MANUAL OF STANDARDS AND SPECIFICATIONS

FOR

WATER MAIN CONSTRUCTION

FOR

TYNDALL AFB SYSTEM

Prepared For:

Gulf Coast Electric Cooperative

A Touchstone Energy® Cooperative

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TABLE OF CONTENTS

APPENDICES

SECTION 1

DEFINITIONS

1.1 DEFINITIONS

Except where specific definitions are used within a specific section, the following terms, phrases, words, and their derivation shall have the meaning given herein when consistent with the context. Words used in the present tense include the future tense, words in the plural number include the singular number and words in the singular number include the plural number. The word "shall" is mandatory, and the word "may" is permissive.

GCEC – Gulf Coast Electric Cooperative

AASHTO – means American Association of State Highway and Transportation Officials. Any reference to AASHTO Standards shall be taken to mean the most recently published revision unless otherwise specified.

ANSI - means American National Standards Institute. Any reference to ANSI Standards shall be taken to mean the most recently published revision unless otherwise specified.

ASTM – means American Society for Testing Materials. Any reference to ASTM Standards shall be taken to mean the most recently published revision unless other specified.

AWWA – means American Water Works Association. Any reference to AWWA Standards shall be taken to mean the most recently published revision unless other specified.

CONTRACTOR – means the person, firm, or corporation with whom the contract for work has been made by the Owner, the Developer or the County.

DEVELOPER – means the person, firm or corporation engaged in developing or improving real estate for use or occupancy.

DEVELOPER'S ENGINEER – means an engineer or engineering firm registered with the State of Florida Department of Professional Regulation, retained by the DEVELOPER to provide professional engineering services for a project.

DIPRA – means Ductile Iron Pipe Research Association

DRAWINGS – means engineering drawings prepared by an ENGINEER to show the proposed construction.

ENGINEER – means an engineer or engineering firm registered with the State of Florida Department of Professional Regulation.

FDOT – means the Florida Department of Transportation, State of Florida.

GEOTECHNICAL/SOILS ENGINEER – means a Registered Florida Engineer who provides services related to terrain evaluation and site selection, subsurface exploration and sampling, determination of soil and rock properties, foundation engineering, settlement and seepage analysis, design of earth and earth retaining structures, the design of subsurface drainage systems and the improvement of soil properties and foundation conditions, and testing and evaluation of construction materials.

OSHA – means the Federal Occupational Safety and Health Administration.

OWNER – means the person, firm, corporation, or governmental unit holding right of possession of the real estate upon which construction is to take place.

PLANS – means DRAWINGS as defined herein above.

GCEC - ENGINEER – means an engineer or engineering firm registered in the State of Florida, Department of Professional Regulation who is a consultant to GCEC.

SECTION 2

PLAN REVIEW, APPROVAL, CONSTRUCTION, AND ACCEPTANCE OF WATER IMPROVEMENTS

2.1 PLANS AND SPECIFICATIONS

2.1.1 GENERAL

All submitted plans shall be standard size sheet, 24" x 36" with title block. Graphic scale (s) shall be provided on each sheet and all lettering shall be 1/8" or larger to permit photographic reproduction. Submittal of specifications will be required for all projects. ALL PLANS sheets and the title page of submitted specifications must be signed, sealed and dated by the DEVELOPER'S ENGINEER.

2.1.2 MASTER PLAN

Whenever possible, the entire water systems shall be shown on a single Master Plan. The Master Plan shall indicate the general locations of all mains, valves, hydrants, and services with respect to the proposed development improvements and the existing water systems. Main sizes shall be indicated on the Master Plan.

2.1.3 PLAN AND PROFILE

All PVC water mains shall be drawn in plan view. All HDPE directional bores shall be drawn in plan and profile view.

The plan and profile drawings shall include the following information:

a. General information such as north arrow, names of designer and engineer, revision block with dates, graphic scale(s) and sheet number.

b. Profile with elevations at 10 foot interval, or more frequently if required by good design practices applicable.

c. Development layout with horizontal and vertical controls.

d. All conflicts with other utility and drainage systems.

e. Pipe data including size, lengths, material, and slopes.

f. Size, type, and locations of fittings, valves, hydrants, air release/vacuum relief, and other related appurtenances.

g. Limits of pipe deflection.

h. Limits of special exterior coatings.

i. Limits of special bedding requirements.

j. Pipe restraint requirements.

k. Details of connection to existing systems.

l. Construction notes regarding cover, horizontal and vertical control, special construction requirements, and reference to standard and specific details.

2.1.4 DETAILS

The PLANS shall include all applicable STANDARD DRAWINGS as shown in this MANUAL. Special details shall be prepared by the DEVELOPER'S ENGINEER for aerial and underwater crossings of rivers, streams, canals and ditches. Other special details shall be prepared by the DEVELOPER'S ENGINEER as required.

2.1.5 SCALE

The master plan shall be prepared at a scale not to exceed 1" to 200'. Plan and profile sheets shall not exceed a scale of 1" to 50' or 1" to 40'. Special details shall be of sufficiently large scale to show pertinent construction information.

2.2 SUBDIVISION RELATED WATER IMPROVEMENTS

2.2.1 GENERAL

This section covers all water improvements that are dedicated to GCEC and constructed in compliance with this manual.

2.2.2 DESIGN AND PLAN REVIEW

Design of water improvements associated with GCEC shall be in compliance with this manual. PLANS will be reviewed and approved by GCEC's ENGINEER or his designated representative shall inspect the water improvements as required to ensure their compliance with this manual.

2.2.3 CONSTRUCTION INSPECTION

Inspection of improvements shall be in accordance with criteria established in this manual. GCEC's ENGINEER or his designated representative shall inspect the water improvements as required to ensure their compliance with this manual. The

DEVELOPER'S ENGINEER shall also inspect the project periodically to ensure quality control.

2.2.4 APPROVAL AND ACCEPTANCE

Approval and acceptance of water improvements shall be in accordance with the criteria established, and other miscellaneous requirements of this manual.

2.3 COMPLIANCE WITH OTHER REGULATORY REQUIREMENTS

It shall be the responsibility of the DEVELOPER to obtain and comply with all applicable Federal, State and Local Regulatory permits. The DEVELOPER is required to obtain and submit copies of all permits and certifications required from FDEP, Bay County, and FDOT if applicable.

2.4 RECORD DRAWINGS (AS-BUILTS)

The DEVELOPER'S ENGINEER shall submit a certified set of record drawings to GCEC prior to issuance of certificate of completion for the improvements. The DEVELOPER'S ENGINEER shall be responsible for recording information on the approved PLANS concurrently with construction progress. Record drawings submitted to GCEC as part of the project acceptance shall comply with the following requirements:

1. As-builts shall be legibly marked to record actual construction and shall be hand drawn during construction. GCEC may request these as-builts at any time during construction to ensure as-built quality control. In addition, the contractor shall provide certified as-builts by a Professional Land Surveyor registered in the State of Florida. Two (2) hard copies signed and sealed and a digital copy in dwg. format in state plan coordinates shall be submitted before the project is cleared through FDEP.

2. As-builts shall show actual location of all underground and above ground water piping and related appurtenances. All changes to piping location including horizontal and vertical locations of utilities and appurtenances shall be clearly shown and referenced to permanent surface improvements. As-builts shall also show actual installed pipe material, class, etc.

3. As-builts shall clearly show all field changes of dimension and detail including changes made by field order of GCEC's ENGINEER.

4. As-builts shall clearly show all details not on original contract drawings but constructed in the field. All equipment and piping relocation shall be clearly shown.

5. Location of all hydrants, valves, and valve boxes shall be shown. All valves shall be referenced from three permanent reference points.

Each sheet of the as-built PLANS shall be signed, sealed and dated by the DEVELOPER'S ENGINEER and PROFESSIONAL LAND SURVEYOR registered in the state of Florida as being "As-Builts" or "Record Drawings". Construction PLANS simply stamped "As-Builts" or "Record Drawings" and lacking in above requirements will not be accepted, and will be returned to the DEVELOPER'S ENGINEER. The "Certificate of Completion" will not be issued until correct "Record Drawings" have been submitted.

The DEVELOPER'S ENGINEER shall sign and seal all pressure test results and submit to GCEC prior to GCEC accepting the system and signing the FDEP certification.

2.5 WARRANTIES

The DEVELOPER will submit to GCEC a one-year written warranty for all materials and labor. In this document, the DEVELOPER must commit themselves to correcting any problem with the water system within a satisfactory time frame established by GCEC. If the DEVELOPER cannot meet GCEC's time constraints, GCEC will correct the problem and assess the DEVELOPER with the cost of repair. It will be the DEVELOPER'S responsibility to recover any monetary compensation from the original contactor for repairing the water system.

2.6 LIST OF MATERIALS AND APPROVED MANUFACTURERS

A list of materials and approved manufacturers for the various products specified in this manual is included in Appendix "B". It is the intent of GCEC's ENGINEER to review and update Appendix "B" as appropriate to ensure efficient operation of the services and facilities under the jurisdiction of this manual.

2.7 DEVELOPMENT COSTS

Any and all fees associated with connecting to the water system at the end-user point will be the responsibility of the DEVELOPER or the new water customer (customer).

GCEC has tax exemption status, which allows it the capability of purchasing water materials without being taxed. GCEC reserves the right to offer this status as an incentive to the DEVELOPER to help control the DEVELOPER'S cost. If GCEC allows the DEVELOPER to use this status, the DEVELOPER must submit the following to GCEC.

- A 911 address for delivery of materials
- An itemized material take off list using the specifications set forth in this manual.

The DEVELOPER must pay GCEC upfront for the entire balance for the cost of materials. GCEC will not order any materials until payment is accepted and processed.

GCEC will be responsible to bid out the job with several vendors to ensure lowest cost is obtained. Each job will be awarded to the company with the lowest overall price. GCEC will not a la Carte the material take off list. This will be a one-time purchase by GCEC. Any refunds or exchanges will be the DEVELOPER'S responsibility. The DEVELOPER and/or CONTRACTOR must submit to GCEC all packaging invoices for accounting purposes.

SECTION 3

WATER MAINS

3.1 GENERAL CONSIDERATIONS

3.1.1 TYPE OF WATER MAINS

GCEC will approve PLANS for water supply mains and extensions only when such mains are designed and constructed in accordance with the criteria set forth in this manual.

3.1.2 DESIGN PERIOD

Water mains should be designed for the estimated ultimate tributary population or Bay County Density. Water systems shall be designed to satisfy the domestic water demand and fire protection requirements for the area.

