q. Units not meeting this requirement shall not be considered. The enclosure shall be removable for easy access to the engine / pump for maintenance and repair. The enclosure doors shall all be equipped with latches that are keyed alike. For maintenance and service needs, the enclosure sides shall have hinged doors for quick access to the engine oil fill, fuel fill port, oil dipstick, and filters. The enclosure shall be coated in epoxy based primer and paint to a total dry film thickness of 5 mils.

R. UL LISTED SKID BASE

1. The pump base tank shall be a UL-142 approved double wall design constructed in accordance with Flammable and Combustible Liquids Code, NFPA 30; The Standard for Installation and use of Stationary Combustible Engine and Gas Turbines, NFPA 37; and The Standard for Emergency and Standby Power Systems, NFPA 110. Pumps installed within 25 feet of a building shall be equipped with UL-2085 fire resistant fuel tanks. All fuel tanks shall comply with the requirements set forth by Collier County Pollution Control.

2. The tank design shall be a Closed Top Dike Pump Base Tank. It shall be of double

wall construction having a primary tank to contain the diesel fuel, held within another tank or dike, which is intended to collect and contain any accidental leakage from the primary fuel tank. The completed base tank assembly is to incorporate pump mounting locations and must be able to support four times the rated load.

3. The primary tank shall be designed to withstand normal and emergency internal pressures and external loads. It shall be capable of withstanding internal air pressures of 3 to 5 psig without showing signs of excessive or permanent distortion and 25 psig hydrostatic pressures without evidence of rupture or leakage.

4. The primary and secondary tanks or dike shall have venting provisions to prevent the development of vacuum or pressure capable of distorting them as a result of the atmospheric temperature changes or while emptying or filling. The vent shall also permit the relief of internal pressures caused by exposure to fires. The vent size shall be determined by using the calculated wetted surface area in square feet (the top is excluded) in conjunction with venting capacity table 10.1of UL-142. The tank's vent shall also be equipped with a coupling device and shall be located to facilitate connection to a vent piping system. The dike's vent may be an opening for venting directly to the atmosphere and protection from the entrance of natural elements or debris shall be provided.

5. The primary and outer tanks are to be constructed of 304 stainless steel, 7 gauge minimum. Internal baffles or reinforcement plates shall be located on a maximum of 24 inch centers in tanks up to 60 inch width and on a maximum of 19.5 inch centers in tanks over 60 inch width. At least one baffle shall separate the fuel suction pipe from the fuel return line.

6. The outer tank is to be constructed in a manner to be able to support four times the wet load of the pump and housing. The entire load is to be carried by the outer tank so no load or vibration stress is placed on the primary tank. If the pump base tank is wider than the pump set to be supported, structural rails are to be incorporated to span the width of the base tank so that the load is transferred to the side rails of the tank. Vertical reinforcements shall be welded to the outer sides of the secondary tank or dike at a maximum of 45 inch centers on tanks up to 30 inches high and on 24 inch centers on tanks greater than 30 inches high. At least one vertical reinforcement shall be positioned adjacent to each mounting hole location. Provide level monitoring and interstitial space leak monitoring.

7. Both primary and secondary tanks shall be fitted with the proper welded pipe fittings to accommodate the requirements for the fill port and normal and emergency venting.

8. The completed assembly is to be cleaned with a heated pressure wash followed by a chromium free post treatment to ensure proper paint adhesion. The tank assembly is to be painted with an epoxy ester primer and high quality polyurethane enamel with a minimum dry film thickness of 3.5 mils.

9. All tanks shall be tested in accordance with **NFPA 30 TO INCLUDE ON SITE**

TIGHTNESS TESTING in accordance with NFPA 30 Section 21.5. This requirement shall not apply to portable trailer mounted diesel pumps.

10. Manufacturing and testing of this system shall be performed within the scope of Underwriters Laboratories, Inc. "Standard for Safety UL 142.", or UL 2085, as applicable. A UL label shall be permanently attached to the tank system showing the following information:

    i. The registered UL mark and the name: Underwriters Laboratories, Inc.
    ii. A control number and the word "listed"
    iii. The product's name as identified by Underwriters Laboratories Inc.
    iv. The serial number assigned by Underwriters Laboratories, Inc.
    v. Other manufacturer's information may also be included.

S. PORTABLE TRAILER (FOR TRAILER MOUNTED UNITS ONLY):

1. The complete pump set shall be factory mounted on a highway trailer meeting NHTSA, DOT Part 571 standards 108, 119 and 120.

2. Trailers with loads of 5,000 pounds or less with fuel tank filled, shall have a flat bed, single axle, two 15-inch wheels with 6-ply tires. Axle ratings shall be a minimum of 5,000 pounds.

    i. Trailers with loads from 5,000 to 10,000 pounds with fuel tank filled, shall have a flat bed, 2-axle, four 15-inch or 16-inch wheels with 10-ply tires. Axle rating shall be a minimum of 10,000 pounds.
    ii. Trailers above shall have following accessories. Ring and pintal hitch including safety chain and fasteners, electric brakes shall be provided on all wheels, and all required ICC lights such as tail, brake, direction signals, license holder and light, etc., shall be provided; jacks and sand shoes for front and rear corners shall be provided so that unit can be completely supported.
    iii. The diesel backup pump engine shall be balanced mounted on trailer. All necessary service and checkout of diesel backup pump set shall be performed prior to delivery.

T. FACTORY PAINTING: Pump, engine, and base shall be shop primed and finish painted at the place of manufacturer.

2. 3 AUTOMATIC STARTING CONTROL SYSTEM

A. The engine control panel shall be provided in a NEMA 3R enclosure mounted on rubber isolators to reduce vibration, equipped with a factory installed microprocessor-based controller designed to start/stop the engine at a signal supplied by high and low level floats or a 4-20 mA transducer.

B. The control system shall be able to start/stop the engine a via a signal supplied by a primary level transducer and back-up high and low level floats for redundant automatic operation.

C. ENGINE / PUMP CONTROL SPECIFICATIONS

1. The engine shall be started, stopped, and controlled by a digital controller. The controller shall be weather proof enclosed, and contain an external weatherproof 12-position keypad accessible without the need to remove or open any protective cover or enclosure. It shall be designed to start/stop the engine based on relay contact closure provided by others. The controller shall provide the following functions without modification, factory recalibration, or change of chips or boards, by simply accessing the keypad:

D. The keypad shall be a capacitive touch sensing system. No mechanical switches will be acceptable. The keypad shall operate in extreme temperatures, and maintain complete weather-tight sealing of the controller.

E. In automatic mode, the unit shall conserve energy and go to "sleep".

F. The controller shall function interchangeably from remote contact closure, as well as manual start/stop by selection at the keypad. No other equipment or hardware changes are required.

G. The start function can be programmed to provide two separate functions each day for seven days (i.e. a start, exercise cycle on two separate days at different times and for a varying length of time all via the keypad).

H. Manual-Automatic Button:

1. In Manual Mode, manual "Start" button starts engine and runs until "Stop" or "Off" button is depressed or an emergency shutdown occurs.

2. In Automatic Mode, start/stop sequencing is initiated by a signal from a digital input.

I. The controller shall integrate the engine safety shut-off for low and high oil temperature, and provide over-speed protection.

J. The controller shall include standard, field-adjustable parameters for engine cycle crank timer, and shutdown time delay.

K. The controller shall have only one circuit board with eight built-in relays. Three (3) of the relays shall be programmable to output desired parameter on display and to be used as dry-contacts for communication with Collier County's SCADA system, all via the keypad without changing relays, chips, printed circuits, or any hardware or software. Relays will monitor the following:

1. Low Battery Charge
2. Low Fuel Level (Less than 25 gallons)
3. Diesel Pump Engine Start

L. Standard components shall consist of one of the following set ups:

1. (24) Digital inputs, (7) analog inputs, (1) magnetic pick-up input, (8) 20-amp form “C” relays, (1) RS232 port, (1) RS485 port, (1) RS232/RS485 port, (1) J1939 port, and (1) 64X128 pixel full graphic LCD display with backlight.

2. (8) Digital inputs, (5) analog inputs, (8) digital outputs, (1) RS232 port, (1) RS485 port, (1) J1939 port, (76) selectable features, (32) alarm event history.

M. The industrially-hardened Controller shall withstand vibration of 3 g, 3 axis, frequency swept 10-1000 Hz, in an operating temperature range of 4° to 176°F (-20° to 80°C) and an operating humidity range of 0-95% non-condensing.

2.4 OPTIONS

A. FULLY AUTOMATIC TRICKLE CHARGER: The unit shall include a fully automatic trickle charger powered by 6-amps, 115 VAC.

B. LIGHT: The unit shall include a single switch operated 12VDC light within the enclosure.

C. FLOATS: The unit shall be supplied with one (1) float assembly including two (2) N/O floats which shall integrate with the engine control panel via a single multi-pin plug.

D. LEVEL TRANSDUCER: The unit shall be supplied with (1) one Teflon diaphragm sewage compatible level transducer assembly including a single 4-20 mA level transducer with leveling guard (0-15 psig), which shall integrate with the engine control panel via a single multi-pin plug.

E. AUTO THROTTLE: The unit/s shall include one (1) automatic throttle controller integrated into (1) relays in the electronic engine control panel. The auto-throttle control panel combination shall allow the pump to ramp up to the target RPM given a start command and ramp down to idle given a stop command via the 4-20 mA level transducer

F. DC / AC INVERTOR: The unit/s shall include one (1) 12VDC to 110VAC volt single-phase inverter, 1750 watts, mounted inside enclosure, single 15-amp GFI outlet, and one (1) fusible link.

2.5 ACCESS PLATFORM

A. Platforms and stairs shall meet the Occupational Safety and Health Administration (OSHA) Part 1910, applicable FBC requirements, and ASCE Standards 7 and 24. All platform and stair designs and plans shall be prepared by a Florida Registered Professional Engineer. The Engineer of Record shall identify Flood Hazard Area, Flodd Design Class (ASCE 24) and other applicable loadings. All components shall be aluminum with stainless steel hardware. Standard stairs shall be utilized. Fall protection shall be provided on all exposed sides by use of an OSHA approved guardrail system. Where required for access, removable guardrail sections shall be provided. Grating shall be slip resistant and bonded at ends of bearing bars and openings.

B. All platforms and stairs shall be supported by a concrete foundation system. The foundation designs and plans shall be prepared by a Florida Registered Professional Engineer. It shall meet the requirements of the FBC, ASCE 7 (Dead, Live, Flood, and Wind), ASCE 24 (Flood Resistant) and other regulatory requirements. Where head clearance under the platform is less than 6'-8", provisions shall be made to limit access.

PART 3 EXECUTION

3.1 MANUFACTURERS SERVICES

A. The manufacturer shall furnish the services of a competent factory representative to do the following:

1. The complete pump set shall be factory tested according to ANSI/HI 1.6¬1994 by a certified quality technician. The pump shall be sound tested according to ISO 3744, ANSI/HI9.4 and CPB Sound Level Measurement Standard.

2. Instruct the Owner's operating personnel in the proper operation and maintenance of the

system for a period of not less than one-half day.

3.2 TOOLS AND SPARE PARTS

A. The manufacturer shall furnish the following on delivery of the pumping system;

1. A recommended list of spare parts.

2. Two (2) replacement mechanical seals

3. An Operations and Maintenance manual for the pump and engine.

4. A fuel polishing system capable of below 1 micron filtration equipped with a fuel-water separator and 12V DC fuel pump rated at 40 GPH minimum. The system shall be a standard commercial or industrial off the shelf unit intended for portable use of diesel fuel polishing. The fuel polishing system shall include 6 spare filters and an operations and maintenance manuals.

3.3 WARRANTY

A. The manufacturer shall furnish the following to the owner:

1. A copy of the engine manufacturer's parts and labor warranty.

2. A 3-year Parts and Labor Warranty issued by the manufacturer on the Diesel Pump System. This warranty must cover all pump parts.

3. The venturi shall have a minimum five (5) year warranty to include parts and labor.

SECTION 263213.13

STANDBY DIESEL GENERATORS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Extent of diesel generator set work as indicated by Drawings and Schedules, and is hereby defined to include, but not by way of limitation:
   1. Diesel engine.
   2. Electrical generator.
   3. Engine starting system.
   4. Batteries.
   5. Instrument control panel.
   6. Sound Attenuating Enclosure.
   7. Sub-Base Fuel Tanks.
   8. Exhaust silencer.
   9. Wall thimble.
   10. Additional accessories.
   11. Automatic transfer switch (ATS).
   12. Access platform and stairs.

B. Types of generator sets required include:
   1. Permanent Diesel Engine-driven Generator.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 013400, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:
   1. Product Data: Submit manufacturer's data on diesel engine-driven generator sets and components.
      a. Generator dimensions.
      b. Generator weight.
      c. Generator rating.
      d. Alternator rating.
      e. Generator Starting System Data:
         1) Battery size and ratings.
         2) Charging system capacity.
         3) Battery heater data.
         4) Battery warranty.
      f. Generator Control Panel Data:
         1) Layout.
         2) Wiring diagrams.
         3) Control interconnection.
         4) Instrumentation.
      g. Exhaust System Data:
         1) Muffler size.
         2) Decibel reduction curve.

3) Fuel system data.

h. Cooling System Data:
   1) Radiator capacity.
   2) Cooling reduction capacity

i. Enclosure Data:
   1) Materials.
   2) Size.
   3) Assembly/disassembly instructions.
   4) Door locations.
   5) Noise reduction.
   6) Color.

j. Sub-Base Fuel Tank:
   1) Capacity.
   2) Fuel usage calculations.
   3) Coating.

k. ATS Data:
   1) Enclosure Material.
   2) Dimensions.
   3) Factory test report.

l. Warranty data.

m. Accessory and miscellaneous equipment.

2. Wiring Diagrams: Submit wiring diagrams for diesel engine-driven generator units showing connections to electrical power panels, feeders, and ancillary equipment. Differentiate between portions of wiring that are manufacturer installed and portions that are field installed.
3. Agreement to Maintain: Prior to time of final acceptance, Installer shall submit 4 copies of an agreement for continued service and maintenance of diesel engine-driven generator sets for OWNER's possible acceptance. Offer terms and conditions for furnishing parts and providing continued testing and servicing, including replacement of materials and equipment, for 1-year period with option for renewal of Agreement by OWNER.
4. Certifications: Provide diesel engine-driven generator sets certified test record of the following final production testing:
   a. Single-step load pickup.
   b. Transient and steady-state governing.
   c. Safety shutdown device testing.
   d. Voltage regulation.
   e. Rated power.
   f. Maximum power.
   g. Provide certified test record prior to engine-driven generator set being shipped from factory to Project location.
5. Spare Parts Data: Submit a list of spare parts for the equipment specified.
6. Operating and Maintenance Instruction Manuals:
   a. Operating instruction manuals outlining step-by-step procedures required for system startup and operation.
   b. Manufacturer's name, model number, service manual parts list.
   c. Brief description of equipment and basic operating features.
   d. Maintenance instruction manuals outlining maintenance procedures.

e. Troubleshooting guide listing possible breakdown and repairs.
f. Point-to-point connection wiring diagram for the system.
g. Performance Test Reports: Upon completion of installed system, submit in booklet form all shop and field tests performed to prove compliance with specified performance criteria.
h. Provide OWNER with two (2) electronic copies of O&M manuals on CD's.

1.03 QUALITY ASSURANCE

A. Codes and Standards:
1. NFPA Compliance: Comply with applicable requirements of NFPA 37, "Installation and Use of Stationary Combustion Engines and Gas Turbines," NFPA 99, "Standard for Health Care Facilities," and NFPA 101, "Code for Safety to Life from Fire in Buildings and Structures."
2. UL Compliance: UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors," UL 2200, "Standard for Safety for Stationary Engine Generator Assemblies," rated 600 volts or less. UL 1008, "Automatic Transfer Switches," and UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide transfer switches and components which are UL listed and labeled.
3. ANSI/NEMA Compliance: Comply with applicable requirements of ANSI/NE MA MG1, "Motors and Generators," and MG2, "Safety and Use of Electric Motors and Generators." NEMA Standards Pub/Nos. ICS 2, "Industrial Control Devices, Controllers and Assemblies," ICS 6 and 250, pertaining to transfer switches.
4. IEEE Compliance: Comply with applicable portions of IEEE Standard 446, "IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications."

B. Submittal information shall be generated from a representative located within Collier County who has knowledge of Local and State code requirements.
C. Warranty: Submit in accordance with requirements of Section 01740, warranties covering the items included under this Section. Unit shall be provided with a full comprehensive warranty of 5 years or 1500 running hours from date of ENGINEER's acceptance. Response time shall be a maximum of 3 hours. Provide label on inside of generator with description of warranty period and contact information.

1.04 DELIVERY, STORAGE AND HANDLING
A. Manufactured material shall be adequately packed to prevent damage during shipping, handling, storage and erection. Material shipped to site shall have approval of OWNER prior to shipping. All shipped material shall be packed in a container properly marked for identification. Blocks and padding shall be used to prevent movement.
B. CONTRACTOR shall inspect the material prior to removing it from carrier. If damage is observed, CONTRACTOR shall immediately notify carrier so that a claim can be made. If no such notice is given, material shall be assumed to be in undamaged condition, any subsequent damage that occurs to the equipment shall be the responsibility of CONTRACTOR.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:
   1. Standby Diesel Generator Sets:
      a. Caterpillar.
      b. Cummins.
   2. Automatic Transfer Switches:
      a. Caterpillar.
      b. Cummins

2.02 GENERATOR SETS

A. Except as otherwise indicated, provide manufacturer's standard diesel engine-driven generator set and auxiliary equipment as indicated by published product information, and as required for a complete installation. Generator set shall be rated to continuously power the total accumulated load and starting load shown on Schedule at 100 degrees F ambient temperature and at altitude where installed.

B. Diesel Engine: Provide a 4-cycle, compression ignition type engine for operation on a commercial grade of petroleum fuel oil such as No. 2 fuel oil. Engine operating speed shall not exceed 1,800 rpm and shall be controlled by a governor to maintain alternator frequency within plus or minus 3 Hertz of 60 hertz from no load to full load. Frequency shall recover to steady-state tolerance within 5 seconds after application of 90 percent rated load.

C. Starting System: Provide engine-generator unit with 12- or 24-volt, negative ground, starting system including positive engagement solenoid shift-starting motor, batteries, and 35-ampere, or greater, automatic battery charging alternator with solid-state voltage regulator. Mount batteries in a plastic- or epoxy-coated metal platform near the starter but not on the generator and coat battery terminals with an anti-oxidant. Generator sets rated 150 kW or less shall have a battery rated 650 amperes cold cranking at 0 degree F and 170 minutes reserve capacity by SAE Standard J-537. Larger generators shall have a battery rated either 220 ampere-hours or 900 amperes cold cranking, and 430 minutes reserve capacity. Batteries shall have a 12-month full warranty and 60-month prorated warranty.

D. Battery Charger: Provide a solid-state, current limiting, float-type SENS model #NRG22-10-RC battery charger with 10-ampere minimum capacity. Charger shall operate from 120-volt AC single phase, 60 hertz power and shall automatically keep batteries at full charge. Equip charger with ammeter and voltmeter. Battery charger shall be located within the generator enclosure.

E. Alternator: Provide a single bearing brushless, self-excited alternator with inherently regulated rotating rectifier exciter system or a revolving field design with a temperature compensated solid-state voltage regulator. Connect the alternator housing directly to the

engine flywheel housing. Couple the alternator rotor directly to engine flywheel with a semi-flexible steel disk coupling.

1. Provide windings with Class F insulation with epoxy impregnation and fungus-resistant coating. Temperature rise shall be as defined in NEMA Standard MG1-22.40.
2. The alternator shall be capable of starting load given for site with 35 percent maximum instantaneous voltage dip. Instantaneous voltage dip shall only be 20 percent when there is a VFD. Recovery to stable equation within plus or minus 5 percent of rated voltage shall occur within 3 seconds.

F. Engine Cooling Radiator: Provide a complete engine cooling system equipped with a radiator and blower type fan sized to maintain safe operation, 190 degrees F engine outlet water temperature at 100 degrees F maximum ambient temperature. The engine cooling system shall be filled with a solution of 50 percent ethylene glycol.

G. Instrument Control Panel: Provide engine-generator unit with engine oil-pressure and water-temperature indicators, reset circuit breaker, static voltage regulator, voltage-adjusting rheostat, voltmeter, ammeter with phase selector switch with an OFF position, and with running time indicator and frequency meters. Select circuitry of plug-in design capable of quick replacement, and capable of accepting a plug-in device which allows maintenance to test control panel performance without operating the engine.

1. Provide a cranking limiter to open starting circuit in 45 to 90 seconds if engine has not started within that time or after a series of 3 or more cranking intervals separated by 2 or more rest periods.
2. Provide engine safety devices to shut unit down on high engine temperature, low oil pressure, overspeed, and overcrank. Provide, for each of these conditions, an alarm light and an unpowered, normally open contact for remote use. Provide an audible alarm with silence switch which is activated by any alarm condition. Provide additional unpowered, normally open contact for remote use that indicates general generator alarm. General alarm contact will be for any alarms associated with the generator and not pre-assigned to a specific alarm. Sacrificing a specific alarm in order to receive the general alarm contact is not acceptable.
3. Provide a relay with 2 normally open and 2 normally closed contacts rated 5A at 120 volts AC and which is energized when unit is running. Wire these contacts to terminal strips for remote use.
4. Provide a RUN-OFF-AUTO switch. In AUTO position unit shall start when a remote contact closes and stop when contact opens. In RUN position unit shall start and run until OFF position is selected.
5. Mount instrument control panel on unit such that it is isolated from generator set vibration.

2.03 PERMANENT ENGINE-GENERATOR SET ACCESSORIES

A. Enclosure Design: Generator set shall be provided with a skin tight outdoor enclosure. Enclosure roof and side panels shall be constructed from a minimum of 0.090 Marine Grade Aluminum. Side panels shall be constructed from a minimum of 0.090 Marine Grade Aluminum. The Side Walls shall be complete with necessary access doors and ventilating louvers. There shall be at least 2 access doors on each side of enclosure and

one at the generator control panel for access to the controls. Doors shall be capable of full-range of motion. CONTRACTOR shall coordinate final location of generator to accommodate door swings. Any changes due to generator clearances shall be at the expense of the CONTRACTOR. Doors shall be hung on full-length piano hinge assembly. All hinge hardware shall be stainless steel. Finish paint shall be powder-coated over epoxy primer. Doors shall be equipped with handles. Louvers shall be stationary type and shall be arranged to provide adequate protection against rainfall at 15 degrees from vertical. Air of intake louvers shall be sized so not to exceed .5 inches of water column while providing the required genset cooling and combustion air flow. Enclosure shall be of bolted formed panel type construction. Exhaust shall be provided within the enclosure unless otherwise directed by the ENGINEER. Roof shall have sufficient strength to support an exhaust silencer. Enclosure shall be large enough to fully enclose all components necessary to the system. All doors shall be capable of being locked or have provisions for padlocks. Door hardware shall be stainless steel.

1. All raceway and conduits within the enclosure shall be sealed-tight flexible conduit or rigid aluminum or galvanized steel with malleable iron boxes and compression type fittings as appropriate for the raceways used under NEC. EMT and flex or “Greenfield” conduits are not acceptable.
2. When this outdoor enclosure is specified, the temperature specifications for unit shall be 0 degrees F to 120 degrees F with ambient air at radiator intake being 100 degrees F maximum.
3. Modular enclosures shall comply with DCA, Florida Building Code and have a minimum sustained wind rating of 150 MPH.
4. The CONTRACTOR is responsible for verifying the impact rating requirements under Florida Building Code and shall provide a generator enclosure in compliance to these standards.
5. Consult the ENGINEER prior to bid when generator is located within any “Zone 4 impact area under FBC”.
6. Enclosure shall match footprint of sub base fuel tank.

B. Sound Attenuation: Enclosure shall be insulated to attenuate sound and include sound attenuating features that direct radiant cooling air in a route to minimize ambient noise when generator is running.

C. Operational noise shall not exceed 75 dBA at 23 feet (in Free Field Conditions). Additional sound attenuation references or limitations may be required. See drawings for additional details. If generator is located within 50 feet of a commercial or residential unit, then operational noise shall not exceed 55 dBA.

D. Source dBA and sound attenuation shall be as measured and defined under ANSI S12.34-1998 and SIO 3744 as applicable. Additional local codes and standards may apply for generator operational noise. The CONTRACTOR is responsible for compliance to all local standards without change order or additional payment.

E. Fuel System: Provide unit with a UL142 compliant double-wall skid base type integral fuel tank that is “skid” mounted, unless otherwise directed by the ENGINEER’s drawings or addenda. Tank capacity shall be a maximumum of 550 gross volume gallons. The

tank capacity shall be calculated assuming the tank is 90% full and based on the generator running at full load/speed continuously for three (3) days.

F. The ENGINEER has projected fuel use estimates using equipment listed as the basis of design. The CONTRACTOR is responsible for providing the manufacturer's fuel usage calculations with submittal documents for ENGINEER's review.

G. The fuel tank shall be furnished with UL142 and FDEP required accessories to include a fuel site gauge, normal and emergency vents and fuel cap having padlocking provisions. All necessary fuel supply and return line shall be furnished pre-assembled to unit. The Fuel Tank shall meet all applicable State and local standards for the volume of fuel the tank will hold.

H. Sub base fuel tank size shall be provided and sized as shown on the contract documents and within the specifications.

I. Sub base fuel tank shall not allow pooling or ponding of water on top once generator is mounted on top.

J. Tank shall be made by a manufacturer with minimum of (10) ten years' experience in the design and construction of UL Listed, FDEP and NFPA compliant sub base fuel tanks. Manufacturer of the fuel tank must be approved and registered with the State of Florida, and have their required "EQ" file number on the supplied fuel tank. The installing CONTRACTOR is responsible for supplying fuel for the field testing.

K. The fuel tank shall be mounted under the generator skid rails, consisting of a dual wall design constructed to UL142 and standards applicable to this application under FS-62-762, NFPA 30, NFPA 37 and NFPA 110. All fuel tanks shall comply with the requirements set forth by Collier County Pollution Control.

L. Sub base fuel tank shall be rectangular in shape and include reinforced steel box channel for generator support.

M. Both the inner and outer tanks shall be constructed of 304 stainless steel.

N. The outer wall shall be prepared before & after primer. Prime with one coat of epoxy primer to a thickness of 12-15 mils (DFT). Outer wall finish coat shall be a high gloss, black, UV blocking epoxy primer applied to a minimum thickness of 3.5 mils (DFT). All welds and fasteners connecting the generator skid base to the fuel tank shall be similarly primed and finished. Primers shall not be electrostatically or powder applied. Primers shall be hand applied & dried in a drying booth.

O. Fuel tank shall be equipped with a magnetic liquid level fuel gauge as manufactured by Rochester Gauges, Inc. Fuel tank level shall be output as a 4-20mA signal from the generator control panel.

P. Sub base fuel tank shall have a 4 point lifting system in place when shipped to the site. It shall be the responsibility of the Generator manufacturer to recommend a lifting system along with instructions for the CONTRACTOR on site.

Q. Sub base tank testing shall consist of primary and secondary tank containment basin and shall be pressurized at 3-5 psi and leak checked to ensure integrity of sub base weld seams per UL-142 standards. A copy of this report shall accompany close-out documents. Fuel containment basin shall be sized as a minimum of 110% of the tank capacity to prevent escape of fuel into the environment in the event of a tank rupture. Provide a fuel containment basin leak detector switch.

R. The sub base tank fittings shall include the following:
   1. Appropriately sized NPT fuel supply.
   2. Fuel return fitting
   3. 2” NPT for normal vent
   4. NPT for emergency vent, sized as appropriate
   5. 2” NPT for manual fill.
   6. NPT for level gauge, sized as appropriate.
   7. 3/8” NPT basin drain
   8. 2” NPT for level alarm.
   9. NPT fitting for leak detection alarm

S. Coolant Heater: Provide engine coolant heater that operates from 120-volt AC single phase, 60 hertz power with thermostatic controls to maintain engine coolant at proper temperature to fulfill start-up requirements of NFPA 99.

T. Inlet and Exhaust Systems: Silencers and exhaust ducting to silencers shall be self-supporting when assembled. Provide all necessary supporting members for ductwork between silencer and outlet. Provide all required cutting as shown on Drawings and noted herein. The unit shall be complete with raincap. All exhaust duct shall be Schedule 10 steel pipe, minimum. Inlet silencer and filter to be self-supporting. Provide necessary supports for all intake ductwork. All intake ducts shall be Schedule 10 steel pipe, minimum.
   1. Provide a silencer which meets sound standards of a critical area. Silencer shall provide attenuation (input to output) of 25 dB or greater at frequencies of 125 hertz to 8 kilohertz. A curve shall be submitted with Shop Drawings showing attenuation (input to output) in dB versus frequency. Curve shall be on manufacturer's standard data sheet or from an independent test lab. A spiral or bellows-type flexible section of pipe shall be installed in the exhaust line between the muffler and engine manifold connection. An insulated thimble section shall be provided where exhaust line passes through roof or wall. Exhaust lines shall be pitched and a condensation trap provided at non-draining low points in line.

U. Circuit Breaker: A generator power circuit breaker shall be installed as a manual load circuit interrupter and an automatic overload and short circuit protection device.
   1. The circuit breaker shall be a solid-state trip type for all sizes rated 200 amps continuous and larger. Solid-state trip shall include Long-time, Short-time, and Instantaneous. Ground fault trip required on breakers 1,000 amps and above.

2. 100% ratings under UL shall be required as noted on ENGINEER's drawings.
3. AIC rating for generator power circuit breaker shall meet or exceed that of the upstream service entrance rating.
4. Generator power circuit breaker shall be UL listed as short circuit, service entrance rated device under UL and NEC.
5. Trip settings for all breakers shall be selected for the rating of the generator power circuit as indicated on Drawings.
6. Provide breaker and alternator trip curves in the submittal. Show coordination of curves for equipment provided.

V. Provide protective relays to protect the generator system/alternator.

W. Alternator protection equipment as basis of design shall be equal to "Amp Sentry" protection by Cummins Power Generation with the following features: Over current and short-circuit shut down - Over current warning -Single and three phase fault regulation - Over and under voltage shut down - *Over and under frequency shut down - Overload warning with alarm contact - Reverse power and reverse* Var shut down - Excitation fault. Equipment other than basis of design is subject to ENGINEER's approval. Provide full submittal and comparison data for ENGINEER's review on equipment as provided.

X. Any pump station requiring a generator shall also have a generator receptacle located on the pump control panel for a portable generator, coordinate exact model with OWNER.

2.04 AUTOMATIC TRANSFER SWITCHES

A. Automatic Transfer Switch: UL listed and 600 volt-rated with amperage rating shown on Drawings and shall be the mechanically held, electrically operated type rated for continuous duty in an unventilated sheet metal enclosure.

B. Switch shall be double throw, with an off position, having electrical operated normal-emergency positions inherently interlocked mechanically, and with main contacts mechanically attached to a common shaft. Main contacts shall be silver alloy wiping-action type. They shall be protected by arcing contacts.

C. Heavy duty emergency pushbuttons shall be provided. Emergency pushbuttons shall reset when pulled out.

D. Switch and Relay Contacts, Coils, Springs, and Control Elements: Removable from front of transfer switch without removal of the switch panels from enclosure and without disconnection of drive linkages or power conductors. Sensing and control relays shall be continuous duty industrial control type with 600 volt, 10 amp rated contacts.

E. Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system

to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism.

F. Power transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.

G. Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.

H. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.

I. Upon drop in normal voltage of 83-85 percent of rated voltage, and after an override delay of 3 seconds nominal, switch shall start generator and transfer the load to emergency source, provided emergency source voltage and frequency are 90 percent of rated or higher.

J. Upon return of normal source voltage for 5 seconds nominal, to 92-95 percent of rated, switch shall retransfer load to normal source after a minimum transfer time or if emergency source fails. Provide a 5- to 60-second adjustable time delay to maintain transfer switch in the "Off" position during transfer to either source.

K. Sensing relays shall operate without contact chatter or false response when voltage is slowly varied to dropout and pickup levels.

L. Four auxiliary contacts shall be provided: Two for transfer switch position indicating use, and two auxiliary contacts, one N.O. and one N.C. to operate after completion of the 3-second override delay for starting generator. All auxiliary contacts shall be 600 volt, 10 amp continuous rating.

M. Operator Panel. Each transfer switch shall be provided with a control panel to allow the operator to view the status and control operation of the transfer switch. The operator panel shall be a sealed membrane panel rated NEMA 3R/IP53 or better (regardless of enclosure rating) that is permanently labeled for switch and control functions. The operator panel shall be provided with the following features and capabilities:
    1. High intensity LED lamps to indicate the source that the load is connected to (source 1 or source 2); and which source(s) are available. Source available LED indicators shall operate from the control microprocessor to indicate the true condition of the sources as sensed by the control
    2. High intensity LED lamps to indicate that the transfer switch is “not in auto” (due to control being disabled or due to bypass switch (when used) enabled or in operation) and “Test/Exercise Active” to indicate that the control system is testing or exercising the generator set.
    3. “OVERRIDE” pushbutton to cause the transfer switch to bypass any active time delays for start, transfer, and retransfer and immediately proceed with its next logical operation.

4. “TEST” pushbutton to initiate a preprogrammed test sequence for the generator set and transfer switch. The transfer switch shall be programmable for test with load or test without load.
5. “RESET/LAMP TEST” pushbutton that will clear any faults present in the control, or simultaneously test all lamps on the panel by lighting them.
6. The control system shall continuously log information on the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. This information shall be available via a PC-based service tool and an operator display panel.
7. Vacuum fluorescent alphanumeric display panel with push-button navigation switches. The display shall be clearly visible in both bright (sunlight) and no light conditions. It shall be visible over an angle of at least 120 degrees. The Alphanumeric display panel shall be capable of providing the following functions and capabilities:
    a. Display source condition information, including AC voltage for each phase of normal and emergency source, frequency of each source. Voltage for all three phases shall be displayed on a single screen for easy viewing of voltage balance. Line to neutral voltages shall be displayed for 4-wire systems.
    b. Display source status, to indicate source is connected or not connected.
    c. Display load data, including 3-phase AC voltage, 3-phase AC current, frequency, KW, KVA, and power factor. Voltage and current data for all phases shall be displayed on a single screen.
    d. The display panel shall allow the operator to view and make the following adjustments in the control system, after entering an access code:
        1) Set nominal voltage and frequency for the transfer switch.
        2) Adjust voltage and frequency sensor operation set points.
        3) Set up time clock functions.
        4) Set up load sequence functions.
        5) Enable or disable control functions in the transfer switch, including program transition.
        6) Set up exercise and load test operation conditions, as well as normal system time delays for transfer time, time delay start, stop, transfer, and retransfer.
    e. Display Real time Clock data, including date, and time in hours, minutes, and seconds. The real time clock shall incorporate provisions for automatic daylight savings time and leap year adjustments. The control shall also log total operating hours for the control system.
    f. Display service history for the transfer switch. Display source connected hours, to indicate the total number of hours connected to each source. Display number of times transferred, and total number of times each source has failed.
    g. Display fault history on the transfer switch, including condition, and date and time of fault. Faults to include controller checksum error, low controller DC voltage, ATS fail to close on transfer, ATS fail to close on retransfer, battery charger malfunction, network battery voltage low, and network communications error.

N. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600VAC. Provide RMS voltage sensing and metering that is accurate to within plus or minus 1% of nominal voltage level. Frequency sensing shall be accurate to within plus or minus 0.2%. Voltage sensing shall be monitored based on the normal

voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.

O. Transfer switch voltage sensors shall be close differential type, providing source availability information to the control system based on the following functions:
   1. Monitoring all phases of the normal service (source 1) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of normal voltage level).
   2. Monitoring all phases of the emergency service (source 2) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of pickup voltage level).
   3. Monitoring all phases of the normal service (source 1) and emergency service (source 2) for loss of a single phase.

P. The transfer switch shall be configurable to control the operation time from source to source (program transition operation). The control system shall be capable of enabling or disabling this feature, and adjusting the time period to a specific value. The transfer switch shall incorporate adjustable time delays for generator set start (adjustable in a range from 0-15 seconds); transfer (adjustable in a range from 0-120 seconds); retransfer (adjustable in a range from 0-30 minutes); and generator stop (cooldown) (adjustable in a range of 0-30 minutes).

Q. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator service.

R. The control system shall be designed and prototype tested for operation in ambient temperatures from -40C to +70C. It shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.

S. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.

T. Enclosures shall be UL listed. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70. The cabinet door shall include permanently mounted key type latches.

U. Transfer switch equipment shall be provided in a NEMA 4X enclosure.

V. The enclosure shall provide code-required wire bend space at point of entry as shown on the drawings. Manual operating handles and all control switches (other than key-operated switches) shall be accessible to authorized personnel only by opening the key-locking cabinet door. Transfer switches with manual operating handles and/or non key-operated control switches located on outside of cabinet do not meet this specification and are not acceptable.

W. Transfer switch normally connects an energized utility power source (source 1) to loads and a generator set (source 2) to the loads when normal source fails. The normal

position of the transfer switch is source 1 (connected to the utility), and no start signal is supplied to the genset.

X. Generator Set Exercise (Test) With Load Mode. The control system shall be configurable to test the generator set under load. In this mode, the transfer switch shall control the generator set in the following sequence:
   1. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.
   2. The transfer switch shall issue a compatible start command to the generator set, and cause the generator set to start and run at idle until it has reached normal operating temperature.
   3. When the generator set has reached normal operating temperature or after an adjustable time period (whichever is shorter), the control system shall accelerate the generator set to rated voltage and frequency.
   4. When the control systems senses the generator set at rated voltage and frequency, it shall operate to connect the loads to the generator set by opening the normal source contacts, and closing the alternate source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.
   5. The generator set shall operate connected to the load for the duration of the exercise period. If the generator set fails during this period, the transfer switch shall automatically reconnect the generator set to the normal service.
   6. On completion of the exercise period, the transfer switch shall operate to connect the loads to the normal source by opening the alternate source contacts, and closing the normal source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.
   7. The transfer switch shall operate the generator set unloaded for a cooldown period, and then remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

Y. Generator Set Exercise (Test) Without Load Mode. The control system shall be configurable to test the generator set without transfer switch load connected. In this mode, the transfer switch shall control the generator set in the following sequence:
   1. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.
   2. The transfer switch shall issue a compatible start command to the generator set, and cause the generator set to start and run at idle until it has reached normal operating temperature.
   3. When the generator set has reached normal operating temperature or after an adjustable time period (whichever is shorter), the control system shall accelerate the generator set to rated voltage and frequency.
   4. When the control systems senses the generator set at rated voltage and frequency, it shall operate the generator set unloaded for the duration of the exercise period.
   5. At the completion of the exercise period, the transfer switch shall remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

Z. Factory Testing. The transfer switch manufacturer shall perform a complete operational test on the transfer switch prior to shipping from the factory. A certified test report shall be provided to OWNER & ENGINEER upon delivery of generator. Test process shall include calibration of voltage sensors.

AA. The manufacturer of the transfer switch and generator set shall maintain service parts inventory at a central location (within 50 miles of the city) which is accessible to the service location 24 hours per day, 365 days.

BB. The transfer switch shall be serviced by a local service organization that is trained and factory certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

CC. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

DD. Accessory devices shall be provided as follows:

1. Time delay to override harmless power dips and outages. (Inverse time characteristic with voltage.)
2. Test switch.
3. Auxiliary contacts (as specified herein).
4. Selector relay (as specified herein).
5. Lockout relay (sensitive to voltage and frequency).
6. Full phase protection with nominal 75-80 percent dropout and 92-95 percent pickup on phase relay.
7. Adjustable time delay on retransfer to normal source. Minimum retransfer of 2 minutes and maximum of 25 minutes. Built-in circuitry to nullify the retransfer time delay if the emergency source fails and the normal source is available.
8. Adjustable (10-20 minutes) time delay for running generator unloaded after transfer for cool down.
9. Adjustable time delay or delays (5 to 60 seconds) for holding transfer switch in the "Off" position when switching from standby source to normal and normal source to standby.
10. Engine starting contact.
11. A selector switch shall permit generator to be exercised with or without load.

2.05 ACCESS PLATFORM

A. Elevated platforms shall be provided where necessary to provide access to the generator for operation and maintenance. Typically, these platforms shall be limited to locations with existing grades requiring equipment to be located at a higher elevation due to the Florida Building Code (FBC), FEMA, and the ASCE Standard 7 and 24 requirements.

B. Platforms and stairs shall meet the Occupational Safety and Health Administration (OSHA) Part 1910, applicable FBC requirements, and ASCE Standards 7 and 24. All platform and stair designs and plans shall be prepared by a Florida Registered

Professional Engineer. The Engineer of Record shall identify Flood Hazard Area, Flodd Design Class (ASCE 24) and other applicable loadings. All components shall be aluminum with stainless steel hardware. Standard stairs shall be utilized. Fall protection shall be provided on all exposed sides by use of an OSHA approved guardrail system. Where required for access, removable guardrail sections shall be provided. Grating shall be slip resistant and bonded at ends of bearing bars and openings.