3.1.3 LOCATION

Water mains shall be located in dedicated rights-of-way or utility easements. When installed in rights-of-way, water mains shall, in general, maintain a consistent alignment with respect to the centerline of the road and shall be installed in the last 7 feet of the right-of-way. All water mains located outside of dedicated rights-of-way shall require a minimum 20 foot easement. Additional easement widths shall be provided when the pipe size or depth of cover so dictate. If a water main is located adjacent to a road right-of-way, a minimum 10 foot easement shall be provided. Additional easement widths shall be provided if the pipe size or depth of cover so dictate. Water mains shall not be placed under retention ponds, tennis courts, or other structures. In general, water mains shall not be located along side or rear lot lines. Placement of a water main along side or rear lot line may be allowed on a case by case basis if such a water main configuration results in efficient placement and utilization of he water main network. The criteria shall also apply to water mains in retention pond berms.

3.2 DESIGN BASIS

3.2.1 AVERAGE DAILY FLOW AND PEAK FLOWS

Average daily water flow shall be calculated by referencing the Equivalent Residential Connection (ERC) flow rates as outlined and Appendix C. Maximum daily and peak hourly water flow rates shall be calculated by referencing the service area peaking factors also included in Appendix C.

3.2.2 FIRE FLOW REQUIREMENTS

Fire flow requirements shall be determined in accordance with AWWA requirements. Where fire flow requirements exceed the anticipated available fire flow from the central water system, on-site fire protection deluge system or other fire department approved mitigation measures shall be utilized or the developer shall improve the system to meet the requirements.

3.2.3 DESIGN CALCULATIONS

Developer's Engineer shall submit signed, sealed and dated design calculations with the PLANS for all water distribution projects. Calculation shall show the water mains will have sufficient hydraulic capacity to transport peak hourly flows and the combination of maximum daily flows and fire flows and the combination of maximum daily flows and fire flows while meeting the requirements of this section. Head losses through meters and backflow devices shall also be included in calculations. The Developer's Engineer shall also prove by calculations that at the furthest fire hydrant in the development, a minimum pressure of 40 psi can be maintained during fire flow and peak hour flow combined.

3.3 DETAILS OF DESIGN AND CONSTRUCTION

3.3.1 PRESSURE

All water mains shall be designed in accordance with Section 3.2 above. The system shall be designed to maintain a minimum pressure of 40 psi at all points in the distribution system under all conditions of fire flow. The system must be able to maintain a minimum pressure of 50 psi during the average daily flow and 40 psi during peak daily flows. The normal working pressure in the distribution system should be approximately 65 psi and 50 psi, but in no case less than 40 psi on the downstream side of a meter.

3.3.2 DIAMETER

Only 4", 6", 8", 10", 12", and 16" diameter water mains shall be permitted. Four (4) inch water mains shall be permitted only in cul-de-sac areas with a maximum length of 400 feet of pipe. As a minimum, six (6) inch looped systems shall be required in a low density residential projects. Where looping of mains is not practical, minimum eight (8) inch mains shall be required, unless detailed calculations are submitted to substantiate the sufficiency of a 6 inch main. In commercial, industrial, and high density residential areas, minimum eight inch looped mains shall be required. Larger size mains shall be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in this section.

3.3.3 FIRE HYDRANT LOCATION AND SPACING

As a minimum, fire hydrants shall be spaced 500 feet apart and shall be placed at street intersections where applicable.

3.3.4 DEAD ENDS

In order to provide increased reliability of service and reduce head loss, dead ends shall be minimized by making appropriate tie-ins whenever practical, as determined by GCEC.

Where dead-end mains occur, they shall be provided with a fire hydrant or with an approved flushing hydrant for flushing purposes. Flushing devices shall be sized to provide flows which will give a velocity of at least 3.0 feet per second in the water main being flushed. No flushing device shall be directly connected to any sewer. All pipes shall be flushed with five (5) times the pipe volume being flushed.

3.3.5 VALVES

Sufficient valves shall be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at not more than 1,000 feet intervals. Appropriate valving shall also be provided at all areas where water mains intersect to ensure effective isolation of water lines for repair, maintenance or future extensions as required by GCEC and shall be installed at all stream crossings and intersections of pipe.

3.3.6 SEPARATION OF WATER MAINS AND SEWERS

No water pipe shall pass through or come in contact with any part of a sewer manhole. All water mains shall have a minimum separation of 6’ from all sewer lines.

3.3.7 AIR RELIEF VALVES

At high points in water mains where air can accumulate, provisions shall be made to remove the air by means of hydrants or automatic air relief valves. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur. Engineer shall use a minimum 2” type valve.

3.3.8 DISINFECTION FOLLOWING REPAIR OR REPLACEMENT

Any part of the GCEC water system which has direct contact with finished water and has been out of service for repair, alteration, or replacement shall be disinfected per AWWA and F.A.C./FDEP requirements.

3.4 WATER AND SERVICES CONNECTIONS

Only 1", 1½", 2", 4", 6", and 8" services will be permitted. Services and connections to new Water systems and to existing water systems, sizes shall be made by the contractor under GCEC supervision.

3.4.1 GENERAL

All water service connections shall be metered. In general, the method of metering will follow the guidelines listed below. However, the DEVELOPER'S ENGINEER must obtain approval before finalizing the design.

3.4.2 SINGLE FAMILY, DUPLEX, AND MULTI-FAMILY SUBDIVISION WITH PUBLIC RIGHT OF WAY

3.4.3 Each unit shall be individually metered. Single and double services shall be installed at property lines as indicated by the standard drawings.

3.4.4 COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL PROJECTS WITHOUT PRIVATE FIRE LINES

In general, each building shall be individually metered. Meter(s) shall be located in the public rights-of-way at the property line.

3.4.5 COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL, MULTI-FAMILY WITH PRIVATE STREETS, APARTMENTS, AND CONDOMINIUM PROJECTS WITH PRIVATE FIRE LINES

3.4.6 In general all such projects shall require installation of a fire line master meter. Where on-site fire systems contain less than 75 feet of main, a dual system (separate domestic and fire lines) may be considered. Dual systems shall require installation of a detector check or double detector check as determined by GCEC. Individual meters to each unit may be considered on a case-by-case basis subject to the DEVELOPER executing a Meter Installation and Easement Agreement.

3.4.7 METER INSTALLATION

All meters will be installed by GCEC after payment of applicable fees and charges. All meters will be installed underground in an approved meter box.

3.4.8 METER SIZING

Size of all meters shall be determined by the DEVELOPER'S ENGINEER and approved by GCEC's ENGINEER. The DEVELOPER'S ENGINEER shall provide sufficient information on estimated peak flows and low flows so that meter size can be determined.

The DEVELOPER'S ENGINEER shall include headlosses through metering device when designing the water system.

3.5 CROSS CONNECTION CONTROL

3.5.1 GENERAL

In order to protect the public water supply system from contamination due to cross-connections, the DEVELOPER shall install approved backflow prevention devices where there is the potential of a non-potable substance coming into contact with the public water system. Some of the common instances requiring installation of cross connection control devices are listed below. However, the DEVELOPER'S ENGINEER must obtain GCEC approval before finalizing the design of a cross connection control device. Appendix D lists the requirements for back flow prevention devices.

3.5.2 COMMERCIAL, INDUSTRIAL AND MULTI-FAMILY RESIDENTIAL

All commercial and industrial projects shall, as a minimum, require installation of approved double check valve assembly. Projects with a higher degree of hazard may be required to install an approved reduced pressure principle device or other device.

All projects with fire sprinkler and standpipe systems, and project with extensive on-site water systems shall be required, as a minimum, to install an approved double check valve assembly.

3.5.3 IRRIGATION SYSTEMS

Pressure-type vacuum breakers or double check valve assembly shall be utilized on all irrigation systems.

3.5.4 LOCATION AND INSTALLATION

In general, all backflow prevention devices are to be located directly following the water meter on DEVELOPER'S property. Backflow prevention devices shall be installed above ground to facilitate maintenance and testing. It shall be the DEVELOPER'S responsibility to pay for, install and maintain all backflow prevention devices.

SECTION 4

GENERAL

4.1 GRADES, SURVEY LINES, AND PROTECTION OF MONUMENTS

4.1.1 GRADE

All work shall be constructed in accordance with the lines and grades, shown on the PLANS. The full responsibility for keeping alignment and grade shall rest upon the CONTRACTOR.

Bench marks and base line controlling points shall be established prior to beginning work. Reference marks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible. The CONTRACTOR shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. CONTRACTOR shall remove any obstructions placed contrary to this provision.

4.1.2 SURVEYS

The DEVELOPER shall provide GCEC with either an easement with associated legal descriptions prior to project approval or the utilities shall be within a public or government right-of-way.

4.1.3 MONUMENT PRESERVATION

Property corners and survey monuments shall be preserved using care not to disturb or destroy them. If a property corner or survey monument is disturbed or destroyed during construction, whether by accident, careless work, or required to be disturbed or destroyed by the construction work, said property corner or survey monument shall be restored by a land surveyor registered in the State of Florida. All costs for this work shall be paid for by the CONTRACTOR.

4.2 UTILITY COORDINATION

4.2.1 LOCATION OF UTILITIES

Prior to proceeding with trench excavation the CONTRACTOR shall contact all utility companies in the area to aid in locating their underground services. It shall be the CONTRACTOR'S responsibility to contact utility companies at least three (3) normal working days before starting construction. The CONTRACTOR shall proceed with caution in the excavation and preparation of the trench so that the exact location of under ground utilities may be determined.

The CONTRACTOR shall take all reasonable precautions against damage to existing utilities. However, in the event of a break in an existing water main, gas main, sewer or underground cable, the CONTRACTOR shall immediately notify the responsible official of the organization operating the interrupted utility. The CONTRACTOR shall lend all possible assistance in restoring services and shall assume all cost, charges, or claims connected with the interruption and repair of such services.

4.2.2 TEST PITS

Test pits for the purpose of locating underground pipeline, utilities, or structures in advance of the construction shall be excavated and backfilled by the CONTRACTOR. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to GCEC. The costs for such test pits shall be borne by the CONTRACTOR.

4.3 CONSTRUCTION HOURS

No WORK shall be done between the hours of 5:00 p.m. and 7:00 a.m., Saturdays, Sundays, and Federal and State Holidays, unless the proper and efficient prosecution of the WORK requires operations during the night and weekend. Written notification for doing the WORK shall be provided to GCEC a minimum of 24 hours before starting such items of the WORK. GCEC shall approve the request for the "after hours" work.

4.4 CONSTRUCTION IN EASEMENTS AND RIGHTS-OF-WAY

4.4.1 CONSTRUCTION IN EASEMENTS

In easements across private property, the CONTRACTOR shall confine all operations within the easement area and shall be responsible and liable for all damage outside of the easement area. Trees, fences, shrubbery or other type of surface improvements located in easements will require protection during construction. Precautions shall be taken by adequate sheeting or other approved method to prevent any cave-in or subsidence beyond the easement limits or damage to improvements within the easement. In general, the easement area is intended to provide reasonable access and working area for efficient operation by the CONTRACTOR. Where easement space for efficient operation is not provided, the CONTRACTOR shall be responsible for organizing his operations to perform within the restrictions shown on the PLANS.

4.4.2 CONSTRUCTION IN FLORIDA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY

The CONTRACTOR shall strictly adhere to the requirements of the Florida Department of Transportation where construction work is in a right-of-way under the jurisdiction of the State of Florida, and shall take care to avoid any unreasonable traffic conflicts due to the WORK in road right-of-way. The Developer shall acquire all FDOT Utility Permits as applicable.

SECTION 5

EXCAVATION, BACKFILL, COMPACTION, GRADING, GRASSING AND SODDING

5.1 GENERAL

This section covers excavation, backfill, fill and grading associated with utility trench and structural construction. The CONTRACTOR shall furnish all labor, materials, equipment and incidentals necessary to perform all excavation, backfill, fill, compaction, grading and slope protection required to complete the WORK shown on the DRAWINGS and specified herein. The WORK shall include, but not necessarily be limited to: vaults, conduit, pipe, all backfilling, fill and require borrow; grading; disposal of surplus and unsuitable materials; and all related WORK such as sheeting bracing and water handling.

5.2 SOIL BORINGS AND SUBSURFACE INVESTIGATIONS

The DEVELOPER'S ENGINEER shall examine the site and undertake subsurface investigations including soil borings before making recommendations for compaction. GCEC will not be responsible for presumed or existing soil conditions in the WORK area.

5.3 EXISTING UTILITIES

CONTRACTOR shall locate existing utilities in the areas of WORK. If utilities are to remain in place, the CONTRACTOR shall provide adequate means of protection during earthwork operations. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, the CONTRACTOR shall consult the owner of such piping or utility immediately for directions.

5.4 MATERIALS

5.4.1 GENERAL

Materials for use as bedding and backfill, whether insitu or borrow, shall be as described under this section.

5.4.2 STRUCTURAL FILL

Materials for structural fill shall be bedding rock or select common fill as specified herein or other suitable material as approved by GCEC's ENGINEER.

5.4.3 COMMON FILL

Common fill shall consist of mineral soil, substantially free of clay, organic material, loam, wood, trash and other objectionable material which may be compressible or which cannot be compacted properly. Common fill shall not contain stones larger than 6 inch in any dimension, asphalt, broken concrete, masonry, rubble, or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Additionally common fill shall be no more than 12 percent by weight finer than the No. 200 mesh sieve unless finer material is approved for use in a specific location by GCEC's ENGINEER.

Material falling within the above specifications, encountered during the excavation may be stored in segregated stockpiles for reuse. All material, which, in the opinion of GCEC's ENGINEER, is not suitable for reuse, shall be spoiled as specified herein for disposal of unsuitable materials.

5.4.4 SELECT COMMON FILL

Select common fill shall be as specified above from common fill, except that the material shall contain no stones larger than 1 ½ inches in largest dimension, and shall be no more than 5 percent by weight finer than the No. 200 mesh sieve.

5.4.5 BEDDING ROCK

Bedding rock shall be 3/16 inch to ¾ inch washed and graded stone (FDOT #67). This stone shall be graded so that 90 to 100 percent will pass a ¾ inch screen and 95 to 100 percent will be retained on a No. 8 screen. No stones larger than 1 inch in any dimension shall be accepted.

5.5 SHEETING AND BRACING IN EXCAVATIONS

5.5.1 GENERAL

If required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction and to protect adjacent structures, existing piping and/or foundation material from disturbance, undermining or other damage, the CONTRACTOR shall construct, brace and maintain cofferdams consisting of sheeting and bracing. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

5.6 DEWATERING, DRAINAGE AND FLOATATION

5.6.1 GENERAL

The CONTRACTOR shall excavate, construct and place all pipelines, concrete work, fill, and bedding rock, in-the-dry. In addition, the CONTRACTOR shall not make the final 24 inches of excavation until the water level is a minimum of one foot below proposed bottom of excavation. For purposes of these specifications, "in-the-dry" is defined to be within 2% of the optimum moisture content of the soil. GCEC's ENGINEER reserves the right to ask the CONTRACTOR to demonstrate that the water level is a minimum of one foot below proposed bottom of excavation before allowing the construction to proceed.

Discharge water shall be clear, with no visible soil particles. Discharge from dewatering shall be disposed of in such a manner that it will not interfere with the normal drainage of the area in which the WORK is being performed, create a public nuisance, or form ponding. The operations shall not cause injury to any portion of the WORK completed, or in progress, or to the surface of streets, or to private property. The dewatering operation shall comply with the requirements of appropriate regulatory agencies. Additionally, where private property will be involved, advance permission shall be obtained by the CONTRACTOR.

5.6.2 ADDITIONAL REQUIREMENTS

The CONTRACTOR shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations and deep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing the water levels to return to natural elevations.

Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

It is expected that well points will be required for predrainage of the soils prior to final excavation for some of the deeper in-ground structures, or piping and for maintaining the lowered groundwater level until construction has been completed to such an extent that the structure, pipeline or fill will not be floated or otherwise damaged. Well points shall be surround by suitable filer sand and negligible fines shall be removed by pumping.

The CONTRACTOR shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.

Continuous pumping will be required as long as water levels are required to be below natural levels.

5.7 EXCAVATION

5.7.1 GENERAL

Excavation consists of removal, storage and disposal of material encountered when establishing required grade elevations and in accordance with the notes shown in the Drawings.

Authorized earth excavation includes removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, and other materials encountered that are not classified as rock excavation or unauthorized excavation. Unauthorized excavation consists of removal of material beyond the limits needed to establish required grade and subgrade elevations without specific direction of GCEC's ENGINEER.

If requested by GCEC's ENGINEER, when excavation has reached required subgrade elevations, a Geotechnical/Soils Engineer shall make an inspection of conditions. If the subgrade is unsuitable, CONTRACTOR shall carry excavation deeper and replace excavated material with select common fill or bedding rock, as directed by GCEC's ENGINEER.

If the CONTRACTOR excavates below grade through error or for his own convenience or through failure to properly dewater the excavation or disturbs the subgrade before dewatering is sufficiently complete, he may be directed by GCEC's ENGINEER to excavate below grade and refill this excavation using select common fill or bedding rock.

Slope sides of excavations shall comply with local codes and ordinances, and with OSHA requirements. CONTRACTOR shall shore and brace where sloping is not possible due to space restrictions or stability of the material excavated. Sides and slopes shall be maintained in a safe condition until completion of backfilling.

5.7.2 EXCAVATION FOR STRUCTURES

All such excavations shall conform to the elevations and dimensions shown on drawing within a tolerance of plus or minus 0.10 feet and extending a sufficient distance from footings and foundations to permit placing and removing formwork, installation of services and other construction, inspection or as shown on the drawings. In excavating for footings and foundations, care shall be exercised not to disturb the bottom of the excavation. Bottoms shall be trimmed to required lines and grades to leave a solid base to receive concrete.

5.7.3 TRENCH EXCAVATION

Excavation for all trenches required for the installation of utility pipes shall be made to the depths indicated on the drawings and in such manner and to such widths as will give

suitable room for laying the pipe within the trenches, for bracing and supporting and for pumping and drainage facilities.

The bottom of the excavations shall be firm and dry and in all respects acceptable to GCEC's ENGINEER.

Excavation shall not exceed normal trench width as specified in the STANDARD DRAWINGS. Any excavation, which exceeds the normal trench width, shall require special backfill requirements as determined by GCEC's ENGINEER.

Where pipes are to be laid in bedding rock, select common fill or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

Where the pipes are to be laid directly on the trench bottom, the lower part of the trenches shall not be excavated to grade by machinery. The last of the material being excavated shall be done manually in such a manner that will give a shaped bottom, true to grade, so that pipe can be evenly supported on undisturbed material. Bell holes shall be made as required.

5.8 BEDDING AND BACKFILL

5.8.1 GENERAL

Material placed in fill areas under and around structures and pipelines shall be deposited within the lines and to the grades shown on the DRAWINGS or as directed by GCEC's ENGINEER, making due allowance for settlement of the material. Fill shall be placed only on properly prepared surfaces, which have been inspected and approved by GCEC's ENGINEER. If sufficient select common or common fill material is not available from excavation on site, the CONTRACTOR shall provide fill as may be required.

Fill shall be brought up in substantially level lifts starting in the deepest portion of the fill. The entire surface of the WORK shall be maintained free from ruts and in such condition that construction equipment can readily travel over any section.

Fill shall be placed spread in layers by a backhoe or other approved method, unless otherwise specified. The CONTRACTOR shall assign a sufficient number of personnel to this WORK to insure satisfactory compliance with these requirements.

If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layer, it shall be loosened by harrowing or by another approved method before the succeeding layer is placed.

All fill materials shall be placed and compacted "in-the-dry". The CONTRACTOR shall dewater excavated areas as required to perform the work and in such manner as to preserve the undisturbed state of the natural inorganic soils.

Prior to filling, the ground surface shall be prepared by removing vegetation, debris, unsatisfactory soil materials, obstructions and deleterious materials. CONTRACTOR shall plow strip or break up sloped surfaces steeper than one vertical to four horizontal so that fill material will bond with the existing surface.

Before compaction, material shall be moistened or aerated as necessary to provide the optimum moisture content. Material which is too wet shall be spread on the fill area and permitted to dry, assisted by harrowing if necessary, until the moisture content is reduced to allowable limits. If added moisture is required, water shall be applied by sprinkler tanks or other sprinkler systems, which will insure uniform distribution of the water over the area to be treated and give complete and accurate control of the amount of water to be used. If too much is added, the area shall be permitted to dry before compaction is continued. The CONTRACTOR shall supply all hose, piping, valves, sprinklers, pumps, sprinkler tanks, hauling equipment and all other materials and equipment necessary to place water in the fill in the manner specified. Backfill or fill material shall not be placed on surfaces that are muddy, frozen or contain frost or ice.

5.8.2 BEDDING AND BACKFILL FOR PIPES

Bedding for pipe shall be as shown on the PLANS. The CONTRACTOR shall take all precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.