C. All platforms and stairs shall be supported by a concrete foundation system. The foundation designs and plans shall be prepared by a Florida Registered Professional Engineer. It shall meet the requirements of the FBC, ASCE 7 (Dead, Live, Flood, and Wind), ASCE 24 (Flood Resistant) and other regulatory requirements. Where head clearance under the platform is less than 6'-8", provisions shall be made to limit access.

PART 3 EXECUTION

3.01 INSTALLATION OF DIESEL ENGINE-DRIVEN GENERATOR SETS

A. Install diesel engine-driven generator units as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that engine-generator units fulfill requirements. Comply with NFPA and NEMA standards pertaining to installation of engine-generator sets and accessories.

B. Coordinate with other work, including raceways, electrical boxes and fittings, fuel tanks, piping, and accessories, as necessary to interface installation of engine generator equipment work with other work.

C. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque-tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and B, and the National Electrical Code.

D. Install units on steel spring type vibration isolators fastened to an inertia base in accordance with manufacturer's instructions.

E. Connect fuel piping to generator equipment as indicated, and comply with manufacturer's installation instructions.

3.02 GROUNDING

A. Provide equipment grounding connections for diesel engine-driven generator unit and automatic transfer switch as indicated. Connect generator equipment ground to ground ring around generator pad. Ground ring shall have a minimum of four (4) 5/8” x 20’ copper-clad ground rods. Connect ground ring to sites counterpoise. Connections to ground ring, counterpoise and ground rods shall be exothermically welded. Add additional ground rings as required to meet five (5) ohm (or less) specified resistance. Tighten connections to comply with tightening torques specified in UL Standard 486A to ensure permanent and effective grounding.

3.03 FIELD QUALITY CONTROL

A. Start-up Testing:
   1. Engage local equipment manufacturer's representative to perform start-up and building load tests upon completion of installation, with ENGINEER in attendance; provide certified test record. Tests are to include the following:
      a. Check fuel, lubricating oil, and antifreeze in liquid-cooled models for conformity to manufacturer's recommendations under environmental conditions present.
      b. Test prior to cranking engine for proper operation, accessories that normally function while the set is in a standby mode. Accessories include: alternator strip heater, engine coolant heater, and battery charger.
      c. Check, during start-up test mode, for exhaust leaks, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage, and phase rotation.
      d. Test, by means of simulated power outage, automatic start-up by remote-automatic starting, transfer of load, and automatic shutdown. Prior to this test, adjust for proper system coordination, transfer switch timers. After installation inspection and fine adjustments have been completed, the Generator set shall be connected to resistive type load banks, matching the full rated output of this installed generator set.

1) A four (4) hour 100% resistive load bank test, matching the full rated output of this installed generator set, is to be performed after installation in the presence of the ENGINEER, OWNER, and any required Authority. Coordinate with ENGINEER, OWNER, and any required Authority for appropriate test date and time. During this load bank test, monitor the engine temperature, oil pressure, battery charge level, generator voltage, amperes, and frequency. Voltage dip will be observed with a recording oscilloscope furnished by supplier for this test only. Voltage dip is defined as the peak-to-peak voltage minimum, at starting compared to the average peak-to-peak voltage with the starting load running. The difference shall be less than 25 percent of the running P-P voltage.
2) Provide a test of safeties and transfer under NFPA-110 criteria.
3) Provide all tests in the presence of an OWNER representative.
Upon completion of installation and testing, demonstrate capability and compliance of system with requirements. Where possible, correct malfunctioning units at Site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting. Initial testing and retesting to be at no cost to OWNER.

3.04 QUALITY ASSURANCE

A. Commissioning and Qualifications shall be performed by Manufacturer's authorized and factory certified trained for installation of units personnel.

B. Maintenance Proximity: The commissioning and selling manufacturer office location shall not be more than two hours' normal travel time from the project site.

C. Access to Service & Parts: Manufacturer for the Generator shall maintain a full operational facility, with service, parts and distribution center within 50 miles of the Project Site. A ‘sales office’ will not qualify as a service & parts facility. A “dealer” that buys product from a Factory Distributor does not qualify.

D. Manufacturer’s Qualifications: The manufacturer shall be in the business of manufacturing power generation systems under ISO-9001 certification process for over 10 years. The manufacturer shall employ service, engineering, and parts staff within a factory-owned or authorized service center, within 50 miles of Project site.

E. When an “upfitter” is used for a fuel tank or generator enclosure, the manufacturer shall be located in the same state as the Project Site.

F. Upfitters shall provide their UL Listing number on all documentation of compliance. UL as an “assembly” under the generator manufacturer’s main UL Listing is not acceptable.

G. cUL (or other) listing or compliance shall not be accepted in lieu of UL listing and label.

H. Manufacturer Service Qualifications: The generator manufacturer shall have a service center within a 2-hour driving distance from the project site. This service center shall have engineering, application support, on-site rental, start-up, commissioning, and

replacement parts and labor for the maintenance and repair of the same brand of power generation system equipment as supplied on the Project.

I. Source Limitations: Obtain all equipment under this section through one source as practical and possible under the limitations of the manufacturer’s ability to provide equipment.

J. The equipment under this Section must be sold to the installer or the OWNER by an entity operating from within the project State.

K. The equipment under this Section must be installed by a CONTRACTOR operating from offices located within the Project state.

L. Equipment under this section shall be provided by a single manufacturer, so as to provide only one source of warranty and responsibility whenever possible.

M. Generator engine, alternator, and generator controller shall be provided by a single manufacturer exceptions must be noted in submittal. The ENGINEER reserves the right to reject exceptions based on the equipment used as the basis of design in comparison.

3.05 PERSONNEL TRAINING

A. Building Operating Personnel Training: Train OWNER's building personnel in procedures for starting-up, testing, and operating diesel engine-driven generator sets. In addition, train OWNER's personnel in periodic maintenance of batteries.

END OF SECTION

SECTION 330518

LAYING AND JOINTING BURIED PIPELINES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Installation of all underground pipelines. Provide pipeline materials, coatings and linings as specified and pipe of the types, sizes and classes shown or specified.

1. Use proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of the pipe and fittings.

2. Use suitable fittings where shown and at connections or where grade or alignment changes require offsets greater than those recommended and approved.

3. Lay all underground pipelines not supported on piles or concrete cradle in select fill bedding material.

4. Close off all lines with bulkheads when pipe laying is not in progress.

B. Related Work Specified in Other Sections Includes:

1. Section 022501 – Leakage Tests

2. Section 025400 – Disinfection

3. Section 312316 – Excavation - Earth and Rock

4. Section 312319 – Groundwater Control for Open Excavation

5. Section 312323 – Backfilling

6. Section 330502 – High Density Polyethylene (HDPE) Pipe and Fittings

7. Section 330503 - Polyvinyl Chloride (PVC) Pipe and Fittings

8. Section 330504 - Ductile Iron Pipe (DIP) and Fittings

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM D 2774 - Practice for Underground Installation of Thermoplastic Pressure Piping

2. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances

3. ASTM A 307 - Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile

4. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, C25, 125, 250, 800

5. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges

6. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

7. AWWA C115/A21.15 - Flanged Ductile-Iron Pipe With Threaded Flanges

8. Uni-Bell - Handbook of PVC Pipe

9. Collier County - Utilities Standards and Procedures Ordinance

1.3 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows:

B. Transportation and Delivery: Take every precaution to prevent injury to the pipe during transportation and delivery to the site.

C. Loading and Unloading: Take extreme care in loading and unloading the pipe and fittings.

1. Work slowly with skids or suitable power equipment, and keep pipe under perfect control at all times.

2. Under no condition is the pipe to be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating.

D. Sling: When handling the pipe with a crane, use a suitable sling around the pipe.

1. Under no condition pass the sling through the pipe. Interior of pipe is to be kept free of dirt and foreign matter at all times.

2. Use a nylon canvas type sling or other material designed to prevent damage to the pipe and coating.

3. When handling reinforced concrete pipe or uncoated steel or ductile iron pipe, steel cables, chain or like slings are acceptable.

E. Damaged Piping: If in the process of transportation, handling, or laying, any pipe or fitting is damaged, replace or repair such pipe or pipes.

F. Blocking and Stakes: Provide suitable blocking and stakes installed to prevent pipe from rolling.

1. Obtain approval for the type of blocking and stakes, and the method of installation.

G. Storage for Gaskets: Store gaskets for pipe joints in a cool place and protect gaskets from light, sunlight, heat, oil, or grease until installed. Store gaskets in a sealed container (such as a vented drum). When long-term storage with exposure to direct sunlight is unavoidable, PVC pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excessive heat accumulation (Uni-Bell PVC Handbook).

1. Do not use any gaskets showing signs of cracking, weathering or other deterioration.

2. Do not use gasket material stored in excess of six months without approval.

1.4 FIELD CONDITIONS

A. Repair of Sanitary Sewers and Services: Rebed, in compacted select fill material, sanitary sewers which cross over the new pipe or which cross under the new pipe with less than 12 inches clear vertical separation. Compact the bedding to densities required for new pipeline construction and extend bedding below the sewer to undisturbed earth. Reconstruct sewers damaged by pipeline construction.

1. Furnish and install all materials and do all work necessary for the reconstruction or repairs of sanitary sewers and services.

2. Provide pipe for reconstruction of sanitary sewers and services meeting the appropriate specification requirements.

3. Provide pipe of the same size as the existing sewer or when the same size is not available, use the next larger size of pipe. Obtain approval of joints made between new pipe and existing pipe.

PART 2 PRODUCTS

A. The materials allowed for buried sewer pipes are PVC, HDPE or Ductile Iron Pipe.

PART 3 EXECUTION

3.1 PREPARATION

A. Dry Trench Bottoms: Lay pipe only in dry trenches having a stable bottom.

1. Where groundwater is encountered, make every effort to obtain a dry trench bottom in accordance with Section 312319.

2. Perform trench excavation and backfill in accordance with Sections 312316 and 312323.

3.2 INSTALLATION

A. General: Install all piping in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Where pipe joint deflections are used, do not exceed 80 percent of the maximum deflection limits shown in AWWA C600. Gravity systems shall contain no joint deflection.

1. Arrange miscellaneous pipelines, which are shown in diagram form on the Plans, clear of other pipelines and equipment.

2. Gravity systems shall not contain vertical dips greater than one ~~and a half~~ inch~~es~~ ~~(1.5”)~~ (1.0”).

B. Code Requirements: Provide pipeline installations complying with AWWA C600 for iron pipe, AWWA Manual M11 for steel pipe, ASTM D 2774 for thermoplastic pressure piping, and as modified or supplemented by the Specifications.

C. Pipe Laying - General:

1. Thoroughly inspect all pipe for damage and cleanliness. If found to be defective, tag, remove and replace pipe with satisfactory pipe or fittings at no additional charge to COUNTY.

2. Generally, lay all pipe with bells pointing ahead.

3. Carefully place all pipe, pipe fittings, valves and hydrants into trench by means of a derrick, ropes or other suitable tools or equipment in such a manner as to prevent damage and check for alignment and grade.

4. Make adjustments to bring pipe to line and grade by scraping away or filling in select fill material under the body of the pipe.

5. Wedging or blocking up the pipe barrel is not permitted.

6. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home.

7. As the work progresses, clean the interior of pipelines of all dirt and superfluous materials of every description.

8. Keep all lines absolutely clean during construction.

9. Lay pipelines accurately to line and grade.

10. During suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other material from entering the pipe.

D. Pipe Laying - Trenches:

1. Carefully lay all pipelines in trench excavations piece by piece using suitable tools or equipment on select fill bedding (refer to Utilities Standards and Procedures Ordinance, Section 9.1.2), concrete cradle or other foundations as shown, specified or ordered in writing. Prevent damage to materials, protective coatings and linings.

2. Do not dump or drop pipe or pipe materials into trench.

3. Properly secure the pipe against movement and make the pipe joints in the excavation as required.

4. Carefully grade and compact pipe bedding.

5. Bell Holes:

a. Cut out bell holes for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.

b. Thoroughly tamp bell holes full of select fill material following the making of each joint to provide adequate support to the pipe throughout its entire length.

E. Other Foundations: Install pipelines laid on other types of foundations as specified for such other foundations or as ordered in writing.

F. Field Cuts of Pipelines: For shorter than standard pipe lengths, make field cuts in a manner producing a cut square and perpendicular to the pipe axis. Remove any sharp, rough edges which otherwise might injure the gasket.

G. Procedure for sealing cut ends and repairing field damaged areas of polyethylene lined pipe and fittings is as follows:

1. Remove burrs caused by field cutting of ends or handling damage and smooth out edge of polyethylene lining if made rough by field cutting or handling damage.

2. Remove oil or lubricant used during field cutting operations.

3. Areas of loose lining associated with field cutting operation must be removed and exposed metal cleaned by sanding or scraping. For larger areas, remove loose lining and dirt, then roughen bare pipe surface by scratching or gouging with a small chisel to provide an anchor pattern for the epoxy. It is recommended that the polyethylene lining be stripped back by chiseling, cutting, or scraping about 1 inch to 2 inches into well adhered lined area before patching. This ensures that all areas of undercutting have been removed. Be sure to roughen an overlap of 1 inch to 2 inches of polyethylene lining in area to be epoxy coated. This roughening should be done with a rough grade emery paper (40 grit), rasp, or small chisel. Avoid honing, buffing, or wire brushing since these tend to make surface to be repaired too smooth for good adhesion.

4. With area to be sealed or repaired clean and suitably roughened, apply a thick coat of a two-part coal tar epoxy (see County Approved Product List, Appendix F). The heavy coat of epoxy must be worked into the scratched surface by brushing. Mixing and application procedure for the epoxy must follow the epoxy manufacturer's instructions.

5. It is important that the entire freshly cut, exposed metal surface of the cut pipe be coated. To ensure proper sealing, overlap at least 1 inch of the roughened polyethylene lining with this two-part epoxy system.

H. Ductile Iron Pipe Mechanical Joints:

1. Assembly: In making up mechanical joints, center the spigot in the bell.

   a. With a wire brush just prior to assembly of the joint thoroughly brush 8 inches outside of spigot and inside of bell with which the rubber gasket comes in contact. Remove all oil, grit, tar (other than standard coating) and other foreign matter from joint.

   b. Brush lubricant over the gasket just prior to installation. (Note: There is only one rubber gasket size for each diameter of pipe.)

   c. Press the gasket into place within the bell and move the gland into position, bolts inserted, and the nuts tightened finger tight.

   d. Tighten the nuts with a torque wrench so that the gland is brought up toward the pipe evenly. Torque wrenches shall be set as specified in AWWA C111. Spanner type wrenches not longer than specified in

AWWA C111 may be used with the permission of County Manager or designee.

e. Tighten all nuts 180 degrees apart alternately in order to produce equal pressure on all parts of the gland.

2. Torques: Apply the following range of bolt torques:

Size Inches	Range of Torque - ft. lbs
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1-1/4	90 - 120

3. Remaking of Joints: If effective sealing is not obtained at the maximum torque listed above, disassemble and reassemble the joint after thorough cleaning.

I. Ductile Iron Pipe Rubber Gasket Joints:

1. Assembly: In making up the rubber gasket joint, brush the gasket seat in the socket thoroughly with a wire brush and wipe the gasket with a cloth.

a. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat.

b. Apply a thin film of lubricant (AWWA C600) to the inside surface of the gasket that will come in contact with the entering pipe.

c. Brush the plain end of the pipe to be entered thoroughly with a wire brush and place it in alignment with the bell of the pipe to which it is to be joined.

d. Exert sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket to make the joint.

2. Positioning: Before proceeding with backfilling, feel completely around the joint using a feeler gauge to confirm that the gasket is in its proper position.

a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.

b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.

3. Optional Mechanical Joints: Use mechanical joint fittings that meet the requirements of Section 330504 with the rubber gasket joint pipe when specified or when rubber gasket fittings are not available.

J. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.

1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.

K. Temporary Blow-Off Assembly: Dead-end water lines shall be temporarily ended with a blow-off as shown in Collier County Standard Details. After full bore flush replace with a fire hydrant meeting the requirements of Section 331619.

L. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.

1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.

M. Concrete Encasement: Concrete encasement shall be constructed in accordance with Collier County Standard Details when:

1. A potable water main crosses at a depth that provides less than 18 inches clear distance from sewer lines in which case a Deviation Form request should be completed. Encase the sewer main unless specifically approved by Collier County Utilities. Encasement shall extend a minimum 10 feet on each side of the point of crossing. Pressure test both pipelines to 150 psi after the concrete has properly cured.

2. A water main running parallel to a sewer line provides less than 10 feet separation from sewer lines, in which case a Deviation Form Request needs to be completed. Encase the sewer main unless specifically approved by Collier County Utilities.

3. The ENGINEER has ordered the line encased. NO POTABLE WATER MAIN SHALL BE ENCASED IN CONCRETE UNLESS SPECIFICALLY AUTHORIZED BY THE COUNTY MANAGER OR DESIGNEE.

The points of beginning and ending of pipe encasement shall be not more than 6 inches from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.

N. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem.

1. Adjust valve-box to final grade at the time designated by the County Manager or designee.

2. Build a collar, as shown in the standard details, 18 inches by 18 inches by 6 inches or 24 inch diameter round by 6 inches flush to grade of top of box. Similar collar shall be poured flush with grade and top of unpaved areas.

3. Satisfactorily reset any valve box that is moved from its original position, preventing the operation of the valve.

4. Replace any valve box that has been damaged.

O. Identification:

1. Metallized Warning Tape: For DIP and PVC pipe (other than gravity sewer pipe and laterals) to be installed, 3-inch detectable marking tape, of appropriate color and appropriate warning statement, shall be placed along the entire pipe length. In all cases, marking tape shall be installed two feet (2') below grade or one-half the pipe's bury, whichever is less, during backfill operations (refer to Utilities Standards Manual Section 1 – 1.1 and 2.2.1). All PVC pipe, PVC fittings, and identification tape shall be color-coded per Collier County Standards. HDPE pipe installed by horizontal directional drilling will not be required to be marked with metalized warning tape.

2. Electronic Markers (see County Approved Product List, Appendix F): Install electronic markers twenty-four inches (24") below final grade, above pipe, at all bends or changes in alignment and every two hundred and fifty feet (250') along the pipe between bends.

P. Separation From Other Pipe Systems:

1. Parallel Water and Sewer or Non-Potable Lines: Sanitary sewer lines, storm sewers or force mains shall be separated from water mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 10 feet. Non-potable, reclaimed or reuse water mains shall be separated from water mains, gravity sewers or force mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 5 feet center to center or 3 feet outside to outside. When this standard cannot be maintained, the sewer line shall be concrete encased for a distance of 10 feet each way from the water line and any other conduit, with a minimum vertical clearance of 12 inches being provided at all times. See Section 1 - Design Criteria, Subsection 1.2.3.

2. Crossing Water and Sewer or Non-Potable Lines: Water mains crossing over a sewer or non-potable water line shall be (bottom of water main to top of sewer) separated by at least 18 inches unless local conditions or barriers

prevent an 18 inch vertical separation. All crossings with vertical clearance less than 18 inches shall be made using sewer pipe thickness Class 200 AWWA C900 PVC pipe, and water pipe of Class 51 Ductile iron pipe, for a distance of 10 feet on each side of the crossing. The gravity sewer pipe in these locations shall be backfilled with USCS Class I bedding stone to a height of 6 inches above the crown of the pipe. When water mains cross under a sewer, both mains shall be constructed of C900 Class 200 PVC pipe with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing with no intermediate joints. Additionally, a section of water main pipe shall be centered at the point of crossing. See Section 1 – Design Criteria, Subsection 1.3.

Q. Aerial Crossings:

1. Pipes spanning elevated pier crossings shall be flanged ductile iron Pressure Class 350 pipe conforming to AWWA C115, C150 & C151. Pipe spanning on piers spaced further apart than normal pipe length of 18 or 20 ft. shall be multiple length pipe with interior flanged joints with a rubber gasket pipe (see County Approved Product List, Appendix F). The pipe wall thickness and flanged joints shall be designed to safely span the elevated piers under working pressure without exceeding the allowable stresses and conform to AWWA C150. Limit pipe deflection at center of span with pipe full of water to 1/720 of span length. Provide expansion joints for between above ground and below ground wastewater lines.

2. Flanges shall conform to AWWA C150 and C115. All bolts and nuts used in aerial crossings shall be 304 stainless steel. Gaskets shall be full faced or recessed "O-Ring" type to prevent leaks in pipe under stress in the aerial crossing.

3. Outside surface of all pipe, flanges or spool pieces shall be shop coated with zinc primer, High Build Epoxy protective coat and a finish coat of polyurethane high gloss. Color shall be Federal Safety Blue for potable water mains and Pantone Purple 522 C for non-potable irrigation water mains.

4. Install operating valves or other flow regulating devices on each shoreline or at a safe distance from each shoreline to prevent discharge in the event the line is damaged.

5. Install supports for all joints in pipes utilized for aerial crossings and to prevent overturning and settlement. Expansion jointing is specified between above ground and below ground sewers and force mains.

3.3 FIELD QUALITY CONTROL

A. Testing: Test pipelines in accordance with Section 022501.

1. Test valves in place, as far as practicable, and correct any defects in valves or connections.

2. Gravity Sewer Lines: Test in accordance with Section 022501

B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.

1. Cut away any lumps or projections on the face of the spigot end or the shoulder.

2. Do not use any cracked, broken, or defective pieces in the work.

3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

3.4 CLEANING

A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work.

B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

3.5 DISINFECTION

A. General: Disinfect all pipelines that are to carry potable water in accordance with Section 025400.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 331619

HYDRANTS

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

A. Furnish and install fire hydrants where shown on the Drawings or directed by the ENGINEER.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Section 033100 – Concrete for Non-Plant Work

B. Section 331200 – Water Valves and Appurtenances

1.3 QUALITY ASSURANCE

A. Install hydrants to meet current requirements of Collier County Utilities.

B. Provide manufacturer's certificate those products meet or exceed minimum requirements as specified.

1.4 SUBMITTALS

A. Submit manufacturer's certificates on conformance.

B. Shop Drawings: Submit manufacturer's drawings and data sheets for material to be supplied under this Section. Indicate sizes and types to be installed.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. During loading, transportation and unloading, exercise care to prevent damage to materials.

B. Handling: Fire hydrants should be unloaded carefully. The hydrant should be carefully lowered from the truck to the ground, not dropped. Only hoists and slings with adequate load capacity to handle the weight of the hydrant shall be used.

C. Storage: Hydrants should be stored in the fully closed position to prevent entry of foreign material that could cause damage to the seating surfaces. Whenever practical, hydrants should be stored indoors. If outside storage is required, means should be provided to protect the operating mechanism. In outside storage, parts and flanges should be protected from the weather and foreign materials.

PART 2 PRODUCTS

2.1 FIRE HYDRANTS

A. Fire hydrants shall be of the dry barrel, compression type conforming to AWWA C502 “Standard for Dry-Barrel Fire Hydrants” and additional requirements as set forth herein.

B. Hydrant shall have break away upper sections capable of ready replacement without loss in the event of traffic damage. Each hydrant shall have a 6" bottom inlet connection and valve opening at least 5-1/4 inches in diameter. Hydrants shall have a national standard pentagon 1.5 inch, point to flat operating nut and turn to the left (counter clockwise) to open. Each hydrant shall be fitted with one 4-1/2-inch pumper connection and two 2-1/2 inch hose connections, both having threads that conform to the Fire Division Standard for the area. Hose caps shall be chained (unless specified without by appropriate fire control district) to the hydrant barrel and fitted with nuts similar to the hydrant operating nuts. Each hydrant shall have a barrel of sufficient length to bring the bottom of the 6" pipe connection 3 feet below the surface of the finished ground. Each hydrant shall have breakaway flanges and be made in at least two sections bolted together. All interior working parts of the hydrant shall be removable from the top of the hydrant to allow repairs without removing the hydrant barrel after it has been installed. Hydrants shall have renewable O-ring stem seals. Hydrant barrels shall be painted AWWA Safety Yellow (lead free) or as specified by appropriate fire control district. They shall be designed for a working pressure of 150 psi.

C. Hydrant shall have no drain ports. If ports exist, they shall be plugged with a threaded plug.

D. Operating stem shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir with O-ring seals.

E. Hydrants shall be designated for 150 psi working pressure and shop tested to 300 psi pressure with main valve both opened and closed. Under test the valve shall not leak, the automatic drain shall function and there shall be no leakage into the bonnet.

F. Hydrants shall be of the years manufacture when construction commenced.

G. Acceptable models, see Appendix F, County Approved Product List.

PART 3 EXECUTION

3.1 INSTALLATION

A. Set hydrants plumb and in true alignment with mains. Utilize restrained joints as shown in the Collier County Standard Details. Carefully backfill around hydrants so as not to disturb the hydrant and thoroughly compact backfill so as to support the hydrant securely. The hydrants ~~shall have 18-inch~~ clearance measured from finish grade to the center of pumper connection shall be based upon manufacturers recommendations.

REVISED STRIKETHROUGH

A. Set hydrants plumb and in true alignment with mains. Utilize restrained joints as shown in the Collier County Standard Details. Carefully backfill around hydrants so as not to disturb the hydrant and thoroughly compact backfill so as to support the hydrant securely. The hydrants shall have a minimum 18-inch clearance measured from finish grade to the center of pumper connection.

requirement is not applicable to privately owned and operated water distribution systems.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 312316

EXCAVATION - EARTH AND ROCK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for performing opencut excavations to the widths and depths necessary for constructing structures and pipelines, including excavation of any material necessary for any purpose pertinent to the construction of the Work.

B. Related Work Specified In Other Sections Includes:

1. Section 017416 – Site Clearing

2. Section 033100 – Concrete, Masonry, Mortar and Grout

3. Section 312319 – Groundwater Control for Open Cut Excavation

4. Section 312323 – Backfilling

5. Section 314000 – Shoring, Sheeting and Bracing

1.2 DEFINITIONS

A. Earth: "Earth" includes all materials which, in the opinion of the ENGINEER, do not require blasting, barring, wedging or special impact tools for their removal from their original beds, and removal of which can be completed using standard excavating equipment. Specifically excluded are all ledge and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.

B. Rock: "Rock" includes all materials which, in the opinion of the ENGINEER, require blasting, barring, wedging and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock for removal from their original beds and which have compressive strengths in their natural undisturbed state in excess of 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

1.3 SUBMITTALS

A. General: Provide all submittals, including the following, as specified in Division 1.

B. Engage the services of a Professional Engineer who is registered in the State of Florida to design all cofferdam and sheeting and bracing systems which the CONTRACTOR feels necessary for the execution of his work. Submit to the ENGINEER a signed statement that he has been employed by the CONTRACTOR to design all sheeting and bracing systems. After the systems have been installed, furnish to the ENGINEER an additional signed statement that the cofferdams and sheeting and bracing systems have been installed in accordance with his design.

C. If a detour is required, submit a traffic control plan for approval to County Manager or designee and/or the Florida Department of Transportation as described in Section 015526.

1.4 SITE CONDITIONS

A. Geotechnical Investigation: A geotechnical investigation may have been prepared by the COUNTY and ENGINEER in preparing the Contract Documents.

1. The geotechnical investigation report may be examined for what ever value it may be considered to be worth. However, this information is not guaranteed as to its accuracy or completeness.

2. The geotechnical investigation report is not part of the Contract Documents.

B. Actual Conditions: Make any geotechnical investigations deemed necessary to determine actual site conditions.

C. Underground Utilities and Collier County Damage Prevention Policy:

1. This policy has been put in place to avoid damage to Collier County underground utilities. A minimum distance of five feet (5') horizontally and eighteen inches (18") vertically must be maintained away from Collier County utilities. Any and all variations from this order must be the Water or Wastewater Department.

2. Before commencement of any excavation at road crossings or any boring or any drilling, the contractor shall mark the proposed run alignment with white paint or flags. Subsequent to placement of the white markings, the existing underground utilities in the area affected by the work must be marked by Sunshine One Call after proper notification to them by either calling 811 in Florida or toll free at 1-800-432-4770. Visit ~~www.callsunshine.com~~ www.sunshine811.com for more information. Before commencing excavation for the work, potholing of all potential conflicts must be performed.

3. All lines in conflict must be physically located by the contractor. Any conflict shall be reported to the utility and Collier County Public Utilities. ~~and verified by Collier County Locate Department personnel before performing work~~. Utilities under concrete or pavement may require soft dig vacuum locates which also is the contractor's responsibility to perform. All utilities will be field marked per Sunshine State One Call's statutes and guidelines. For line verification or any

other information concerning locates, please call the Locate Department at 239-252-5922 during normal business hours. For line verification or emergency locates after hours, call emergency number 239-825-1444. ~~numeric pager at 239-890-0809~~. **In the event the potholing and/or vacuum soft dig does not locate the marked utility, work must be stopped and the affected utility owner contacted.** Failure to comply with this policy and obtain required signature(s) may result in revocation of existing right-of-way permits. ~~delay or denial of permit~~.

4. The contractor must comply with all provisions of Florida Statute 556, the Underground Facility Damage Prevention and Safety Act.

D. Quality and Quantity: Make any other investigations and determinations necessary to determine the quality and quantities of earth and rock and the methods to be used to excavate these materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

A. Clearing: Clear opencut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 017416, includes removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during trench excavation.

B. Banks: Shore or slope banks to the angle of repose to prevent slides or cave-ins in accordance with Section 314000.

C. Safety: Whenever an excavation site or trench is left unattended by the CONTRACTOR or when an area is not within 100 feet of observation by the CONTRACTOR, the excavation site or trench shall be filled and/or, at the County's Manager or designee discretion, protected by other means to prevent accidental or unauthorized entry. Include barricades and other protection devices requested by the ENGINEER or County Manager or designee, including temporary fencing, snow fencing, or temporary "structure" tape. Such safety items shall not relieve the CONTRACTOR of any site safety requirements or liabilities established by Federal, State and local laws and agencies, including OSHA, but is intended as additional safety measures to protect the general public.

D. Hazardous Materials: If encountered, take care of hazardous materials not specifically shown or noted in accordance with Section 015000.

E. During excavation and any site work, take storm water pollution prevention measures to ensure that water quality criteria are not violated in the receiving water body and all state and local regulatory requirements are met.

3.2 STRUCTURE EXCAVATION

A. Excavation Size: Provide excavations of sufficient size and only of sufficient size to permit the Work to be economically and properly constructed in the manner and of the size specified.

B. Excavation Shape: Shape and dimension the bottom of the excavation in earth or rock to the shape and dimensions of the underside of the structure or drainage blanket wherever the nature of the excavated material permits.

C. Compaction: Before placing foundation slabs, footings or backfill, proof roll the bottom of the excavations to detect soft spots.

1. For accessible areas, proof roll with a ten wheel tandem axle dump truck loaded to at least 15 tons or similarly loaded construction equipment.

2. For small areas, proof roll with a smooth-faced steel roller filled with water or sand, or compact with a mechanical tamper.

3. Make one complete coverage, with overlap, of the area.

4. Overexcavate soft zones and replace with compacted select fill.

3.3 TRENCH EXCAVATION

A. Preparation: Properly brace and protect trees, shrubs, poles and other structures which are to be preserved. Unless shown or specified otherwise, preserve all trees and large shrubs. Hold damage to the root structure to a minimum. Small shrubs may be preserved or replaced with equivalent specimens.

B. Adequate Space: Keep the width of trenches to a minimum, however provide adequate space for workers to place, joint and backfill the pipe properly.

1. The minimum width of the trench shall be equal to at least 3.5 feet or the outside diameter of the pipe at the joint plus 8-inches for unsheeted trench or 12 inches for sheeted trench, whichever is greater. Conform the trench walls to OSHA Regulations.

2. In sheeted trenches, measure the clear width of the trench at the level of the top of the pipe to the inside of the sheeting.

C. Depth:

1. Excavate trenches to a minimum depth of 8 inches, but not more than 12 inches, below the bottom of the pipe so that bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for pipe barrels and bells.

2. Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as additional undercuts backfilled with crushed stone compacted in 6-inch lifts, below the standard 8-inches minimum trench undercut. Backfill excavation below trench grade not ordered in writing by the ENGINEER with acceptable Class I, II or III embedment material to trench grade and compact to density equal to native soil.

D. Unstable or Unsuitable Materials: If unstable or unsuitable material is exposed at the level of the bottom of the trench excavation, excavate the material in accordance with the subsection headed "Authorized Additional Excavation".

1. Remove material for the full width of the trench and to the depth required to reach suitable foundation material.

2. When in the judgment of the ENGINEER the unstable or unsuitable material extends to an excessive depth, the ENGINEER may advise, in writing, the need for stabilization of the trench bottom with additional select fill material, crushed stone, washed shell, gravel mat or the need to provide firm support for the pipe or electrical duct by other suitable methods.

3. Crushed stone, washed shell and gravel shall be as specified in Section 312323.

4. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as a change in the Work.

E. Length of Excavation: Keep the open excavated trench preceding the pipe laying operation and the unfilled trench, with pipe in place, to a minimum length which causes the least disturbance. Provide ladders for a means of exit from the trench as required by applicable safety and health regulations.

F. Excavated Material: Neatly deposit excavated material to be used for backfill at the sides of the trenches where space is available. Where stockpiling of excavated material is required, obtain the sites to be used and maintain operations to provide for natural drainage and not present an unsightly appearance.

G. Water: Allow no water to rise in the trench excavation until sufficient backfill has been placed to prevent pipe flotation. Provide trench dewatering in accordance with Section 312319.

3.4 EXCAVATION FOR JACKING AND AUGERING

A. Jacking and Augering Requirements: Allow adequate length in jacking pits to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Provide sufficient pit width to allow ample working space on each side of the jacking frame. Allow sufficient pit depth such that the invert of the pipe, when placed on the guide frame, will be at the elevation desired for the completed line. Tightly sheet the pit and keep it dry at all times.

3.5 ROCK EXCAVATION

A. Rock Excavation: Excavate rock within the boundary lines and grades as shown, specified or required.

1. Rock removed from the excavation becomes the property of the CONTRACTOR. Transport and dispose of excavated rock at an off site disposal location. Obtain the off site disposal location.

2. Remove all shattered rock and loose pieces.

B. Structure Depths: For cast-in-place structures, excavate the rock only to the bottom of the structure, foundation slab, or drainage blanket.

C. Trench Width: Maintain a minimum clear width of the trench at the level of the top of the pipe of the outside diameter of the pipe barrel plus 2 feet, unless otherwise approved.

D. Trench Depth: For trench excavation, in which pipelines are to be placed, excavate the rock to a minimum depth of 8 inches below the bottom of the pipe or duct encasement. Provide a cushion of sand or suitable crushed rock. Refill the excavated space with pipe bedding material in accordance with Section 312323. Include placing, compacting and shaping pipe bedding material in the appropriate Contract Items.

E. Manhole Depths: For manhole excavation, excavate the rock to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter. Refill the excavated space with pipe bedding material in accordance with Section 312323. Include placing, compacting and shaping pipe bedding material for manhole bases in the appropriate Contract Items.

F. Over-excavated Space: Refill the excavated space in rock below structures, pipelines, conduits and manholes, which exceeds the specified depths with 2,500 psi concrete, crushed stone, washed shell, or other material as directed. Include refilling of over-excavated space in rock as part of the rock excavation.

G. Other Requirements: Follow, where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation".

H. Payment: No additional payment will be made for rock excavation.

3.6 FINISHED EXCAVATION

A. Finish: Provide a reasonably smooth finished surface for all excavations, which is uniformly compacted and free from irregular surface changes.

B. Finish Methods: Provide a degree of finish that is ordinarily obtainable from blade-grade operations and in accordance with Section 312323.

3.7 PROTECTION

A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.

B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.

C. It shall be the CONTRACTOR’s responsibility to acquaint himself with all existing conditions and to locate all structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, coordinate work with the facility owner and perform work so as to cause as little interference as possible with the service rendered by the facility disturbed in accordance with Section 020500. Repair and/or replace facilities or structures damaged in the prosecution of the work immediately, in conformance with current standard practices of the industry, or according to the direction of the owner of such facility, at the CONTRACTOR’s expense.

D. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 1.

3.8 AUTHORIZED ADDITIONAL EXCAVATION

A. Additional Excavation: Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:

1. In case the materials encountered at the elevations shown are not suitable.

2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.

B. Refill Materials: Refill such excavated space with either authorized 2500 psi concrete or compacted select fill material, in compliance with the applicable provisions of Section 312323.

C. Compaction: Compact fill materials to avoid future settlement. As a minimum, backfill layers shall not exceed 6-inches in thickness for the full trench width and compaction shall equal 95% of maximum density, or 98% if under paved area of roadway, as determined by using ASTM D 1557. Perform compaction density tests at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.

D. Payment: Additional earth excavations so authorized and concrete or select fill materials authorized for filling such additional excavation and compaction of select fill materials will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

3.9 UNAUTHORIZED EXCAVATION

A. Stability: Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed "Authorized Additional Excavation", with such material and in such manner as may be approved in order to provide for the stability of the various structures.

B. Refill Materials: Refill spaces beneath all manholes, structures, pipelines, or conduits excavated without authority with 2500 psi concrete or compacted select fill material, as approved.

C. Payment: Refill for unauthorized excavation will not be measured and no payment will be made therefor.

3.10 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

A. Stockpiling Suitable Materials: Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.

B. Stockpile Locations: Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.

C. Excess Materials: Be responsible for transport and disposal of surplus excavated material and excavated material unsuitable for backfilling or embankments at an off site disposal location secured by the CONTRACTOR.

3.11 REMOVAL OF WATER

A. Water Removal: At all times during the excavation period and until completion and acceptance of the WORK at final inspection, provide ample means and equipment with which to remove promptly and dispose of properly all water entering any excavation or other parts of the WORK.

B. Dry Excavations: Keep the excavation dry, in accordance with Section 312319.

C. Water Contact: Allow no water to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set and, in any event, not sooner than 12 hours after placing the masonry or concrete.

D. Discharge of Water: Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.

E. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.

F. Sanitary Sewers: Discharge no water into sanitary sewers.

G. Storm Sewers: Discharge no water containing settleable solids into storm sewers.

H. Repair: Promptly repair any and all damage caused by dewatering the Work.

END OF SECTION

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SECTION 330502

HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required to install High Density Polyethylene (HDPE) pressure pipe, fittings, and appurtenances as shown on the Drawings and specified in the Contract Documents.

B. High Density Polyethylene (HDPE) – Collier County Utilities has the option of approving the use of HDPE for pipeline crossings of roadways, ditches, canals, and environmentally sensitive lands. HDPE mains shall have the same equivalent internal diameter and equivalent pressure class rating as the corresponding PVC pipe, unless otherwise approved by the County Manager or designee. For all roadway crossings requiring casing pipe, a steel or DR 11 HDPE casing pipe must be provided. The Department of Transportation having jurisdiction of said road and right-of-way must grant specific approval.

1.2 REFERENCED STANDARDS

A. All standard specifications, i.e., Federal, ANSI, ASTM, etc., made a portion of these Specifications by reference, shall be the latest edition and revision thereof.

1.3 QUALIFICATIONS

A. Furnish all HDPE pipe, fittings, and appurtenances by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

1.4 SUBMITTALS

A. Submit to the ENGINEER, a list of materials to be furnished, the names of the suppliers, and the appropriate shop drawings for all HDPE pipe and fittings.

B. Submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

C. Submit shop drawings showing installation method and the proposed method and specialized equipment to be used.

1.5 INSPECTIONS AND TESTS

A. All work shall be inspected by the County Manager or designee who shall have the authority to halt construction if, in his opinion, these specifications or standard construction practices are not being followed. Whenever any portion of these specifications is violated, the County Manager or designee, may order further construction to cease until all deficiencies are corrected.

1.6 WARRANTY AND ACCEPTANCE

A. Warrant all work to be free from defects in workmanship and materials for a period of one year from the date of completion of all construction. If work meets these specifications, a letter of acceptance, subject to the one year warranty period, shall be given at the time of completion. A final acceptance letter shall be given upon final inspection at the end of the one year warranty period, provided the work still complies with these specifications. In the event deficiencies are discovered during the warranty period, the CONTRACTOR shall correct them without additional charge to the COUNTY before final acceptance. During the warranty period, the ENGINEER will determine if warranty repairs or replacement work shall be performed by the CONTRACTOR. The decision of the ENGINEER shall be binding upon the CONTRACTOR.

B. Installer Certification for The CONTRACTOR installing thermal butt fused HDPE pipe.

PART 2 PRODUCTS

2.1 POLYETHYLENE PIPE AND FITTINGS

A. Provide polyethylene pressure pipe manufactured from ~~PE3408~~ PE4710 polyethylene meeting AWWA C906 standards. When specified by the ENGINEER on the construction drawings, as an alternate to PVC, HDPE (ductile iron pipe sized) piping can be used for buried applications. Iron pipe sized (IPS) HDPE piping can be used for below-ground applications as determined by the ENGINEER.

B. The diameter of DR 11 HDPE casing pipe provided for roadway crossings or other purposes shall conform to the following.