Backfilling over and around pipes shall begin as soon as practical after the pipe has been laid, jointed and inspected.

Any space remaining between the pipe and sides of the trench shall be carefully backfilled and spread by hand or approved mechanical device and thoroughly compacted with a tamper as fast as placed, up to a level of one (1) foot above the top of the pipe. The filling shall be carried up evenly on both sides.

The remainder of the trench above the compacted backfill as just described above, shall be filled and thoroughly compacted in uniform layers.

5.9 COMPACTION

5.9.1 GENERAL

The CONTRACTOR shall control soil compaction during construction to provide the percentage of maximum density specified. The Developer's Engineer shall provide

GCEC's ENGINEER copies of all soils testing reports, prepared by a GEOTECHNICAL/SOILS ENGINEER, demonstrating compliance with these SPECIFICATIONS.

When existing trench bottom has a density less than that specified, the CONTRACTOR shall break up the trench bottom surface, pulverize, moisture-condition to the optimum moisture content and compact to required depth and percentage of maximum density.

5.9.2 PERCENTAGE OF MAXIMUM DENSITY REQUIREMENTS

Fill or undisturbed soil from the bottom of the pipe trench to 1 foot above the pipe shall be densified to a minimum density of 95% of the maximum dry density as determined by AASHTO T-180.

Backfill from 1 foot above utility pipes to grade shall be densified to a minimum density of 95% of the maximum dry density as determined by AASHTO T-180.

Fill under and around structures, and to the extent of the excavation shall be densified to a minimum density of 95% of the maximum dry density as determined by AASHTO T-180.

5.9.3 COMPACTION TESTS

One compaction test location shall be required for each 500 linear feet of pipe. GCEC's ENGINEER may determine that more compaction tests are required to certify the installation depending on field conditions. The locations of compaction tests within the trench shall be in conformance with the following schedule:

a. One test at the spring line of the pipe.

b. At least one test for each 12" layer of backfill within the pipe bedding zone for pipes 24 inches and larger.

c. One test at an elevation of one foot above the top of the pipe.

d. One test for each two feet of backfill placed from one foot above the top of the pipe to finished grade elevation.

If based on GEOTECHNICAL/SOILS ENGINEER testing reports and inspection, fill which has been placed is below specified density, CONTRACTOR shall provide additional compaction and testing prior to commencing further construction.

5.10 GRADING

All areas within the limits of construction, including transition areas, shall be uniformly graded to produce a smooth uniform surface. Areas adjacent to structures or paved surfaces shall be graded to drain away from structures and pavement. Ponding shall be prevented. After grading, the area shall be compacted to the specified depth and percentage of a maximum density.

No grading shall be done in areas where there are existing pipelines that may be uncovered or damaged until such lines have been relocated.

5.11 MAINTENANCE

CONTRACTOR shall protect newly graded areas from traffic and erosion and keep them free of trash and debris. CONTRACTOR shall repair and reestablish grades in settled, eroded and rutted areas.

Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, CONTRACTOR shall scarify surface, and reshape and compact to required density prior to further construction.

5.12 INSPECTION AND QUALITY ASSURANCE

5.12.1 INSPECTION AND QUALITY ASSURANCE

CONTRACTOR shall examine the areas and conditions under which excavating, filling and grading are to be performed, and not proceed with the WORK until unsatisfactory conditions have been corrected.

5.12.2 QUALITY ASSURANCE

All work shall be performed in compliance with applicable requirements of governing authorities having jurisdiction.

The CONTRACTOR, at his expense, shall engage soil testing and inspection services for quality control testing during earthwork operations. The testing and inspection service shall be subject to the approval of GCEC's ENGINEER.

Quality control testing shall be performed during construction to ensure compliance with these specifications. CONTRACTOR shall allow the testing service to inspect and approve fill materials and fill layers before further construction is performed. The CONTRACTOR shall give copies of all test results in a report form to the GCEC's ENGINEER to demonstrate compliance with compaction requirements stipulated in this MANUAL.

5.13 GRASSING

5.13.1 GENERAL

5.13.2 DESCRIPTION OF WORK

Extent of grassing work is as specified or shown on the construction plans. All other areas disturbed during construction operations shall be seeded.

5.13.3 QUALITY ASSURANCE

All seed used shall be labeled in accordance with U. S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitation for bids. All seed shall be furnished in sealed standard containers, unless exception is granted in writing by Owner. Seed which has become wet, moldy, or otherwise damaged in transit or in storage shall not be used. Fertilizer shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, shall not be used. Seed, fertilizer and other grassing materials shall be stored under cover and protected from damage which would make them unacceptable for use.

5.13.4 GRASS MATERIALS

Grass Seed: Federal Specifications JJJ-S-181 and shall satisfy the following requirements:

Seed	Min. Pure Seed	Min. % Germination and Hard Seed	Max. % Weed Seed
Bermuda Grass, (Cynodon Dactylan)	80%	15%	.25%

Seed failing to meet the purity or germination requirements by no more than twenty-five percent may be used, but the quantity shall be increased to yield the required rate of pure live seed. Seed failing to meet the weed seed requirements shall not be used.

5.13.5 PLACING TOPSOIL

Areas to be grassed shall have a minimum topsoil cover of two inches. Topsoil shall not be placed when the subgrade is excessively wet, extremely dry or in a condition otherwise detrimental to the proposed planting or proper grading.

5.13.6 APPLICATION OF FERTILIZER

Fertilizer shall be applied at the rate of 6 pounds per 1,000 square feet and shall be thoroughly incorporated into the top three to four inches of soil. Fertilizer: 16-16-16 formulation of which 60 percent of the nitrogen is in the urea-formaldehyde form and shall conform to the applicable State Fertilizer laws.

1. Seed shall be applied at the following rate:

Seed	Rate of Application
Argentine Bahia Grass (Paspalum notatum)	6 lbs./1000 sq. ft. 260 lbs./acre
Bermuda Grass, (Cynodon Dactylan)	6 lbs./1000 sq. ft. 260 lbs./acre

2. Seeded areas shall be mulched at the rate of not less than 1-1/2" loose measurement over all seeded areas. Spread by hand, blower, or other suitable equipment. Mulch shall be cut into the soil with equipment capable of cutting the mulch uniformly into the soil. Mulching shall be done within 24 hours of the time seeding is completed. All seeded areas shall be mulched, no exceptions. Hydro-see must also be mulched.

5.13.7 WINTER COVER

All areas to be grassed shall be protected against erosion at all times. For protection during winter months (November 1st through March 31st) Italian rye grass shall be planted at the rate of four pounds per 1,000 square feet on all areas which are not protected by permanent grass. This does not alleviate the contractor from the required seeding.

5.14 SODDING

5.14.1 GENERAL

5.14.1.1 WORK INCLUDED

Sod Installation.

5.14.1.2 DELIVERY, STORAGE, AND HANDLING

Deliver sod on pallets. Protect exposed roots from dehydration. Do not deliver more sod that can be laid within 24 hours.

5.14.2 PRODUCTS

5.14.2.1 MATERIALS

Sod: ASPA approved, field grown grade; cultivated grass sod; for low maintenance and traffic durability, with strong fibrous root system, free of stone, burned or bare spots; containing no more than 5 weeds per 1000 square feet.

Approved Sods: Bermuda, (Cynodon Dactylon).

5.14.2.2 PREPARATION OF SUBSOIL:

Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

Remove foreign materials and undesirable plants and their roots. Do not bury foreign material beneath areas to be sodded. Remove contaminated subsoil.

5.14.2.3 LAYING SOD

Moisten prepared surface immediately prior to laying sod.

Lay sod immediately on delivery to site and within 24 hours after harvesting to prevent deterioration.

Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12-inches overlapping; minimum. Do not stretch or overlap sod pieces.

Lay smooth. Align with adjoining grass areas. Place top elevation of sod 1/2 inch below adjoining paving or curbs.

On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.

Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

Sod shall be laid in all ditch areas and slopes that are steeper than or equal to 1 vertical to 3 horizontal. Sod shall be pinned down for stabilization in these areas. Sod shall be placed in all swales and 24" next to all above ground structures. This includes but not limited to roads, valve boxes, fences, sidewalks, and lift stations.

SECTION 6

BORING AND JACKING/DIRECTIONAL BORING

6.1 GENERAL

The installation of a casing pipe by the method of boring and jacking shall be covered by these specifications. The overall work scope shall include, but not be limited to, boring and jacking pits and equipment, sheeting, steel casing pipe, skid, steel straps, coatings, location signs as required, miscellaneous appurtenances to complete the entire WORK. Boring and jacking operations shall be performed within the right-of-way and/or easements shown on the DRAWINGS.

6.2 PIPE MATERIAL

6.2.1 STEEL CASING

Steel casings shall conform to the requirements of ASTM Designation A139 (straight seam pipe only) Grade "B" with a minimum yield strength of 35,000 psi. The casing pipes shall have the minimum nominal diameter and wall thickness as shown on the following table:

Carrier Pipe Nominal Diameter	Casing Outside Diameter	Casing Wall Thickness
4"	16"	.250"
6"	18"	.250"
8"	20"	.250"
10"	24"	.250"
12"	30"	.312"
16"	30"	.312"
20"	36"	.375"
24"	42"	.500"
30"	48"	.500"
36"	54"	.500"
42"	60"	.500"

Field and shop welds of the casing pipes shall conform with the American Welding Society (AWS) standard specifications. Field welds shall be complete penetration, single-bevel groove type joints. Welds shall be airtight and continuous over the entire circumference of the pipe and shall not increase the outside pipe diameter by more than ¾ inch.

6.2.2 CARRIER PIPE

The carrier pipe shall be minimum class 50 ductile iron pipe with restrained joints.

6.3 PIPE HANDLING

Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe or coatings. Pipe shall not be dropped. All pipe shall be examined before laying, and no piece shall be installed which is found to be defective. Any damage to the pipe or coatings shall be repaired to the satisfaction of GCEC's ENGINEER.

6.4 CONSTRUCTION REQUIREMENTS

6.4.1 WORK COORDINATION

It shall be the CONTRACTOR'S responsibility to perform the boring and jacking work in strict conformance with the requirements of the agency in whose right-of-way or easement the work is being performed. Any special requirements of the agency such as insurance, flagmen, etc., shall be strictly adhered to during the performance of WORK.

6.4.2 DEWATERING

Dewatering through the casing during construction shall not be permitted. All dewatering methods shall be approved by Bay County and GCEC's ENGINEER before construction work begins.

6.4.3 CARRIER PIPE SUPPORT

The carrier pipes shall be supported within the casing pipes so that the pipe bells do not rest directly on the casing. The load of the carrier pipes shall be distributed along the casing by approved casing spacers. Casing spacers shall be bolt on style split shells made of either T-304 stainless steel or fusion-coated steel (a minimum 0.10" thick coating of PVC shall be provided over the entire band). The shell shall be lined with a PVC liner 0.090" thick with 85-90 Durometer. All nuts and bolts shall be high strength, low alloy meeting AWWA C111. Runners shall be made of a high molecular weight polymer with inherent high abrasion resistance and a low coefficient of friction.

6.4.4 JACKING PITS

Excavation adjacent to the roads shall be performed in a manner to adequately support the roads. Bracing, shoring, sheeting or other supports shall be installed as needed. CONTRACTOR shall install suitable reaction blocks for the jacks as required. Jacking operations shall be continuous and precautions shall be taken to avoid interruptions, which might cause the casing to "freeze" in place. Upon completion of jacking operations, the reaction blocks, braces, and all other associated construction materials shall be completely removed from the site.

6.4.5 MISCELLANOUS REQUIREMENTS

Correct line and grade shall be carefully maintained. Earth within the casing shall not be removed too close to the cutting edge in order to prevent the formation of voids outside the casing. If voids are formed, they shall be satisfactorily filled with grout by pumping.

The sections of steel casing shall be field welded in accordance with the applicable portions of AWWA C206 and AWS D7.0 for field welded pipe joints. CONTRACTOR shall wire brush the welded joints and paint with Inertol Quick-Drying Primer 626 by Koppers Company or approved equal. After completion of jacking, CONTRACTOR shall clean the interior of the casing of all excess material.

The annular space between the carrier pipe and casing shall be filled with clean sand, if required in the bore and jack permit. Masonry plugs are to be installed at each open end of the casing. Plugs shall be suitable for restraining the earth load while allowing drainage of the casing.

SECTION 7

PRESSURE PIPE RESTRAINT

7.1 GENERAL

Pressure pipe fittings and other items requiring restraint shall be braced with restraining assemblies as specified in this manual.

7.2 RESTRAINED JOINT CONSTRUCTION

Sections of piping requiring restrained joints shall be constructed using pipe and fittings with restrained "locked-type" joints manufactured by the pipe and fitting manufacturer and the joints shall be capable of holding against withdrawal for line pressures of 150 psi. Any restrained joints that allow for elongation upon pressurization will not be allowed in those locations where the pipe comes out of the ground.

Restrained pipe joints that achieve restraint by incorporating cut out sections in the wall of the pipe shall have a minimum wall thickness at the point of cut out that corresponds with the minimum specified wall thickness for the rest of the pipe.

The minimum number of restrained joints required for resisting forces at fittings and changes in direction of pipe shall be determined from the length of restrained pipe on each side of fittings and changes in direction necessary to develop adequate resisting friction with the soil.

The required lengths of restrained joint ductile iron pipe are provided in this manual.

Wherever 2-45^{o} bends are used in place of a 90^{o} bend and the minimum restrained joints required from one 45^{o} bend extend beyond the other 45^{o} bend, the 2-45^{o} bends will be considered as though a 90^{o} bend were located midway between the 2-45^{o} bends.

7.3 MECHANICAL RESTRAINING DEVICE

7.3.1 JOINT RESTRAINT DEVICE

Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A 536. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI A21.11 and ANSI/AWWA C153/A21.53. Twist-off nuts shall be used to insure proper actuating of the restraining devices.

The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1.

SECTION 8

PRESSURE CONNECTION

8.1 GENERAL

Installations of pressure connections 4" and larger shall be made in accordance with this section.

8.2 TAPPING SLEEVES

8.2.1 GENERAL

Tapping sleeves shall be mechanical joint sleeves or fabricated stainless steel sleeves as specified below.

8.2.2 TAPPING SLEEVES

Sleeves shall be stainless steel and have an outlet flange with the dimensions of the Class 125 flanges shown in ANSI B16.1 properly recessed for tapping valve. Gaskets shall be vulcanized natural or synthetic rubber. Sleeves shall be capable of withstanding a 150 psi working pressure.

8.2.3 TAPPING VALVES

Tapping valves shall meet the requirements of Section 11.2 except the units shall be flange by mechanical joint ends. Valves shall be compatible with tapping sleeves as specified above and specifically designed for pressure connection operations.

8.3 NOTIFICATION AND CONNECTION TO EXISTING MAINS

All connections to existing mains shall be made by the CONTRACTOR only after the connection procedure and his work scheduling has been reviewed and approved by GCEC. The CONTRACTOR shall submit a written request to GCEC a minimum of five (5) working days prior to scheduling said connections. In his request he shall outline the following:

1. Points of Connection, fittings to be used, and method of flushing and disinfection if applicable.

2. Estimated construction time for said connections.

GCEC shall review the submittal within three (3) working days after receiving it and inform the CONTRACTOR regarding approval or denial of his request. If his request is rejected by GCEC, the CONTRACTOR shall resubmit his request modifying it in a manner acceptable to GCEC.

All connections shall only be made on the agreed upon date and time. If the CONTRACTOR does not initiate and complete the connection work in the agreed upon manner, he shall be required to reschedule the said connection by following the procedure outlined above.

The CONTRACTOR shall not operate any valves in the system.

8.4 INSTALLATION

8.4.1 CONSTRUCTION DETAILS

Sufficient length of main shall be exposed to allow for installation of the tapping sleeve and valve and the operation of the tapping machinery. The main shall be supported on concrete pedestals or bedding rock at sufficient intervals to properly carry its own weight, plus the weight of the tapping sleeve valve and machinery. Any damage to the main due to improper or insufficient supports shall be repaired at the CONTRACTOR'S expense.

The inside of the tapping sleeve and valve, the outside of the main, and the tapping machine shall be cleaned and swabbed or sprayed with 10% liquid chlorine prior to beginning installation for water system pressure connections.

After the tapping sleeve has been mounted on the main, the tapping valve shall be bolted to the outlet flange, making a pressure tight connection. Prior to beginning the tapping operation, the sleeve and valve shall be pressure tested at 150 psi to ensure that no leakage will occur.

For pressure connections through 12" diameter or less the minimum diameter cut shall be ½" less than the nominal diameter of the pipe to be attached. For 14" through 20" installations the minimum diameter shall be 1 ½" less; for larger taps the allowable minimum diameter shall be 2" to 3" less than the nominal diameter of the pipe being attached. After the tapping procedure is complete the CONTRACTOR shall submit the coupon to GCEC.

SECTION 9

PIPE MATERIAL FOR WATER MAINS AND SERVICE CONNECTIONS

9.1 GENERAL

These specifications cover the pipe, fittings, and accessory items used for water distribution systems.

Pipe used in water distribution systems shall be either polyvinyl chloride (PVC), or ductile iron pipe (DIP).

The CONTRACTOR shall be responsible for all materials furnished and storage of same, until the date of substantial completion. He shall replace at his expense all materials found to be defective or damaged in handling or storage. The CONTRACTOR shall, if requested by GCEC's ENGINEER, furnish certificates, affidavits of compliance, test reports, or samples for check analysis for any of the materials specified herein. All pipe delivered to project site for installation is subject to random testing for compliance with the designated specifications.

9.2 PVC PIPE

9.2.1 PVC PIPE

All PVC pipe of nominal diameter six (6) through twelve (12) inches shall be manufactured in accordance with AWWA Standard C900, latest edition and sixteen (16) inch pipe shall be in accordance with AWWA Standard C905. The PVC pipe shall have a minimum working pressure rating of 150 psi and shall have a dimension ratio (DR) of 18. Pipe shall be the same O.D. as ductile iron pipe. DR 25 pipe will not be accepted.

9.2.2 JOINTS

PVC pipe shall have integral bell push on type joints conforming to ASTM D3139.

9.3 DUCTILE IRON PIPE AND FITTINGS

9.3.1 DUCTILE IRON PIPE

All ductile iron pipe of nominal diameter four (4) through sixteen (16) inches shall conform to ANSI/AWWA A21.51/C151. A minimum of Class 50 pipe shall be supplied for all sizes of pipe unless specifically called out in the DRAWINGS, or required by GCEC's ENGINEER.

9.3.2 FITTINGS

Any fittings required shall be mechanical joint ductile iron or gray iron conforming to ANSI/AWWA A21.10/C110, 250 psi minimum pressure rating, or ductile iron compact fittings four (4) through twelve (12) inches in accordance with ANSI/AWWA A21.53/C153.

9.3.3 JOINTS

Joints for ductile iron pipe and fitting joints shall be push on or mechanical joints conforming to ANSI/AWWA A21.11/C111. Where called for in the PLANS, restrained or flanged joints shall be provided. Flanged joints shall conform to ANSI Standard B16.1-125 LB. Restrained joints shall conform to Sections 7.3 and 7.4.

9.3.4 COATINGS AND LININGS

Where ductile iron pipe and fittings are to be below ground or installed in a casing pipe the coating shall be a minimum 1.0 mil thick in accordance with ANSI/AWWA A21.51/C151. Where ductile iron pipe and fittings are to be installed above ground, pipe, fittings and valves shall be thoroughly cleaned and given one field coat (minimum 1.5 mils dry thickness) of rust inhibitor primer. Intermediate and finished field coats of Alkyd shall also be applied by the CONTRACTOR (minimum 1.5 mils dry thickness each coat). Primer and field coats shall be compatible and shall be applied in accordance with the manufacturer's list in appendix.) Final field coat shall be green for raw water and blue for finished water.

All ductile iron pipe and fittings shall have an interior protective lining of cement-mortar with a seal coat of asphaltic material in accordance with ANSI/AWWA A21.4/C104.

9.3.5 POLYETHYLENE ENCASEMENT

The pipe shall be polyethylene encased (8 mil) where shown on the DRAWINGS or required by the GCEC in accordance with ANSI/AWWA A21.51/C105.

9.4 HDPE PIPE - GENERAL

9.4.1 DESCRIPTION OF WORK

A. This section includes material and installation requirements necessary for furnishing and installing HDPE pipe, fittings and specials in the locations and quantities as shown on the drawings. Quantities shown on the plans may not be the exact length needed for directional bores. The Contractor shall investigate this before the Bid and shall inform the Engineer prior to the bid if additional HDPE pipe will be needed. Any additional HDPE pipe needed after the Bid will be the responsibility of the Contractor and shall not require any additional costs to the Owner.

9.4.2 QUALITY CRITERIA

A. Reference to industry standards as contained herein shall be construed as to be in reference to the latest revision or edition. All HDPE pipe shall meet all AWWA Standards.