For HDPE pressure carrier pipes, casing spacers are not required when HDPE DR11 (or DR17 for 42” to 54” or DR21 for 63”) casing is used. The casing inside diameter shall be a minimum of two inches larger than the carrier pipe’s outside diameter.

C. HDPE to HDPE pipe connections shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the pipe manufacturer and fusion equipment supplier specifications. The CONTRACTOR installing thermal butt

fused HDPE pipe shall be certified in this type of work and have a minimum of five years experience performing this type of work. The CONTRACTOR shall provide certification to the Engineer of Record, who will provide the Engineering Review Services Department with the certification.

D. Qualification of Manufacturer: The Manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these specifications. The Manufacturer's production facilities shall be open for inspection by the County Manager or designee. Qualified manufacturers shall be approved by the County Manager or designee.

E. See the County Approved Product List, Appendix F, for manufacturers that are qualified. Products from other manufacturers proposed for the work must receive approval from the County Manager or designee prior to ordering.

F. Materials: Materials used for the manufacture of polyethylene pipe and fittings shall be ~~PE3408~~ PE4710 high density polyethylene meeting cell classification 445574C ~~345434C~~ or 445574E ~~345434E~~ per ASTM D3350; and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D1248; and shall be listed in the name of the pipe and fitting manufacturer in PPI (Plastics Pipe Institute) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73°F. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

G. Polyethylene Pipe: Polyethylene pipe shall be manufactured in accordance with ASTM F714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter or ASTM D3035, Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, (from pipe) dimensions and either quick burst or ring tensile strength (equipment permitting).

H. Color Identification: HDPE must have at least three equally spaced horizontal colored marking stripes. Permanent identification of piping service shall be provided by adhering to the following colors.

Blue – potable water (Underground HDPE pipe shall be one of the following:

a. Solid-wall blue pipe;
b. Co-extruded blue external skin; or
c. White or black pipe with blue stripes incorporated into, or applied to, the pipe wall.

White – raw water
Green – wastewater, sewage
Pantone Purple – non-potable irrigation, reclaimed or reuse water

I. Polyethylene Fittings and Custom Fabrications: Polyethylene fittings and custom fabrications shall be molded or fabricated by the pipe manufacturer. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe. All fittings and custom fabrications shall be fully rated for the same internal pressure as the mating pipe. Pressure de-rated fabricated fittings are prohibited.

J. Molded Fittings: Molded fittings shall be manufactured in accordance with ASTM D3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the tests required under ASTM D3261.

K. X-Ray Inspection: The Manufacturer shall submit samples from each molded fittings production lot to x-ray inspection for voids, and shall certify that voids were not found.

L. Fabricated Fittings: Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings. Fabricated fittings shall be rated for internal pressure service equivalent to the full service pressure rating of the mating pipe. Directional fittings 16” IPS and larger such as elbows, tees, crosses, etc., shall have a plain end inlet for butt fusion and flanged directional outlets. Part drawings shall be submitted for the approval of the ENGINEER.

M. Polyethylene Flange Adapters: Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small v-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out.

N. Back-up Rings and Flange Bolts: Flange adapters shall be fitted with lap joint flanges pressure rated equal to or greater than the mating pipe. The lap joint flange bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.

2.2 MANUFACTURER’S QUALITY CONTROL

A. The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rate, and contamination. The cell classification properties of the material shall be certified by the supplier, and verified by Manufacturer’s Quality Control. Incoming materials shall be approved by Quality Control before processing into finished goods. Outgoing materials shall be checked for:

1. Outside diameter, wall thickness, and eccentricity as per ASTM D2122 at a frequency of at least once/hour or once/coil, whichever is less frequent.

2. Out of Roundness at frequency of at least once/hour or once/coil, whichever is less frequent.

3. Straightness, inside and outside surface finish, markings and end cuts shall be visually inspected as per ASTM F714 on every length of pipe.

B. Quality Control shall verify production checks and test for:

1. Density as per ASTM D1505 at a frequency of at least once per extrusion lot.

2. Melt Index as per ASTM D1238 at a frequency of at least once per extrusion lot.

3. Carbon content as per ASTM D1603 at a frequency of at least once per day per extrusion line.

4. Quick burst pressure (sizes thru 4-inch) as per ASTM D1599 at a frequency of at least once per day per line.

5. Ring Tensile Strength (sizes above 4-inch equipment permitting) as per ASTM D2290 at a frequency of at least once per day per line.

6. ESCR (size permitting) as per ASTM F1248 at a frequency of at least once per extrusion lot.

C. X-ray inspection shall be used to inspect molded fittings for voids, and knit line strength shall be tested. All fabricated fittings shall be inspected for joint quality and alignment.

2.3 COMPLIANCE TESTS

A. In case of conflict with Manufacturer's certifications, the CONTRACTOR, ENGINEER, or County Manager or designee may request re-testing by the manufacturer or have re-tests performed by an outside testing service. All re-testing shall be at the requestor's expense, and shall be performed in accordance with the Specifications.

B. Installation shall be in accordance with Manufacturer's recommendations and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with the applicable codes and standards.

PART 3 EXECUTION

3.1 INSTALLATION OF HIGH DENSITY POLYETHYLENE PRESSURE PIPE AND FITTINGS

A. Install all high density polyethylene (HDPE) pressure pipe by direct bury, directional bore, or a method approved by the COUNTY or ENGINEER prior to construction. If directional bore is used, or if directed by the County Manager or designee or ENGINEER, surround the entire area of construction by silt barriers.

Install all high density polyethylene pressure pipe and fittings in accordance with Manufacturer's recommendations, and this specification. Take all necessary precautions to ensure a safe working environment in accordance with the applicable codes and standards.

3.2 HEAT FUSION JOINING

A. Make joints between plain end pipes and fittings by butt fusion, and joints between the main and saddle branch fittings by using saddle fusion using only procedures that are recommended by the pipe and fitting Manufacturer. Ensure that persons making heat fusion joints have received training and certification for heat fusion in the Manufacturer's recommended procedure. Maintain records of trained personnel, and shall certify that training was received not more than 12 months before commencing construction. External and internal beads shall not be removed.

3.3 MECHANICAL JOINING

A. HDPE pipe and fittings shall be fused together by heat welding when possible. HDPE pipe and fittings may be joined together or to other materials by means of flanged connections with back-up rings, by mechanical joint adapter with glands, or mechanical couplings designed for joining HDPE pipe or for joining HDPE pipe to another material. A stainless steel sleeve insert shall be used with a mechanical coupling. Mechanical couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins.

3.4 BRANCH CONNECTIONS

A. Make branch connections to the main with saddle fittings or tees. Saddle fuse polyethylene saddle fittings to the main pipe.

3.5 EXCAVATION

A. Excavate trenches in conformance to this specification, the plans and drawings, or as authorized in writing by the County Manager or designee, and in accordance

with all applicable codes. Remove excess groundwater. Where necessary, shore or reinforce trench walls.

3.6 LARGE DIAMETER FABRICATED FITTINGS

A. Butt fuse fabricated directional fittings 16" IPS and larger to the end of a pipe. Make up the flanged directional outlet connections in the trench.

3.7 MECHANCIAL JOINT AND FLANGE INSTALLATION

A. Install mechanical joints and flange connections in accordance with the Manufacturer's recommended procedure. Center and align flange faces to each other before assembling and tightening bolts. Do not use the flange bolts to draw the flanges into alignment. Lubricate bolt threads, and fit flat washers under the flange nuts. Tighten bolts evenly according to the tightening pattern and torque step recommendations of the Manufacturer. At least one hour after initial assembly, re-tighten flange connections following the tightening pattern and torque step recommendations of the Manufacturer. The final tightening torque shall be 100 ft-lbs or less as recommended by the Manufacturer.

3.8 FOUNDATION AND BEDDING

A. Lay pipe on grade and on a stable foundation. Remove unstable or mucky trench bottom soils, and install a 6-inch foundation or bedding of compacted Class I material to pipe bottom grade. Remove excess groundwater from the trench before laying the foundation or bedding and the pipe. A trench cut in rock or stony soil shall be excavated to 6 inches below pipe bottom grade, and brought back to grade with compacted Class I bedding. Remove all ledge rock, boulders, and large stones.

3.9 PIPE HANDLING

A. When lifting with slings, use only wide fabric choker slings to lift, move, or lower pipe and fittings. Do not use wire rope or chain. Slings shall be of sufficient capacity for the load, and shall be inspected before use. Do not use worn or defective equipment.

3.10 TESTING

A. Hydrostatic Pressure Testing: Pressure test and flush HDPE pipes after swabbing in accordance with Section 022501 and 025400.

END OF SECTION

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SECTION 333200

PUMP STATIONS

PART 1 GENERAL

1.1 SCOPE OF WORK FOR COUNTY PUMP STATIONS

A. This section includes the following items for COUNTY owned and operated pump stations: wet wells, access covers, pumps, wet well equipment, valves, emergency bypasses, pump control panels, pump controller, antenna subsystem, disconnects, electric meters, electric service, pump wiring, lightning arrestors, and odor control systems.

B. Conform all pump stations to the specifications, Utilities Detail Drawings, and latest National Electrical Code (NEC) requirements.

C. When a pump station has a peak design flow coming into the station greater than 500 gpm, contact Public Utilities Planning and Project Management Department for specifications.

D. For systems eligible to be taken over by the COUNTY, provide enough room to operate and maintain all water and wastewater systems in a simple and non-awkward manner. If a pump station pump needs to be replaced, provide enough room for the COUNTY to readily remove the pump, and to do so without interfering with traffic. To be eligible for conveyance to the COUNTY, the pump station easement area must be designed to 30'X30', or twice the depth of the wet well by twice the depth of the wet well, whichever is larger, as defined in the Collier County Standards and Procedures Ordinance, Subsection 7.7(c), as amended or superseded.

E. Schedule required COUNTY inspections of (1) pump station installation prior to cover-up and (2) pump station start-up.

F. Install all fencing and gates around the pump station in accordance with Section 323113.

G. Communications: When proposing fiber-optic connectivity at pump stations, a letter of availability shall be requested to the COUNTY for review and approval.

H. Elevated platforms shall be provided where necessary to provide access to wet wells, pump station control panels, electrical devices and panels, generators, and bypass equipment. Typically, these platforms shall be limited to locations with existing grades requiring equipment to be located at a higher elevation due to the Florida Building Code (FBC), FEMA, and the ASCE Standard 7 and 24 requirements.

1.2 SCOPE OF WORK FOR PRIVATE GRINDER PUMP STATIONS

A. This section includes the following items for privately owned and operated grinder pump stations: wet wells, pumps, impeller, valves, level control, alarm, well equipment, pump control panels, pump controller, disconnects, and sloping requirements for private pump stations.

B. All maintenance tasks for private grinder pump stations must be possible without entry into the grinder pump station per 29 CFR 1910.146 (OSHA Permit-Required Confined Spaces).

C. The grinder pump station shall be free from electrical and fire hazards as required for functionality in a residential environment. The completed assembled and wired grinder pump station shall be listed by Underwriters Laboratories, Inc. (UL) to be safe and appropriate for the intended use. UL listing of components of the grinder pump station, or third-party testing to UL standard is not acceptable.

D. All private grinder pump stations shall bear the seal of NSF International to show that station meets accepted standards for plumbing equipment in or near residences, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low-pressure sewer system applications.

E. Private pump service sewers shall conform to applicable parts of the Florida Building Code and the COUNTY's Design Criteria. Where the COUNTY's standards are more restrictive than the Florida Building Code, the COUNTY's standards shall prevail.

F. Private pump station force main connections must follow the COUNTY's requirements for testing.

G. Schedule required COUNTY inspections of (1) testing of force main connection prior to cover-up and (2) pump station start-up.

H. Prior to the start-up inspection, the following documentation must be furnished to the COUNTY via electronic mail or a secure electronic file transfer service:

1. As-built drawing (in both PDF and DWG formats) showing the completed pump station and force main locations, sizes, materials, and elevations along with the location of all valves, the pump-out connection, the control panel, and the generator receptacle on the property and

2. A pump test curve from the pump manufacturer.

PART 2 EQUIPMENT

2.1 MATERIALS FOR COUNTY PUMP STATIONS

A. All stainless steel components and hardware shall be a minimum of Type 304, unless otherwise specified.

B. Wet Well: The concrete structure shall consist of precast, reinforced sections conforming to ASTM C76 and/or ASTM C478. 8-foot diameter wet wells shall have a minimum wall thickness of 8 inches. Wall thickness for larger wet wells shall conform to ASTM standards for wall thickness, but shall not be less than 8 inches in any case. The minimum inside diameter for all wet wells eligible to be owned and maintained by Collier County shall be 8 feet. As a deviation, a 6-foot

diameter wet well can be utilized if the ENGINEER can demonstrate that the wet well is sufficient hydraulically and the developer can demonstrate that the pump station shall be used for the perpetual and exclusive use of that development. For pump stations that will not be owned and maintained by Collier County, the ENGINEER shall set the design specifications for the wet well, provided such design does not in any way endanger the health, safety and/or welfare of the public. Base riser section shall be monolithically cast with the base slab. All concrete shall utilize Type 2 cement and have a minimum compressive strength of 4000 psi at 28 days. On new construction, if more than one hole is abandoned and required to be cemented in, provide a new wet well barrel section. Reinforcing steel for all wet well structures should be sized by the unit manufacturer and verified by the ENGINEER. All connections to the wet well for gravity sewer piping shall be equal to those for manholes as described in Section 333913. Factory double coat all exterior surfaces with an acceptable bituminous or epoxy sealer a minimum of 18 mils thick. Seal all riser joints utilizing plastic joint sealing compound (see County Approved Product List, Appendix F). Reinforcement and top slab thickness shall be specified by the design ENGINEER for H-20 loadings in all cases. Minimum reinforced slab thickness shall be 8 inches. Typical standards for wet wells are available in the Collier County Standard Details. The ENGINEER shall be responsible for designing all wet well structures to overcome buoyancy forces exerted on the installed structure. Coat all wet well interiors with an acceptable field applied internal protection (see County Approved Product List, Appendix F) in accordance with Section 099723.

C. Above-Ground Valves and Piping: Above-ground valves and piping must be positioned so that it does not lie above any gravity sewer line entering the wet well, unless field conditions dictate otherwise and the COUNTY has granted prior approval. Typical above-ground valves and piping standards are shown in the Collier County Standard Details. All valve and flange bolting shall be Type 316 stainless steel.

D. Pumps: Sewage pumps (see County Approved Product List, Appendix F) shall be of the submersible type suitable for operation in sewage of temperature not exceeding 115 degrees Fahrenheit. Pump head curves and design specifications for each application proposed shall be submitted for review and approval within the ENGINEER's hydraulic design report. All pumps shall be three-phase unless approved by a Utility Deviation Form. At least one (1) pump in each wet well shall be equipped with an opening in the volute with a bolted cover for a mix-flush system (see County Approved Product List, Appendix F).

E. Access Covers: Access covers for pump station wet wells shall be above the 100-year flood elevation unless the structure is located within a documented velocity and tidal flood zone, and elevation differentials prohibit such installation. In such cases, watertight access covers shall be utilized. The ENGINEER shall provide shop drawings of such access covers for review and approval by THE County Manager or designee prior to use. Access covers shall be constructed of diamond plate aluminum sheets and aluminum structural members. All access covers shall be attached to aluminum angle frames with stainless steel hinges and fasteners. Angle frames shall be firmly anchored into the top concrete slab of the structure.

All access covers shall be equipped with a ratchet-type restraint mechanism to prevent accidental closing of the cover and torsion bar or spring assist type openers. Assist openers shall be manufactured of stainless steel. Access covers shall be designed for H-20 loadings.

F. Wet Well Equipment: All pump discharge piping shall be HDPE pipe and shall be in conformance with pipe utilized for wastewater force mains. All fittings shall be HDPE fused, flange/flange, or Uni-Flange connections. All nuts, bolts, fasteners, brackets, pump guide rails and other hardware located inside the wet well shall be 316 stainless steel. A pump out with a screened vent shall be provided on all installations, with the pipe extended through the wet well lid (see details). Electrical systems and components (e.g. motors, lights, cables, conduits, switch boxes, control circuits, etc.) in raw wastewater wetwells, or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors may be present shall comply with the National Electrical Code (NEC) requirements for Class I Group D, Division 1 locations. Electrical equipment located in wet wells shall be suitable for use under corrosive conditions.

G. Valves: Discharge piping for each pump shall be equipped with a weighted check valve and plug valve. A tee with an isolation plug valve, equipped with a quick coupling (see County Approved Product List, Appendix F), shall be provided for a means of emergency bypass access to the wastewater force main. Valves shall be supported by stainless steel pipe supports.

H. Emergency Bypass: A 4-inch emergency bypass connection shall be provided down-stream from the in-line discharge piping valves. The connection shall be readily accessible and be equipped with a plug-type isolation valve and 4-inch male camlock type quick coupling and cap.

I. Pump Control Panel (see County Approved Product List, Appendix F): Panel enclosure construction shall be equal to a NEMA 4X stainless steel with 3-point latch where required and utilize stainless steel. When possible, panel door shall open away from wetwell and not towards wetwell hatch to ensure safety during maintenance of wetwell and panel. To ensure proper installation of control panel, contact the Wastewater Division prior to rough-in or installation of control panel, for a pre-construction meeting with respective Wastewater Collections personnel. Control panels shall be mounted on two 6-inch by 6-inch precast concrete posts. All mounting bars, nuts, bolts, etc. shall be stainless steel. A 110/120-volt (110V) receptacle shall be provided inside the control panel for pump stations that have outdoor control panels. Ground fault interruption (GFI) protection shall be provided for all outdoor outlets.

J. Pump Controller: Provide a pump control panel (see County Approved Product List, Appendix F) including a telemetry control unit (TCU) for pump controlling purposes. At a minimum, the TCU shall include an integrated 2-Watt digital radio with and Ethernet module for dual communications capability, an 18-amp-hour back-up battery, a manufacturer's prefabricated wire harness, all manufacturer recommended surge protection, and suitable devices for measuring wastewater flow. The TCU shall incorporate three on-board fail-safe HOA switches and

Triplex/Duplex/Simplex configurable operation mode. An on-board 240 or 460 VAC three-phase monitor shall be provided. The Alarm light and bell shall be activated by the TCU and the external push-button alarm silence switch shall be wired into the TCU. The TCU shall incorporate an on-board 4- by 20- character LCD display for elapsed runtime of each pump. During the automatic sequence, the pumps shall be controlled in an alternate mode. Pump controller shall be Data Flow Systems model TCU800 with features listed above.

K. Antenna Subsystem: Provide a high gain antenna (see County Approved Product List, Appendix F) for use to transmit and receive TCU data to and from the COUNTY's existing SCADA server. Antenna shall utilize all welded-aluminum elements. Element connections utilizing nuts and bolts are not acceptable. Antenna shall have a single radiator element connected to a type N female connector. Antenna shall be supported on a mast/pole and have DC grounding for lightning protection. Antenna mounting hardware shall be made of stainless steel. Antenna shall meet or exceed the quality, reliability and performance of the RTA series as provided by Data Flow Systems, Inc. Antenna mast/pole shall be a 21foot by 1.25 inch SCH80 galvanized pole. Mounting of the antenna mast/pole shall be in accordance with all applicable local and state building codes as they pertain to structural strength and wind velocity requirements. Tower shall meet or exceed the quality and reliability of the 25G manufactured by Rohn. Coaxial cable shall be RTC 400 as supplied by Data Flow Systems, Inc. Type N connectors shall be utilized at both ends of the coax. Type N connectors shall be sealed with 3-inch sections of Alpha FIT321-1-0 sealant shrink tubing. Coaxial cable shall be secured to the mast/pole with E.V.A.-coated 316 stainless steel cable ties. Cable ties shall meet or exceed the quality, reliability and performance of AE112 cable ties manufactured by Band-It. For pump stations to be conveyed to the County, a startup and successful testing of Data Flow telemetry equipment by Data Flow representatives and County Wastewater Collections instrumentation and telemetry representatives is required prior to County acceptance. After initial startup, for pump stations to be conveyed to the County, the latitude and longitude of pump stations shall be provided.

L. Disconnect: A circuit breaker disconnect shall be provided to isolate the pump control panel. Disconnect shall be installed on the service line between the electric meter and control panel and shall be lockable in the "ON" or "OFF" position. Disconnects shall be housed in a NEMA 4X, stainless steel enclosure or better.

M. Electric Meter: The electric meter servicing the pump station shall be located adjacent to the pump control panel, and shall be located and wired to service only the pump station facility.

N. Electric Service: All underground electric services shall be fully conduited in 2-inch diameter Schedule 80 PVC pipe from the power company source point to the pump control panel. The maximum length of the electric service from the power company transformer to the pump control panel shall be 200 feet. One spare conduit shall be provided and terminated in the meter. Only copper service wire shall be utilized. Sizing of the service wire shall be verified with the power company and the

extent and location of the service shall be indicated on the record drawings. The CONTRACTOR shall certify that the voltage drop across the service does not exceed five percent (5%) of the power company's line voltage at full load start-up of the pump station pumps. All pump stations shall have minimum 100-amp service. All electrical components shall be located within the COUNTY right-of-way or County Utility Easement (CUE).

O. Pump Wiring: Power wiring for each pump, from the control panel to the wet well shall be conduited in separate 2-inch diameter Schedule 80 PVC pipe and an appropriately sized water-tight fitting with separate strain relief shall be installed on each line. A spare parallel 2-inch PVC pipe conduit from the panel to the wet well shall be provided. All wire shall be stranded THHN or MTW copper wire. The pump motor cords shall be flexible and serviceable under conditions of extreme usage. Total of angle bends shall be 180 degrees or less. All conduits between wetwell and control panel shall not exceed a total of 180 degrees of bends per run. All service conduits shall be 2" Schedule 80 PVC except where noted. The pump motor cords shall be flexible and have an appropriate amount of slack.

P. Lightning Arrestors: All pump stations shall be equipped with lightning arrestor(s) (see County Approved Product List, Appendix F). The lightning arrestor shall be installed externally on the load side of the disconnect, between the disconnect and the main breaker. The penetration through the disconnect must be made below the working mechanism of the disconnect.

Q. Odor Control Systems for Community Pump Stations: Furnish and install an 8'X11' concrete slab for potential future odor control system. A Pre-Engineered Biofiltration Odor Control System shall be furnished if required by the engineer of record.

R. Platforms and stairs shall meet the Occupational Safety and Health Administration (OSHA) Part 1910, applicable FBC requirements, and ASCE Standards 7 and 24. All platform and stair designs and plans shall be prepared by a Florida Registered Professional Engineer. The Engineer of Record shall identify Flood Hazard Area, Flodd Design Class (ASCE 24) and other applicable loadings. All components shall be aluminum with stainless steel hardware. Standard stairs shall be utilized. Fall protection shall be provided on all exposed sides by use of an OSHA approved guardrail system. Where required for access, removable guardrail sections shall be provided. Grating shall be slip resistant and bonded at ends of bearing bars and openings.

S. All platforms and stairs shall be supported by a concrete foundation system. The foundation designs and plans shall be prepared by a Florida Registered Professional Engineer. It shall meet the requirements of the FBC, ASCE 7 (Dead, Live, Flood, and Wind), ASCE 24 (Flood Resistant) and other regulatory requirements. Where head clearance under the platform is less than 6'-8", provisions shall be made to limit access.

2.2 MATERIALS FOR PRIVATE PUMP STATIONS

A. All private grinder pump stations shall conform to the requirements specified in Section 2.1 above, unless otherwise stated in this section.

B. Pumps: Private pump stations shall be constructed using progressive cavity, non-clogging, non-jamming, positive or semi-positive displacement grinder pump(s) capable of operating at a negative total dynamic head (TDH) equipped with thermal overload protection. Grinder pumps shall be capable of grinding all material typically found in domestic or commercial wastewater to a fine slurry that will pass through the pump, 1-1/4-inch NPT discharge piping and downstream appurtenances.

C. Impeller: The grinder impeller shall be a one-piece, rotating type cutter wheel constructed from hardened 4140 steel. The cutter teeth shall be treated and hardened to 56 to 60 Rockwell C. The shredder ring shall be stationary type with a staggered tooth pattern and made of white cast iron per ASTM A532(1B).

D. Valves: In addition to valve requirements described in Section 2.1, an anti-siphon valve shall be integral with the grinder pump station pump. The anti-siphon port diameter shall be no less than 60% of the inside diameter of the grinder pump station discharge piping. The check valve will provide a full-ported passageway when open and shall introduce a friction loss of less than 6 inches of water at maximum rated flow.

E. Level Control: Level sensing control for private grinder pump stations shall be a non-fouling type with no moving parts in contact with the wastewater.

F. Alarms: All grinder pump station shall be equipped with a high level audible and visual warning alarm to notify the residential or commercial property owner(s) of a high wet well level.

G. Wet Well: The wet-well basin for all grinder pump stations shall be constructed from any watertight material suitable for light commercial applications, such as high-density polyethylene (HDPE), polyethylene (PE), or glass-fiber reinforced polyester (FRP). FRP wet wells must conform to ASTM D3753. All grinder pump station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure. The grinder pump station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation, no field penetrations will be acceptable. No secondary welding of the wet well basin or cover will be accepted. The wet well shall be vented to the atmosphere.

H. Wet Well Equipment: Pumps and all electrical devices, components, and connections inside the wet well shall be explosion proof.

I. Anti-Siphon/Check Valve: All private grinder pump stations shall be equipped with a factory installed, gravity operated flapper-type integral check valve and anti-siphon valve built into the stainless-steel discharge piping, per Section 2.1 and Section 2.2. valve requirements.

J. Pump Control Panel: All electrical elements for private grinder pump stations shall be furnished pre-wired and housed in a NEMA 4X enclosure. In a flood zone, a NEMA 6P

enclosure is required if the control panel is mounted less than a foot above the base flood elevation. A NEMA Control circuit shall be 115 volts. The door of the control box shall be hinged of the dead type with locking hasp and suitable accessories to allow wall mounting. Motor shall be activated by a magnetic type contactor and protected by a UL-listed electrical monitoring system against damaging high current or low voltage conditions. An automatic reset, integral thermal overload protector shall protect the motor against excessive heat. The sensor shall reset automatically when the motor cools. An alarm test switch, HOA switch, run light, auto/off switch, and overload reset button shall be supplied inside the control box. A terminal strip with box type connections shall be supplied to make all power and control connections. All terminals shall be marked for easy identification. A ground terminal strip shall also be provided and labeled.

K. Disconnect: The grinder pump station shall be equipped with a factory-installed NEMA 6P electrical quick disconnect for all power and control functions.

PART 3 EXECUTION

3.1 INSTALLATION

A. Finished grade shall be 1 inch to 4 inches below the bottom of the lid and shall slope away from the wet well.

B. Fill grinder pump stations with water prior to backfill compaction to prevent deformation of the basin wall and follow all other manufacturer's installation instructions.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 409500

FIBER-OPTIC COMMUNICATION STANDARDS

PART 1 GENERAL

1.1 OVERVIEW

A. The standards herein pertain to all work associated with the procurement, installation, configuration, and testing of fiber-optic communications and associated infrastructure for County installations.

B. All contractors and subcontractors selected to perform fiber-optic communications work for the County shall adhere to the standards described in this document.

C. Additional requirements may be defined in engineering plans related to the fiber-optic communications work performed. In the event of a conflict, the most stringent requirement shall be followed. In the event of a conflict where the most stringent requirement cannot be resolved, Contractor shall inform County in writing identifying the discrepancy for final direction.

1.2 DEFINITIONS

A. Common Abbreviations

1. Amps: Ampere.
2. ANSI: American National Standards Institute.
3. ASTM: American Society for Testing and Materials.
4. AWG: American Wire Gauge.
5. CCITD: Collier County Information Technology Department.
6. CFR: Code of Federal Regulations.
7. dB: Decibel.
8. EIA: Electronic Industries Alliance.
9. FDEP: Florida Department of Environmental Protection.
10. HASB: High Airspeed Blowing.
11. HDPE: High Density Polyethylene.
12. IT: Information Technology.
13. km: Kilometer.
14. lbs: Pounds.
15. m: Meter.
16. N: Newton.

17. NEC: National Electric Code.
18. NEMA: National Electrical Manufacturers Association.
19. NESC: National Electrical Safety Code.
20. nm: Nanometer.
21. OSHA: Occupational Safety and Health Administration.
22. OTDR: Optical Time Domain Reflectometer.
23. PVC: Polyvinyl Chloride.
24. RCDD: Registered Communications Distribution Designer.
25. RUS: United States Rural Utilities Service.
26. SC: Subscriber Connection.
27. SDR: Standard Dimension Ratio.
28. SMF: Single Mode Fiber.
29. SRM: Standard Route Marker.
30. TIA: Telecommunications Industry Association.
31. UV: Ultraviolet.
32. VAC: Volts Alternating Current.
33. WGU: Wire Grounding Unit.

1.3 COORDINATION ACTIVITIES

A. Work involving the installation of fiber-optic cabling and equipment will interface with equipment provided by Others including, but not limited to, the following:
   1. Mounting of the IT Telecommunications Panel
      a. The IT telecommunications panel shall be mounted to an equipment rack at the installation site. Refer to County Utility Detail G-12.

B. Contractor shall determine all interface and installation requirements at the site prior to procurement and delivery and coordinate as required with County.

C. Permitting:
   1. Contractor is responsible for determining and obtaining all necessary permits for the work being performed, including, but not limited to:
      a. Stormwater.
      b. Utilities.
      c. Right-of-way.
      d. Canal crossings [South Florida Water Management District].
      e. FDEP.
   2. Contractor is responsible for all permitting fees.

1.4 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Contractor shall be firms, corporations, individuals, or partnerships normally engaged in the deployment, maintenance, and repairs of fiber-optics at the municipal, county or state level.
2. Contractor shall have one or more of the following certifications
    a. Registered Communications Distribution Designer (RCDD)
    b. IMSA Fiber Optics for Traffic Stem Technician 2
    c. IMSA Traffic Signal Technician Level 2
    d. IMSA Traffic Signal Technician Level 3
3. Contractor shall have a minimum of 5 years of experience performing fiber-optic communications work based on the relevant scope definition category or categories above.

PART 2 PRODUCTS

2.1 GENERAL

A. Each subsection below specifies the minimum requirements for each type of product. Contractor shall adhere to product requirements below unless otherwise approved by County in writing.

2.2 FIBER-OPTIC CABLE

A. General: Provide all-dielectric, dry-filled, loose-tube, dispersion-unshifted, single-mode fiber (SMF) with low water peak, gel free, and suitable for underground (i.e., in conduit) and aerial outside plant installation. All fiber optic cable shall be splice-compatible with existing dispersion-unshifted SMF and require no electronic equipment for dispersion compensation between new and existing fiber. Ensure that all components that comprise a single length of cable are continuous and of the same material. Furnish only commercial off-the-shelf materials, equipment, and components.

B. Optical Fibers:

1. Ensure that the optical fibers used in the cable meet or exceed the Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) TIA/EIA-492-CAAB specification, the U.S. Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900, and International Telecommunication Union ITU-T G.652.D requirements. Use only optical fibers meeting the additional requirements as follows:
    a. Optical:
        1) Cabled Fiber Attenuation:
            a) 1310 nm; Less than or equal to 0.35 dB/km.
            b) 1550 nm; Less than or equal to 0.25 dB/km.
        2) Point Discontinuity:
            a) 1310 nm; Less than or equal to 0.05 dB/km.
            b) 1550 nm; Less than or equal to 0.05 dB/km.

2. Ensure that all fiber in the buffer tube is usable fiber that complies with attenuation requirements. Ensure that fibers do not adhere to each other. Ensure that the fiber is free of surface imperfections and inclusions. Ensure that all fiber optic core glass is from the same manufacturer.

C. Buffer Tubes: Ensure that the fiber optic cable includes loose buffer tubes that isolate internal optical fibers from outside forces and provide protection from physical damage as well as water ingress and migration. Ensure that buffer tubes provide freedom of movement for internal optical fibers. Ensure buffer tubes allow for expansion and contraction of the cable without damage to internal optical fiber. Ensure that fiber does not adhere to the inside of the tube. Ensure that buffer tubes permit intentional scoring and breakout without damage to the fiber. Ensure that each fiber optic cable buffer tube contains 12 fibers per tube.

D. Color Code:

1. Ensure that the marking and color-coding of the fibers and buffer tubes conforms to the TIA-598-D standard.
2. Ensure that colors are permanent and stable during temperature cycling, and not subject to fading or smearing onto each other or into the water-blocking material. Ensure that fibers are colored with UV curable inks that remain clearly distinguishable as the intended color.

E. Strength Member: Ensure that the fiber optic cable contains a dielectric central and outside elements that prevent buckling of the cable and provide tensile strength. Ensure that the fiber optic cable can withstand a pulling tension of 600 lbs. without damage to any components of the fiber optic cable.

F. Outer Jacket:

1. Mark the jacket with the cable manufacturer’s name, fiber type, fiber count, date of manufacture”, and the sequential cable lengths marked in feet. All fiber-optic cabling shall have a stripe, yellow in color, along the entire length of the cable, and shall be marked "Collier County BCC IT" at three-foot intervals. Provide legible marking with contrasting color to that of the cable jacket.

G. Performance:

1. Bend radius: Ensure that the fiber optic cable is capable of withstanding a minimum unloaded bend radius of 10 times the cable diameter and a minimum loaded bend radius of 20 times the cable diameter when loaded to pulling tension of 600 pounds. Test the cable as required in the TIA -455-33B standard. Ensure that bending the fiber optic cable up to the minimum bend radius does not affect the optical characteristics of the fiber.

2. Cable Strength: Ensure that the fiber optic cable is capable of withstanding a pulling tension of 600 pounds during installation without increasing the fiber attenuation more than 0.8 dB/mile and without changing other optical fiber characteristics after the tensile load is removed. Ensure that optical fiber is proof-tested by the fiber manufacturer at a minimum of 100 kilo pounds per square inch. Ensure that the cable will withstand 25 impact cycles and the change in attenuation does not exceed 0.2 dB at 1550 nm when tested according to the requirements as detailed in the TIA -455-25D standard. Ensure that the change in attenuation will not exceed 0.15 dB during loading at 1550 nm, and that no fiber displays a measurable change in attenuation after load removal.

2.3 FIBER-OPTIC CONNECTION HARDWARE

A. General: Ensure that all splice enclosures, organizers, cable end preparation tools, and procedures are compatible with the fiber optic cable, and are approved by the County in writing.

B. Splice Enclosures:

1. Contain all optical fiber splices within a splice enclosure. Ensure that the enclosures provide storage for splices, fiber, and buffer tubes. Ensure that the splice enclosure restores the mechanical and environmental integrity of the fiber optic cable, encases the sheath opening in the cable, and organizes and stores optical fiber. Ensure all hinges and latching devices are stainless steel. Ensure that the enclosure is airtight and prevents water intrusion. Ensure that the splice enclosure can accommodate pressurization and has the ability to be reentered without requiring specialized tools or equipment. Ensure that the enclosure provides fiber and splice organizers including splice trays and strain relief.
2. Ensure that splice enclosures are hermetically sealed to protect internal components from environmental hazards such as moisture, insects, and UV light. Fiber optic splice enclosures shall also:
3. Comply with the Telcordia Technologies' GR-771-CORE standard and all applicable NEC requirements.
4. Provide space for future expansion equal to 100% of the initial utilization.
5. Provide fiber optic cable penetration end caps to accommodate a minimum installation of two trunk fiber optic cables and two fiber optic drop cables. Ensure that the enclosure end caps are factory-drilled to the proper diameter to accept and seal the fiber optic cable entries. Ensure that the cable entry locations can accommodate an assortment of cables with outside diameters ranging from 0.45 inches to 0.55

inches, plus 10%, without jeopardizing the waterproof characteristics of the enclosure.

C. Splice Trays: Ensure that splice trays are securely attached and accessible and provide sufficient storage for the fiber cable. Ensure splice trays provide access to individual fibers without disrupting other fibers in the tray. Ensure that splice trays hold the buffer tubes rigidly in place and provide protection for fusion splices. Ensure that the raceway accommodates the minimum bend radius of the fiber. Ensure that splice trays allow visible inspection of the fiber. Ensure that splice trays include a cover with a locking mechanism to hold it in place.

D. Cable Terminations:

1. Use Type SC connectors for all new network installations. Ensure that all connectors include a ceramic ferrule and provide a strain relief mechanism when installed on a single fiber cable that contains strength elements. Ensure that the optical fiber within the body of all connectors is mechanically isolated from cable tension, bending, and twisting.

E. Pre-Terminated Connector Assemblies: Ensure that pre-terminated cable assemblies consist of fiber optic cables with factory-installed connectors on one end of the cable and an un-terminated optical fiber on the other. Ensure that the pre-terminated connector assemblies are installed with fusion splices. Ensure that all buffer tubes and fibers are protected once the attachment of pre-terminated connector assemblies is complete.

F. Buffer Tube Fan-Out Kits: Ensure that a buffer tube fan-out kit is installed when fiber optic cables are terminated. Use a kit compatible with the fiber optic cable being terminated and that is color-coded to match the optical fiber color scheme. Ensure that the buffer tube fan-out kit supports 12 fiber strands.

G. Patch Panels:

1. Ensure that the patch panel is compatible with the fiber optic cable being terminated and color coded to match the optical fiber color scheme. Ensure that the patch panel has a minimum of 12 SC-type panel connectors unless otherwise shown in the Plans. Ensure that the patch panel dimensions do not exceed 14 inches x 6 inches x 4 inches for fiber counts of twelve or less. Ensure the patch panel is suitable for mounting within an approved cabinet at the field device location. Ensure patch panels are sized to accommodate specified coupler housings and maintain sufficient bend radius for cables. Ensure the patch panel is sized to occupy the minimum space required for capacity.
2. Connector Panels:

a. Ensure that the connector panel provides 12 SC-type, bulkhead-mount coupling connectors. Ensure that each coupling connector allows connection of a cable terminated on one side of the panel to a cable on the opposite side.

2.4 IT TELECOMMUNICATIONS PANEL

A. General:
1. Function: Receive incoming fiber-optic cable at installation site from County network.
2. Major parts include fiber-optic patch panel, network cabling, and accessories.

B. Enclosure Specifications:
1. Manufacturers and Products:
a. American Products; AP Minifort Model AM-462418-24RU.
b. No substitutions.
2. Panel Size:
a. Include mounting bracket accessory from panel manufacturer for installation.
b. Increase panel size if and as needed to accommodate additional network equipment or to increase heat dissipation to reach an internal steady-state operating temperature below the maximum operating temperature of all contained equipment.
3. Provide ground bar inside enclosure.
4. All conduit penetrations shall be made through the bottom face of the enclosure. Side or top penetrations are not acceptable.
5. Include quad 120 VAC power receptacle gang box inside enclosure.
6. Enclosure shall include a standard rack for mounting of rack-mounted equipment.

2.5 CONDUIT

A. Materials of Construction: Use materials that have been tested and listed by a Nationally Recognized Testing Laboratory to the following industry standards:
- High Density Polyethylene (HDPE):
  - For use outside site boundaries, such as roadside pull boxes and splice enclosures.
- HDPE Standard Dimension Ratio (SDR) 13.5: ASTM F2160, NEMA TC-7
- All HDPE conduit shall be orange in color.
- Schedule 80 PVC:
  - For use inside site boundary for interconnection of fiber-optic equipment and to on-site fiber-optic handholes, pull boxes, and splice enclosures.

B. Locate Wire: Ensure that locate wire is a single copper solid conductor with a minimum gauge of No. 12 AWG with blue shielding. Ensure locate wire is insulated using a 45-millimeter minimum thickness polyethylene sheath that is orange in color and marked to identify the manufacturer and the conductor size.

C. Locate Wire Grounding: Ensure that locate wires are attached to a wire grounding unit (WGU) dedicated to safely dissipate high transient voltages or other foreign electrical surges induced into the designated system. Ensure the WGU conforms to the following:

1. Allows signals generated by locate system transmitters to pass through the protection system without going to ground.
2. The protection system automatically resets and passes locate system transmitter signals after the unit has been grounded to dissipate over-voltages.
3. Is intended for below or above grade applications. Ground the WGU to a driven rod within 10 feet of the system using a No. 6 AWG single conductor wire with green insulation.
4. The WGU system meets the minimum standards listed below for surge protection:
    a. Surge Element: Three-element maximum duty fail-safe gas tube.
    b. Rating: 40,000 Amp surge capacity (single-cycle, 8 by 20 microsecond waveform).
    c. Life: Minimum 1,000 surges (1000 Amps to ground).
    d. Insulation Resistance: 1,000 megohm minimum at 100 volts of direct current.
    e. Clamp Voltages:
        1) Impulse at 100 volts per microsecond.
        2) Direct Current: 300 to 500 volts.

D. Route Markers:

1. Ensure Standard Route Marker (SRM) is a rigid, three-sided driven post used for location and notification purposes only.
2. Ensure that each SRM is labeled and identified as a County IT fiber optic cable marker unless otherwise shown in the Plans. The labels must include the contact information for the Collier County IT department, and a telephone number to call prior to any excavation in the area. Ensure that the identification information is permanently imprinted on the top fitting, and will not peel, fade, or deteriorate.
3. Ensure that SRM posts are white with an orange top fitting cover with black or white lettering and graphics. Ensure that the SRM is a tubular configuration, and both the marker post and the top fitting are made

from virgin Type 111 HDPE. Ensure that any fasteners used with the SRM are constructed of stainless steel.

4. Ensure that all SRMs have a minimum outside diameter of 3.5 inches with a minimum wall thickness of 0.125 inches. Ensure that the top fitting cover is a minimum of 1.5 feet long and has an outside diameter of 3.75 inches with a minimum wall thickness of 0.125 inches. Ensure that each SRM provides a tensile strength of 4,200 pounds per square inch as required in ASTM D638. Ensure that each SRM is manufactured for use in temperatures range of minus 30° to 165°F in accordance with NEMA TS 2.
5. Ensure the SRM can withstand an impact force of 70 pounds per foot at 32°F in accordance with ASTM D2444, before and after UV conditioning for 2,000 hours in accordance with ASTM G154. Ensure that the control sample of any material tested maintains a minimum of 70 percent of its original tensile strength.
6. Ensure that SRMs installed at the minimum 2-foot depth can withstand at least one impact at 45 miles per hour by a vehicle weighing at least 3,500 pounds and that after impact, post returns to an upright position within 10 degrees of vertical alignment within 30 seconds from the time of impact.

2.6 PULL AND SPLICE BOXES

A. General:

1. The box bodies and covers shall be free of flaws such as cracks, sharp, broken, or uneven edges, and voids.
2. Ensure in-ground boxes have an open bottom design.

B. Marking:

1. The following information shall be permanently cast or engraved into the top surface of all pull and splice box covers. If used, identification plates shall be UV stable, mechanically fastened, and bonded with adhesive material suitable for outdoor applications.
   a. Mark application as “COMMUNICATIONS”
   b. Manufacturer’s name or logo.

C. Dimensions:

1. For fiber optic cable applications, pull boxes with nominal cover dimensions of 24 inches wide by 36 inches long or larger and no less than 18 inches deep shall be provided.
2. Rectangular splice boxes with nominal cover dimensions of 30 inches wide by 48 inches long or larger and no less than 18 inches deep shall be provided.

D. Fabrication:

1. Box covers shall be constructed of concrete, polymer concrete or other materials meeting the requirements of this Section.
2. Box covers with lifting slots and a flush-seating lockdown mechanism shall be provided. Penta-head or other non-standard, security type lockdown lag bolts shall be used. Lockdown bolts and lifting slots shall be Type 316, 304, or 302 passivated stainless steel or brass. Lockdown bolt assembly shall be designed to prevent seizing and can be removed without damaging the cover or box body. The lockdown bolt threaded insert/nut assembly shall be field replaceable.
3. The box construction shall be an ANSI Tier 22 Quazite brand enclosure.

PART 3 EXECUTION

3.1 PREPARATION

A. Conduit:
   1. Ensure installed conduit system conforms to fiber-optic system requirements, including:
      a. Conduits: Size and number.
      b. Access Holes, Handholes, and Pull Boxes: Location and size, to ensure cables may be installed without exceeding manufacturer's limitations.
      c. Outlet Boxes: Size to coordinate with outlet cover plates for adequate volume and bend radius.
   2. Expansion Plugs: Seal conduit to stop ingress of water and grit with fabricated expansion plugs.
   3. Ensure duct bank, conduit, and other confined routing is free and clear of debris before cable placement.

3.2 SOURCE QUALITY CONTROL

A. Cable End Sealing: Ensure that fiber optic cable ends are capped or sealed to prevent the entry of moisture during shipping, handling, storage, and installation. Equip one end of the fiber optic cable with flexible pulling eyes.

B. Protective Wrap: Ensure that the fiber optic cable is shipped and stored with a protective wrap or other approved mechanical reel protection device over the outer turns of the fiber optic cable on each reel. Ensure that the wrap is weather resistant and protects the cable reel from environmental hazards. Ensure that the cable reel remains wrapped until cable is to be installed.

C. Packaging, Shipping and Receiving: Ensure that the packaging and delivery of fiber optic cable reels comply with the following minimum requirements:

1. Ensure cable is shipped on reels of marked continuous length.
2. Ensure each cable is shipped on a separate, strongly constructed reel designed to prevent damage to the cable during shipment and installation.
3. Ensure each reel has a minimum of 6 feet on each end of the cable available for testing.
4. Ensure that all fiber optic cable is continuous and free from damage.
5. Ensure no point discontinuities greater than 0.1 dB per reel.
6. Ensure satisfactory transmission loss test results as required by the TIA-455-61-A standard.
7. Ensure that the manufacturer submits the date of manufacture; product and serial numbers; cable data, including the reel length; refraction index; the project name and location; type of fiber and quantity of strands used; technical product data sheets; and reel numbers.

D. Manufacturer Testing and Certification: Submit documentation of all factory tests performed by the manufacturer for all fiber optic cable, splicing material, cable terminations, and patch panels as requested by the County.

3.3 INSTALLATION

A. Fiber-Optic Cable Installation:
   1. Install all materials and equipment according to the latest version of the manufacturer's installation procedures. Ensure that all materials and installation practices are in accordance with the applicable OSHA requirements as found in 29 CFR Part 1926, Safety and Health Standards for Construction. In addition, perform the following:
      a. Ensure conduit and innerduct is clean and free from damage prior to installing fiber optic cable.
      b. Document the sequential cable length markings at each splice box and pull box wall that the cable passes through and include the information with the as-built documentation.
   2. Provide all incidental parts needed to complete the installation as necessary for a complete and properly operating system.
   3. Cable Identification:
      a. All fiber cable shall be striped with a yellow color along the entire length of the cable.
      b. A cable tag with permanent ink shall denote "COLLIER COUNTY BCC IT FIBER-OPTIC CABLE" shall be affixed on the cable at every 3-foot interval.
   4. Pulling:
      a. Install the fiber optic cable by hand or by using a mechanical pulling machine. If a mechanical pulling machine is used, equip the machine with a monitored or recording tension meter.

Ensure that at no time the manufacturer's recommended maximum pulling tension is exceeded. Ensure that the central strength member and aramid yarn are attached directly to the pulling eye during cable pulling. Use pulling attachments to ensure that the optical and mechanical characteristics are not degraded during the fiber optic cable installation.

b. Ensure that excess cable is coiled in a figure eight and fed manually when pulling through pull boxes and splice boxes by hand. If pulleys and sheaves will be used to mechanically pull through pull boxes and splice boxes, ensure that the cable will never be pulled through a radius less than the manufacturer's minimum bend radius. Use large diameter wheels, pulling sheaves, and cable guides to maintain the appropriate bend radius. Provide tension monitoring at all times during the pulling operation. Ensure that cable pulling lubricant used during installation is recommended by the optical fiber cable manufacturer.

5. Blowing: Use either the high airspeed blowing (HASB) method or the piston method. When using the HASB method, ensure that the volume of air passing through the conduit does not exceed 600 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive. When using the piston method, ensure that the volume of air passing through the conduit does not exceed 300 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive.
6. Slack Cable Storage: Provide and store fiber optic cable at each pull box and splice box to allow for future splices, additions, or repairs to the fiber network. Store the fiber optic cable without twisting or bending the cable below the minimum bend radius.
   a. Store a total of 200 feet of fiber optic backbone cable in splice boxes, with 100 feet of cable on each side of the cable splice point.
   b. Store a minimum of 100 feet of fiber optic drop cable in splice boxes.
   c. Store 100 feet of spare fiber optic cable in pull boxes.
7. Fiber Optic Connection - Splicing:
   a. Perform all optical fiber splicing using the fusion splicing technique, and according to the latest version of the manufacturer's cable installation procedures, industry accepted installation standards, codes, and practices. Ensure that all splices match fiber and buffer tube colors.
   b. Ensure that splice loss does not exceed a maximum of 0.05 dB per splice as measured on the fusion splice machine when splicing newly installed fibers together. Ensure that splice loss does not exceed a maximum of 0.1 dB per splice as measured

on the fusion splice machine when splicing newly installed fibers to existing fibers.

c. Where a fiber cable is to be accessed for lateral or drop signal insertion, only open the buffer tube containing the fiber to be accessed and only cut the actual fiber to be accessed. If a fiber end is not intended for use, cut the fiber to a length equal to that of the fiber to be used and neatly lay it into the splice tray.

d. Treat any fibers exposed during splicing with a protective coating and place in a protective sleeve or housing to protect the fiber from damage or contaminants. Neatly store all splice enclosures within a splice box.

8. Splice Plan: Submit a splice plan showing the location and configuration of splices in the system for approval by the County. Perform all splicing according to the splice plan. Document each splice location and identify the source and destination of each fiber in each splice tray. Document all fiber colors and buffer jacket colors used during installation and develop a sequential fiber numbering plan as required in the TIA -598-D standard for color-coding in the documentation.

9. Splice Equipment: Use a fusion splice machine to splice all optical fiber. Ensure that splice equipment is new from the factory, or equipment has been serviced and certified by the factory or its authorized representative within the previous 12 months from the commencement of its use. Ensure that the calibration certificate is maintained in the splicing equipment case or provided electronically when requested. Clean all splicing equipment and calibrate according to the manufacturer's recommendations prior to each splicing session at each location.

B. Cable Termination Installation: Ensure that cables, buffer tubes, or strands are neatly routed, secured, and terminated in a patch panel in coordination with the County. Ensure all cable termination points include documentation regarding the identification, route, and function of each fiber installed at that location. Ensure that a copy of this information is placed alongside the installed equipment (for instance, in a document pouch or drawer within a field cabinet).

C. Patch Panel Installation: Ensure that patch panels are neatly installed and secured in a weather-proof enclosure.

D. Conduit Installation:

1. Install the conduit in accordance with NEC or National Electrical Safety Code (NESC) requirements and the Standard Plans. Construct conduit runs as straight as possible. Mark the location of the conduit system

with route markers every 1,000 feet and at every pull box and splice box. Ensure that all route markers used are new and consistent in appearance.

2. Install a No. 12 AWG pull wire or polypropylene cord inside the full length of all conduits. Ensure that a minimum of 24 inches of pull wire/cord is accessible at each conduit termination.
3. Ensure the conduit includes all required fittings and incidentals necessary to construct a complete installation.
4. Prevent the ingress of water, dirt, sand, and other foreign materials into the conduit prior to, during, and after construction. Seal the ends of conduit after wiring is complete with a moisture resistant sealant that is designed for this specific application.
5. Install the conduit system so the fiber optic cable maintains the minimum bend radius. Use approved methods for connecting inner duct or conduit within or between plowed portions, trenched portions, and bored portions. Coupling method and material to be in compliance with manufacturer's installation guidelines.
6. Conduit Terminations:
    a. Where conduit enters a box, fitting, or other enclosure, provide a bushing or adapter (end bell, conduit adapter, etc.) to protect the conductor or cable from abrasion unless the box, fitting, or enclosure provides equivalent protection.
    b. For conduit to be encased in concrete, wrap with tape, or otherwise protect all terminations to prevent the entrance of concrete.
    c. Connect new underground conduits to existing underground conduits with a pull box.
    d. Seal conduits terminating in a pull box or junction box with a moisture resistant sealant.
7. Restoration of Trench Areas: Restore the conduit trench construction area to an acceptable condition. Such work includes repair or replacement of all pavement areas, sidewalks, driveways, curbs, structures, landscaping, grass areas (including removal of excavated materials and spoils), removal and disposal of drilling fluids, and backfilling areas disturbed by the conduit installation.
8. Above-Ground Installation
    a. Use conduit designed and manufactured for use in long-term above-ground applications with UV stabilization to prevent material deterioration.
    b. Securely attach above-ground conduit installations to the surface of the supporting structure using conduit straps. As a minimum, use conduit straps located on 5-foot centers.
9. Elbow Curvature:
    a. For 2-inch conduit, the radius of curvature of the centerline of any bend shall not be less than 9.5 inches.

E. Fiber-Optic Cable Locate Wire:

1. Installation:
    a. Install locate wire in the trench or bore with all underground conduits to provide end-to-end electrical continuity for electronically locating the underground conduit system. When conduit is placed by trenching, bury locate wire along the centerline of the top outer surface of installed conduit.
    b. Do not run locate wires into field cabinets. Terminate locate wires at the following locations or as shown on the Plans, nearest pull box to a field cabinet, nearest pull box to a building, and splice box locations. Ensure that wire termination occurs in a pull box.
    c. Install WGUs in pull boxes and splice boxes as shown in the Plans. Mount the device in a location high enough from the bottom of the box to allow access to terminal facilities without disturbing cables present within the box. Terminate the locate wires and connect the WGU to ground in accordance with the manufacturer's instructions.
2. Testing: Test the locate wire system after installation to ensure that it functions and can be used to accurately locate the conduit system. Perform continuity tests and insulation resistance tests on all locate wires. Replace, or repair defective locate wire at no additional cost.

F. Route Markers:

1. Install route markers for new fiber optic cable installations, replace route markers as shown in the Plans, and ensure the following:
    a. Markers are plumb and level and the notification information is clearly visible when viewed from the side facing the roadway.
    b. Markers are set within the right of way.
    c. Markers are placed at a one-foot offset from the conduit system.
    d. The top of the marker post is a minimum of five feet and maximum of six feet above the finish grade
    e. Place marker at each pull box location.
    f. Markers are installed on both sides of a stream, river, or other water crossing, and on both sides of aboveground attachments such as bridges and walls.
2. Remove and replace all marker posts damaged during installation at no additional cost. Provide as-built documentation at the completion of installation that includes location of all installed route markers and correlates the marker to the fiber optic infrastructure that it signifies.

G. Pull and Splice Boxes:

1. Do not install power and communication cables in the same box.

2. Install pull and splice boxes in accordance with Plans. Ensure that the pull or splice box cover is flush with the concrete apron or sidewalk. Prior to installation, pour in a bed of pea rock or crushed stone at least one foot deep, with horizontal dimensions four inches longer than the width and length of the pull box. The pull or splice box installation shall be placed so that the inside edge of the box rests entirely on a gravel bed. Do not install pull or splice boxes in roadways, driveways, parking areas, ditches, or public sidewalk curb ramps. Avoid placing pull and splice boxes in low-lying locations with poor drainage. Ensure that pull and splice boxes house fiber optic cable without exceeding the cable bend radius.
3. Provide conductive metal ground rod that is at least 5/8 inches in diameter and 48 inches long. Ground rod shall be installed vertically within three inches of the inside edge of the pull or splice box, with at least 10 inches of the rod exposed above the gravel base.
4. Placement and Spacing: Pull boxes shall be spaced a maximum of 1,000 feet apart, and within 20 feet of either side of a roadway, and within 10 linear feet of any fiber optics termination point. The County agency shall reserve sole determination whether spacing of pull boxes shall be less or more than the standard 1,000 feet apart.
5. Relocation of Pull and Splice Boxes:
    a. Relocation of pull and splice boxes shall consist of removing an existing box and installing the box at the location shown in the Plans. Restore the area of the box removal and relocation to the condition of the adjacent area. The costs for restoration will be included in the Contract unit price of the relocation.
    b. Boxes damaged due to the Contractor's operations must be replaced by the Contractor at no cost to the County. Replacement boxes must be of the same material and size of the existing box, unless directed otherwise by the CCITD.

3.4 FIELD QUALITY CONTROL

A. Installation Testing:
    1. General:
        a. Notify the CCITD of cable testing at least 14 calendar days in advance. Submit the testing procedures to the CCITD staff for approval prior to commencement of testing. Perform all tests at 1310 nm and 1550 nm wavelengths, and include the last calibration date of all test equipment with the test parameters set on the equipment in the test documentation. Ensure that the last calibration date of all test equipment is within the last 12 months and that the calibration certificate is maintained in the test equipment case or provided electronically when requested. Test all installed fibers (terminated and un-terminated) using

methods identified in this Section. All tests must be conducted with a launch box.

b. Fibers containing splices or fibers terminated on both ends must be bidirectionally tested.

c. Present the results of the optical time domain reflectometer (OTDR) testing (i.e., traces for each fiber) and a loss table showing details for each splice and termination tested to the CCITD in an approved electronic format. Ensure all OTDR testing complies with the EIA/TIA-455-61 standard.

2. OTDR Attenuation Testing: Perform testing on all fibers to ensure that attenuation does not exceed allowable loss (0.35 dB/km for 1310 nm wavelength, 0.25 dB/km for 1550 nm wavelength, plus 0.5 dB for any connectors and 0.1 dB for splices). Repair or replace cable sections exceeding allowable attenuation at no cost to the County.

3. OTDR Tracing: Test all fibers with an OTDR at wavelengths of 1310 and 1550 nm.

4. Splice Loss Testing: Ensure that the splice loss for a SMF fusion splice does not exceed a maximum bidirectional average of 0.1 dB per splice when measured using an OTDR. Repair or replace splices that exceed allowable attenuation at no cost to the County.

5. Connector Loss Testing**:** Ensure that the attenuation in the connector at each termination panel and its associated splice does not exceed 0.6 dB when measured using an OTDR. Repair or replace connectors exceeding allowable attenuation at no cost to the County.

B. Fiber Optic Cable Locator: Locate and mark all existing County owned or maintained fiber optic facilities within project limits prior to performing any subsurface work. Locate and mark as necessary to ensure that all fiber optic facilities are located and visibly marked at all times.

C. Fiber-Optic Cable Warranty: Ensure that the fiber optic cable, the splice enclosures, and terminations have a manufacturer's warranty covering defects for a minimum of two years from the date of final acceptance. Ensure the warranty includes providing replacements, within 10 calendar days of notification, for defective parts and equipment during the warranty period at no cost to the County.

D. Pull and Splice Box Warranty: Ensure all pull, splice, and junction boxes have a manufacturer's warranty covering defects for a minimum of one year from the date of final acceptance. Ensure the warranty includes providing replacements, within 30 calendar days of notification, for defective parts and equipment during the warranty period at no cost to the County.

E. Documentation and Closeout

1. Within ten (10) days following successful installation and testing of the fiber-optic communication work, Contractor shall provide the County both printed and electronic copies of as-built network drawings.
2. At minimum, as-builts shall contain:
    a. Network block diagrams, identifying endpoints for fiber termination, number of fiber strands and cables, and topology layout.
    b. Updated site plan of each affected installation site identifying location of the IT telecommunications cabinet, in addition to pull boxes and handhole locations at the installation and interconnecting conduit.
    c. Updated overall site plan identifying the fiber-optic cable installation for the entire project, including all interconnecting segments between installations or other endpoint locations. Overall site plant shall include all pull boxes, splice vaults, handholes, and fiber cable lengths.
    d. As-built plans shall additionally be provided as converted Google Earth and Visio formats for County use.

END OF SECTION

DETAILS

SECTION 3

UTILITIES DETAIL DRAWINGS

~~Go to the Collier County website below for the latest revision of the Utilities Detail Drawings:~~

For the latest revisions to the Utilities Detail Drawings visit:

~~https://www.colliercountyfl.gov/your-government/divisions-f-r/public-utilities-planning-and-project-management/utilities-standards-manual~~

Collier County Public Utilities
Engineering and Project Management Resources Webpage.

COLLIER COUNTY WATER-SEWER DISTRICT
UTILITIES STANDARDS MANUAL

SECTION 3

UTILITIES DETAIL DRAWINGS

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Drawing No.	Title	Revision Date
	Valve Single Control Panel Site Electrical Details	08/2008
NP-E8	Reuse System Standard Service Connections Open/Close Valve Single Control Panel Site Electrical Details	04/2006
NP-E9	Reuse System Standard Service Connections Open/Close Valve Single Control Panel Site Typical RTU Antenna Tower Details	08/2008

Water Details

W-1	Temporary Blowoff Assembly with Bacterial Sample Point Detail	01/2014
W-2	Automatic Water Main Flushing Device Detail	01/2014
W-3	Fire Hydrant Detail	01/2025
W-4	Connection to Existing Water Main Detail (Gap Configuration)	07/2018
W-5	Potable Water Air Release Valve Detail	08/2008
W-6	Permanent Bacterial Sample Point Detail	01/2025
W-7	Not Used	
W-8	2-1/2” and Smaller Fire System Detector Check Assembly Detail	07/2018
W-9	Temporary Backflow Preventer and Fire Protection Meter Tie-In Assembly	01/2009
W-9A	Alternate Temporary Backflow Preventer and Fire Protection Meter Tie-in Assembly	01/2009
W-10	Not Used	
W-10A	Not Used	
W-11	3” and Larger Fire System Detector Check Assembly Detail	07/2018
W-11A	4” Through 10” Only Compact Fire System Detector Check Assembly Detail	07/2011
W-12	Typical Short and Long Side Water Service Meter Setting Detail for Connection to Water Main	01/2025
W-12A	Service Connection Sizing Chart and Notes	01/2025
W-13	3” and Over Potable Water Meter Assembly Detail	01/2025
W-14	4” and Over Potable Water Fire and Domestic Meter Assembly Detail	01/2025
W-14A	Maintenance Driveway for Water Meters 3” and Larger	07/2018
W-15	Not Used	
W-16	Fire Service Dual Detector Check Assembly Over 10” Fire Main Detail (Dual 8” Assemblies)	07/2011

Wastewater Details

WW-1	Force Main Connection to Gravity Sanitary Sewer Detail	04/2006
WW-2	Private Force Main Connection to County Force Main Detail	07/2018
WW-3	Precast Reinforced Concrete Manhole Detail	01/2025
WW-4	Shallow Manhole Detail	01/2025
WW-5	Drop Manhole Detail	01/2025
WW-6	Manhole Ring and Cover Detail	01/2025
WW-7	Pump Station Detail – Profile	01/2025
WW-7A	Pump Station and Wastewater Details	01/2015
WW-7B	Pump Station Concrete Details	01/2015
WW-7C	Pump Station and Wastewater Details	07/2018
WW-7D	Private Grinder Pump Station Detail	01/2025
WW-8	Pump Station Detail – Plan	01/2025
WW-8A	Community Pump Station with Generator Detail – Plan	01/2025

PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET							
	VERTICAL BENDS							
	90°		45°		22–1/2°		11–1/4°	
	UPPER	LOWER	UPPER	LOWER	UPPER	LOWER	UPPER	LOWER
4	60	24	25	10	12	5	6	3
6	85	34	35	14	17	7	9	3
8	110	43	45	18	22	9	11	9
10	133	52	55	21	27	10	13	5
12	155	60	64	25	31	12	15	6
16	198	76	82	31	40	15	20	8
18	218	83	90	35	44	17	22	8
20	238	90	98	37	47	18	23	9
24	277	104	115	43	55	21	27	10
30	330	122	136	51	66	24	33	12
36	379	139	156	57	75	28	38	14

PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET (1)	
	TEE (3)	REDUCER (4)
6 x 4	0	40
6 x 6	34	
8 x 4	0	72
8 x 8	55	
10 x 6	3	74
10 x 10	75	
12 x 4	0	122
12 x 8	31	75
12 x 12	95	
16 x 6	0	153
16 x 10	44	107
16 x 16	134	
18 x 8	0	157
18 x 12	68	108
18 x 18	152	
20 x 10	20	161
20 x 16	120	77
20 x 20	170	
24 x 12	37	187
24 x 18	132	109
24 x 24	204	
30 x 16	78	213
30 x 20	138	165
30 x 30	252	
36 x 18	84	259
36 x 24	170	191
36 x 36	298	

PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET				
	HORIZONTAL BENDS				DEAD ENDS (2)
	90°	45°	22–1/2°	11–1/4°	
4	23	9	5	2	55
6	32	13	6	3	77
8	40	17	8	4	100
10	48	20	10	5	120
12	56	23	11	6	141
16	71	29	14	7	181
18	77	32	15	8	200
20	84	35	17	8	218
24	96	40	19	10	253
30	112	47	22	11	303
36	127	53	25	13	350

NOTES:

1. RESTRAIN ALL PIPE JOINTS WITHIN THE DISTANCE SHOWN ON THE TABLES MEASURED FROM THE POINT OF CONNECTION.

2. ISOLATION VALVES SHALL BE TREATED AS DEAD ENDS. WITH RESTRAINT ON BOTH SIDES OF THE VALVE.

3. RESTRAINT IS FOR BRANCH OF TEE. IF BRANCH SIZE IS NOT ON TABLE, USE NEXT LARGEST BRANCH.

4. RESTRAINT IS FOR LARGE DIAMETER SIDE OF REDUCER. IF REDUCER SIZE IS NOT ON TABLE, USE NEXT SMALLER REDUCER (SMALL END).

5. THIS SCHEDULE IS TO BE USED FOR DUCTILE IRON AND PVC PIPE.

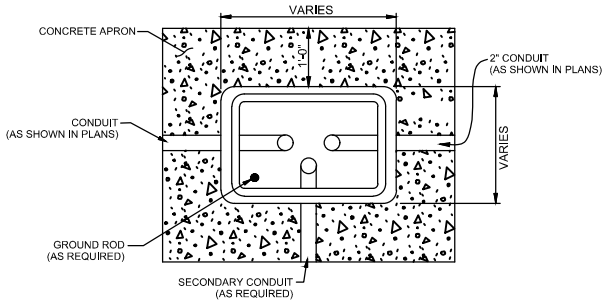
PIPE RESTRAINT SCHEDULE

NTS

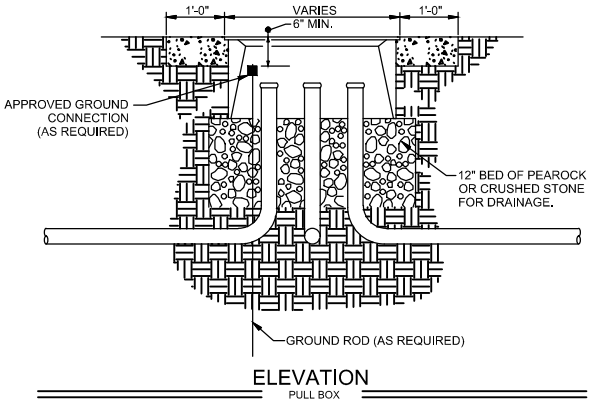
REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
G–10



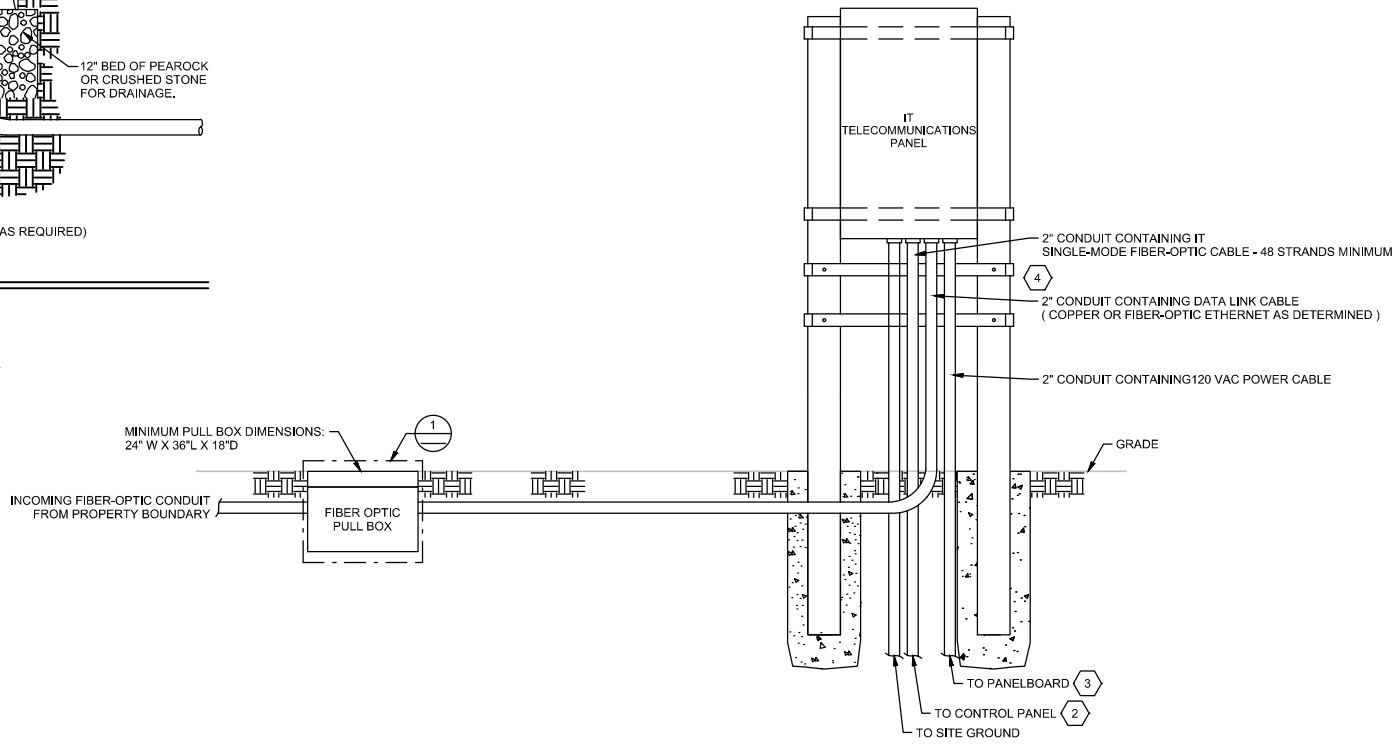
PLAN



① DETAIL

EQUIPMENT SPECIFICATIONS

MARK	
1	DRAWING NOT TO SCALE.
2	CONTROL PANEL LOCATION AND CONFIGURATION VARIES. REFER TO COUNTY DETAILS WW-8, WW-8A, AND WW-8B FOR DETAILS.
3	120VAC PANELBOARD LOCATED ON EQUIPMENT RACK WITH OTHER PANELS NOT SHOWN. REFER TO COUNTY DETAIL WW-9A FOR COMPLETE EQUIPMENT RACK LAYOUT AND ADDITIONAL PANELBOARD REQUIREMENTS.
4	ALL TELECOMMUNICATIONS CONDUIT ENTERING SITE FROM STATION SIDE HANDHOLE SHALL BE SCH 80 PVC UNLESS OTHERWISE NOTED.
5	REFER TO COUNTY SPECIFICATIONS FOR DETAILED REQUIREMENTS ON MATERIALS OF CONSTRUCTION AND INSTALLATION METHODS.



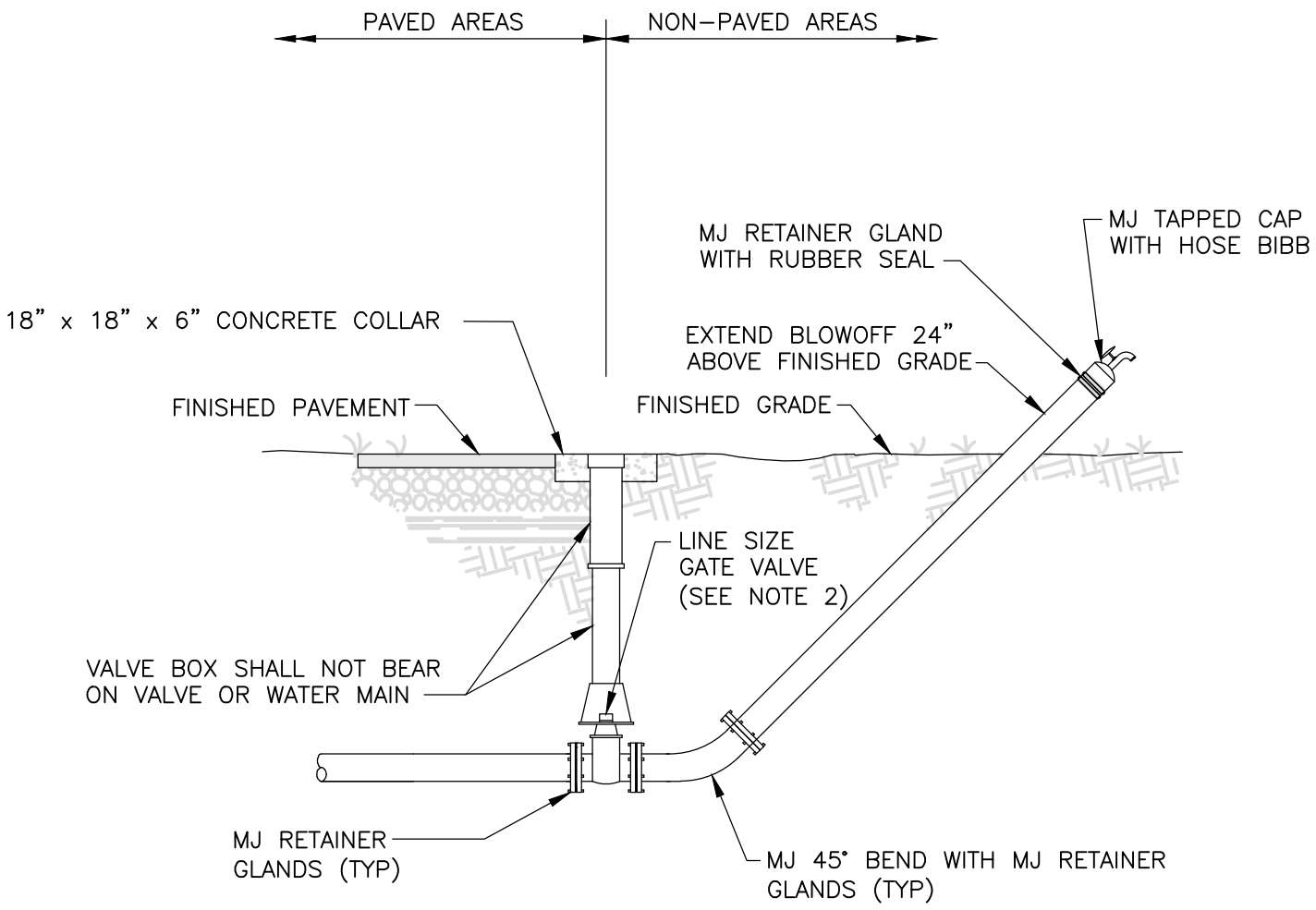
IT FIBER-OPTIC TELECOMMUNICATIONS DETAIL

NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
G-12

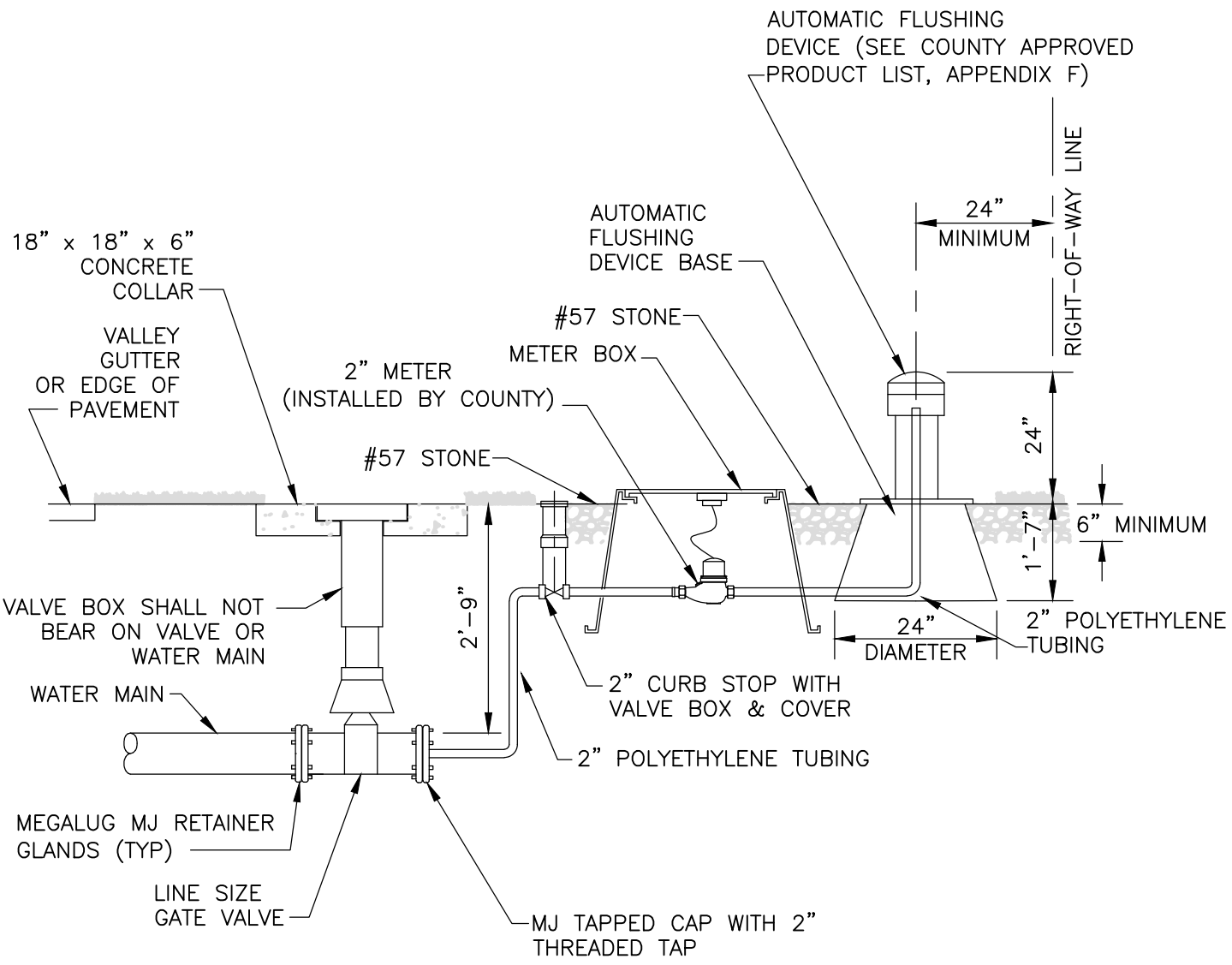


SIDE VIEW

NOTES:

1. MJ TAPPED CAP WITH HOSE BIBB IS TO BE REMOVED AFTER INITIAL BACTERIOLOGICAL CLEARANCE AND PRIOR TO WATER MAIN ACCEPTANCE.
2. SEE TECHNICAL SPECIFICATIONS SECTION 331200 FOR GATE VALVE AND VALVE BOX REQUIREMENTS.
3. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.

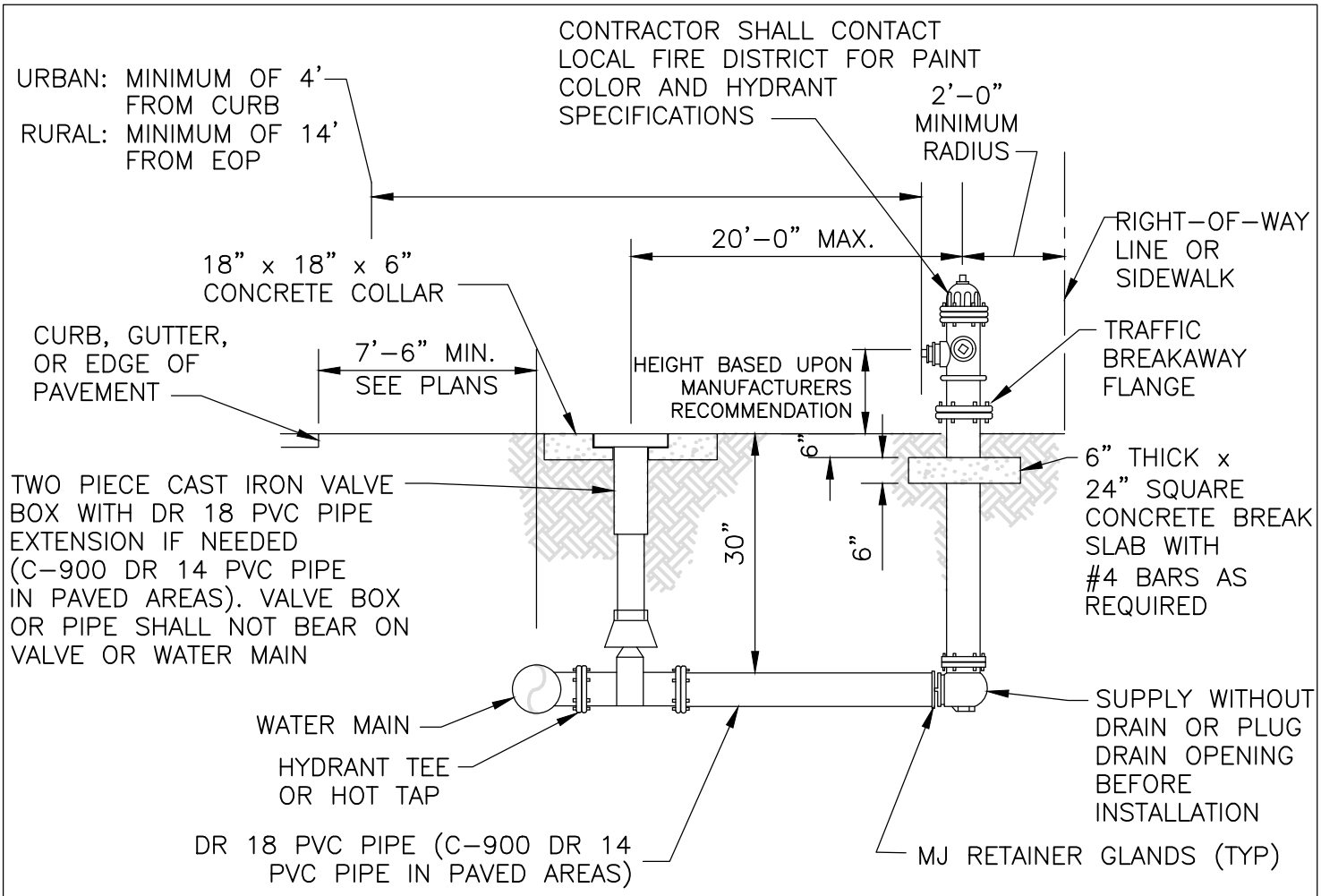
TEMPORARY BLOWOFF ASSEMBLY WITH BACTERIAL SAMPLING POINT DETAIL NTS	REVISION DATE: JANUARY 2014	Collier County	SHEET NO. W–1



NOTES:

1. PIPING SHALL BE INSTALLED UP TO 2" CURB STOP WITH VALVE BOX AND COVER AT TIME OF MAIN INSTALLATION.
2. AUTOMATIC FLUSHING DEVICE SHALL BE SHUT OFF UNTIL MAIN LINE HAS BEEN BACTERIOLOGICALLY TESTED.
3. SEE TECHNICAL SPECIFICATIONS SECTION 331200 FOR GATE VALVE AND VALVE BOX REQUIREMENTS.
4. AT TIME OF ACCEPTANCE, WATER DEPARTMENT WILL INSTALL 2" METER.
5. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.