B. The pipe fittings and specials shall be made by a manufacturer experienced in producing pipe, fittings, and specials of the type, size, configuration, and quality specified herein. The manufacturer shall have produced pipe, fittings and specials having a record of at least five years successful performance.

9.4.3 SUBMITTALS

A. The Contractor shall submit shop drawings showing the pipe lengths, design details, joint details, specials, etc., for the Engineer's approval. Pipe shall be fabricated in accordance with these plans.

B. The Contractor shall submit a notarized statement of certification from the pipe manufacturer as to conformance with the specified ANSI/AWWA Specifications listed herein, and modifications thereto, at the time of submitting shop drawing data on the pipe and fittings.

9.4.4 DELIVERY, STORAGE AND HANDLING

A. The Contractor shall be responsible for the acceptability of all material furnished by him and shall assume responsibility for the replacement of all such material found damaged in shipping, or defective in manufacture. This shall include the furnishing of all material and labor required for the replacement of installed material discovered to be defective prior to the final acceptance of the work.

B. The interior, as well as all sealing surfaces of all pipe, fittings, and other accessories shall be kept free from dirt and foreign matter. Consult the manufacturer for specific storage recommendations.

C. Materials shall, at all times be handled properly to prevent damage in accordance with manufacturer's recommendations. Pipe and fittings shall not be thrown, dropped, or dragged.

9.4.5 HDPE PIPE - PRODUCTS

9.4.5.1 <u>HDPE PIPE</u>

A. Polyethylene pipe shall be manufactured in accordance with ASTM F714. All HDPE pipe used for water mains shall have an embedded blue stripe on each side symbolizing water.

B. The polyethylene pipe shall be rated for use with water at 73.4^{o}F. at a hydrostatic design stress of 800 psi and a minimum working pressure of 160 psi.

C. Dimension Ratio (DR) shall be DR11 for the HDPE pipe shown on the drawings.

D. Polyethylene extrusion compound from which the polyethylene pipe is extruded shall comply with application requirements for PE-4710 high molecular weight polyethylene plastic material. Material shall be as described in ASTM D1248 and shall comply with the following:

1. Pipe resin shall have a minimum inherent viscosity of 2.5 when run according to ASTM D1601.
2. Exceed 5,000 hours on ESC as determined by ASTM D-1248-345434C.
3. Have a specific gravity of between 0.9141 and 0.955.
4. Contain a minimum of 2% and a maximum of 3% of carbon black and shall produce a finish product that is uniformly black.

E. Marking on the pipe shall include: the nominal pipe or tubing size; the type of plastic material, i.e., PE-3408; the standard thermoplastic pipe dimension ratio or the pressure rating in psi for water at 73.4^{0}F. (160 psi); the ASTM designation with which the pipe complies and manufacturer's name or trade mark and code.

9.4.6 FITTINGS AND JOINTS

Fittings shall be fabricated to the same standards as the pipe from the same raw materials by thermal fusion. Jointing shall be by the thermal butt fusion method as recommended by the manufacturer. Fittings and joints shall have a pressure rating equal to the pipe and shall have machined fusion ends matched to pipe wall. The Contractor shall use mechanical joint fusion welded adapters with ductile iron mechanical joint sleeves for transition connections.

9.4.7 HDPE PIPE - EXECUTION

9.4.7.1 GENERAL REQUIREMENTS

A. Installation of all polyethylene pipe, fittings, specials and appurtenances shall be in accordance with Section 02730 and Manufacturers Instructions.

B. Openings such as stubs, tees and other services along the lines shall be securely closed by means of an approved stopper that fits into the pipe and is recommended by the pipe manufacturer. This stopper shall be jointed in such a manner that it may be removed at some future time without injury to the pipe itself. At the close of each day's work and other times when the pipe is not being laid, the end of the pipe shall be temporarily closed with a close-fitting stopper.

C. Cleaning - All necessary precautions shall be taken to prevent the entrance of mud, sand or other obstructing material into the pipelines. As the work progresses, the interior of the main shall be cleaned of all dirt, jointing material, and superfluous materials of every description.

D. Joining of piping shall be performed by experienced fusion technicians with a minimum of five (5) years or more experience in field application involving large diameter (over 12-inches) polyethylene pipe. Experience record shall be submitted for review 15 days prior to directional boring activities.

If the Contractor feels that the length of HDPE pipe shown on the plans is not adequate, then the Contractor shall notify the Engineer prior to the bid. Contractor shall not ask for additional directional boring cost after the bid.

E. Handling:

1. Pipe must be handled in a way to insure that it is not gouged or scratched to a depth of more than 10% of the wall thickness.

2. Pipe shall not be bent to a radius of less than the manufacturer's recommendation at any time during installation.

3. Pipe shall be handled at all times with strapping that a combined width at each load area of at least half the pipe diameter to prevent point damage to the pipe. No wire rope slings shall be used.

9.4.8 INSPECTION OF SYSTEM

A. Inspection of the system shall be performed by the Engineer's Representative during all underground pipe installation and shall provide daily inspection reports and photos documenting the work was completed in accordance of GCEC's specifications and the Engineers design.
B. GCEC's ENGINEER shall witness all pressure tests, disinfection and flushing activities.

9.4.9 HDPE PIPE – TESTING

9.4.10 TESTING IN THE TRENCH

Fill the pipeline with water after it has been laid; bleed off any trapped air. Subject the lowest element in the system to a test pressure that is 1.5 times the design pressure, and check for any leakage. When in the pinion of the engineer, local conditions require that the trenches be backfilled immediately after the pipe has been laid, apply the pressure test after backfilling has been completed but not sooner that a time which will allow sufficient

curing of any concrete that may have been used. Typical minimum concrete curing times are 36 hours for early strengths and seven days for normal strengths.

The test procedures consist of two steps: the initial expansion and the test phase. When test pressure applied to a water-filled pipe, the pipe expands. During the initial expansion of the pipe under test sufficient make-up water must be added to the system at hourly intervals for three hours to maintain the test pressure. After about four hours, initial expansion should be complete and the actual test can start.

When the test is to begin, the pipe is full of water and is subjected to a constant test pressure of 1.5 times the system design pressure. The test phase should not exceed three hours, after which time any water deficiency must be replaced and measured. Add and measure the amount of make-up water required to return to the test pressure and compare this to the maximum allowance in Figure 4.1.

An alternate leakage test consists of maintaining the test pressure (described above) over a period of one hour, and then dropping the pressure by 10 psi (0.069Mpa). If the pressure than remains within 5% of the target value of one hour, this indicates there is no leakage in the system.

NOTE: Under no circumstances shall the total time under test exceed eight (8) hours at 1 ½ times the system pressure rating. If the test is not complete within this time limit (due to leakage, equipment failure, etc.), the test section shall be permitted to "relax" for eight (8) hours prior to the next test sequence. Air testing is not recommended. Additional safety precautions may be required.

FIGURE 4.1
ALLOWANCE FOR EXPANSION UNDER TEST PRESSURE

Nominal Pipe Size inches (1)	U.S. Gals/100 feet of Pipe (2)				Nominal Pipe Size Inches (1)	U.S. Gals/100 feet of Pipe (2)		
	1-Hour	2-Hour	3-Hour			1-Hour	2-Hour	3-Hour
2	0.08	0.12	0.15		20	2.80	5.50	8.00
3	0.10	0.15	0.25		22	3.50	7.00	10.50
4	0.13	0.25	0.40		24	4.50	8.90	13.30
5	0.21	0.41	0.63		28	5.50	11.10	16.80
6	0.30	0.60	0.90		30	6.20	12.60	19.10
8	0.50	1.00	1.50		32	7.00	14.30	21.50
10	0.75	1.30	2.10		36	9.00	18.00	27.00
12	1.10	2.30	3.40		42	12.00	24.00	36.00
14	1.40	2.80	4.20		48	15.00	27.00	43.00
16	1.70	3.30	5.00		54	18.00	30.00	50.00
18	2.20	4.30	6.50					
(1) mm* 0.03937 (2) multiply by 11.53 to convert to liter/100 meters of pipe								

9.5 SERVICE PIPE, STOPS, FITTINGS, AND SERVICE SADDLES

9.5.1 SERVICE PIPE

All service lines shall be 1", 1 ½" or 2" polyethylene tubing conforming to specifications in AWWA C800 and AWWA C901.

9.5.2 STOPS

Corporation stops shall be 1", 1 ½" or 2" brass, equipped with connections compatible with the polyethylene tubing and threaded in accordance with specifications in AWWA C800 and AWWA C901. Curb stops shall be sized to match the meter size and conform to the specifications in AWWA C800 and AWWA C901.

9.5.3 FITTINGS

Fittings shall be brass, cast and machined in accordance with specifications in AWWA C800 and AWWA C901, with compatible polyethylene tubing connections.

9.5.4 SERVICE SADDLES

A service saddle shall be used for all service line taps. Service saddles shall be double strap, anchored by a minimum four (4) bolt pattern on a ductile iron saddle body. Service saddles for PVC pipe shall have the double strap sized exactly to the pipe outside diameter. Sealing gaskets shall be BUNA-N rubber and straps shall be corrosion resistant alloy steel.

GCEC may require a stainless steel strap and fusion epoxy or nylon coated ductile iron body with stainless steel hardware in areas designated as corrosive.

SECTION 10

PIPE INSTALLATION FOR WATER MAINS

10.1 GENERAL

Pipe shall be installed in accordance with the manufacturer's specifications and instructions for the type of pipe used and applicable AWWA Standards, such as C600 and C603, unless otherwise stated in these specifications.

10.2 PIPE HANDLING

All types of pipe shall be handled in such manner as will prevent damage to the pipe or coating. Accidental damage to pipe or coating shall be repaired to the satisfaction of GCEC or be removed from the job. When not being handled, the pipe shall be supported on timber cradles or on properly prepared ground, graded to eliminate all rock points and to provide uniform support along the full length. When being transported, the pipe shall be supported at all times in a manner which will not permit distortion or damage to the lining or coating. Any unit of pipe that, in the opinion of GCEC, or GCEC's ENGINEER or representative is damaged beyond repair by the CONTRACTOR shall be removed from the site of the work and replaced with another unit.

Joint gaskets shall be stored in clean, dark, dry locations until immediately before use.

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

10.3 SEPARATION OF WATER MAINS AND SEWERS

10.3.1 GENERAL

Water mains that are laid in the vicinity of pipe lines designated to carry raw wastewater or reclaimed water (wastewater effluent) shall meet the horizontal and vertical separations specified below.