AUTOMATIC WATER MAIN FLUSHING DEVICE DETAIL	REVISION DATE: JANUARY 2014	Collier County	SHEET NO. W-2
NTS			

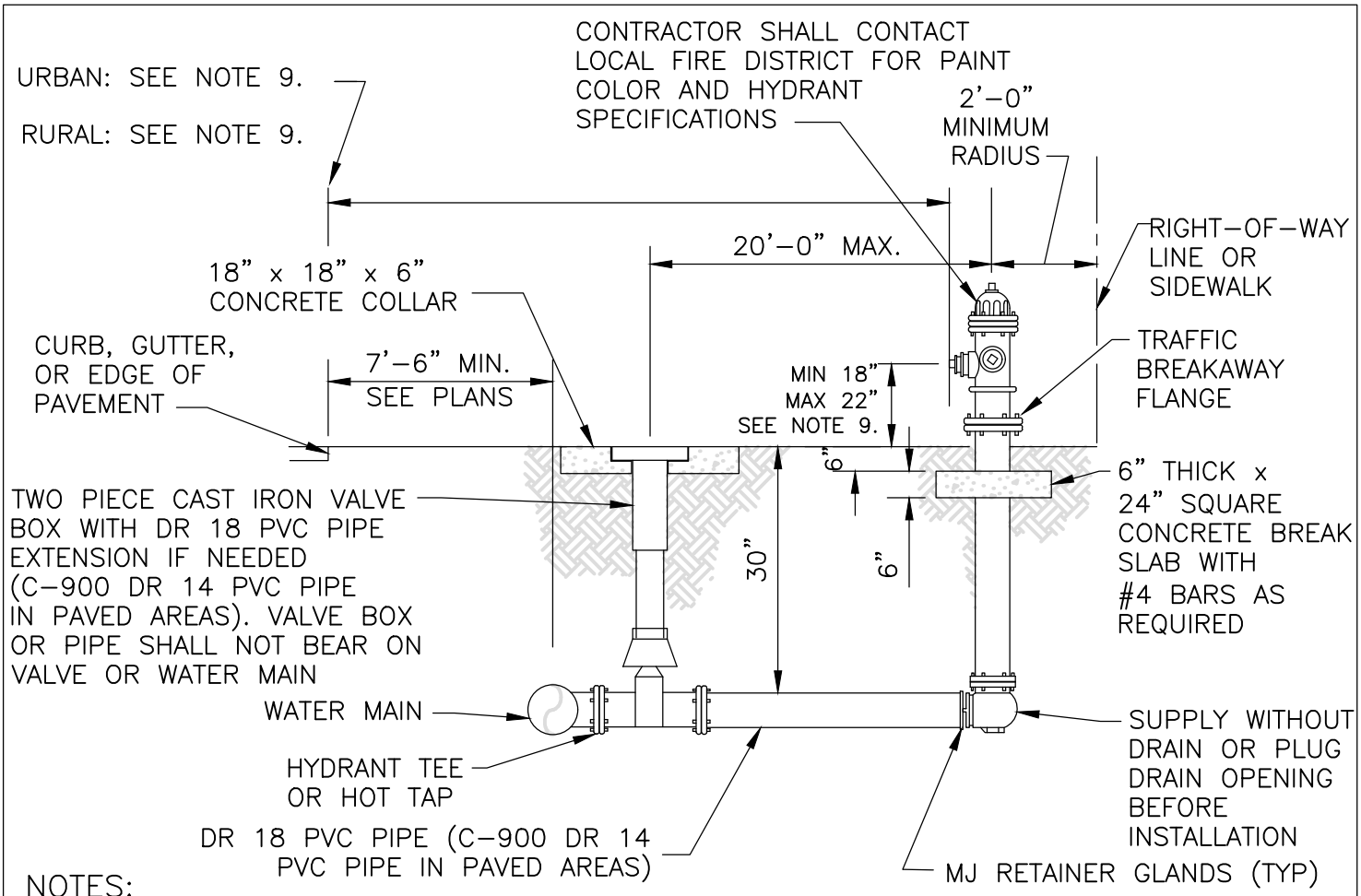


NOTES:

1. HYDRANT MUST BE CURRENT YEAR MANUFACTURE AND YEAR OF MANUFACTURE MUST BE CAST ON BARREL.
2. ALL EXISTING MAINS WHERE FIRE HYDRANTS ARE TO BE INSTALLED SHALL BE HOT TAPPED.
3. TAPPING SADDLES MAY BE EITHER STAINLESS STEEL OR DUCTILE IRON. ALL TAPPING SADDLES FOR ASBESTOS CEMENT PIPE SHALL BE STAINLESS STEEL.
4. ALL FIRE HYDRANT BARRELS SHALL BE A MINIMUM 5-1/4" IN DIAMETER.
5. ALL FIRE HYDRANTS INSTALLED SHALL BE OF THE BREAK AWAY FLANGE TYPE AND SHALL MEET THE REQUIREMENTS OF THE LOCAL FIRE CONTROL DISTRICT.
6. HYDRANT SHALL CONFORM WITH AWWA C-502.
7. THRUST RESTRAINT SHALL BE BY MJ RETAINER GLANDS.
8. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.

FIRE HYDRANT DETAIL	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. W-3
NTS			

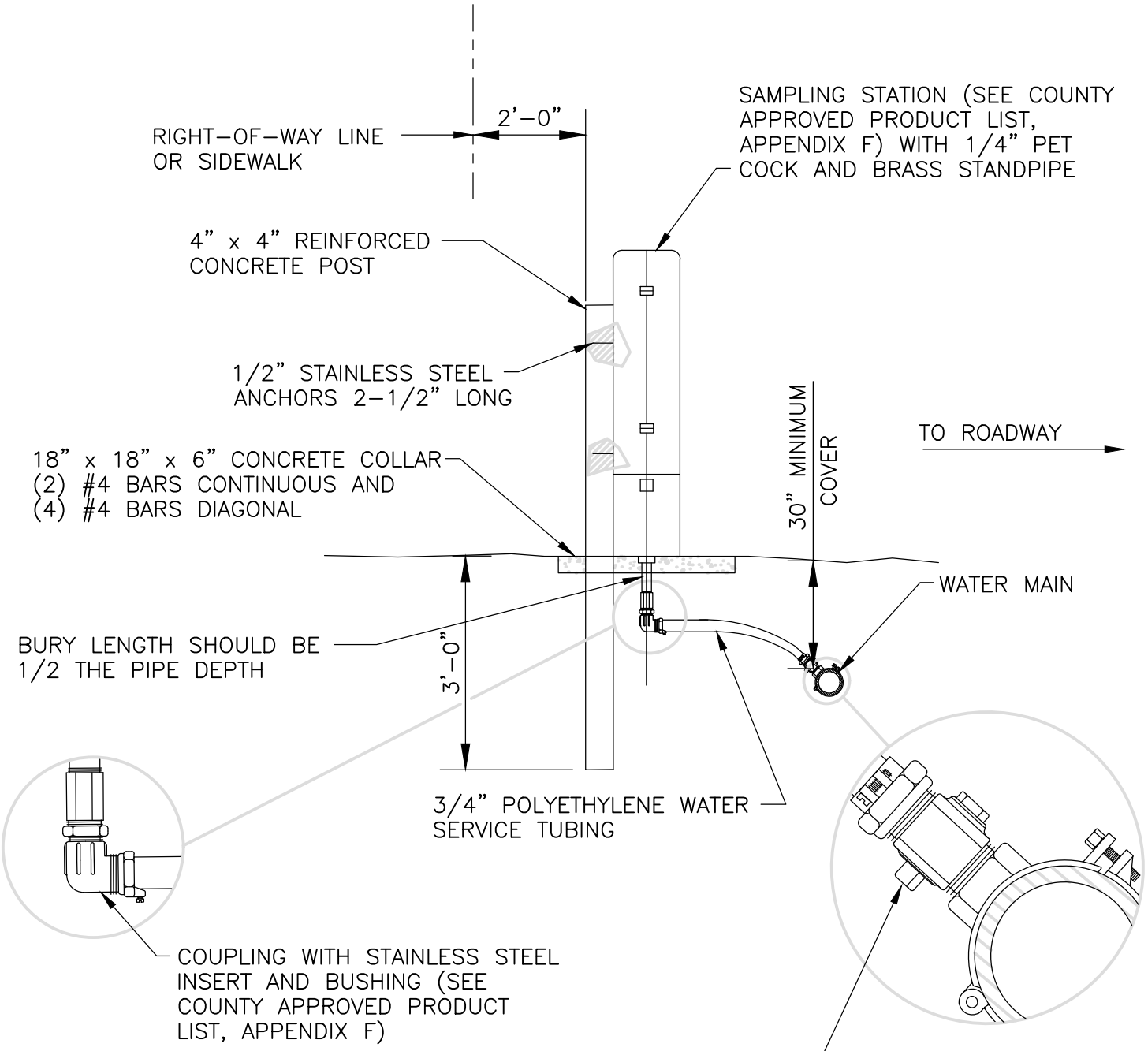
REVISED DETAIL



NOTES:

1. HYDRANT MUST BE CURRENT YEAR MANUFACTURE AND YEAR OF MANUFACTURE MUST BE CAST ON BARREL.
2. ALL EXISTING MAINS WHERE FIRE HYDRANTS ARE TO BE INSTALLED SHALL BE HOT TAPPED.
3. TAPPING SADDLES MAY BE EITHER STAINLESS STEEL OR DUCTILE IRON. ALL TAPPING SADDLES FOR ASBESTOS CEMENT PIPE SHALL BE STAINLESS STEEL.
4. ALL FIRE HYDRANT BARRELS SHALL BE A MINIMUM 5-1/4" IN DIAMETER.
5. ALL FIRE HYDRANTS INSTALLED SHALL BE OF THE BREAK AWAY FLANGE TYPE AND SHALL MEET THE REQUIREMENTS OF THE LOCAL FIRE CONTROL DISTRICT.
6. HYDRANT SHALL CONFORM WITH AWWA C-502.
7. THRUST RESTRAINT SHALL BE BY MJ RETAINER GLANDS.
8. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
9. INSTALLATION OF ALL FIRE HYDRANTS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE DEPARTMENT OF TRANSPORTATION AND LOCAL FIRE CONTROL DISTRICT REQUIREMENTS.

FIRE HYDRANT DETAIL	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. W-3
NTS			



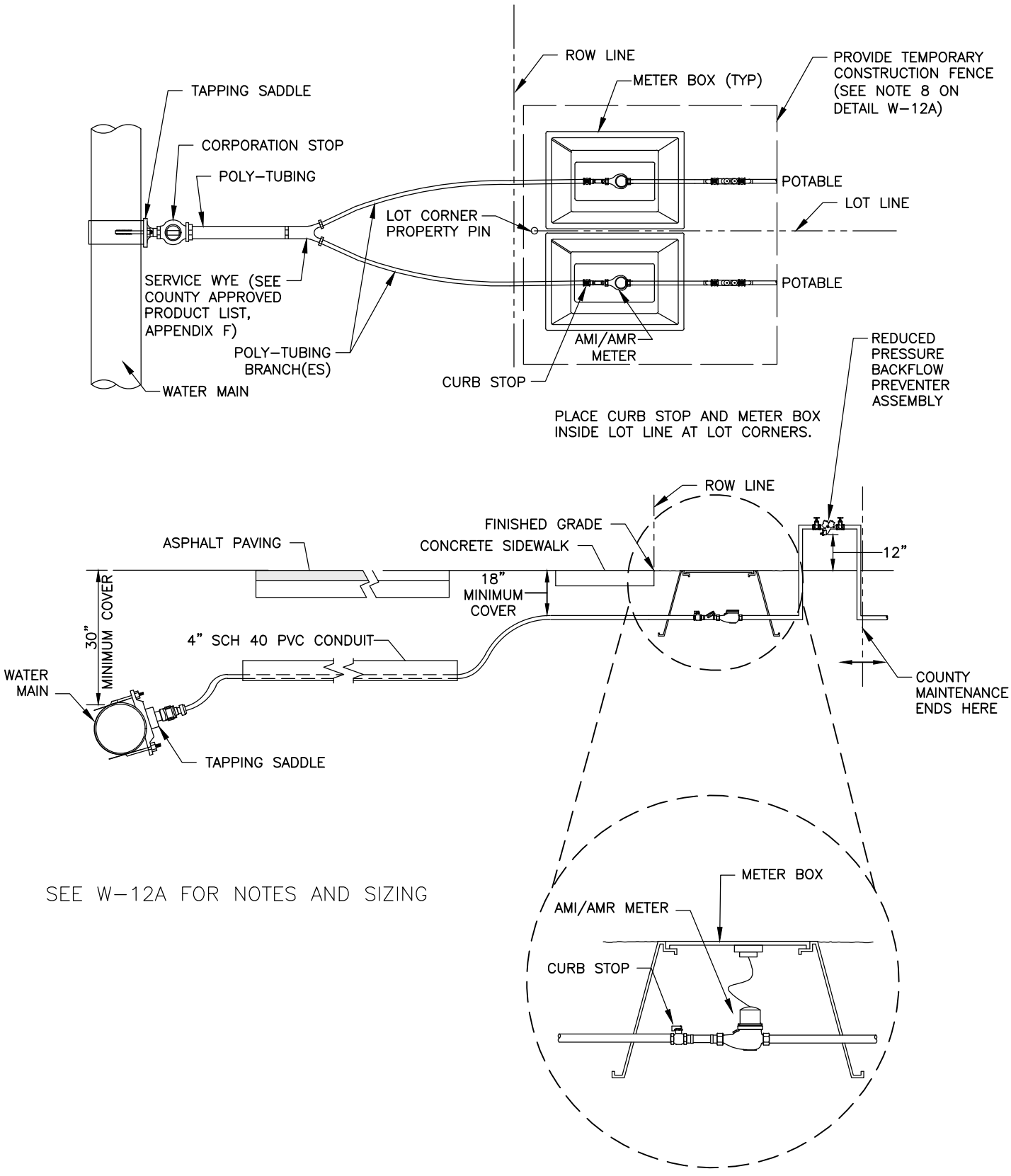
PERMANENT BACTERIAL SAMPLE POINT DETAIL

NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
W–6



SEE W-12A FOR NOTES AND SIZING

TYPICAL SHORT AND LONG SIDE WATER SERVICE METER SETTING DETAIL FOR CONNECTION TO WATER MAIN NTS	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. W-12

SERVICE CONNECTION SIZING CHART				
SINGLE SERVICE	CONNECTION TO MAIN	DOUBLE SERVICE	CONNECTION TO MAIN	BRANCH SIZE
$\frac{3}{4}$" METER	$1-\frac{1}{2}$"	(2) $\frac{3}{4}$" METERS	$1-\frac{1}{2}$"	1"
1" METER	$1-\frac{1}{2}$"	(2) 1" METERS	$1-\frac{1}{2}$"	1"
$1-\frac{1}{2}$" METER	$1-\frac{1}{2}$"			
2" METER	2"			

NOTES:

1. $1-\frac{1}{2}$" AND LARGER METERS SHALL BE SERVED BY SINGLE SERVICES ONLY.
2. WYE CONNECTORS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE USED FOR MULTI-SERVICE. SUCCESSIVE TAPS INTO WATER MAIN WILL BE NO CLOSER THAN 24" APART.
3. ALL CASING PIPE SHALL EXTEND A MINIMUM OF 5' BEYOND THE EDGE OF PAVEMENT, WITH A CASING DIAMETER TO BE NO LESS THAN 4". CONDUIT SHALL BE MARKED WITH A ELECTRONIC MARKER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
4. TAPPING SADDLE, CORPORATION STOP, POLY TUBING, CURB STOP, AND METER BOXES SHALL BE INSTALLED BY UNDERGROUND UTILITY CONTRACTOR AT THE TIME OF WATER MAIN INSTALLATION.
5. MATERIAL SPECIFICATIONS:
   A. TAPPING SADDLES SHALL BE DOUBLE STRAP BRASS OR DUCTILE IRON (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
   B. CORPORATION STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. OUTLET SHALL BE COMPRESSION TYPE POLYETHYLENE TUBE. COMPRESSION INSERT SHALL BE STAINLESS STEEL.
   C. CURB STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. INLET SHALL BE COMPRESSION JOINT. OUTLET SHALL BE SWIVEL NUT FOR METER CONNECTION.
   D. TUBING SHALL BE POLYETHYLENE, PE4710, (AWWA C-901, DR 9) AND BLUE IN COLOR.
6. ALL PLANTINGS SHALL BE A MINIMUM 3' FROM METER BOX, AND SHALL PROVIDE A 3' ACCESS OPENING.
7. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61 AND THE REDUCTION OF LEAD IN DRINKING WATER ACT AMENDING THE SAFE DRINKING WATER ACT.
8. A TEMPORARY CONSTRUCTION FENCE SHALL BE INSTALLED AT WATER METER SETTINGS UNTIL BUILDING CERTIFICATE OF OCCUPANCY OR INSTALLATION OF SOD. FENCE TO BE 3' IN HEIGHT AND OFFSET 3' FROM ASSEMBLY.

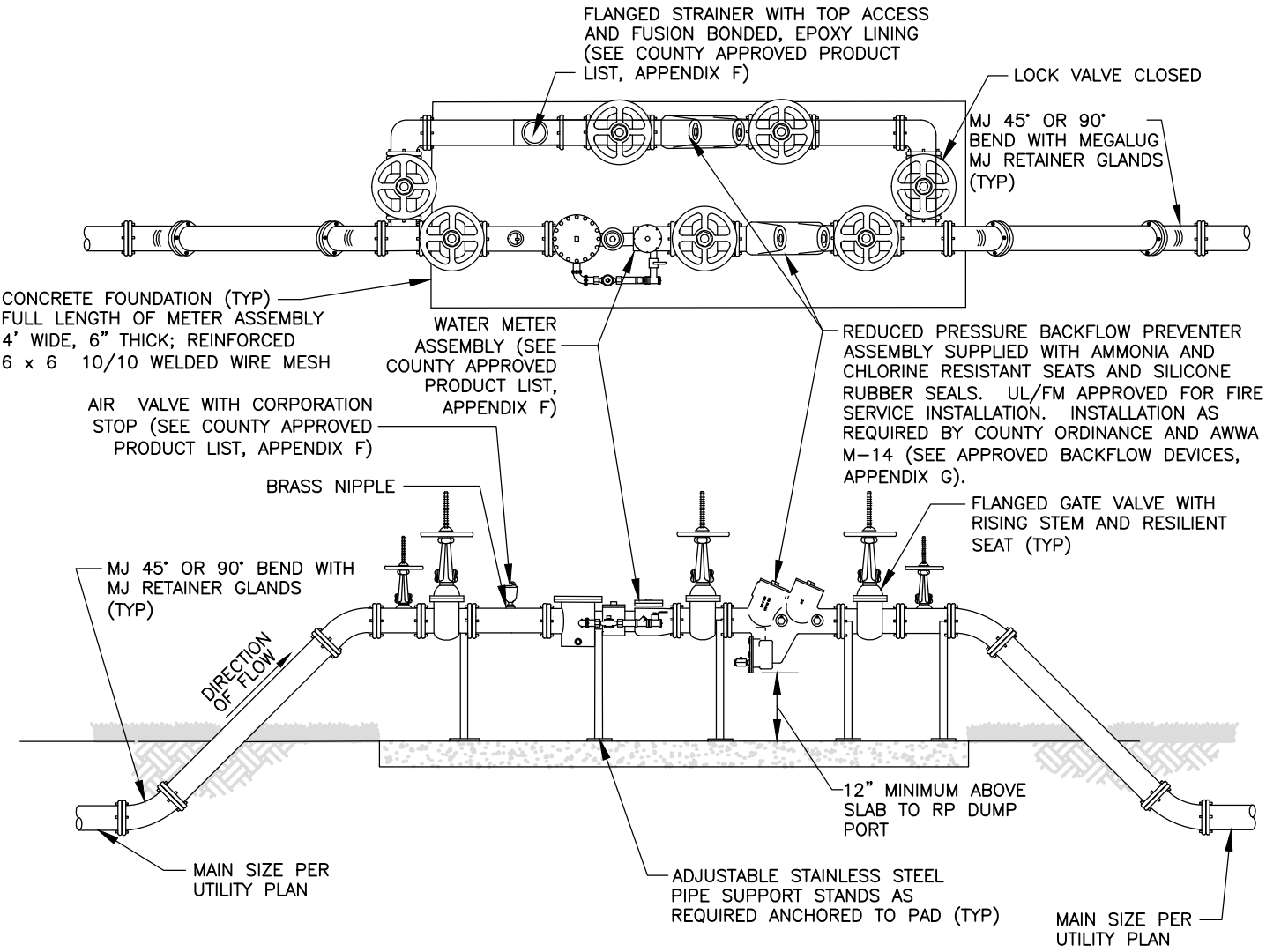
REVISED DETAIL

SERVICE CONNECTION SIZING CHART				
SINGLE SERVICE	CONNECTION TO MAIN	DOUBLE SERVICE	CONNECTION TO MAIN	BRANCH SIZE
$\frac{3}{4}$" METER	1–$\frac{1}{2}$"	(2) $\frac{3}{4}$" METERS	1–$\frac{1}{2}$"	1"
1" METER	1–$\frac{1}{2}$"	(2) 1" METERS	1–$\frac{1}{2}$"	1"
1–$\frac{1}{2}$" METER	1–$\frac{1}{2}$"			
2" METER	2"			

NOTES:

1. 1–$\frac{1}{2}$" AND LARGER METERS SHALL BE SERVED BY SINGLE SERVICES ONLY.
2. WYE CONNECTORS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE USED FOR MULTI–SERVICE. SUCCESSIVE TAPS INTO WATER MAIN WILL BE NO CLOSER THAN 24" APART.
3. ALL CASING PIPE SHALL EXTEND A MINIMUM OF 5' BEYOND THE EDGE OF PAVEMENT, WITH A CASING DIAMETER TO BE NO LESS THAN 4". CONDUIT SHALL BE MARKED WITH A ELECTRONIC MARKER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
4. TAPPING SADDLE, CORPORATION STOP, POLY TUBING, CURB STOP, AND METER BOXES SHALL BE INSTALLED BY UNDERGROUND UTILITY CONTRACTOR AT THE TIME OF WATER MAIN INSTALLATION.
5. MATERIAL SPECIFICATIONS:
   A. TAPPING SADDLES SHALL BE DOUBLE STRAP BRASS OR DUCTILE IRON (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
   B. CORPORATION STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. OUTLET SHALL BE COMPRESSION TYPE POLYETHYLENE TUBE. COMPRESSION INSERT SHALL BE STAINLESS STEEL.
   C. CURB STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. INLET SHALL BE COMPRESSION JOINT. OUTLET SHALL BE SWIVEL NUT FOR METER CONNECTION.
   D. TUBING SHALL BE POLYETHYLENE, PE4710, (AWWA C–901, DR 9) AND BLUE IN COLOR.
6. ALL PLANTINGS SHALL BE A MINIMUM 3' FROM METER BOX, AND SHALL PROVIDE A 3' ACCESS OPENING.
7. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61 AND THE REDUCTION OF LEAD IN DRINKING WATER ACT AMENDING THE SAFE DRINKING WATER ACT.
8. A TEMPORARY CONSTRUCTION FENCE SHALL BE INSTALLED AT WATER METER SETTINGS UNTIL BUILDING CERTIFICATE OF OCCUPANCY OR INSTALLATION OF SOD. THE EXISTING TEMPORARY CONSTRUCTION FENCE SHALL BE MODIFIED AS NECESSITATED BY LOT DEVELOPMENT. FENCE TO BE 3' IN HEIGHT AND OFFSET 3' FROM ASSEMBLY.

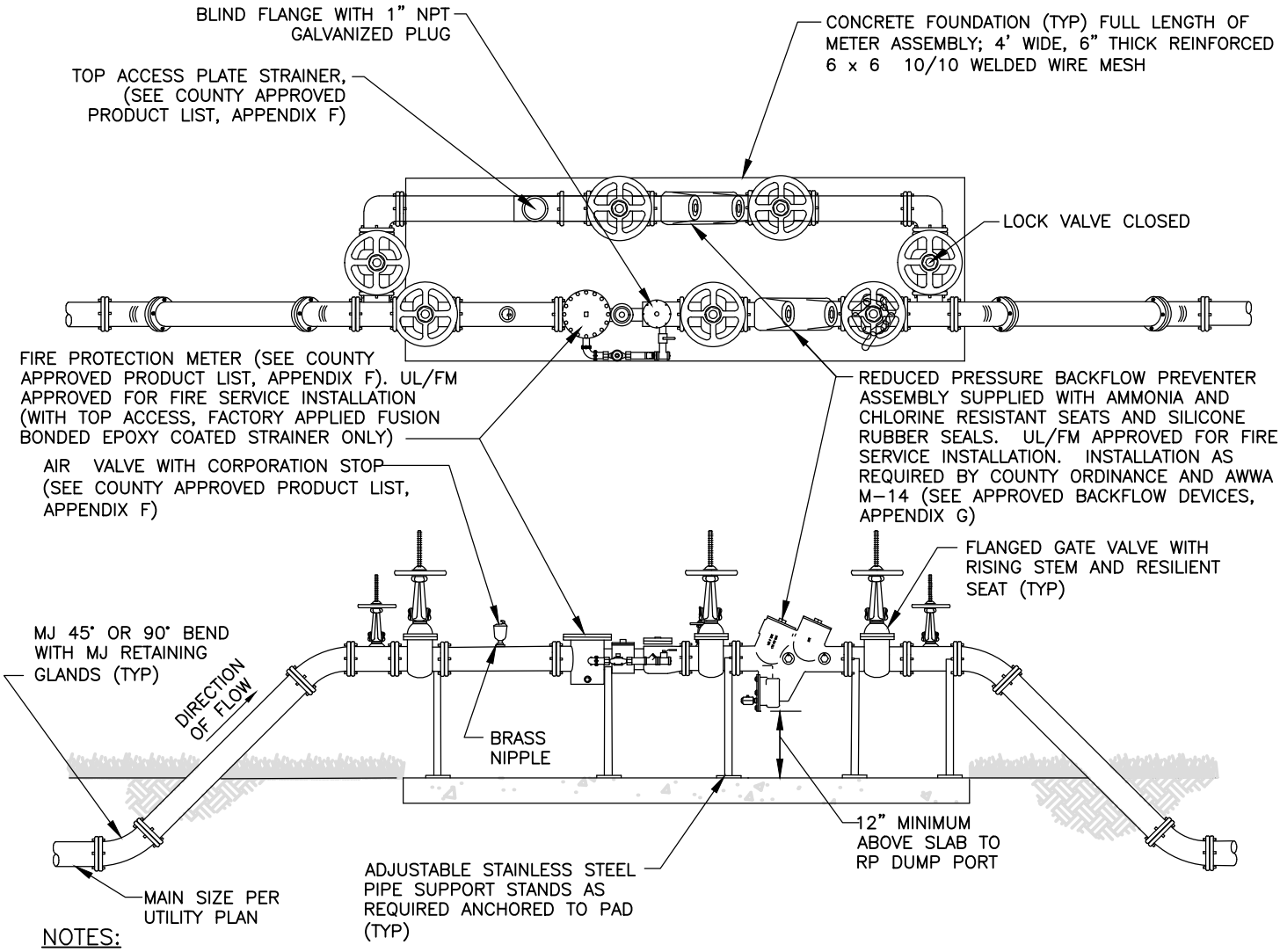
SERVICE CONNECTION SIZING CHART AND NOTES NTS	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. W–12A



NOTES:

1. ALL ABOVE GROUND PIPES WILL BE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND METER. LOCATION TO BE FIELD DETERMINED BY THE ENGINEER OR HIS DESIGNEE.
3. THIS ASSEMBLY IS PERMITTED FOR POTABLE SERVICE ONLY.
4. A FULL SIZE BYPASS SHALL BE INSTALLED TO PREVENT A REDUCTION IN FLOW DURING PERIODIC TESTING.
5. BACKFLOW UNITS SHALL BE TESTED BY CERTIFIED BACKFLOW TECHNICIAN WITH TEST RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT FOR CERTIFICATION AND APPROVAL.
6. COUNTY WILL REQUIRE DEDICATION OF ALL MATERIALS AND EQUIPMENT FROM THE METER ASSEMBLY BACK TO THE COUNTY WATER MAIN.
7. ALL PLANTINGS SHALL BE A MINIMUM OF 1.5' FROM EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
8. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
9. MAINTENANCE ACCESS SHALL BE INCLUDED IN COUNTY UTILITY EASEMENT OR RIGHT OF WAY (SEE DETAIL W-14A FOR CORRECT DRIVEWAY ORIENTATION).

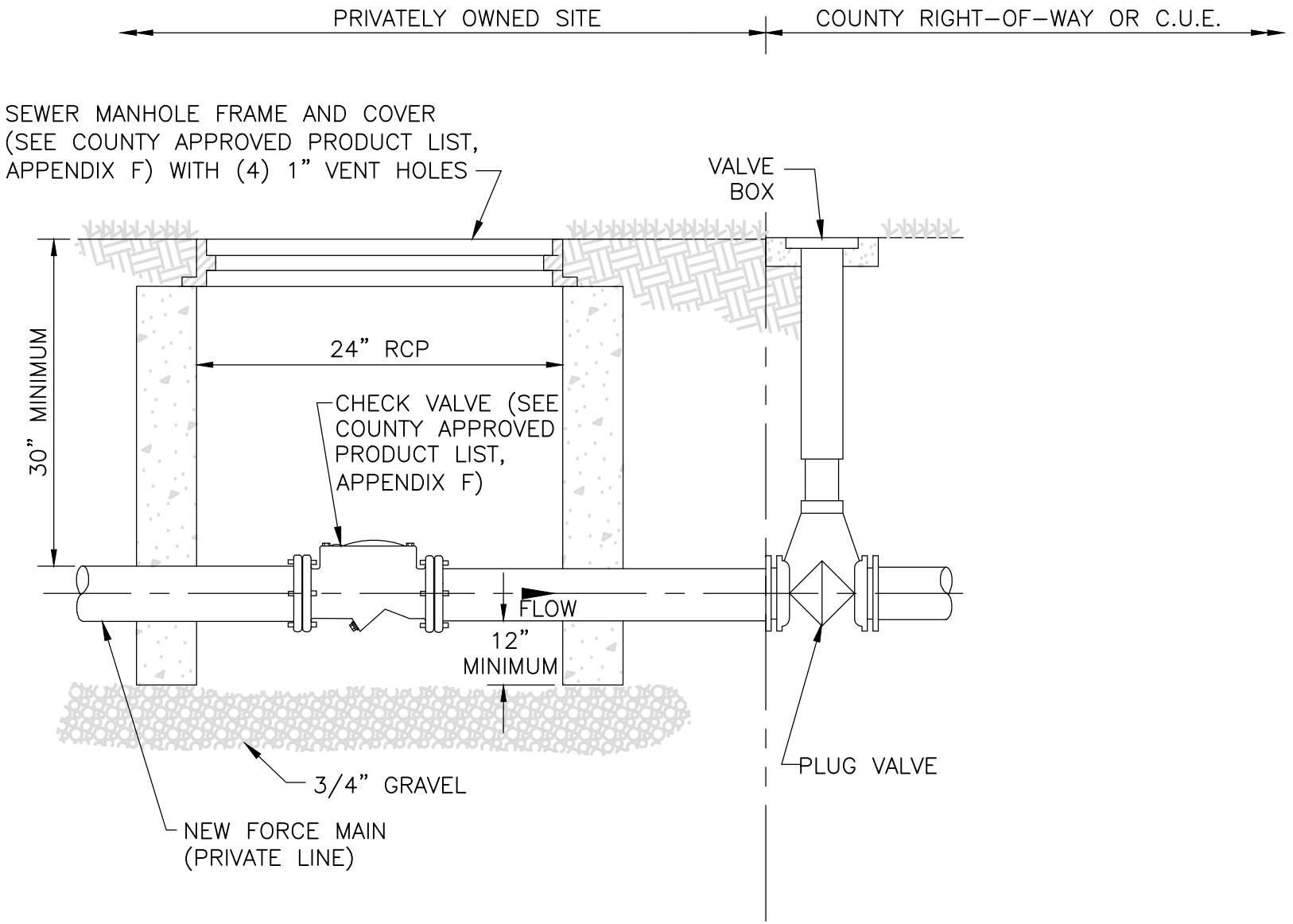
3" AND OVER POTABLE WATER METER ASSEMBLY DETAIL	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. W-13
NTS			



NOTES:

1. ALL ABOVE GROUND PIPE WILL HAVE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND METER. CONFIGURATION TO BE ILLUSTRATED ON CONSTRUCTION DOCUMENTS SUBMITTED FOR REVIEW AND APPROVAL.
3. THIS ASSEMBLY IS PERMITTED FOR COMBINATION FIRE AND POTABLE WATER SERVICE.
4. A FULL SIZE BYPASS SHALL BE INSTALLED TO PREVENT A REDUCTION IN FLOW DURING PERIODIC TESTING.
5. BACKFLOW DEVICE REQUIRES INITIAL CERTIFICATION BY AN APPROVED CERTIFIED TESTER WITH RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT.
6. COUNTY REQUIRES DEDICATION OF ALL ABOVE GROUND MATERIAL AND EQUIPMENT FROM THE METER ASSEMBLY BACK TO THE COUNTY MAIN.
7. ALL PLANTING SHALL BE A MINIMUM OF 1.5' FROM THE EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
8. STRAINER SHALL HAVE FUSION-BONDED EPOXY COATING.
9. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
10. MAINTENANCE ACCESS SHALL BE INCLUDED IN COUNTY UTILITY EASEMENT OR RIGHT OR RIGHT OF WAY (SEE DETAIL W-14A FOR CORRECT DRIVEWAY ORIENTATION),

4" AND OVER POTABLE-WATER FIRE AND DOMESTIC METER ASSEMBLY DETAIL NTS	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. W-14



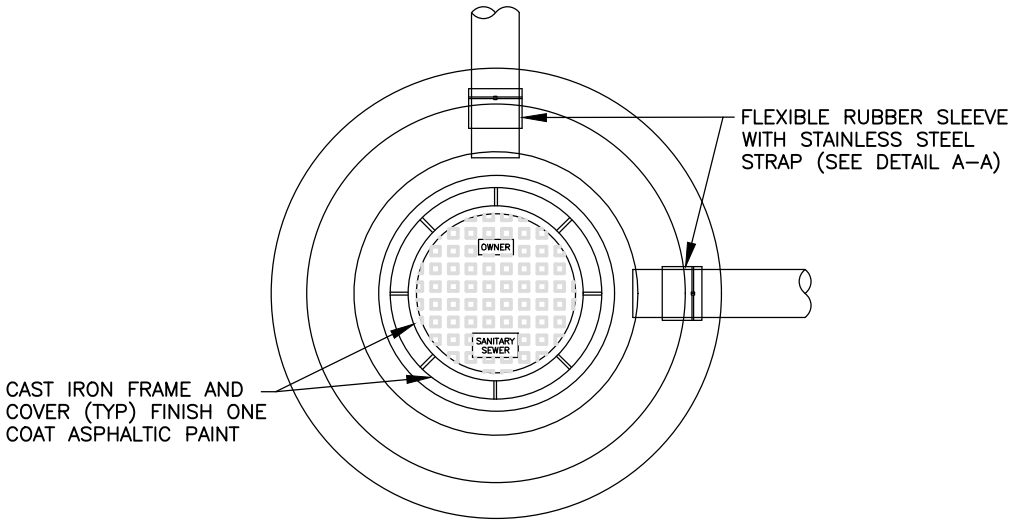
PRIVATE FORCE MAIN CONNECTION TO COUNTY FORCE MAIN DETAIL

NTS

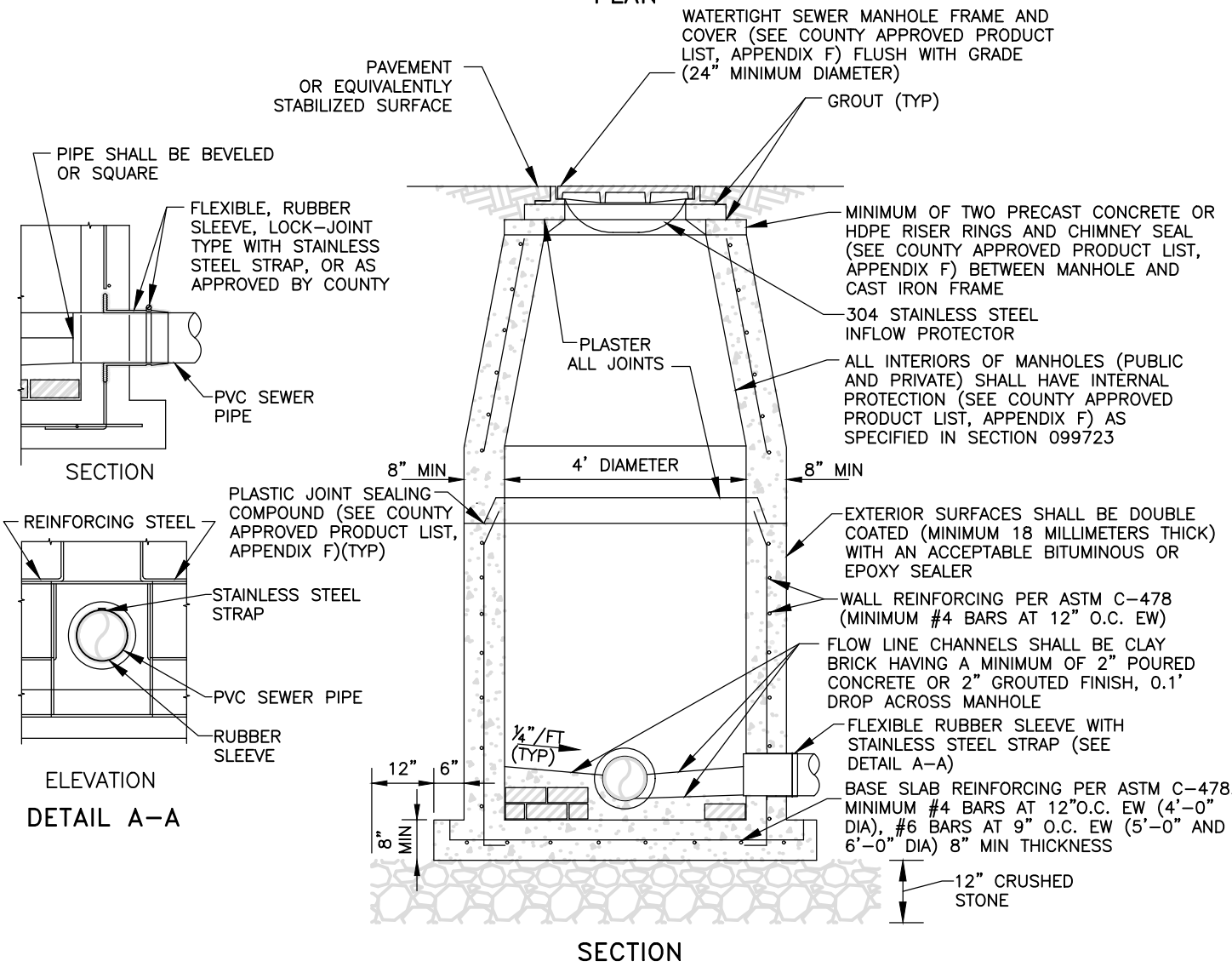
REVISION DATE: JULY 2018

Collier County

SHEET NO. WW-2



PLAN



SECTION

ELEVATION

DETAIL A–A

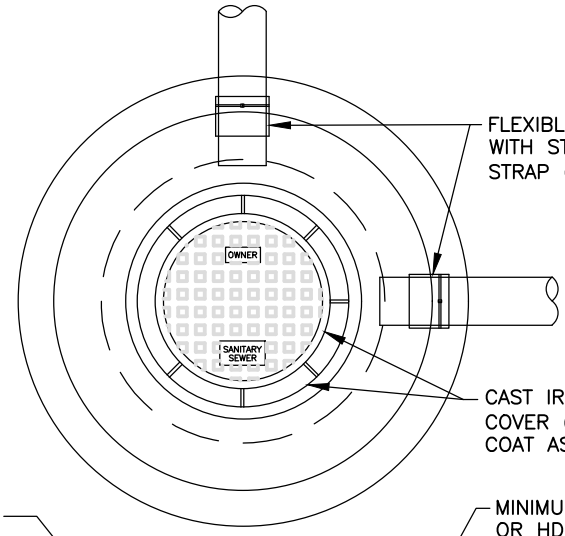
PRECAST REINFORCED CONCRETE MANHOLE DETAIL

NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
WW–3



FLEXIBLE RUBBER SLEEVE WITH STAINLESS STEEL STRAP (SEE DETAIL A–A)

CAST IRON FRAME AND COVER (TYP) FINISH ONE COAT ASPHALTIC PAINT

PLAN

WATERTIGHT SEWER MANHOLE FRAME AND COVER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) FLUSH WITH GRADE (24" MINIMUM DIAMETER)

PAVEMENT

304 STAINLESS STEEL INFLOW PROTECTORS

TOP SLAB REINFORCING PER ASTM C–478 (MIN #4 BARS AT 12" O.C. EW). MIN 8" THICK.