10.3.2 HORIZONTAL SEPARATION

NORMAL CONDITIONS: Water mains shall be located at least 10 feet horizontally from pipes carrying raw wastewater, and 3 feet horizontally from pipes carrying reclaimed water, whenever possible; the distance shall be measured from inside edge of pipe to inside edge of pipe.

UNUSUAL CONDITIONS: When local conditions prevent a horizontal separation of 10 feet, a water main may be laid closer to a pipe carrying raw wastewater provided that the bottom of the water main is at least 18 inches above the top of the sewer pipe and the water main is laid in a separate trench or on an undisturbed earth shelf.

10.3.3 VERTICAL SEPARATION

NORMAL CONDITIONS: Water mains shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer.

UNUSUAL CONDITIONS: When construction conditions prevent a vertical separation of 18 inches as described hereinabove; the sewer pipe shall be constructed of ductile iron pipe with mechanical joints.

10.3.4 CROSSING OF WATER MAINS AND SEWERS

Water mains shall be above the sewer whenever they cross.

A VERTICAL SEPARATION OF AT LEAST 18 INCHES SHALL BE MAINTAINED BETWEEN THE TOP OF THE SEWER AND THE BOTTOM OF THE WATER MAIN.

Adequate structural support for both the water main and sewer mains shall be provided to prevent excessive deflection of joints and settling.

10.4 TRENCH PREPARATION AND PIPE BEDDING

10.4.1 TRENCH PREPARATION AND PIPE BEDDING

Applicable provisions of Section 5 shall apply. Also refer to STANDARD DETAIL DRAWINGS.

10.4.2 PIPE PREPARATION AND HANDLING

All pipe and fittings shall be inspected prior to lowering into trench to insure no cracked, broken, or otherwise defective materials are being used. CONTRACTOR shall clean ends of pipe thoroughly and remove foreign material and dirt from the inside of the pipe and keep clean during and after laying.

CONTRACTOR shall use proper implements, tools, and facilities for the safe and proper protection of the WORK. CONTRACTOR shall lower pipe into the trench in such a manner as to avoid any physical damage to the pipe and shall remove all damaged pipe from the jobsite. Care shall be taken not to drop or dump pipe into trenches under any circumstances.

10.4.3 TRENCH DEWATERING AND DRAINAGE CONTROL

Specifications from Section 5 shall apply. CONTRACTOR shall prevent water from entering the trench during excavation and pipe laying operations to the extent required to properly grade the bottom of the trench and allow for proper compaction of the backfill. Pipe shall not be laid in water.

10.4.4 SURVEY LINE AND GRADE

Pipe shall be laid to the lines and grades shown on the PLANS. The CONTRACTOR shall provide line and grade stakes at a 100-foot maximum spacing and at all line and/or grade change locations. CONTRACTOR shall provide temporary benchmarks at maximum 1000-foot intervals. The minimum pipe depth shall be three (3) feet below the finished grade surface or three (3) feet below the elevation of the edge of pavement of the road surface whichever is greater.

10.4.5 PIPE LAYING IN TRENCH

CONTRACTOR shall prevent foreign material from entering the pipe while it is being placed in the trench. CONTRACTOR shall remove all foreign material from the pipe or joint ring before the next pipe is placed. If the pipe laying crew cannot put the pipe into the trench and in place without getting earth into the pipe, GCEC may require that snugly-fitted, tightly woven canvas bags be placed over each end before lowering the pipe. The bags shall be left in place until the connection is to be made to the adjacent pipe. During laying operations, CONTRACTOR shall keep debris, tools, clothing, or other materials out of the pipe.

10.4.6 LAYING PVC PIPE

All PVC pipe shall be installed in accordance with standards set forth in the UNI-BELL "Handbook of PVC Pipe Design and Construction" unless such standards conflict with this MANUAL in which case this MANUAL shall apply.

10.4.7 LAYING DUCTILE IRON PIPE

All ductile iron pipe shall be installed in accordance with AWWA C600 unless such standards conflicts with this MANUAL in which case this MANUAL shall apply. CONTRACTOR shall cut pipe only as necessary to comply with alignment shown on the PLANS. Flame cutting of pipe shall not be allowed.

CONTRACTOR shall provide special tools and devices, such as special jacks, chokers, and similar items required for proper installation. Lubricant for the pipe gaskets shall be furnished by the pipe manufacturer, and no substitutes shall be permitted under any circumstances.

The pipe shall be polyethylene encased (8 mil) where shown on the DRAWINGS in accordance with ANSI/AWWA A21.51/C105.

10.4.8 LAYING OF PIPES ON CURVES

Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints. Maximum deflections at pipe joints and laying radius for the various pipe lengths shall be as recommended by the pipe manufacturer.

10.4.9 PIPE RESTRAINING AND THRUST BLOCK

Requirements specified in Section 7 shall apply.

10.4.10 BEDDING AND BACKFILL FOR PIPES

Requirements specified in Section 5 shall apply.

10.5 HYDROSTATIC TESTS

10.5.1 GENERAL

Hydrostatic tests shall consist of pressure test and leakage test. Hydrostatic tests shall be conducted on all newly laid pressure pipes, joints and valves including all service lines to the curb stops. Air testing of pressure pipes will not be permitted under any circumstance. Tests may be made on sections not exceeding 1,000 feet or valve-to-valve whichever is less, when this procedure is acceptable to GCEC. CONTRACTOR shall furnish all necessary equipment and material, make all taps, and furnish all closure pieces in the pipe as required. Equipment to be furnished by the CONTRACTOR shall include graduated containers, pressure gauges, hydraulic force pumps, and suitable hoses and piping. GCEC will monitor and approve all hydrostatic test.

The CONTRACTOR may conduct hydrostatic tests after the trench has been partially backfilled with the joints left exposed for inspection informational purposes only. The hydrostatic tests for acceptance shall only be conducted after the trenches have been completely backfilled and compacted as specified.

10.5.2 TESTING CRITERIA

All pipe sections to be pressure tested shall be subjected to a hydrostatic pressure of 150 psi. The duration of each pressure test shall be for a period of two (2) hours. If during the test, the integrity of the tested line is in question, GCEC may require an additional two (2) hour pressure test. The basic provisions of AWWA C600 shall be applicable.

10.5.3 PROCEDURE FOR PRESSURE TESTING

Each section of pipe to be tested, as determined by GCEC, shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. Before applying the specified test pressure, all air shall

be expelled from the pipe. To accomplish this, taps shall be made, and appropriate valves installed to ensure bleeding of all air from the main. If defective pipes, fittings, valves, or hydrants are discovered in consequence of this pressure test, all such items shall be removed and replaced by the CONTRACTOR with sound material and the test shall be repeated until satisfactory results are obtained. Provisions of AWWA C600, where applicable, shall apply.

10.5.4 PROCEDURE FOR LEAKAGE TESTS

After completion of the pressure test, a leakage test shall be conducted to determine the quantity of water lost by leakage under the specified test pressure. Applicable provisions of AWWA C600 shall apply.

See Appendix E-G for Hydrostatic Pressure Test Forms

Leakage is defined as the quantity of water to be supplied in the newly laid pipe or any valved section under test, which is necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. Should any test of pipe laid disclose leakage greater than that allowed, CONTRACTOR shall locate and replace or repair the defective joints, pipe or valve until the leakage from subsequent testing is within the specified allowance.

10.6 DISINFECTION OF WATER MAINS

10.6.1 GENERAL

Before being placed in service, all new water mains shall be chlorinated in accordance with the specifications below and the procedures outline in AWWA C-651 “Standard Procedure for Disinfecting Water Mains”.

10.6.2 FLUSHING

Section of pipe to be disinfected shall first be flushed (6 times volume of pipe) to remove any solids or contaminated material that may have become lodged in the pipe. If no hydrant is installed at the end of the main, then a blow-off valve shall be provided large enough to develop a velocity of at least 3 feet per second in the main. Calculations must be provided for pipe larger than 10”. All flushing must be coordinated through GCEC and given 48 hour notice before any flushing occurs.

All taps required for chlorination or flushing purpose, or for temporary or permanent release of air shall be provided for by the CONTRACTOR as a part of the construction of water mains. After the disinfection, all such taps shall be sealed to the satisfaction of GCEC.

10.6.3 DISINFECTION CRITERIA

Before being placed into service, all new mains and repaired portions of, or extensions to existing mains shall be chlorinated so that the initial chlorine residual is not less than 50 mg/l and that a chlorine residual of not less than 25 mg/l remains in the water after standing 24 hours in the pipe.

10.6.4 FORM OF APPLIED CHLORINE

Chlorine may be applied as a liquid chlorine (gas-water mixture), or a mixture of water and high-test calcium hypochlorite. CONTRACTOR shall assume responsibility for safe handling of chlorine and shall meet requirements of OSHA and other regulatory agencies for safe handling of chlorine.

10.6.5 POINT OF APPLICATION

The preferred point of application of the chlorinating agent is at the beginning of the pipe line extension or any valved section of it, and through a corporation stop inserted in the pipe. The water injector for delivering the chlorine-bearing water into the pipe should be supplied from a tap made on the pressure side of the gate valve controlling the flow into the pipe line extension. Alternate points of applications may be used when approved or directed by GCEC.

10.6.6 OPERATION OF COUNTY VALVES

Valves shall be manipulated by GCEC personnel so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water.

10.6.7 RETENTION

Treated water shall be retained in the pipe at least 24 hours. After this period, the chlorine residual at pipe extremities and at other representative points shall be at least 24 mg/l.

10.6.8 CHLORINATING VALVES AND HYDRANTS

In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipe line is filled with the chlorinating agent and under normal operating pressure.

10.6.9 FINAL FLUSHING AND TESTING

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its lengths shows upon test, a free chlorine residual not in excess of that normally carried in the system.

After flushing, water samples collected on two (2) consecutive days from the treated piping system, as directed by GCEC, shall show acceptable bacteriological results. All bacteriological testing shall be performed by GCEC. However, in order to expedite testing, the DEVELOPER may request testing by a private laboratory. All such bacteriological analysis must be performed by a laboratory certified by the State of Florida.

Proper chain of custody procedures must be followed and samples shall only be collected by certified laboratory personnel in the presence of GCEC personnel.

10.6.10 REPETITION OF FLUSHING AND TESTING

Should the initial treatment result in an unsatisfactory bacterial test, the original chlorination procedure shall be repeated by the CONTRACTOR until satisfactory results are obtained.

10.7 WATER SERVICE PIPING AND CONNECTION

Water service piping and connection shall be installed as indicated in the STANDARD DRAWINGS. The location of all service lines shall be as shown on the DRAWINGS and shall be either single or dual service. On curbed streets the exact location for each installed service shall be marked by etching or cutting a "W" in the concrete curb. Where no curb exists, locations shall be adequately marked by a method approved by GCEC.