ALL INTERIORS OF MANHOLES (PUBLIC AND PRIVATE) SHALL HAVE INTERNAL PROTECTION (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AS SPECIFIED IN SECTION 099723

MINIMUM OF TWO PRECAST CONCRETE OR HDPE RISER RINGS AND CHIMNEY SEAL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) BETWEEN MANHOLE AND CAST IRON FRAME

GROUT (TYP)

PLASTIC JOINT SEALING COMPOUND (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) KEYED (TYP)

EXTERIOR SURFACES SHALL BE DOUBLE COATED (MINIMUM 18 MILLIMETERS THICK) WITH AN ACCEPTABLE BITUMINOUS OR EPOXY SEALER

WALL REINFORCING PER ASTM C–478

FLOW LINE CHANNELS SHALL BE CLAY BRICK HAVING A MINIMUM OF 2" POURED CONCRETE OR 2" GROUTED FINISH, 0.1' DROP ACROSS MANHOLE

FLEXIBLE RUBBER SLEEVE WITH STAINLESS STEEL STRAP (SEE DETAIL A–A)

BASE SLAB REINFORCING PER ASTM C–478. MINIMUM #4 BARS AT 12"O.C. EW (4'–0" DIA), #6 BARS AT 9" O.C. EW (5'–0" AND 6'–0" DIA). 8" MIN THICKNESS.

12" CRUSHED STONE

8" MIN

8" MIN

12'

24"

12"

8" MIN

4' DIAMETER

VARIES

¼"/FT (TYP)

12"

6"

8" MIN

SECTION

PIPE SHALL BE BEVELED OR SQUARE

FLEXIBLE, RUBBER SLEEVE, LOCK–JOINT TYPE WITH STAINLESS STEEL STRAP, OR AS APPROVED BY COUNTY

PVC SEWER PIPE

SECTION

REINFORCING STEEL

STAINLESS STEEL STRAP

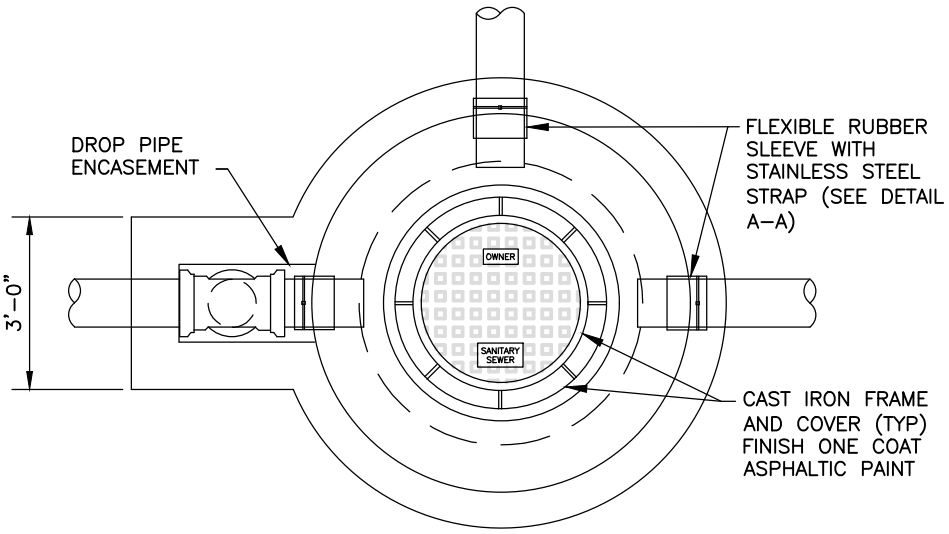
PVC SEWER PIPE

RUBBER SLEEVE

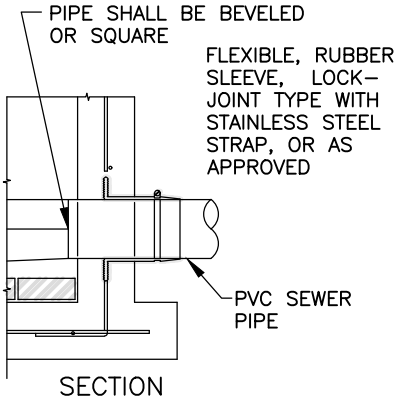
ELEVATION

DETAIL A–A

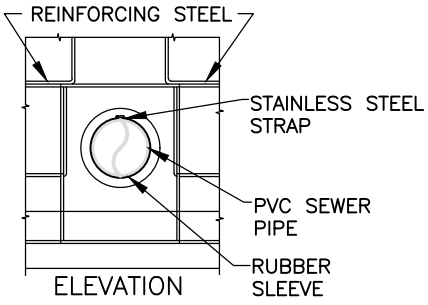
SHALLOW MANHOLE DETAIL	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. WW–4
NTS			



PLAN

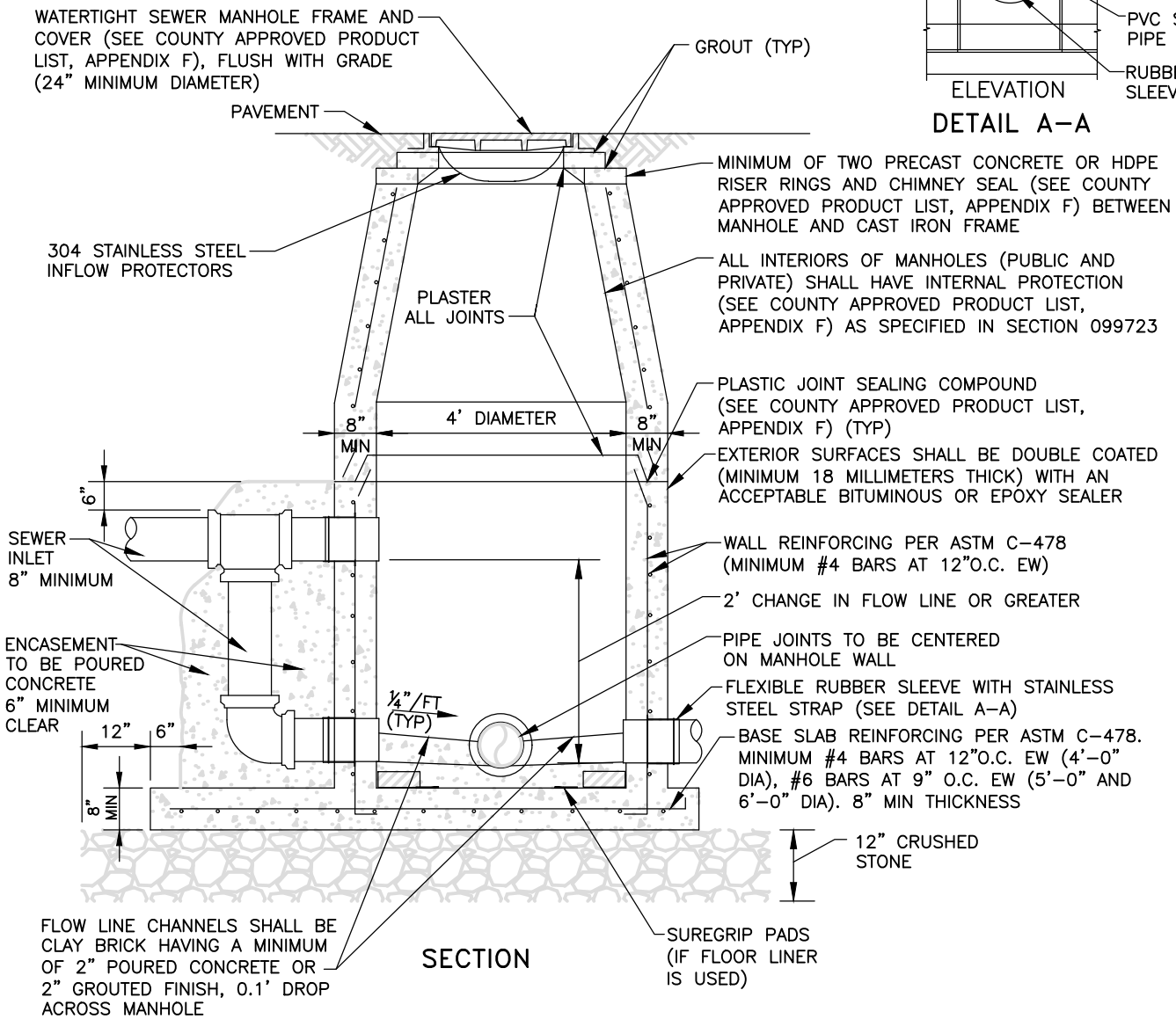


SECTION



ELEVATION

DETAIL A–A



SECTION

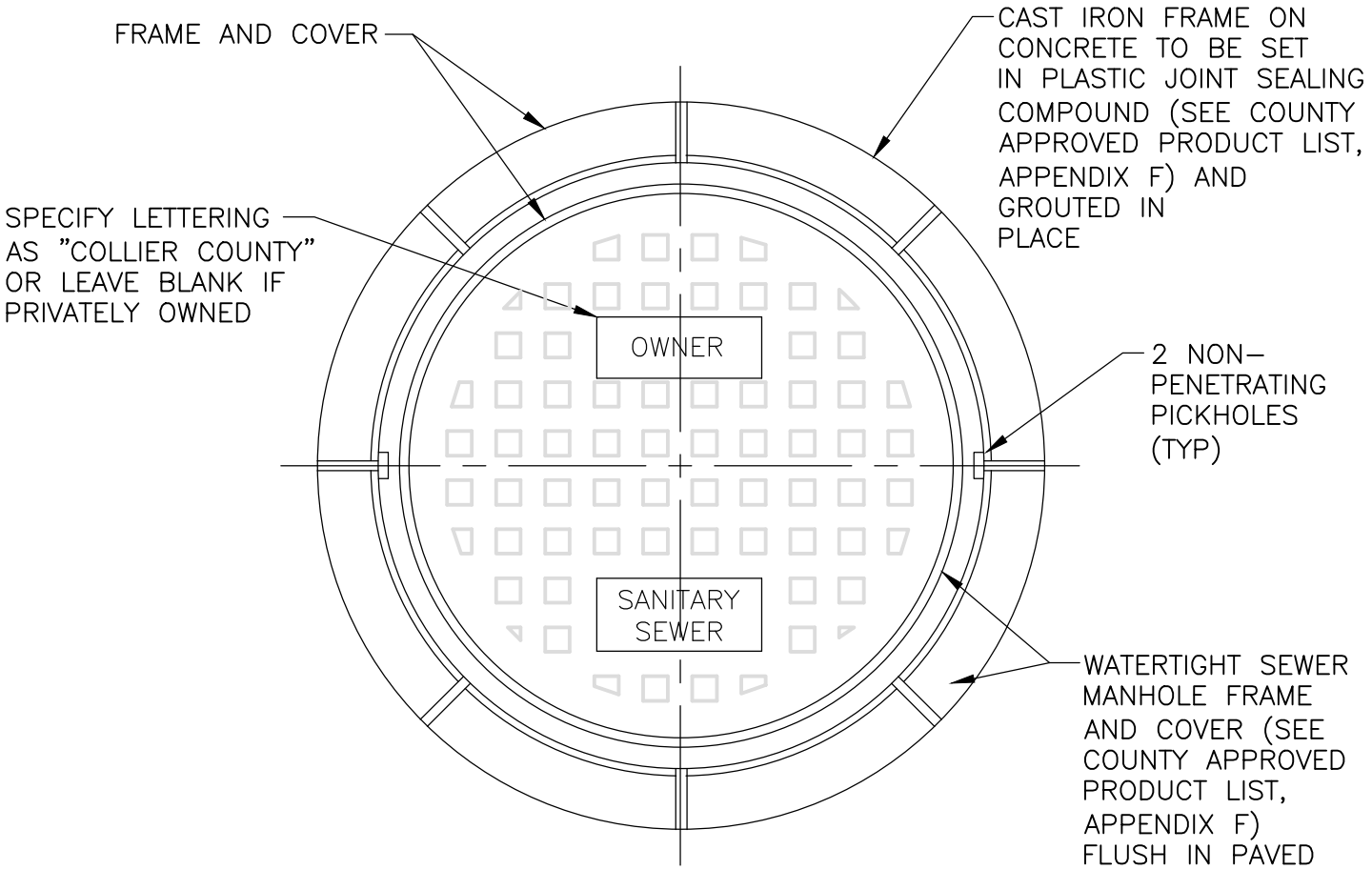
DROP MANHOLE DETAIL

NTS

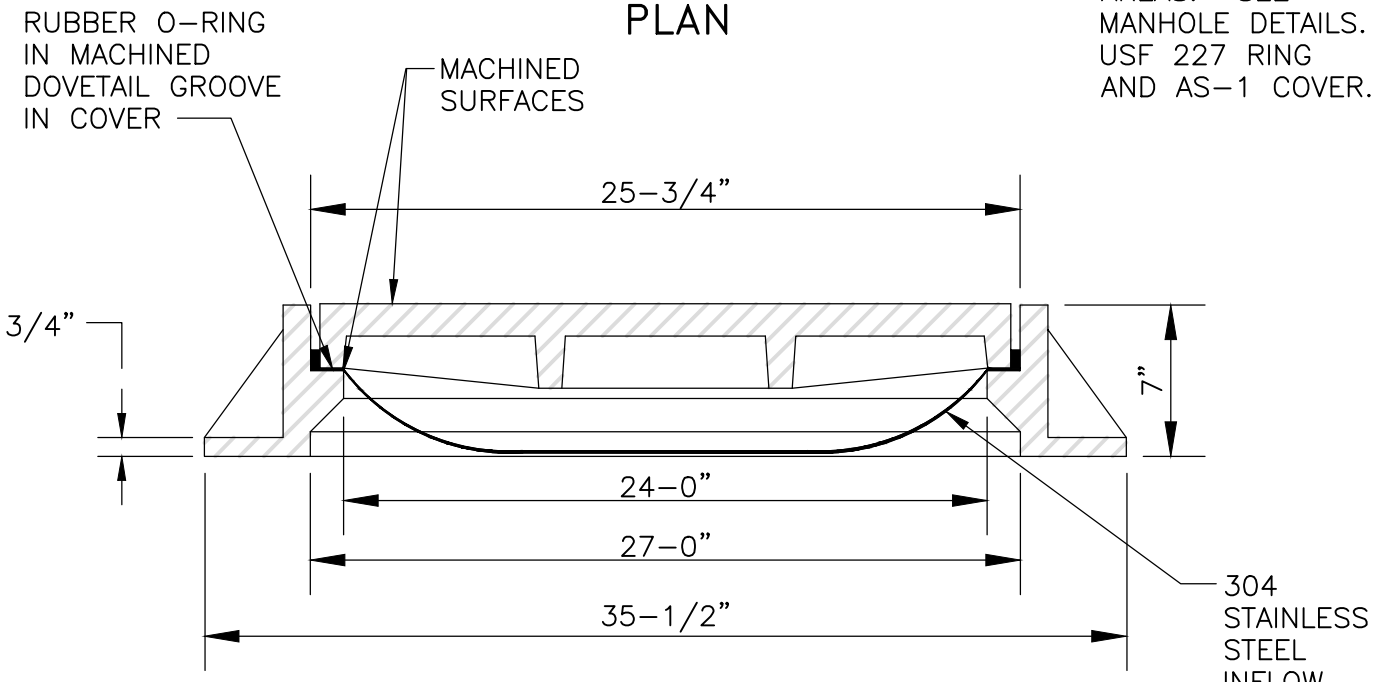
REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
WW–5



PLAN



SECTION

MANHOLE RING AND COVER DETAIL	REVISION DATE: JANUARY 2025	Collier County	SHEET NO. WW-6
NTS			

DIMENSION TABLE

(A)	WETWELL INSIDE DIAMETER	
(B)	DISTANCE B/W WETWELL FLOOR AND TOP OF DISCH. CONNECTION	
(C)	TOP OF WETWELL ELEVATION	
(D)	INFLUENT PIPE ELEV.	
(E)	HIGH WATER ALARM ELEV.	
(F)	LAG PUMP ON ELEV.	
(G)	LEAD PUMP ON ELEVATION	
(H)	ALL PUMPS OFF ELEVATION*	
(I)	TOP OF WETWELL FOOTING	
(K)	DIAMETER OF DISCHARGE RISER	
(L)	DIAMETER OF DISCHARGE FORCE MAIN	
(T)	THICKNESS OF FOOTING (MINIMUM 12")	

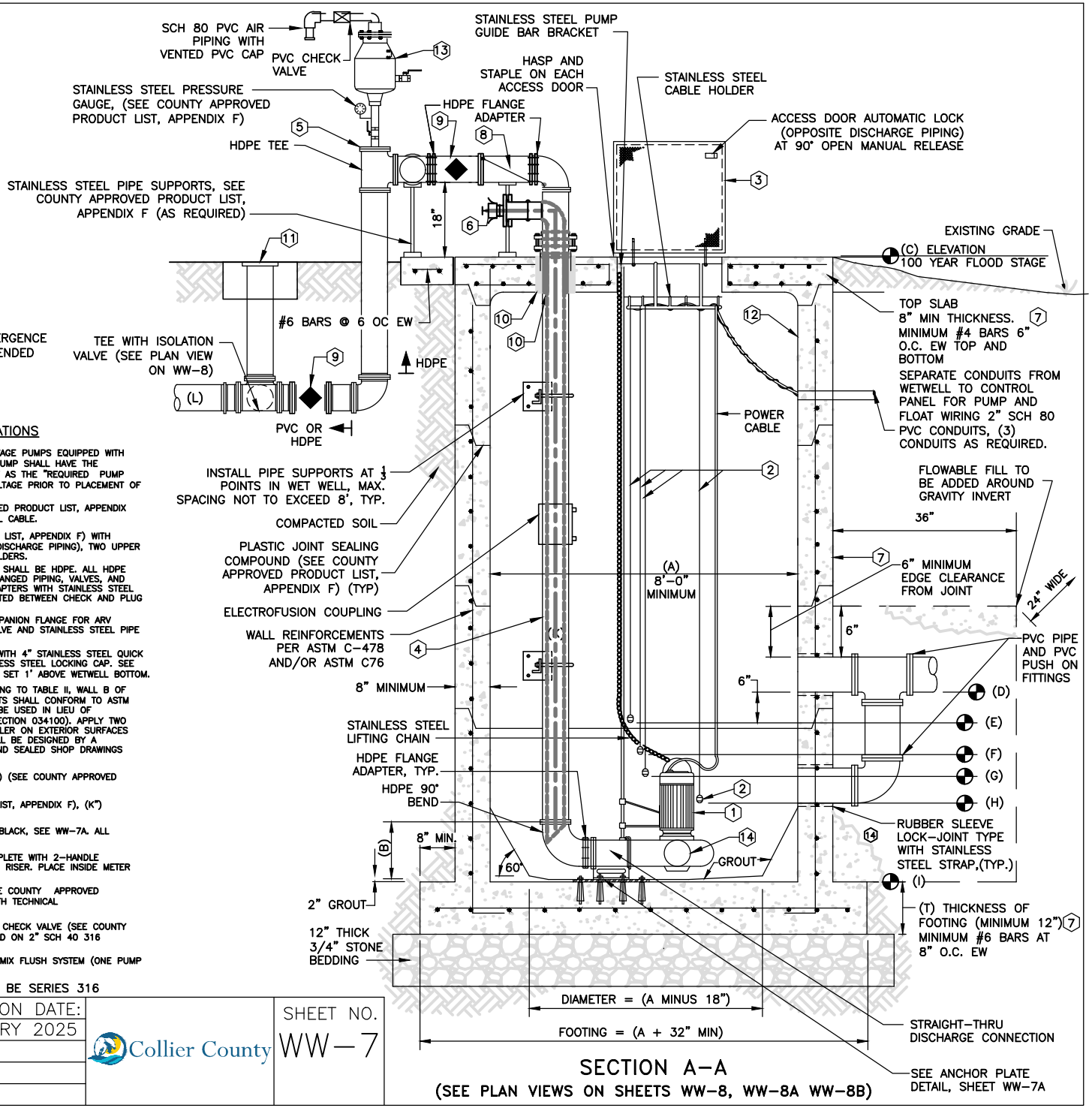
*SET ELEVATION H SO THAT THE MINIMUM SUBMERGENCE OF THE PUMPS IS 18", OR THE DEPTH RECOMMENDED BY THE MANUFACTURER, WHICHEVER IS GREATER

EQUIPMENT SPECIFICATIONS

MARK

1. DUPLEX ___ INCH DISCHARGE SUBMERSIBLE SEWAGE PUMPS EQUIPPED WITH 230/460 VOLT OR 480 VOLT MOTORS. EACH PUMP SHALL HAVE THE CAPACITY AND RANGE SET FORTH ON THIS SHEET AS THE "REQUIRED PUMP PERFORMANCE CURVE". VERIFY PUMP LOCAL VOLTAGE PRIOR TO PLACEMENT OF PUMP ORDER.
2. LIQUID LEVEL REGULATORS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), EACH PROVIDED WITH 60 FEET OF ELECTRICAL CABLE.
3. ACCESS DOOR (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH HINGED AND HASP EQUIPPED COVER (OPPOSITE DISCHARGE PIPING), TWO UPPER GUIDE HOLDERS, CHAIN HOLDERS AND CABLE HOLDERS.
4. ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACERS PERMITTED BETWEEN CHECK AND PLUG VALVES. SEE SPECIFICATIONS SECTION 330502.
5. TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND STAINLESS STEEL PIPE NIPPLES TO CONNECT TO ARV.
6. COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK CONNECT COUPLING UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL. SUCTION PIPE TO BE SET 1' ABOVE WETWELL BOTTOM.
7. WETWELL, REINFORCED CONCRETE PIPE CONFORMING TO TABLE II, WALL B OF ASTM C-76 AND/OR ASTM C-478. O-RING JOINTS SHALL CONFORM TO ASTM C-443 WETWELL CONSTRUCTION. RAM-NEK MAY BE USED IN LIEU OF O-RING RUBBER GASKETS (SEE SPECIFICATION SECTION 034100). APPLY TWO COATS OF APPROVED BITUMINOUS OR EPOXY SEALER ON EXTERIOR SURFACES OF THE WETWELL. PUMP STATION WET WELL SHALL BE DESIGNED BY A FLORIDA PROFESSIONAL ENGINEER AND SIGNED AND SEALED SHOP DRAWINGS SHALL BE SUBMITTED.
8. CHECK VALVE WITH EXTERNAL WEIGHT/LEVER, (K") (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
9. PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), (K") COMPLETE WITH WRENCH.
10. STAINLESS STEEL WALL PENETRATION ASSEMBLY, BLACK, SEE WW-7A. ALL PENETRATIONS SHALL BE CORED IN THE FIELD.
11. 4" STAINLESS STEEL QUICK-COUPLING UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
12. INTERIOR SHALL HAVE INTERNAL PROTECTION (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 099723.
13. 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" SCH 40 316 STAINLESS STEEL PIPING.
14. VOLUTE PORT WITH BOLTED COVER FOR FUTURE MIX FLUSH SYSTEM (ONE PUMP ONLY).

NOTE: ALL STAINLESS STEEL SHALL BE SERIES 316



PUMP STATION DETAIL - PROFILE

NTS

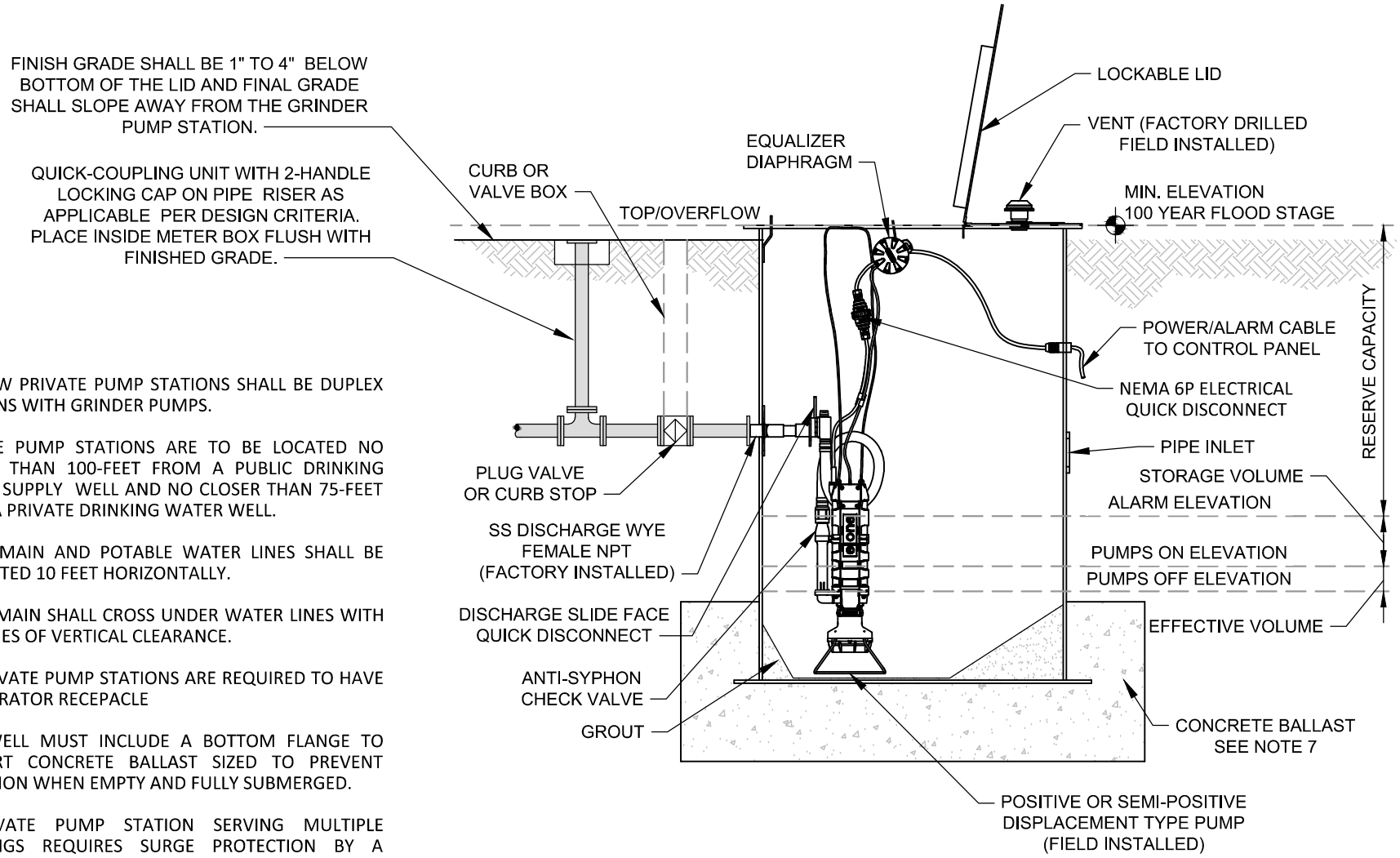
REVISION DATE: JANUARY 2025

Collier County

SHEET NO. WW-7

SECTION A-A

(SEE PLAN VIEWS ON SHEETS WW-8, WW-8A WW-8B)



NOTES:

1. ALL NEW PRIVATE PUMP STATIONS SHALL BE DUPLEX STATIONS WITH GRINDER PUMPS.
2. PRIVATE PUMP STATIONS ARE TO BE LOCATED NO CLOSER THAN 100-FEET FROM A PUBLIC DRINKING WATER SUPPLY WELL AND NO CLOSER THAN 75-FEET FROM A PRIVATE DRINKING WATER WELL.
3. FORCE MAIN AND POTABLE WATER LINES SHALL BE SEPARATED 10 FEET HORIZONTALLY.
4. FORCE MAIN SHALL CROSS UNDER WATER LINES WITH 18 INCHES OF VERTICAL CLEARANCE.
5. ALL PRIVATE PUMP STATIONS ARE REQUIRED TO HAVE A GENERATOR RECEPACLE
6. WET WELL MUST INCLUDE A BOTTOM FLANGE TO SUPPORT CONCRETE BALLAST SIZED TO PREVENT FLOTATION WHEN EMPTY AND FULLY SUBMERGED.
7. A PRIVATE PUMP STATION SERVING MULTIPLE BUILDINGS REQUIRES SURGE PROTECTION BY A LIGHTING ARRESTOR, SOURCE CAPACITOR, OR OTHER SIMILAR PROTECTION DEVICE, AND PHASE PROTECTION.
8. SEE PRIVATE PUMP STATIONS PANEL SPECIFICATION SECTION 333200 2.2J FOR PANEL REQUIREMENTS.

PRIVATE GRINDER PUMP STATION DETAIL

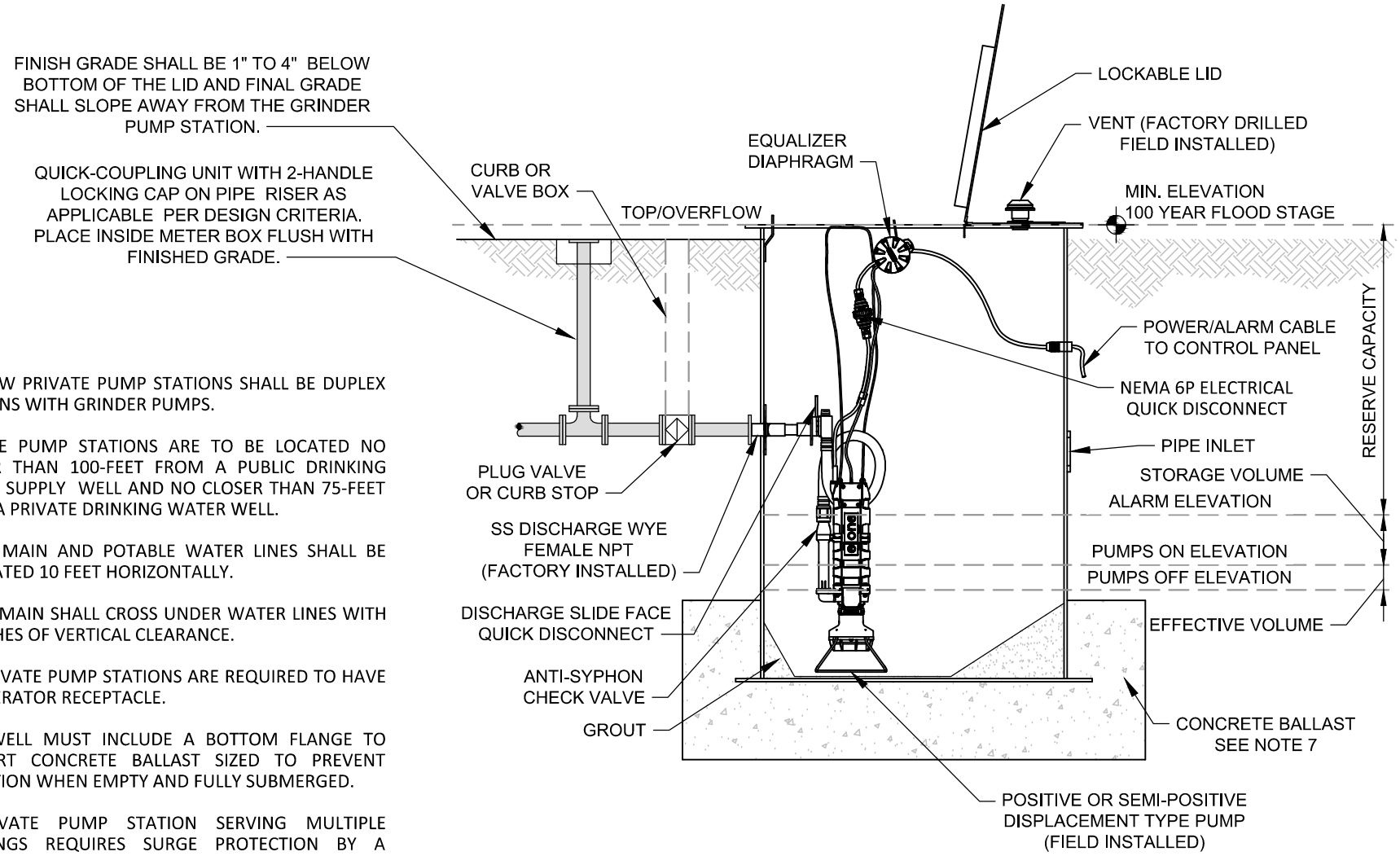
NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
WW-7D

REVISED DETAIL



NOTES:

1. ALL NEW PRIVATE PUMP STATIONS SHALL BE DUPLEX STATIONS WITH GRINDER PUMPS.
2. PRIVATE PUMP STATIONS ARE TO BE LOCATED NO CLOSER THAN 100-FEET FROM A PUBLIC DRINKING WATER SUPPLY WELL AND NO CLOSER THAN 75-FEET FROM A PRIVATE DRINKING WATER WELL.
3. FORCE MAIN AND POTABLE WATER LINES SHALL BE SEPARATED 10 FEET HORIZONTALLY.
4. FORCE MAIN SHALL CROSS UNDER WATER LINES WITH 18 INCHES OF VERTICAL CLEARANCE.
5. ALL PRIVATE PUMP STATIONS ARE REQUIRED TO HAVE A GENERATOR RECEPTACLE.
6. WET WELL MUST INCLUDE A BOTTOM FLANGE TO SUPPORT CONCRETE BALLAST SIZED TO PREVENT FLOTATION WHEN EMPTY AND FULLY SUBMERGED.
7. A PRIVATE PUMP STATION SERVING MULTIPLE BUILDINGS REQUIRES SURGE PROTECTION BY A LIGHTING ARRESTOR, SOURCE CAPACITOR, OR OTHER SIMILAR PROTECTION DEVICE, AND PHASE PROTECTION.
8. SEE PRIVATE PUMP STATIONS PANEL SPECIFICATION SECTION 333200 2.2J FOR PANEL REQUIREMENTS.

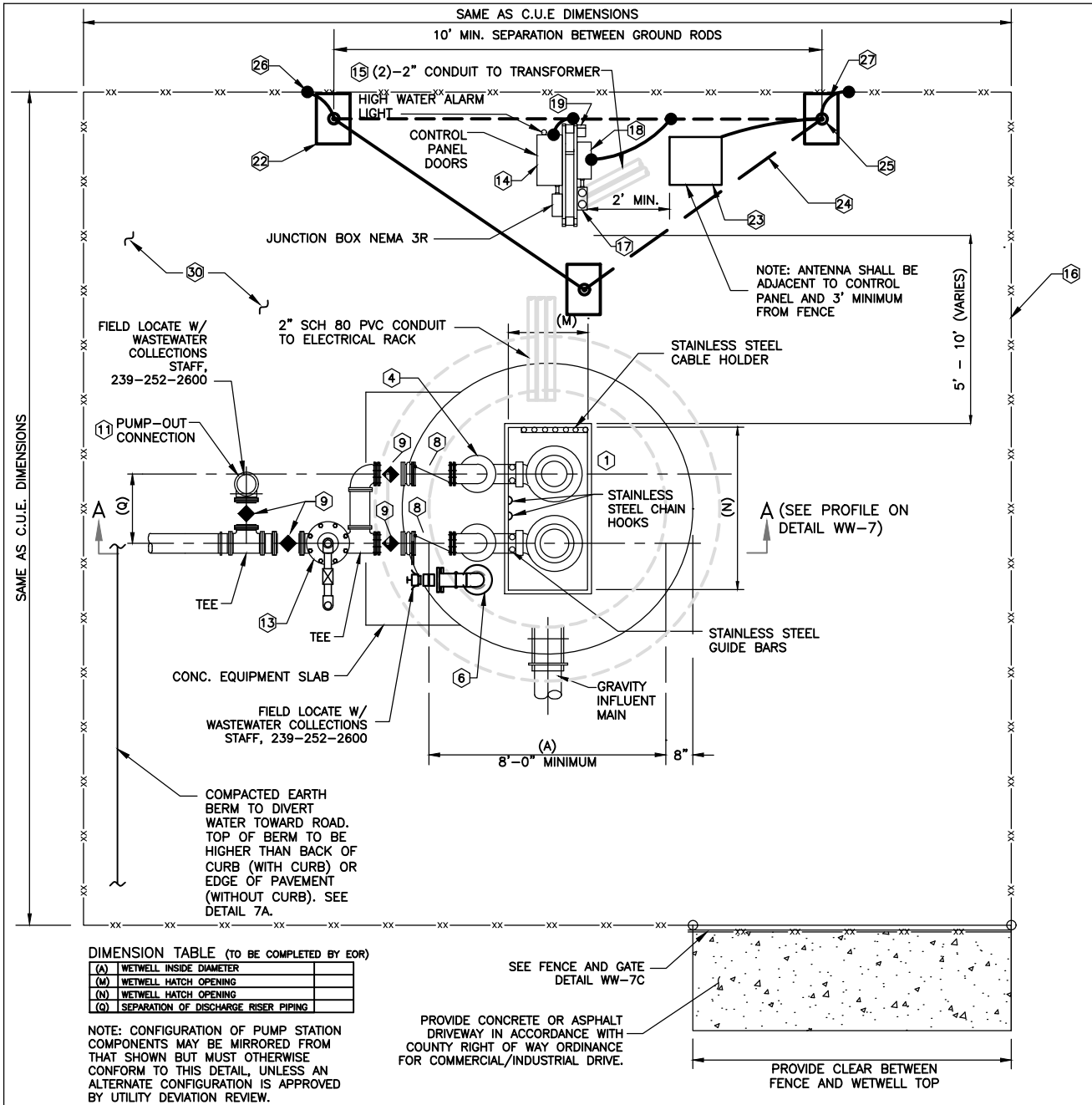
PRIVATE GRINDER PUMP STATION DETAIL

NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
WW-7D



DIMENSION TABLE (TO BE COMPLETED BY EOR)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
(N)	WETWELL HATCH OPENING	
(Q)	SEPARATION OF DISCHARGE RISER PIPING	

NOTE: CONFIGURATION OF PUMP STATION COMPONENTS MAY BE MIRRORED FROM THAT SHOWN BUT MUST OTHERWISE CONFORM TO THIS DETAIL, UNLESS AN ALTERNATE CONFIGURATION IS APPROVED BY UTILITY DEVIATION REVIEW.

EQUIPMENT SPECIFICATIONS

MARK

1. ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD. FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
2. NOT USED
3. NOT USED
4. ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACER PERMITTED BETWEEN CHECK AND PLUG VALVES. SEE SPECIFICATIONS SECTION 330502.
5. TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND PIPE NIPPLES TO CONNECT TO ARV.
6. COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK-CONNECT COUPLING UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL.
7. NOT USED
8. CHECK VALVE WITH EXTERNAL WEIGHT/LEVER, (K") (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
9. PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
10. NOT USED
11. 4" QUICK-COUPLING UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
12. NOT USED
13. 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" STAINLESS STEEL PIPING.
14. PUMP CONTROL PANEL: SEE TECHNICAL SPECIFICATIONS SECTION 333200, 2.1.H. AND DETAIL WW-9. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
15. ALL ELECTRICAL SERVICE TRANSFORMERS SHALL BE INSTALLED OUTSIDE OF PUMP STATION FENCE LINE
16. 6' HIGH CHAIN LINK FENCE AS PER COUNTY STANDARDS. FENCE SHALL HAVE GREEN SLATS TO SCREEN PUMP STATION FROM VIEW.
17. POWER METER
18. SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
19. GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF AT (239)-252-2600. SEE DETAIL WW-9.
20. NOT USED
21. NOT USED
22. SEE GROUND TEST WELL DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
23. TELEMETRY ANTENNA, SEE WW-17. PROVIDE NEW ANTENNA LIGHTNING ROD, CONDUIT, AND DOWN CONDUCTOR PER DETAIL ON WW-17. ROUTE LIGHTNING ROD DOWN CONDUCTOR TO GROUND ROD AT BOTTOM OF TOWER. BOND GROUND ROD TO STATION GROUND MAT.
24. #4/0 BARE COPPER. SEE GROUND MAT DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
25. 3/4" X 20' COPPER-CLAD GROUND ROD (TYP.)
26. EXOTHERMICALLY WELDED CONNECTION (TYP.)
27. #2 SOLID TINNED COPPER JUMPER (TYP.)
28. NOT USED
29. NOT USED
30. GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
31. NOT USED

PUMP STATION DETAIL - PLAN

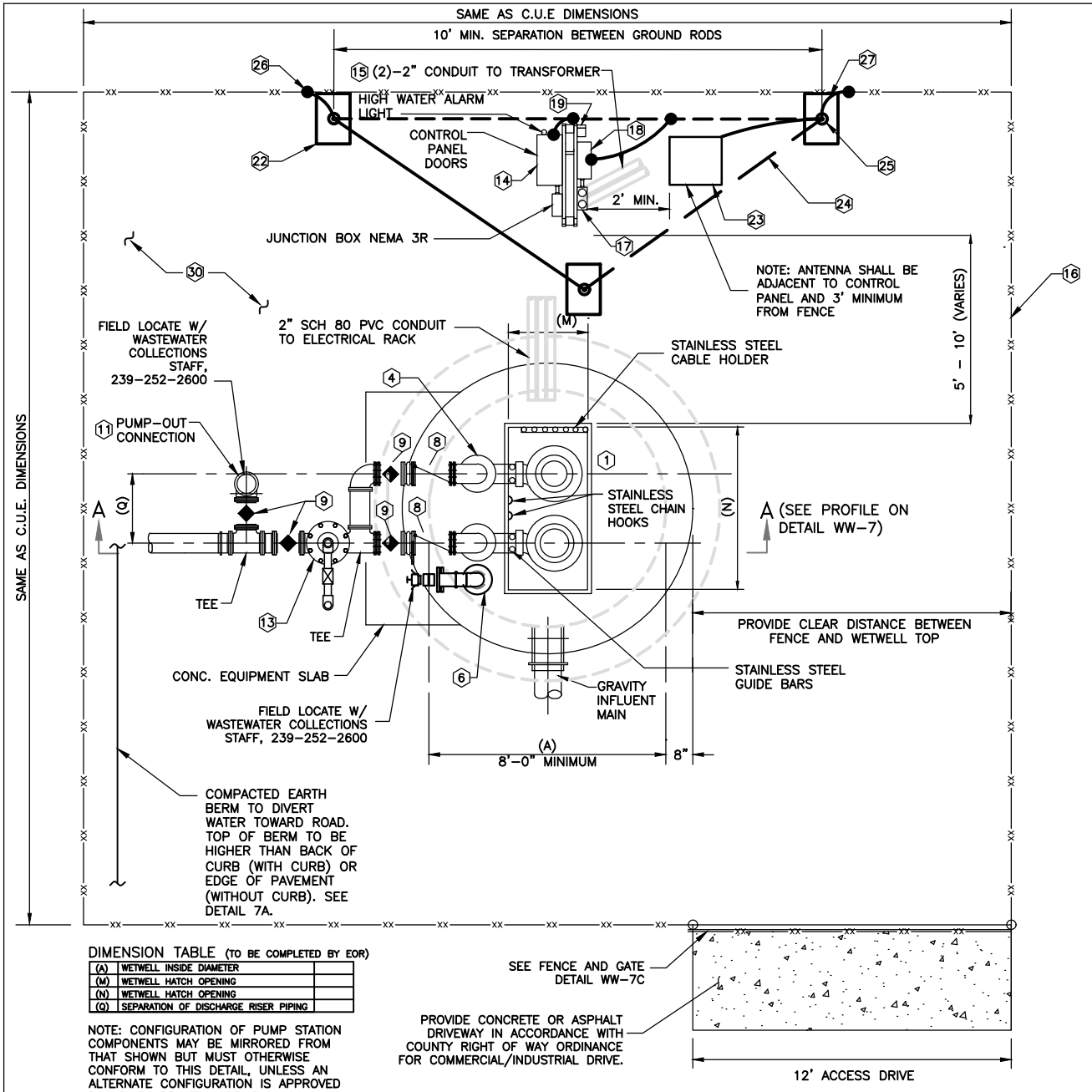
NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
WW-8

REVISED DETAIL



DIMENSION TABLE (TO BE COMPLETED BY EOR)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
(N)	WETWELL HATCH OPENING	
(Q)	SEPARATION OF DISCHARGE RISER PIPING	

NOTE: CONFIGURATION OF PUMP STATION COMPONENTS MAY BE MIRRORED FROM THAT SHOWN BUT MUST OTHERWISE CONFORM TO THIS DETAIL, UNLESS AN ALTERNATE CONFIGURATION IS APPROVED BY UTILITY DEVIATION REVIEW.

EQUIPMENT SPECIFICATIONS

MARK

1. ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD. FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
2. NOT USED
3. NOT USED
4. ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACER PERMITTED BETWEEN CHECK AND PLUG VALVES. SEE SPECIFICATIONS SECTION 330502.
5. TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND PIPE NIPPLES TO CONNECT TO ARV.
6. COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK-CONNECT COUPLING UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL.
7. NOT USED
8. CHECK VALVE WITH EXTERNAL WEIGHT/LEVER, (K") (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
9. PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
10. NOT USED
11. 4" QUICK-COUPLING UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
12. NOT USED
13. 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" STAINLESS STEEL PIPING.
14. PUMP CONTROL PANEL: SEE TECHNICAL SPECIFICATIONS SECTION 333200, 2.1.H. AND DETAIL WW-9. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
15. ALL ELECTRICAL SERVICE TRANSFORMERS SHALL BE INSTALLED OUTSIDE OF PUMP STATION FENCE LINE
16. 6' HIGH CHAIN LINK FENCE AS PER COUNTY STANDARDS. FENCE SHALL HAVE GREEN SLATS TO SCREEN PUMP STATION FROM VIEW.
17. POWER METER
18. SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
19. GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF AT (239)-252-2600. SEE DETAIL WW-9.
20. NOT USED
21. NOT USED
22. SEE GROUND TEST WELL DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
23. TELEMETRY ANTENNA, SEE WW-17. PROVIDE NEW ANTENNA LIGHTNING ROD, CONDUIT, AND DOWN CONDUCTOR PER DETAIL ON WW-17. ROUTE LIGHTNING ROD DOWN CONDUCTOR TO GROUND ROD AT BOTTOM OF TOWER. BOND GROUND ROD TO STATION GROUND MAT.
24. #4/0 BARE COPPER. SEE GROUND MAT DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
25. 3/4" X 20' COPPER-CLAD GROUND ROD (TYP.)
26. EXOTHERMICALLY WELDED CONNECTION (TYP.)
27. #2 SOLID TINNED COPPER JUMPER (TYP.)
28. NOT USED
29. NOT USED
30. GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
31. NOT USED

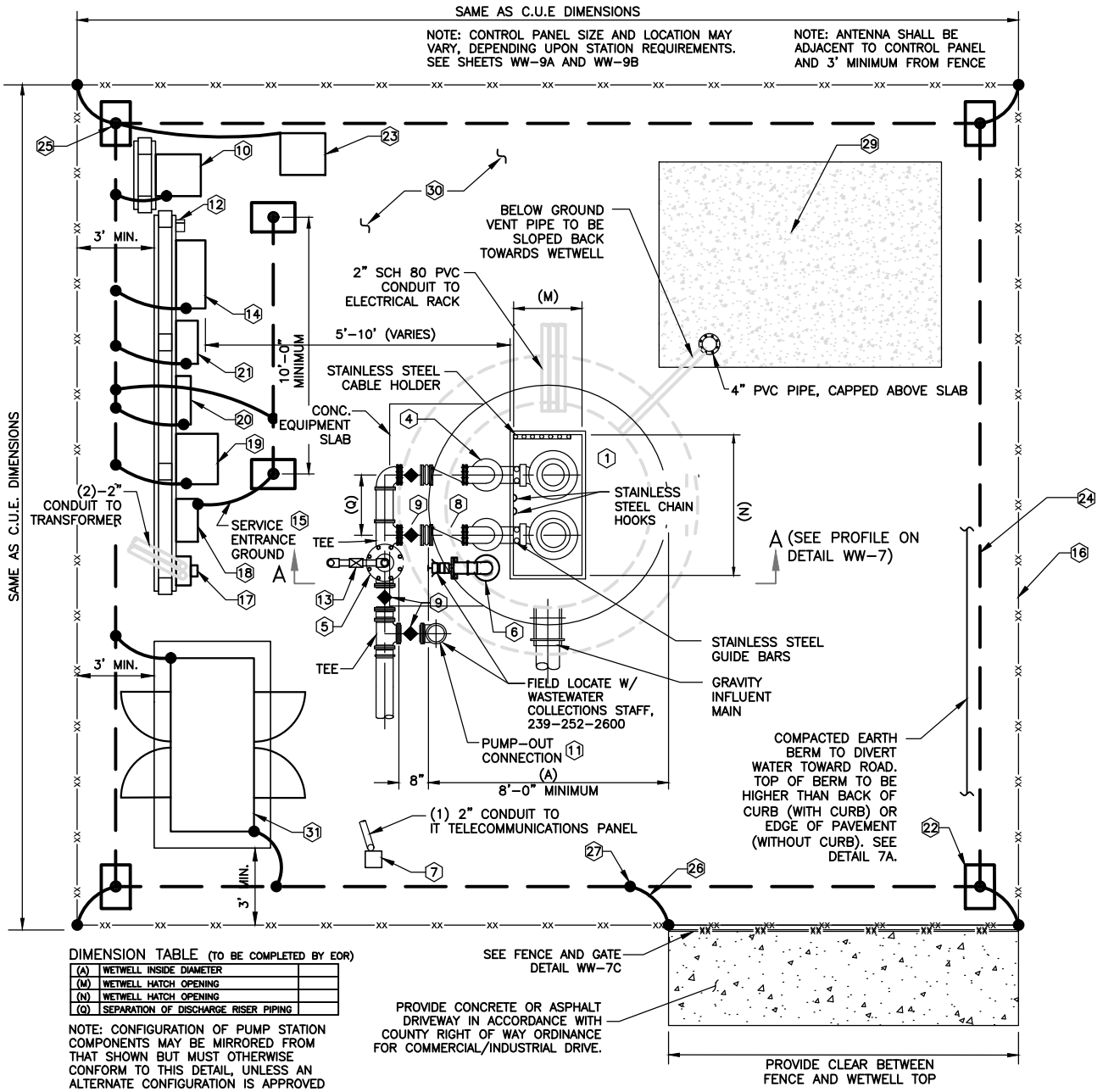
PUMP STATION DETAIL - PLAN

NTS

REVISION DATE: JANUARY 2025

Collier County

SHEET NO. WW-8



DIMENSION TABLE (TO BE COMPLETED BY EOR)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
(N)	WETWELL HATCH OPENING	
(Q)	SEPARATION OF DISCHARGE RISER PIPING	

NOTE: CONFIGURATION OF PUMP STATION COMPONENTS MAY BE MIRRORED FROM THAT SHOWN BUT MUST OTHERWISE CONFORM TO THIS DETAIL, UNLESS AN ALTERNATE CONFIGURATION IS APPROVED BY UTILITY DEVIATION REVIEW.

EQUIPMENT SPECIFICATIONS

MARK

1. ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD. FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
2. NOT USED
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4. ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACER PERMITTED BETWEEN CHECK AND PLUG VALVES SEE SPECIFICATIONS SECTION 330502.
5. TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND PIPE NIPPLES TO CONNECT TO ARV.
6. COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK-CONNECT COUPLING UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL.
7. FIBER-OPTIC HANDHOLE: SEE TECHNICAL DETAILS SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
8. CHECK VALVE WITH EXTERNAL WEIGHT/LEVER. (K") (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
9. PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
10. IT TELECOMMUNICATIONS PANEL: SEE TECHNICAL SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
11. 4" QUICK-COUPLING UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
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17. POWER METER
18. SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
19. AUTOMATIC TRANSFER SWITCH
20. PANELBOARD / MINI POWER ZONE AS REQUIRED
21. CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
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28. BOND FENCE POST. SEE FENCE POST/GATE BONDING DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
29. 8' X 11' X 6" CONCRETE PAD FOR FUTURE ODOR CONTROL
30. GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
31. STANDY-BY DIESEL GENERATOR, SUB BASE FUEL TANK, AND CONCRETE PAD. SEE TECHNICAL SPECIFICATIONS SECTION 263213

COMMUNITY PUMP STATION WITH GENERATOR DETAIL – PLAN

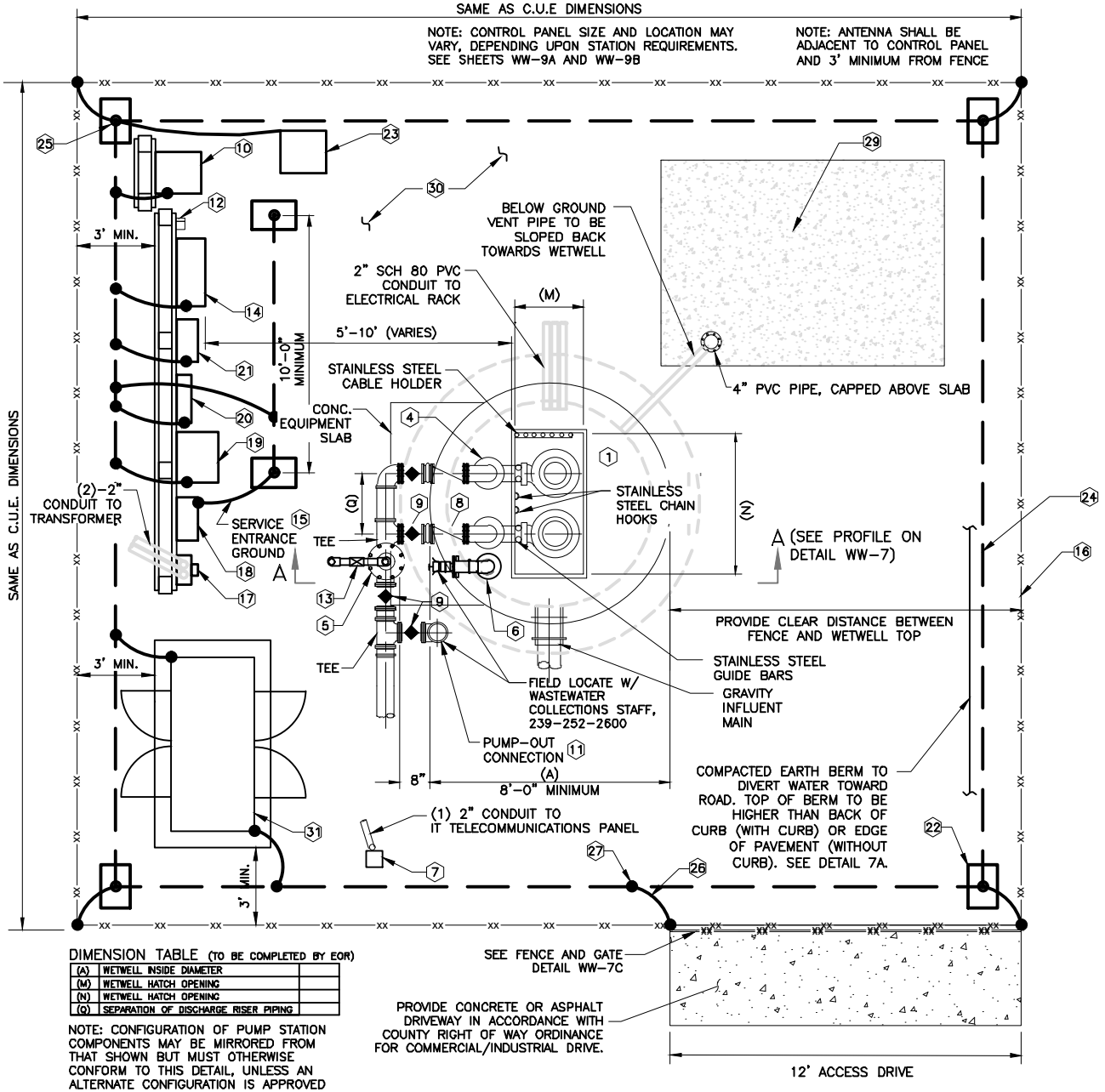
NTS

REVISION DATE: JANUARY 2025

Collier County

SHEET NO. WW-8A

REVISED DETAIL



DIMENSION TABLE (TO BE COMPLETED BY EOR)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
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EQUIPMENT SPECIFICATIONS

MARK

1. ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD, FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
2. NOT USED
3. NOT USED
4. ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACER PERMITTED BETWEEN CHECK AND PLUG VALVES SEE SPECIFICATIONS SECTION 330502.
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7. FIBER-OPTIC HANDHOLE: SEE TECHNICAL DETAILS SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
8. CHECK VALVE WITH EXTERNAL WEIGHT/LEVER. (K") (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
9. PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
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13. 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" STAINLESS STEEL PIPING.
14. PUMP CONTROL PANEL: SEE TECHNICAL SPECIFICATIONS SECTION 333200, 2.1.H. AND DETAILS WW-9A AND WW-9B, AS APPLICABLE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
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16. 6' HIGH CHAIN LINK FENCE AS PER COUNTY STANDARDS. FENCE SHALL HAVE GREEN SLATS TO SCREEN PUMP STATION FROM VIEW.
17. POWER METER
18. SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
19. AUTOMATIC TRANSFER SWITCH
20. PANELBOARD / MINI POWER ZONE AS REQUIRED
21. CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
22. SEE GROUND TEST WELL DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
23. TELEMETRY ANTENNA, SEE WW-17. PROVIDE NEW ANTENNA LIGHTNING ROD, CONDUIT, AND DOWN CONDUCTOR PER DETAIL ON WW-17. ROUTE LIGHTNING ROD DOWN CONDUCTOR TO GROUND ROD AT BOTTOM OF TOWER. BOND GROUND ROD TO STATION GROUND MAT.
24. #4/0 BARE COPPER. SEE GROUND MAT DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
25. 3/4" X 20' COPPER-CLAD GROUND ROD (TYP.)
26. EXOTHERMICALLY WELDED CONNECTION (TYP.)
27. #2 SOLID TINNED COPPER JUMPER (TYP.)
28. BOND FENCE POST. SEE FENCE POST/GATE BONDING DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
29. 8' X 11' X 6" CONCRETE PAD FOR FUTURE ODOR CONTROL
30. GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
31. STANDY-BY DIESEL GENERATOR, SUB BASE FUEL TANK, AND CONCRETE PAD. SEE TECHNICAL SPECIFICATIONS SECTION 263213

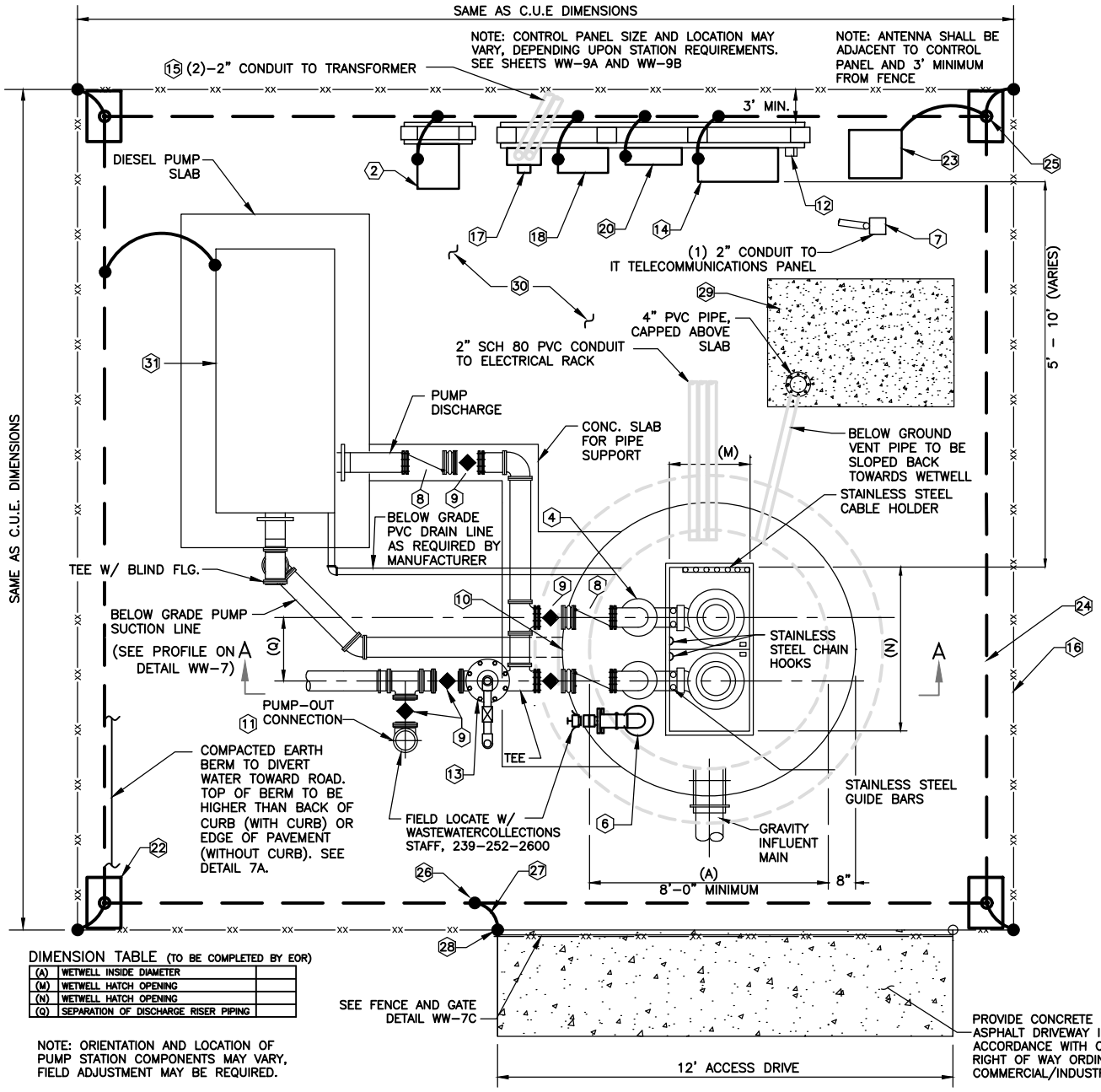
COMMUNITY PUMP STATION WITH GENERATOR DETAIL – PLAN

NTS

REVISION DATE: JANUARY 2025

Collier County

SHEET NO. WW-8A



DIMENSION TABLE (TO BE COMPLETED BY EOR)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
(N)	WETWELL HATCH OPENING	
(Q)	SEPARATION OF DISCHARGE RISER PIPING	

NOTE: ORIENTATION AND LOCATION OF PUMP STATION COMPONENTS MAY VARY, FIELD ADJUSTMENT MAY BE REQUIRED.

EQUIPMENT SPECIFICATIONS

MARK

1. ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD. FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
2. IT TELECOMMUNICATIONS PANEL: SEE TECHNICAL SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
3. NOT USED
4. ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACERS PERMITTED BETWEEN CHECK AND PLUG VALVES. SEE SPECIFICATIONS SECTION 330502.
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8. CHECK VALVE WITH EXTERNAL WEIGHT/LEVER. (K") (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
9. PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
10. STAINLESS STEEL WALL PENETRATION ASSEMBLY, BLACK, SEE WW-7A. ALL PENETRATIONS SHALL BE CORED IN THE FIELD.
11. 4" QUICK-COUPLING UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
12. GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF AT (239)-252-2600.
13. 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" STAINLESS STEEL PIPING.
14. PUMP CONTROL PANEL: SEE TECHNICAL SPECIFICATIONS SECTION 333200, 2.1.H. AND DETAILS WW-9A AND WW-9B, AS APPLICABLE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
15. ALL ELECTRICAL SERVICE TRANSFORMERS SHALL BE INSTALLED OUTSIDE OF PUMP STATION FENCE LINE
16. 6' HIGH CHAIN LINK FENCE AS PER COUNTY STANDARDS. FENCE SHALL HAVE GREEN SLATS TO SCREEN PUMP STATION FROM VIEW.
17. POWER METER
18. SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
19. NOT USED
20. 120V PANELBOARD / MINI POWER ZONE AS REQUIRED
21. NOT USED
22. SEE GROUND TEST WELL DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
23. TELEMETRY ANTENNA, SEE WW-17. PROVIDE NEW ANTENNA LIGHTNING ROD, CONDUIT, AND DOWN CONDUCTOR PER DETAIL ON WW-17. ROUTE LIGHTNING ROD DOWN CONDUCTOR TO GROUND ROD AT BOTTOM OF TOWER. BOND GROUND ROD TO STATION GROUND MAT.
24. #4/0 BARE COPPER. SEE GROUND MAT DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
25. 3/4" X 20' COPPER-CLAD GROUND ROD (TYP.)
26. EXOTHERMICALLY WELDED CONNECTION (TYP.)
27. #2 SOLID TINNED COPPER JUMPER (TYP.)
28. BOND FENCE POST. SEE FENCE POST/GATE BONDING DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
29. 8' X 11' X 6" CONCRETE PAD FOR FUTURE ODOR CONTROL
30. GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
31. STAND-BY DIESEL PUMP WITH INTEGRATED FUEL TANK AND CONCRETE PAD. SEE TECHNICAL SPECIFICATIONS SECTION 221336.

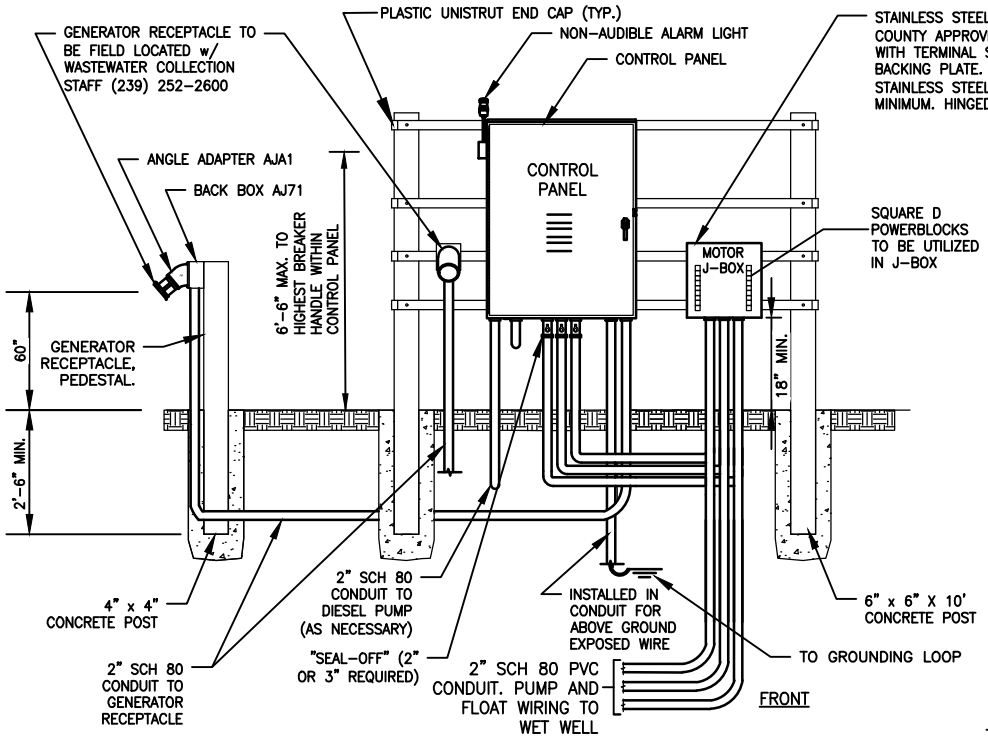
COMMUNITY PUMP STATION WITH DIESEL PUMP DETAIL - PLAN

NTS

REVISION DATE: JANUARY 2025

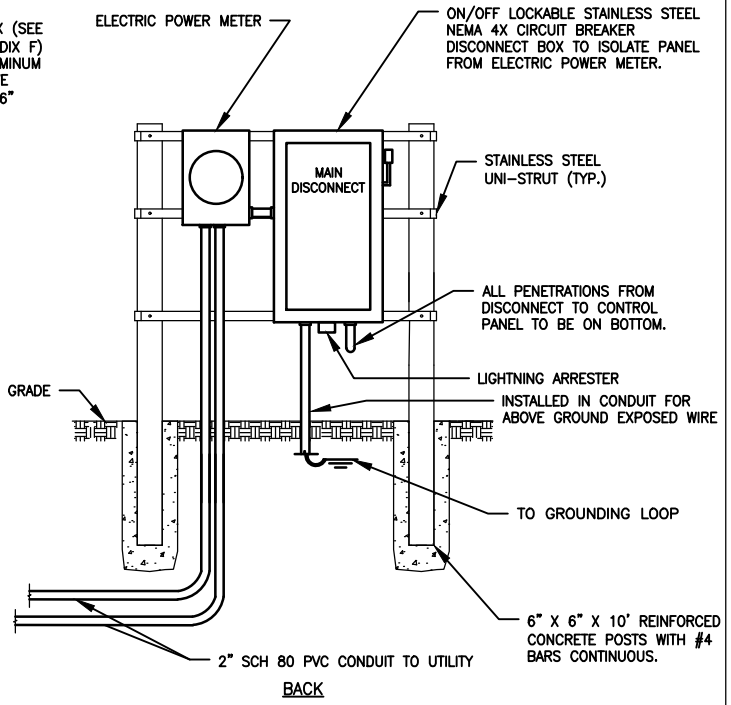
Collier County

SHEET NO. WW-8B



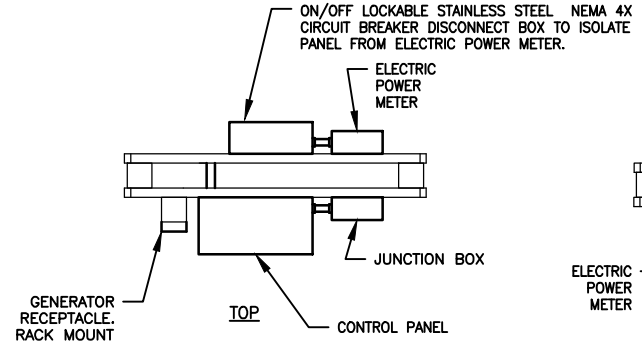
PUMP STATION CONTROL PANEL DETAIL - FRONT ELEVATION

SCALE: 1" = 4'-0"



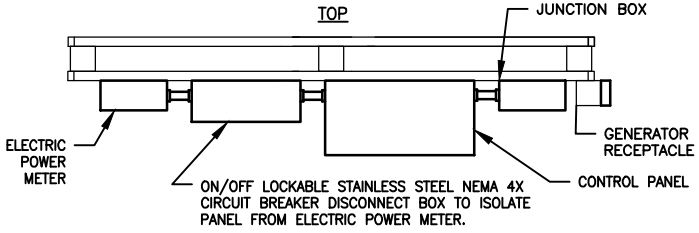
PUMP STATION CONTROL PANEL DETAIL - BACK ELEVATION

SCALE: 1" = 4'-0"



PUMP STATION CONTROL PANEL DETAIL - PLAN VIEW

SCALE: 1" = 4'-0"



SINGLE SIDE ALTERNATE - PLAN VIEW

SCALE: 1" = 4'-0"

NOTES:

1. #10 STRAND MINIMUM FROM CONTROL PANEL TO J-BOX.
2. LIGHTNING ARRESTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) MUST BE INSTALLED EXTERNALLY ON LOAD SIDE OF DISCONNECT BETWEEN DISCONNECT AND MAIN BREAKER. THE PENETRATION THROUGH THE DISCONNECT MUST BE MADE BELOW THE WORKING MECHANISM OF THE DISCONNECT.
3. PUMP CONTROL PANEL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH ALL COMPONENTS FOR OPERATING TWO PUMPS AND LIQUID LEVEL REGULATORS; GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AND NEMA 4X STAINLESS STEEL ENCLOSURE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
4. SEE DETAIL WW-17 FOR ANTENNA MOUNT DETAIL.
5. GROUND WIRE FROM SERVICE SHALL BE INSTALLED IN SCH 80 PVC CONDUIT.
6. ALL CONDUIT SHALL BE SCH 80 PVC
7. GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
8. GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF (239) 252-2600
9. SIDE PANEL PENETRATIONS ARE ACCEPTABLE WITH USE OF MYERS HUBS.
10. PHASE MONITOR TO BE INSTALLED PARALLEL WITH FPL METER (ON FPL SIDE).
11. CHICO USED TO SEAL-OFF IN EXPLOSION PROOF FITTINGS UNDER J-BOX, PUTTY FOR ALL OTHER CONDUIT OPENINGS.
12. ALL UNI-STRUT TO BE MOUNTED FLUSH WITH POST AND PENETRATE POST WITH STAINLESS STEEL HARDWARE.
13. ALL MOUNTED EQUIPMENT MUST BE EVENLY SPACED, LEVEL, PLUMB AND INSTALLED IN A WORKMANLIKE MANNER.

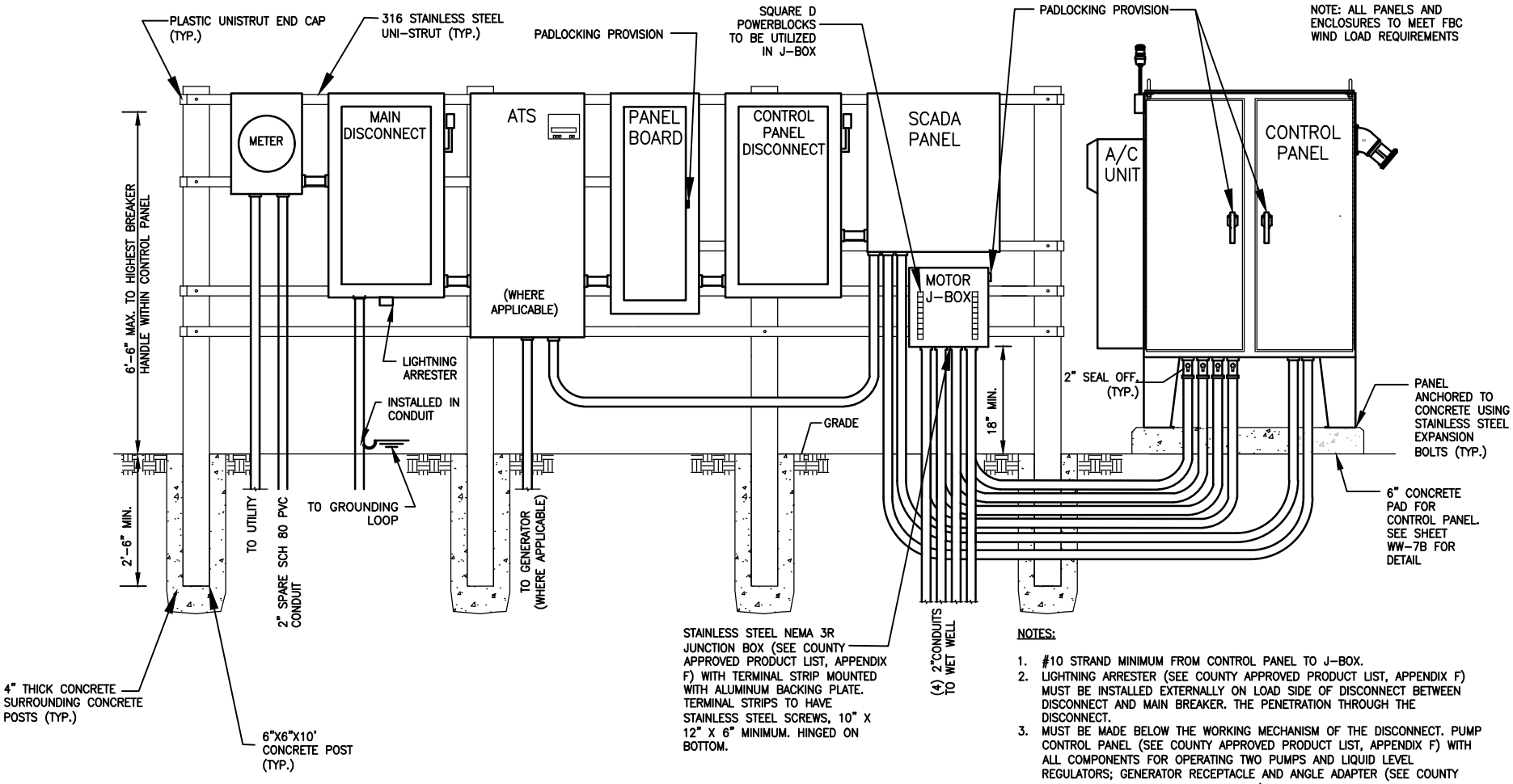
PUMP STATION CONTROL PANEL DETAIL

NTS

REVISION DATE: JANUARY 2025

Collier County

SHEET NO. WW-9



NOTES:

1. #10 STRAND MINIMUM FROM CONTROL PANEL TO J-BOX.
2. LIGHTNING ARRESTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) MUST BE INSTALLED EXTERNALLY ON LOAD SIDE OF DISCONNECT BETWEEN DISCONNECT AND MAIN BREAKER. THE PENETRATION THROUGH THE DISCONNECT.
3. MUST BE MADE BELOW THE WORKING MECHANISM OF THE DISCONNECT. PUMP CONTROL PANEL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH ALL COMPONENTS FOR OPERATING TWO PUMPS AND LIQUID LEVEL REGULATORS; GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AND NEMA 4X STAINLESS STEEL ENCLOSURE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
4. SEE DETAIL WW-17 FOR ANTENNA MOUNT DETAIL.
5. GROUND WIRE FROM SERVICE SHALL BE INSTALLED IN CONDUIT.
6. ALL CONDUIT SHALL BE SCH 80 PVC.
7. LABEL ALL EQUIPMENT USING MIN. ½" BLACK LETTERING ON WHITE PLASTIC LABELS FIX MOUNTED ONTO FRONT OF ALL PANELS AND CABINETS.
8. SIDE PANEL PENETRATIONS ARE ACCEPTABLE WITH USE OF MYERS HUBS.
9. PHASE MONITOR TO BE INSTALLED PARALLEL WITH FPL METER (ON FPL SIDE).
10. CHICO USED TO SEAL-OFF IN EXPLOSION PROOF FITTINGS UNDER J-BOX, PUTTY FOR ALL OTHER CONDUIT OPENINGS.
11. ADD EMERGENCY STOP FOR GENERATOR AND FIRE EXTINGUISHER ON POST FURTHEST FROM GENERATOR WITH APPROPIATE SIGNAGE.
12. ALL UNI-STRUT TO BE MOUNTED FLUSH WITH POST AND PENETRATE POST WITH STAINLESS STEEL HARDWARE.
13. ALL MOUNTED EQUIPMENT MUST BE EVENLY SPACED, LEVEL, PLUMB AND INSTALLED IN A WORKMANLIKE MANNER.

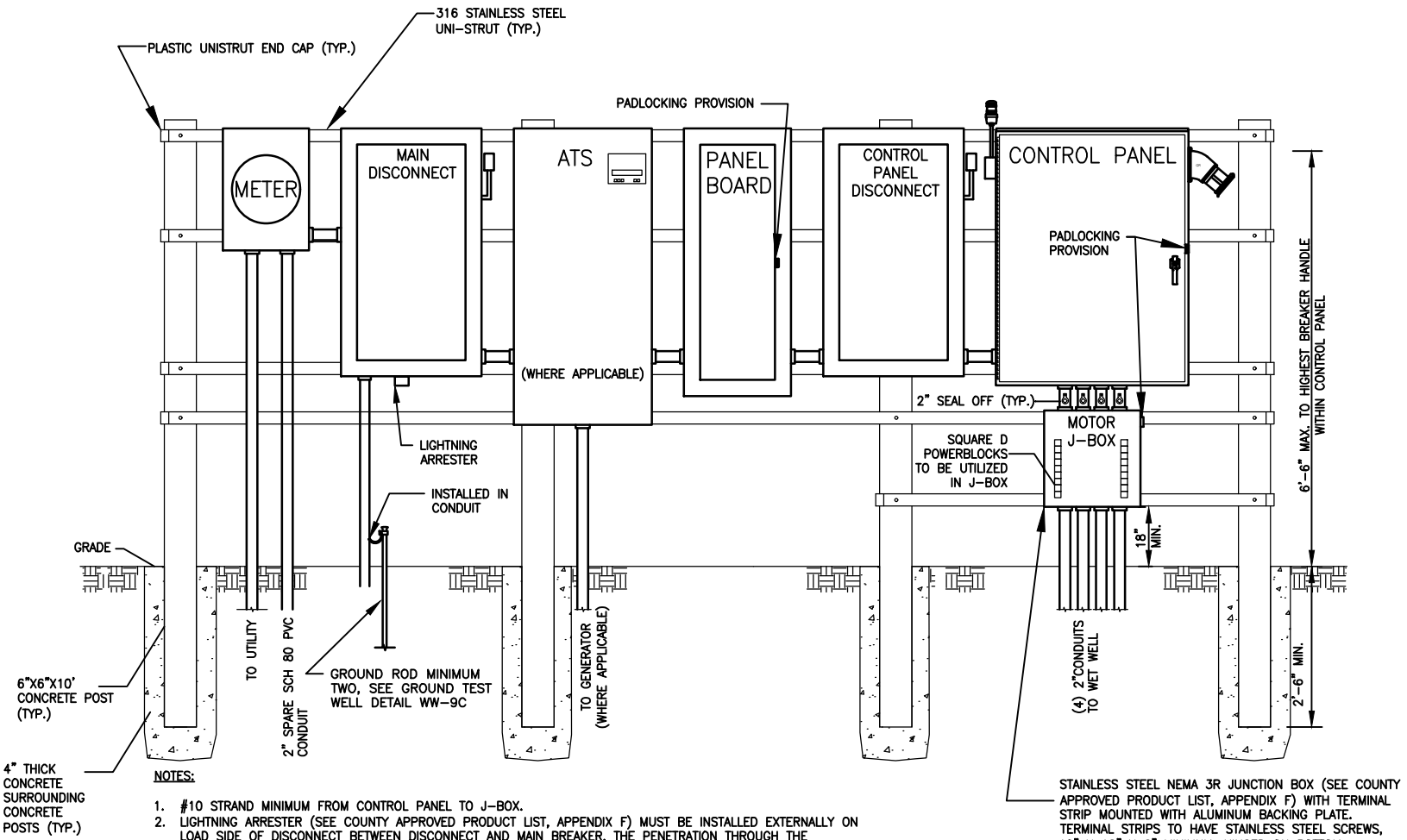
COMMUNITY PUMP STATION CONTROL PANEL DETAIL
VFD STATION WITH GENERATOR

NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
WW-9A



NOTES:

1. #10 STRAND MINIMUM FROM CONTROL PANEL TO J-BOX.
2. LIGHTNING ARRESTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) MUST BE INSTALLED EXTERNALLY ON LOAD SIDE OF DISCONNECT BETWEEN DISCONNECT AND MAIN BREAKER. THE PENETRATION THROUGH THE DISCONNECT MUST BE MADE BELOW THE WORKING MECHANISM OF THE DISCONNECT.
3. PUMP CONTROL PANEL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH ALL COMPONENTS FOR OPERATING TWO PUMPS AND LIQUID LEVEL REGULATORS; GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AND NEMA 4X STAINLESS STEEL ENCLOSURE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
4. SEE DETAIL WW-17 FOR ANTENNA MOUNT DETAIL.
5. GROUND WIRE FROM SERVICE SHALL BE INSTALLED IN CONDUIT.
6. ALL CONDUIT SHALL BE SCH 80 PVC.
7. LABEL ALL EQUIPMENT USING MIN. ½" BLACK LETTERING ON WHITE PLASTIC LABELS FIX MOUNTED ONTO FRONT OF ALL PANELS AND CABINETS.
8. SIDE PANEL PENETRATIONS ARE ACCEPTABLE WITH USE OF MYERS HUBS.
9. PHASE MONITOR TO BE INSTALLED PARALLEL WITH FPL METER (ON FPL SIDE).
10. CHICO USED TO SEAL-OFF IN EXPLOSION PROOF FITTINGS UNDER J-BOX, PUTTY FOR ALL OTHER CONDUIT OPENINGS.
11. ADD EMERGENCY STOP FOR GENERATOR AND FIRE EXTINGUISHER ON POST FURTHEST FROM GENERATOR WITH APPROPIATE SIGNAGE.
12. ALL UNI-STRUT TO BE MOUNTED FLUSH WITH POST AND PENETRATE POST WITH STAINLESS STEEL HARDWARE.
13. ALL MOUNTED EQUIPMENT MUST BE EVENLY SPACED, LEVEL, PLUMB AND INSTALLED IN A WORKMANLIKE MANNER.

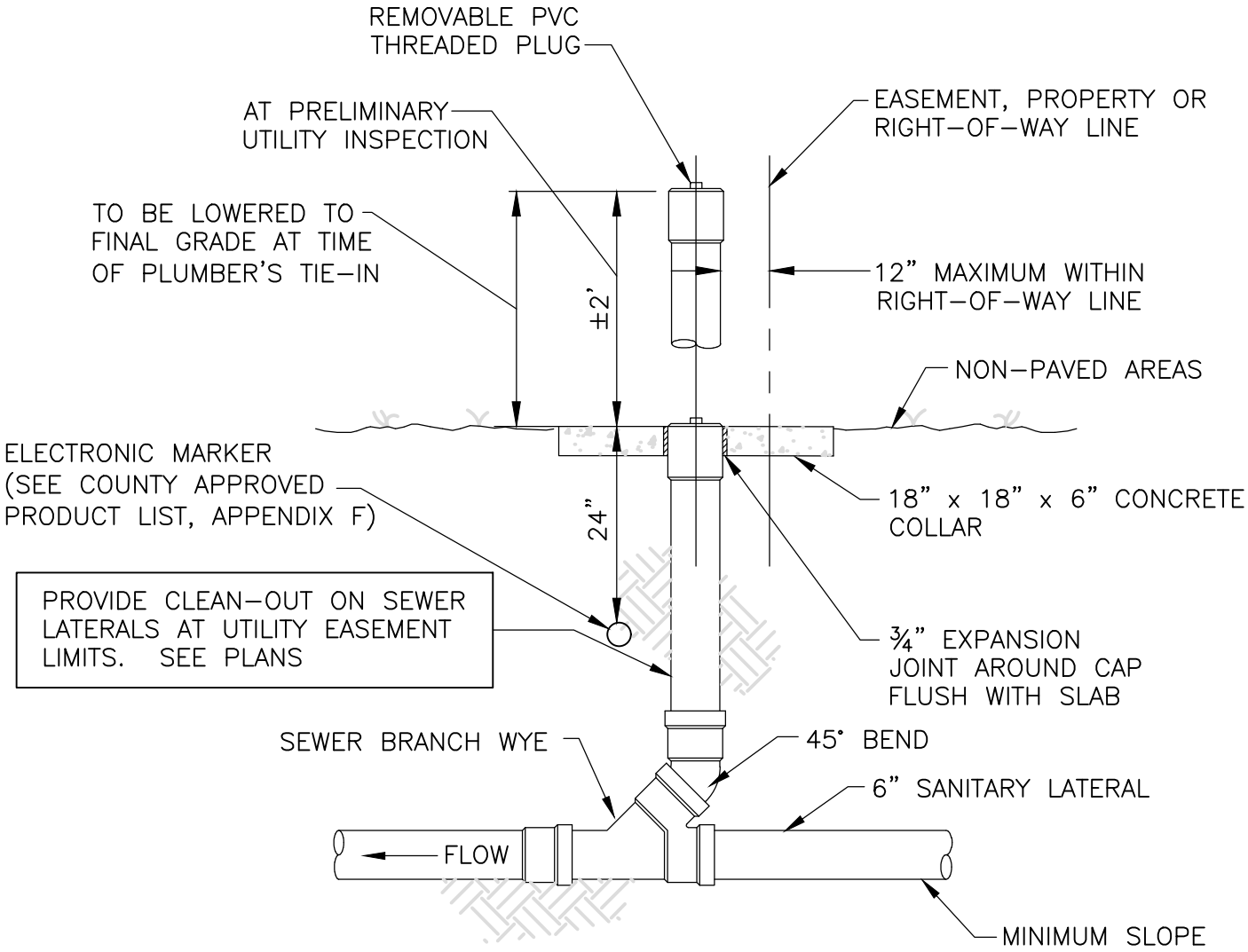
COMMUNITY PUMP STATION CONTROL PANEL DETAIL
NON-VFD STATION WITH GENERATOR

NTS

REVISION DATE:
JANUARY 2025

Collier County

SHEET NO.
WW-9B



ELEVATION

SEWER CLEAN-OUT DETAIL NON PAVED AREAS	REVISION DATE: JANUARY 2014	Collier County	SHEET NO. WW-12
NTS			

SECTION 4

APPENDICES

~~Go to the Collier County website below for the latest revisions to the appendices:~~

For the latest revisions to the Appendices visit:

~~https://www.colliercountyfl.gov/your-government/divisions-f-r/public-utilities-planning-and-project-management/utilities-standards-manual~~

Collier County Public Utilities
Engineering and Project Management Resources Webpage.

COLLIER COUNTY WATER-SEWER DISTRICT
UTILITIES STANDARDS MANUAL

SECTION 4

APPENDICES

Table of Contents

APPENDIX B

Collier County

Water Meter Sizing Form

One Form Per Meter

Preparer's Information:

Name ==========> _____

Title ==========> _____

Company=========> _____

Address ==========> _____

_____

Phone ==========> _____

Email Address =====> _____

Project Information:

Date ====> _____

Permit or AR Number _____

Name of Project ===> _____

Project Address ===> _____

Please Note:

1. All commercial facilities must be metered separately from residential facilities with the exception of those commercial facilities that are within a master metered residential development and designed for the exclusive use of the residents within such development.

2. The Design Engineer/Architect must submit signed and sealed documentation supporting meter sizing. Sizing shall be based upon fixture flow values, as shown on the following page and the table on page 3, unless approved otherwise by Utility Deviation. If an increase in meter size is requested to accommodate for fire flow, the Engineer/Architect should check appropriate box below. A Utility Deviation will not be required for increasing meter size for fire flow requirements. For all meter sizes, the Engineer/Architect must consider all relevant factors before selecting the final meter size.

3. For remodeling projects this form must be submitted only if there is a net increase in fixture flow value.

This Section to be filled out by Engineer/Architect of Record:

Demand in accordance with the Fixture Flow Value Worksheet and the Table for Estimating Demand

_____ **GPM**

Meter Size Required: _____

Meter Size Requested: _____

Existing Meter Size: _____

If the meter size requested is larger than the meter size required per the table velow, please indicate the reason for the request by checking the appropriate box:

☐ **Fire Flow** ☐ **Other (Please attach Utility Deviation approval)**

_____

Type or Print Name of Engineer/Architect of Record for Project

_____

Signature of Engineer/Architect of Record for Project and Date

[Affix Engineering/Architect Seal Here]

Demand Range (GPM)	Meter Size
0 to 30	3/4"
30.1 to 50	1"
50.1 to 100	1 1/2"
100.1 to 160	2"
160.1 to 435	3"
435.1 to 750	4"
750.1 to 1600	6"
1600.1 to 2800	8"
2800.1 to 4200	10"

Demand ranges from AWWA M22 Table 6-1 Third Edition

Collier County

Fixture Flow Value Worksheet

Please call Public Utilities Engineering (239) 252-2380 with any questions.

Enter # of Fixtures of each Fixture Type, per unit, then multiply by appropriate Load Value to get Fixture Flow Value

Fixture	Occupancy	Type of Supply Control	Load Values, in Water Supply Fixture Units (wsfu) Total		# of Fixtures Per Unit		Fixture Flow Value
Bathroom group	Private	Flush tank	3.6	x		=	
Bathroom group	Private	Flushometer valve	8	x		=	
Bathtub	Private	Faucet	1.4	x		=	
Bathtub	Public	Faucet	4	x		=	
Bidet	Private	Faucet	2	x		=	
Combination fixture	Private	Faucet	3	x		=	
Dishwashing machine	Private	Automatic	1.4	x		=	
Drinking fountain	Offices, etc.	3/8″ valve	0.25	x		=	
Kitchen sink	Private	Faucet	1.4	x		=	
Kitchen sink	Hotel, restaurant	Faucet	4	x		=	
Laundry trays (1 to 3)	Private	Faucet	1.4	x		=	
Lavatory	Private	Faucet	0.7	x		=	
Lavatory	Public	Faucet	2	x		=	
Service sink	Offices, etc.	Faucet	3	x		=	
Shower head	Public	Mixing valve	4	x		=	
Shower head	Private	Mixing valve	1.4	x		=	
Urinal	Public	1″ flushometervalve	10	x		=	
Urinal	Public	3/4″ flushometervalve	5	x		=	
Urinal	Public	Flush tank	3	x		=	
Washing machine (8 lb)	Private	Automatic	1.4	x		=	
Washing machine (8 lb)	Public	Automatic	3	x		=	
Washing machine (15 lb)	Public	Automatic	4	x		=	
Water closet	Private	Flushometer valve	6	x		=	
Water closet	Private	Flush tank	2.2	x		=	
Water closet	Public	Flushometer valve	10	x		=	
Water closet	Public	Flush tank	5			=	
Water closet	Public or private	Flushometer tank	2	x		=	
For any fixtures not listed, submit manufacturer's data sheets and enter appropriate description and value:							
Other:				x		=	
Other:				x		=	
Other:				x		=	
Other:				x		=	
Other:				x		=	

Total Fixture Value Per Unit =====>	
Number of Units with this Fixture Count =====>	
Grand Total of Fixture Flow Value (Per Unit Total x Number of Units) =====>**	

****Use total Fixture Flow Value on "Table for Estimating Demand" to estimate water meter demand.**

Fixture Flow Value worksheet from FBC 2023 edition

Collier County

Table for Estimating Demand

Please call Public Utilities Engineering (239) 252-2380 with any questions.

Enter # of Fixtures of each Fixture Type, per unit, then multiply by appropriate Load Value to get Fixture Flow		SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH VALVES	
Load	**Demand**	**Load**	**Demand**
Fixture Flow Value	Gallons per minute	Fixture Flow Value	Gallons per minute
1	3.0	---	---
2	5.0	---	---
3	6.5	---	---
4	8.0	---	---
5	9.4	5	15.0
6	10.7	6	17.4
7	11.8	7	19.8
8	12.8	8	22.2
9	13.7	9	24.6
10	14.6	10	27.0
11	15.4	11	27.8
12	16.0	12	28.6
13	16.5	13	29.4
14	17.0	14	30.2
15	17.5	15	31.0
16	18.0	16	31.8
17	18.4	17	32.6
18	18.8	18	33.4
19	19.2	19	34.2
20	19.6	20	35.0
25	21.5	25	38.0
30	23.3	30	42.0
35	24.9	35	44.0
40	26.3	40	46.0
45	27.7	45	48.0
50	29.1	50	50.0
60	32.0	60	54.0
70	35.0	70	58.0
80	38.0	80	61.2
90	41.0	90	64.3
100	43.5	100	67.5
120	48.0	120	73.0
140	52.5	140	77.0
160	57.0	160	81.0
180	61.0	180	85.5
200	65.0	200	90.0
225	70.0	225	95.5
250	75.0	250	101.0
275	80.0	275	104.5
300	85.0	300	108.0
400	105.0	400	127.0
500	124.0	500	143.0
750	170.0	750	177.0
1,000	208.0	1,000	208.0
1,250	239.0	1,250	239.0
1,500	269.0	1,500	269.0
1,750	297.0	1,750	297.0
2,000	325.0	2,000	325.0
2,500	380.0	2,500	380.0
3,000	433.0	3,000	433.0
4,000	535.0	4,000	535.0
5,000	593.0	5,000	593.0

Table for estimating demand taken from Florida Building Code 2023 Edition

APPENDIX F

Collier County Public Utilities Department
County Approved Product List
All Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Casing Spacer End Seals	Power Seal	EndSeal	Section 330523.16, Page 4, 3.1 B
Casing Spacer End Seals	Cascade Waterworks MFG Co.	CCES	Section 330523.16, Page 4, 3.1 B
Casing Spacers Stainless Steel	Power Seal	4810	Section 330523.16, Page 4, 3.1 BG-5
Casing Spacers Stainless Steel	Cascade Waterworks MFG Co.	CCS	Section 330523.16, Page 4, 3.1 B-5
Electronic Markers	3M Electronic Ball Marker	1423, 1424 & 1428	Section 1: 2.6.1, 3.1.4, 3.2.1/WW-10/WW-12/WW-16
Electronic Markers	OMNI MARKER	161, 162 & 168	Section 330518, Page 9, 3.2 O.2
Joint Restraint Devices	EBAA Iron Sales		Section 1: 2.3/Section 330503, Page 5, 2.1 L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Romac Industries		Section 1: 2.3/Section 330503, Page 5, 2.1 L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Sigma		Section 1: 2.3/Section 330503, Page 5, L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Star Pipe Products		Section 1: 2.3/Section 330503, Page 5, 2.1 L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Ford Meter Box Company		Section 1: 2.3/Section 330503, Page 5, L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices, Push-On joints for push joint pipe	American Cast Iron Pipe Company	Flex-Ring & Lok-Ring	Section 330504, Page 7, F.3
Joint Restraint Devices, Push-On joints for push joint pipe	McWane Inc.	Super-Lock & TR Flex	Section 330504, Page 7, F.3
Joint Restraint Devices, Push-On joints for push joint pipe	U.S. Pipe		Section 330504, Page 7, F.3
Metalized Tape	Reef Industries, Inc. Houston, TX	Terra Tape	Section 330518, Page 9, O.1

Collier County Public Utilities Department
County Approved Product List
All Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Metalized Tape	Proline Safety Products	Detectable Tape	Section 330518, Page 9, O.1
Rubber Gasket pipe	McWane Inc.	Long-Span Pipe	Section 330518, Page 10, Q.1
Rubber Gasket pipe	American Cast Iron Pipe Company	Flanged	Section 330518, Page 10, Q.1
Rubber Gasket pipe	US Pipe	Flanged	Section 330518, Page 10, Q.1
Single Sealed Gasket Push-on type joint	American Cast Iron Pipe Company	Fastite	Section 330504, Page 10, 3.3.C
Single Sealed Gasket Push-on type joint	U.S. Pipe	Tyton	Section 330504, Page 10, 3.3.C
Single Sealed Gasket Push-on type joint	McWane Inc.	Tyton	Section 330504, Page 10, 3.3.C
Two-part Coal tar Epoxy	Madewell Products Corp.	Madewell 1104	Section 330518, Page 6, 3.2 G.4

Collier County Public Utilities Department
County Approved Product List
Water Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Automatic Flushing Device, Ground Mounted	Mueller/Hydro-Guard	HG-1	W-2
Automatic Flushing Device, Ground Mounted	Kupferle Foundry Company	Eclipse #9400-WC	W-2
Automatic Flushing Device, Hydrant Mounted	Mueller/Hydro-Guard	HG-6	W-2
Automatic Flushing Device, Hydrant Mounted	Kupferle Foundry Company	Eclipse #9700	W-2
Backflow Preventer Assembly	See Approved Backflow Devices List, Appendix G		
Bushing	Ford	C18	W-6
Corporation Stops	Ford	F1100NL SERIES	W-6
Corporation Stops	Ford	FB1100NL SERIES	W-6
Corporation Stops	A.Y. McDonald	4104NL	W-5
Corporation Stops	A.Y. McDonald	4101 BF NL	W-5
Corporation Stops	Mueller	H10045N, H15008N	Section 331200, Page 2, 2.3 A.1
Corporation Stops	Mueller	H-10046N/ H-10046	W-5
Coupling	Ford	Model numbers vary by application	W-6
Coupling	A.Y. McDonald	Model numbers vary by application	W-6
Coupling	Mueller	Model numbers vary by application	W-6
Curb Stop	Ford	B43xxxW-NL	W-12
Curb Stop	A.Y. McDonald	76102-22	W-12
Curb Stop	Mueller	Mark II Oriseal H-15172N	Section 331200, Page 2, 2.3 A.1

Collier County Public Utilities Department
County Approved Product List
Water Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
HDPE Stab Fitting	Elster	Hydrosert	
Hydrant	American Darling	6-inch B-84-B	Section 331619, Page 2, 2.1 G
Hydrant	Clow	Medallion	Section 331619, Page 2, 2.1 G
Hydrant	Mueller	Centurion A-423	Section 331619, Page 2, 2.1 G
Meter Box, ~~Light Duty~~	~~DFW~~ Carson	~~Light Duty~~ Fiberlyte FL 12	W-12
Meter Box, ~~Light~~ Duty	Carson	~~Light Duty~~ Fiberlyte FL30	W-12
Meter Box,~~Heavy Duty (Staff Use)~~	DFW	~~Heavy Duty~~ DFW1324FXX-12-AF1PT2	W-12
Meter Box,~~Heavy Duty (Staff Use)~~	~~Carson~~ DFW	~~Heavy Duty~~ DFW37F-12-AF1PT	W-12
Meter Box,~~Heavy Duty (Staff Use)~~	~~Hubbel~~ DFW	~~Heavy Duty~~ DFW1324F-12-AF1PT	W-12
Meter, Fire Protection (3", 4", 6", 8")	Elster AMCO	evoQ4 Electromagnetic Meter	W-9/W-14
Meter, Fire Protection (3", 4", 6", 8", 10")	Neptune	HP Fire Service Turbine Meter	W-9/W-14
Meter, Fire Protection (3/4", 1", 1-1/2", 2")	Mueller Systems - Hersey	Residential Fire Meter	W
Meter, Fire Protection (4", 6", 8", 10")	Neptune	HP Protectus III Fire Service Meter	W-9/W-14
Meter, Potable Water	Neptune	Tru/Flo	W-13
Meter, Potable Water	Neptune	Mach 10	W-13
Pedestal Housing	Channel	CCWD Signature Series SPH	W-5
Pedestal Housing	Water Plus Corp	131632	NP-4
Pedestal Housing	PenCell Plastics	AV142034HDHS001009	NP-4

Sampling Station	Kupferle Foundry Company	~~Eclipse 88WC~~ Eclipse 88	W-6
Sampling Station	~~Water Plus Corp~~ Mueller Company	~~301W~~ Mueller Safety Guard B.O.S.S.	W-6
~~Sampling Station~~	~~GIL Industries~~	~~3/4"~~	~~W-6~~

Collier County Public Utilities Department
County Approved Product List
Water Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Service Saddles (Brass)	Ford	F202B	Section 331200, Page 7, 2.3 G.1
Service Saddles (Brass)	Mueller	DR2 B	Section 331200, Page 7, 2.3 G.1
Service Saddles (PVC) Perm Bact Sample Point	Powerseal	P3401 SERIES	Section 331200, Page 7, 2.3 G.1/W-6
Service Saddles (PVC) Perm Bact Sample Point	Ford	S 90 SERIES	Section 331200, Page 7, 2.3 G.1/W-6
Service Wye	Ford	Y44-xxx-NL	W-12
Strainer, Flanged (Staff Use)	Mars	Z-plate	
Strainer, Flanged (Staff Use)	Neptune	Rilsan nylon-coated ductile iron	
Tapping Saddle/ Hot taps	Powerseal	P3490MJ Series	W-12
Valve Box	Tyler/Union	461	Section 331200, Page 4, 2.3 B.2
Valve Box, Locking Cover	AMPro USA	LL562	Section 331200, Page , 2.3 B.2.
Valve Setter	Wilkins	WMJS	W-9A/W-11A
Valve, Air	Val-Matic	Model 801AS	W-11/W-14/W-16
Valve, Air Release	A.R.I.	D-040 (nylon), D-040 ST ST (SS)	W-5
Valve, Bacterial Sampling Station Line	Mueller	Mark II Oriseal	Section 331200, Page 3, 2.3 A.1
Valve, Ball	Ford		Section 331200, Page 3, 2.3 A.1
Valves and Appurtenances	American Darling		Section 331200 2.3 A
Valves and Appurtenances	A.Y. McDonald		Section 331200 2.3 A
Valves and Appurtenances	Clow		Section 331200 2.3 A
Valves and Appurtenances	Ford		Section 331200 2.3 A
Valves and Appurtenances	Kennedy		Section 331200 2.3 A
Valves and Appurtenances	Mueller		Section 331200 2.3 A
Valves and Appurtenances	U.S. Pipe		Section 331200 2.3 A

Collier County Public Utilities Department
County Approved Product List
Irrigation Quality (IQ) Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
120VAC Surge Suppressor	Edco	HSP121	NP-E3
12VDC Power Supply	Allen Bradley	1606-XLS	NP-E3
12VDC Power Supply	Sola HD	SDN-P	NP-E3
12VDC Power Supply	PULS	Dimension - QS	NP-E3
24VDC Power Supply	Allen Bradley	1606-XLE	NP-E3
24VDC Power Supply	Sola HD	SDN-P	NP-E3
24VDC Power Supply	PULS	Dimension - QS	NP-E3
Antenna Subsystem	Data Flow Systems, Inc.	RTA209 Yagi Antenna	NP-E9
Back Pressure Sustaining Valve	Ames	No. 920	NP-1/NP-E2
Plate Strainer, Top Access	Mars		NP-1/NP-E2
Corporation Stops	Ford	FB 1100-NL/ FB 1100	NP-2
Corporation Stops	A.Y. McDonald	74704B	NP-2
Corporation Stops	A.Y. McDonald	74104NL/ 74104	NP-4
Corporation Stops	A.Y. McDonald	74101 BF NL/ 74101 BF	NP-4
Corporation Stops	Mueller	H-10046N/ H-10046	NP-4
Curb Stop	Ford	B43-444W-NL, Compression x Meter Swivel	NP-2
Data Radio	Integra	TR	NP-E3
Data Signal Line Surge Processor	Edco	PC642 Series	NP-E3
Geomembrane	GSE Environmental		Section 334713, Page 4, 1.6 A.1
Level Transducer	Wika		NP-E6

Collier County Public Utilities Department
County Approved Product List
Irrigation Quality (IQ) Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Meter Box	DFW	12" D1200 AMR Series, Light Duty	NP-2
Meter Box	Carson	Light Duty	NP-2
Flow Meter, Magnetic	Endress+Hauser	W400	NP-1/NP-E2
Meter, Non-Potable Propeller	McCrometer	Water Specialties No. ML-04-X with 4-20 MA Output Transmitter, TR-16	NP-1/NP-E2
Pedestal Housing	Channel	CCWD Signature Series SPH14206C1B1L01	NP-4
Pedestal Housing	Water Plus Corp	131632	NP-4
Pedestal Housing	PenCell Plastics	AV142034HDHS001009	NP-4
Rain Gauge	ISCO	674	NP-E5
Service Wye	Ford	Y44-264-NL	NP-2
Service Wye	A.Y. McDonald	708YS22	NP-2
Service Wye	Mueller	P-15343N	NP-2
Surge Suppression	Edco	SS65 Series	NP-E6/NP-E7
Surge Suppression	CITEL	TSP15M	NP-E6/NP-E7
Surge Suppression, Main Service	Lea	USP-M Series	NP-E5
Tapping Saddle/ Hot taps	Powerseal	P3490MJ Series	NP-2
Valve, Air Release	A.R.I.	D-040	NP-4
Valve, Air Release	A.R.I.	D-040 SS	NP-4
Valve, Air Release	GA Industries	942SS	NP-4
Valve, Air Release	GA Industries	Combination	Section 1 2.7/NP-1/NP-4/NP-E2
Valve, Rising Stem Gate/ OS&Y	American Flow Control	AFC-2500 SERIES	NP-1/NP-E2
Valve, V-Port Ball	DeZurik	VPB - flanged, type 317 stainless, and Teflon seat and bearings	NP-1

Collier County Public Utilities Department
County Approved Product List
Irrigation Quality (IQ) Systems

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Item	Manufacturer	Model(s)	Location in Standards Manual
Valve, V-Port Ball - Motor (Actuator)	Rotork	IQTM	NP-E2

Collier County Public Utilities Department
County Approved Product List
Wastewater Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Access Frame (Pump Station)	U.S. Foundry	AHD	WW-7/WW-8
Access Hatch, Aluminum	Bilco	J-AL H20 (5-1/2" depth)	~~WW-13~~ WW-8/WW-8A/WW-8B
Access Hatch, Aluminum	Halliday	H1W (3-1/2" depth)	~~WW-13~~ WW-8/WW-8A/WW-8B
Access Hatch, Aluminum	U.S. Foundry	AHS (5" depth)	~~WW-13~~ WW-8/WW-8A/WW-8B
Antenna Subsystem	Data Flow Systems, Inc.	RTA209 Yagi Antenna	Section 333200, Page 4, 2.1 J/WW-17
Biofiltration Odor Control System	Evoqua	Zabocs (pre-engineered)	Section 333200, Page 5, 2.1 P
Ceramic Epoxy Lining	Vulcan Painters	Protecto 401 Coating	Section 330504, Page 3, 2.1.B
Chimney Seal	Cretex		Section 333913, Page 4, 2.2 K/WW-3/WW-4/WW-5
Chimney Seal	Trelleborg		Section 333913, Page 4, 2.2 K/WW-3/WW-4/WW-5
Coaxial Cable	Data Flow Systems, Inc.	RTC 400	Section 333200, Page 2.1 J/WW-17
Diaphragm Seals	Ashcroft		Section 333313, Page 8, 2.2 G
Diaphragm Seals	Mansfield and Green	Type SB	Section 333313, Page 8, 2.2 G
Diaphragm Seals	Trerice		Section 333313, Page 8, 2.2 G
Flanged Adapter Connections	EBAA Iron Sales	E2100 SERIES	Section 333313, Page 8, 2.2 F.1.c.
Flanged Adapter Connections	Victaulic	Vic Flange Style 741	Section 333313, Page 8, 2.2 F.1.c.
Flow Meter	Endress-Hauser	Promag W400	Section 333313, Page 9, 2.2 M.1
Generator Receptacle and Angle Adapter	Crouse-Hinds	AR2042 with S22 option, and an AJA1 angle adaptor	WW-7/WW-9
Grass Covered Porous Pavement	Invisible Structures	Grasspave2	WW-8/WW-8A/WW-8B
Inflow Protector, Stainless Steel	Sewer Shield, Inc. Maitland, FL		Section 333913, Page 4, 2.2 K
Internal Protection	IET Sytems	IET Coating System	Section 333913, Page 5, 3.1 F/Section 099723/WW-3/WW-4/WW-5/WW-7

Collier County Public Utilities Department
County Approved Product List
Wastewater Systems

NOTES:
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Internal Protection	Raven Lining Systems - Broken Arrow, OK	Raven 405	Section 333913, Page 5, 3.1F/Section 099723/WW-3/WW-4/WW-5/WW-7
Internal Protection	Kerneos - Chesapeake, VA	Sewpercoat Lining System	Section 333913, Page 5, 3.1F/Section 099723/WW-3/WW-4/WW-5/WW-7
Junction Box	Hoffman	A12106NFSS	WW-9
Lightning Arrestor	Square D	SDSA-1175 for 1-phase	Section 333200, Page 5, 2.1 O/WW-9
Lightning Arrestor	Square D	SDSA-3650 for 3-phase	Section 333200, Page 5, 2.1 O/WW-9
Liquid Level Regulators (Float Switch)	Roto-Float		WW-7/WW-8
Liquid Level Regulator (Float Switch)	Dura-Float	2900 Series B4	WW-7/WW-8
Pipe Interior Lining	Permox CTF	Ceramic Epoxy Lining	Section 330504, Page 3, 2.1 B
Plastic Joint Sealing Compound	Hamilton Kent, Toronto/Ontario, Canada	Kent-Seal	Section 333913, Pages 2, 2.1 A/WW-3/WW-4/WW-5/WW-6/WW-7/WW-18
Plastic Joint Sealing Compound	Henry	Ram-Nek	Section 333913, Pages 2, 2.1 A/WW-3/WW-4/WW-5/WW-6/WW-7/WW-18
Polymer Concrete Manholes	US Composite Pipe, Inc.		Section 034100, Page 5, 2.2 D
Polymer Concrete Manholes	Armorock		Section 034100, Page 5, 2.2 D
Power Distribution Blocks	Schneider (Square D)	Class 9080 Power Distribution Blocks	WW-9/WW-9A/WW-9B
Pump Control Panel	ECS		Section 333200, Page 43, 2.1 I/WW-7/WW-9
Pump Control Panel	Suncoast Hydraulic		Section 333200, Page 43, 2.1 I/WW-7/WW-9
Pump Controller	Data Flow Systems, Inc.	TCU	Section 333200, Page 3, 2.1 J
Riser Ring, HDPE/EPP	Ladtech/Cretex(EPP)	Riser Ring	Section 333913, Page 4, 2.2 L
Sealing Compound	Crouse-Hindz	Chico Sealing Compound	WW-9/WW-9A/WW-9B

Sealing Element	GPT	Link-Seal	Section 333313, Page 9, 2.2 I.1/WW-18
Sewage Pump	Flygt	N-Series	Section 333200, Page 2, 2.1 D
Sewer Clean-Out Rim and Cover	U.S. Foundry	7621	WW-11

Collier County Public Utilities Department
County Approved Product List
Wastewater Systems

NOTES:
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2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Sewer Manhole Frame and Covers	Pamrex		WW-5
Sewer Manhole Frame and Covers	U.S. Foundry	105M	WW-2
Sewer Manhole Frame and Covers	U.S. Foundry	420-C-ORS	Section 333913, Page 2, 2.1A/WW-3/WW-4/WW-5/WW-6/WW-18
Sleeve Type Couplings	Powerseal	STYLE 3501	Section 333313, Page 8, 2.2 F.1.d.
Sleeve Type Couplings	Dresser	Style 38	Section 333313, Page 8, 2.2 F.1.d.
Sleeve Type Couplings	Smith Blair	Style 413	Section 333313, Page 8, 2.2 F.1.d.
Tower	Rohn		WW-17
Valve Box	Brooks		WW-9
Valve, 3-Way Plug (Staff Use)	Milliken Valve Co.	Modle M604	WW-7/WW-8
Valve, 3-Way Plug (Staff Use)	Dezurik	Model D202	WW-7/WW-8
Valve, Air Release	HTECH	2" SS MODEL # 8889860041	WW-13/~~WW-14~~/Section 333313, Page 7, 2.2 D.11
Valve, Air Release	A.R.I.	D-025	~~WW-13/WW-14~~ WW-5/Section 333313, Page 7, 2.2 D.11
Valve, Check	Kennedy Valve Manufacturing Co.	MODEL 1106LW/106LW	WW-7/WW-8/Section 333313, Page 5, 2.2 C
Valve, Check	Mueller	A-2600, A2602	WW-7/WW-8, Section 333313, Page 5, 2.2 C
Valve, Check	Milliken Valve Co.	8001	WW-7/WW-8, Section 333313, Page 5, 2.2 C
Valve, Check	GA Industries	340-W	WW-7/WW-8, Section 333313, Page 5, 2.2 C
Valve, Duckbill (Staff Use)	Red Valve Co., Inc. Longwood, FL	"Tideflex"	WW-7

Collier County Public Utilities Department
County Approved Product List
Wastewater Systems

NOTES:
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2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Valve~~s~~, Plug	DeZurik	Model PEC & PEF (MJ & Flange)	WW-7/WW-8(A)(B)/Section 333313, Page 2, 2.2 A.1
Valve~~s~~, Plug	Milliken Valve Co.	Model M600 & M601 (MJ & Flange)	WW-7/WW-8(A)(B)/Section 333313, Page 2, 2.2 A.1

APPENDIX G

Approved Backflow Devices

VENDOR	SIZE	MODEL NO.	TYPE	USE
Ames / Watts	3/4" - 2"	LF4000B / LF009	RP	Residential or commercial potable water locations
Watts	3/4" - 2"	LF919	RP	Residential or commercial potable water locations
Wilkins	3/4" - 2"	975XL	RP	Residential or commercial potable water locations
Ames / Watts	2.5" - 10"	C400 / 957	RP	Large size meter - potable water for commercial or residential applications
Watts	2.5" - 10"	LF909	RP	Large size meter - potable water for commercial or residential applications
Wilkins	2.5" - 10"	375 or 375AST	RP	Large size meter - potable water for commercial or residential applications
Ames	3/4" - 2"	LF4000B	RP	Combo services: fire and domestic lines
Watts	3/4" - 2"	LF009	RP	Combo services: fire and domestic lines
Wilkins	3/4" - 2"	975XL	RP	Combo services: fire and domestic lines
Ames Colt	2.5" - 10"	C400 (w/OSY)	RP	Combo services: fire and domestic lines
Watts	2.5" - 10"	LF909 (w/OSY)	RP	Combo services: fire and domestic lines
Wilkins	2.5" - 10"	375 or 375AST (w/OSY)	RP	Combo services: fire and domestic lines
Ames	2"	3000B	DCDA	Fire Lines - Standard
Watts	2" - 3"	007DCDA	DCDA	Fire Lines - Standard
Wilkins	2"	950XLTDA	DCDA	Fire Lines - Standard
Ames	2.5" - 10"	C300/M300	DCDA	Fire Lines - Standard
Watts	3" - 10"	709DCDA	DCDA	Fire Lines - Standard
Wilkins	2.5" - 12"	350DA or 350ASTDA	DCDA	Fire Lines - Standard
Wilkins	4" - 10"	450DA or 450STDA (N-Shape)	DCDA	Fire Lines - Standard

Note: All fire line Backflow Devices shall be UL or FM approved for fire service installation. Above is a small list, others may be used if requirements are met and information is provided

APPENDIX H

Collier County

Appendix H

Basic User Application & Agreement for Delivery and Reuse of Irrigation Quality (IQ) Water

1. Property & Customer Information

Property Owner Name:	Date:
Mailing Address:	Phone Number:
Service Address:	Email Address:
Section_____Township_____Range_____	Folio (Parcel) Number:
Total Property Acres:	Acres irrigated by IQ Water only:

2. Irrigation Information

Total Number of Zones:

Each Zones Gallons per Minute-Use another sheet if necessary		
Zone1 =	Zone 6 =	Zone 11 =
Zone 2 =	Zone 7 =	Zone 12 =
Zone 3 =	Zone 8 =	Zone 13 =
Zone 4 =	Zone 9 =	Zone 14 =
Zone 5 =	Zone 10 =	Zone 15 =
Maximum number of zones running at once =		

3. Do you have a backflow prevention device installed on your potable (drinking) water line?

Yes	No	Unknown

4. For what purpose are you using IQ Water? Please select all that apply.

	Golf Course Irrigation
	Common Area Irrigation (i.e. condo associations, parks, schools, medians)
	Single Family Home landscape irrigation
	Cooling Tower
	Other, please specify_____

5. How many total individual dwelling units will this serve? Please enter a number or N/A. A single family home = 1, a condo with 20 units = 20

	Golf Course Irrigation
	Common Area Irrigation (i.e. condo associations, parks, schools, medians)

6. What is your estimated average and maximum IQ Water usage in gallons per day?

_____

Collier County

I,_____, (property owner) have read, understand, and shall abide Collier County Ordinance, No. 2013-48 as amended; Collier County Ordinance No. 1997-33, as amended; Ordinance No. 2001-73, as amended, the Federal, State, and local laws, rules, and regulations that pertain to the use of IQ Water.

I understand that due to the composition of IQ water, it may not be suitable for the irrigation of certain susceptible vegetation, and I agree that the District will not be held liable for damages that may occur to susceptible vegetation or any damages that may occur due to the uses of IQ Water, and agree to defend and hold harmless the Collier County Water-Sewer District (District) from all claims and judgments arising therefrom against the District by any person. It is further agreed that submission of this application does not ensure IQ water delivery and the Owner further agrees that the County shall not be liable to the Owner for any damages or expenses incurred by the Owner as a result of the District's failure to deliver IQ Water.

It is further agreed that District employees or authorized agents shall have the right to enter the applicant's property served by the District with IQ Water to inspect the IQ Water System and shall have the right to discontinue IQ Water service should any infraction exist.

Sign and return the completed application, an 8.5"X11" drawing of property detailing desired meter location, and the Legal Property Description to: Reuse Manager, 4370 Mercantile Ave, Naples, FL 34104.

Printed Name:_____Signed:_____Date:_____

Frequently Asked Questions

1. Where can I find the applicable Ordinances? **www.municode.com**
2. Where can I find my Legal Property Description? On your deed which may be found at **www.collierappraiser.com**
3. Where can I find applicable State laws regarding IQ/reclaimed water? **www.dep.state.fl.us/water/reuse**
4. Where do I find billing information? **www.colliercountyfl.gov**
5. How do I report IQ water, potable water, or sewer issues? **Call (239) 252-2600 for IQ water and wastewater and (239) 252-6245 for potable water.**
6. What are irrigated acres? **The acres that are irrigated, you can calculate irrigated acres by subtracting non irrigated areas such as ponds, mulched areas, etc; from the site's pervious acres.**

For District Use Only

Service Level:	Bulk	Pressurized	Pressurized & Distributed
User Type:	Major User	Basic User	
Base Charge:	Allocation Based	Meter Based Charge	

Peak GPM for proposed system_____ Minimum Meter Size Required_____
Existing Service Tap/Tap Fee $_____ Existing Customer_____
Meter Hang Fee $_____ Total Fees $_____
Approved by:_____ Date:_____
Notes:_____
_____
_____