10.8 LOCATION AND IDENTIFICATION

All non-metallic water mains shall be installed with a continuous, insulated 12 gauge copper wire installed directly on top of the pipe for location purposes, splice detail must insure watertight condition. See STANDARD DRAWINGS. In addition, all PVC water mains shall be either a solid blue color or white with blue lettering. All lettering shall appear legibly on pipe and shall run the entire length of the pipe. Lettering shall read as is acceptable for the intended use (ie., watermain, etc.)

All ductile iron force mains shall be marked with a continuous stripe located within the top 90 degrees of the pipe. Said stripe shall be a minimum two (2) inches in width and shall be blue in color. Backfill shall not be placed for 30 minutes following paint application.

SECTION 11

VALVES, HYDRANTS AND ACCESSORIES FOR WATER MAINS

11.1 GENERAL

All valves and appurtenances shall be products of well-established firms who are fully experienced and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these SPECIFICATIONS as applicable.

11.2 RESILIENT SEAT GATE VALVES

11.2.1 GENERAL

All gate valves sixteen (16) inches and smaller shall be resilient seat gate valves. Such valves shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509, latest revision, and in accordance with the following SPECIFICATIONS. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.

11.2.2 MATERIAL

The valve body, bonnet, and bonnet cover shall be cast iron ASTM A126, Class B. All ferrous surface inside and outside shall have a fusion-bonded epoxy coating. A 2" wrench nut shall be provided for operating the valve. All valves are to be tested in strict accordance with AWWA C509.

11.2.3 MISCELLANEOUS REQUIRMENTS

The valves shall be non-rising stem with the stem made of cast, forged, or rolled bronze as specified in AWWA C509. Two stem seals shall be provided and shall be of the o-ring type. The stem nut must be independent of the gate.

The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

11.3 BUTTERFLY VALVES

11.3.1 MATERIAL

The valve body shall be constructed of close grain cast iron per ASTM A126, Class B or equivalent material. All retaining segments and adjusting devices shall be of corrosion resistant material. Valve seats shall be a natural rubber or synthetic rubber compound. All retaining segments and adjusting devices shall be of corrosion resistant material.

Valves 24 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C504.

11.3.2 FACE TO FACE DIMENSION

The face-to-face dimensions of valves shall be in accordance with above mentioned AWWA Specification for short-body valve.

11.3.3 VALVE SHAFT

The valve shaft shall be turned, ground, and polished constructed of 18-8 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. Shaft shall be of either a one-piece unit extending full size through the valve disc and valve bearing or it may be of a stub shaft design.

11.3.4 VALVE OPERATOR

In general, the butterfly valve operators shall conform to the requirements of AWWA Standard Specifications for Rubber Seated Butterfly Valves, Designation C504, insofar as applicable.

11.4 VALVE INSTALLATIOIN

All valves shall be inspected upon delivery in the field to insure proper working order before installation. They shall be set and jointed to the pipe in the manner as set forth in the AWWA Standards for the type of connection ends furnished. All valves and appurtenances shall be installed true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of GCEC before they are installed.

Valves shall be installed in a vertical position and be provided with a standard valve box so arranged that no shock will be transmitted to the valve. The box shall be vertically centered over the operating nut, and the cast iron box cover shall be set flush with the road bed or finished surface.

After installation, all valves shall be subjected to the field test for piping as outlined in Section 10 of these Specifications. Should any defects in materials or workmanship appear during these tests, the CONTRACTOR shall correct such defects to the satisfaction of GCEC.

Flanged joints shall be made with stainless steel bolts, nuts and washers. Mechanical joints shall be made with mild corrosion resistant alloy steel bolts and nuts. All exposed bolts shall be painted the same color as the pipe. All buried bolts and nuts shall be heavily coated with two (2) coats of bituminous paint.

11.5 VALVE BOXES

All buried valves shall have cast-iron three-piece valve boxers. Valve boxes shall be provided with suitable heavy bonnets and shall extend to such elevation at or slightly above the finished grade surface as directed by GCEC. The barrel shall be two-piece, sliding type, having 5-1/4 inch shaft. The upper section shall have a flange at the bottom having sufficient bearing area to prevent settling and shall be complete with cast iron covers. Covers shall have "WATER" cast into the top for all watermains. The actuating nuts for deeper valves shall be extended to come up to a four (4) foot depth below finished grade. Extension bars shall have locking unit to two (2) inch nut and centering unit inside valve box.

Care shall be taken while constructing valve boxes to ensure that valve stems are vertical and the cast iron box has been placed over the stem with base bearing on compacted fill and top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. CONTRACTOR shall remove any sand or undesirable fill from valve box prior to final inspection.

11.6 AIR RELEASE VALVES

The air release valves for use in water mains shall be installed as shown on the STANDARD DRAWINGS. The valves shall be 2" minimum and shall have a cast iron body, cover and baffle, stainless steel float, bronze water diffuser Buna-N or viton seat and stainless steel trim. Valves shall be provided with a vacuum check to prevent air from reentering the line. The fittings shall be threaded.

11.7 FIRE HYDRANTS

11.7.1 MATERIAL

Fire hydrants shall have 5 ¼ inch valve opening and shall comply with AWWA Standard C502 for fire hydrants for water works service, unless in conflict with MANUAL in which case this MANUAL shall apply. Each hydrant shall have 6-inch mechanical joint ends with harnessing lugs ("dog ears") and shall open by turning to the left (counter-clockwise). Fire hydrant shall be of ample length for 3-1/2 foot depth of bury. It shall be provided with two 2-1/2 inch hose nozzles and one 4-1/2 inch pumper nozzle, all having National Standard hose threads. Nozzles shall have caps attached by chains. Operating nuts shall be AWWA Standard (pentagonal, measuring 1-1/2 inch point to flat). Fire hydrants shall be equipped with "O-Ring" packing. All exterior nuts and bolts shall be stainless steel.

11.7.2 PAINTING

All iron parts of the hydrant both inside and outside shall be painted, in accordance with AWWA C502. All inside surfaces and the outside surfaces below the ground line shall be coated with asphalt varnish. They shall be covered with two coats, the first having dried thoroughly before the second is applied.

The outside of the hydrant above the finished ground line shall be thoroughly cleaned and thereafter painted with one coat of paint of a durable composition, and one additional coat of red paint. Paint needs to be (Tyndall Tan) on the body and the bonnet painted orange, blue, green, or red, depending on flows.

The flow requirements are as follows:

1. Class AA – Rated capacity of 1500 gpm (5680 L/min) or greater.
2. Class A – Rated capacity of 1000-1499 gpm (3785-5675 L/min)
3. Class B – Rated capacity of 500-999 gpm (1900-3780 L/min)
4. Class C – Rated capacity of less than 500 gpm (1900 L/min)

1. Class AA – Light Blue
2. Class A – Green
3. Class B – Orange
4. Class C - Red

11.7.3 CONSTRUCTION DETAILS

Hydrants shall be plumb and shall be set so that the lowest hose connection is, at least, eighteen (18) inches above the surrounding finished grade. All hydrants shall be inspected in the field upon delivery to the job to insure proper operation before installation. The resetting of existing hydrants and moving and reconnecting of existing hydrants shall be handled in a manner similar to a new installation. Hydrant shall be constructed in accordance with the STANDARD DRAWINGS.

11.7.4 LOCATION

Fire hydrants shall be located in the general location as shown on the DRAWINGS. Final field location of all hydrants shall be as approved by GCEC. All hydrants shall be located no less than seven (7) and no more than ten (10) feet from the edge of pavement of the adjacent roadway and no less than five (5) feet from any physical feature, which may obstruct access or view of any hydrant unless otherwise approved by GCEC.

DRAWING NAME	SHEET
GENERAL NOTES	W1
AS–BUILT REQUIREMENTS	W2
WATER SERVICE LOCATION	W3
WATER GATE VALVE & BOX (3" TO 12")	W4
WATER GATE VALVE & BOX (16" AND LARGER w/ DEPTHS LESS THAN 4')	W5
WATER GATE VALVE & BOX (16" AND LARGER w/ DEPTHS GREATER THAN 4')	W6
WATER GATE VALVE 1 1/2" TO 2" DI)	W7
VALVE EXTENSION	W8
STANDARD – FIRE HYDRANT ASSEMBLY	W9
1 1/2" & 2" WATER METER w/ IRON BODY GATE VALVE & HANDWHEEL	W10
3/4" & 1" WATER METER ASSWEMBLY	W11
1" WATER METER ASSEMBLY (COMMERCIAL USE)	W12
1 1/2" & 2" WATER METER ASSEMBLY	W13
TRANSITION CONNECTIONS	W14
DIRECTIONAL BORE ROADWAY CROSSINGS	W15
DIRECTIONAL BORE ROADWAY CROSSINGS	W15A
AIR AND/OR VACUUM RELEASE VALVE	W16
1" & 2" RPZ & DOUBLE CHECK VALVE BACKFLOW PREVENTER	W17
1" & 2" ATMOSPHERIC VENT BACKFLOW PREVENTER	W18
3" WATER METER INSTALLATION	W19
4" WATER METER INSTALLATION	W20
4" & 6" WATER METER INSTALLATION	W21
4" & 6" WATER METER AND BACKFLOW INSTALLATION	W22
FLUSHING STAND	W23
FIRE HYDRANT WITH LOCKED 90° BEND	W24
RESTRAINED JOINTS	W25
RESTRAINED JOINT CHART	W26
CONCRETE ENCASEMENT	W27
WATER / SEWER SEPARATION	W28
STANDARD BEDDING	W29
JACK AND BORE	W30

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INDEX

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET I 1
CHECKED: C. FOREHAND	

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF EXISTING UTILITIES, AND TO DETERMINE IF OTHER UTILITIES WILL BE ENCOUNTERED DURING THE COURSE OF THE WORK, AND TAKE WHATEVER STEP NECESSARY TO PROVIDE FOR THEIR PROTECTION.
2. THE CONTRACTOR SHALL NOTIFY ALL UTILITY OWNERS 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT OCCUR DUE TO THE CONTRACTORS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
4. THE CONTRACTOR SHALL MAINTAIN A REASONABLE ACCESS TO ALL RESIDENCES AND BUSINESSES DURING CONSTRUCTION.
5. ALL WATER MAINS SHALL BE INSTALLED ACCORDING TO ENGINEERING PLANS AND SPECIFICATIONS.
6. ALL VALVES AND MATERIALS SHALL COMPLY WITH AWWA (AMERICAN WATER WORKS ASSOCIATION) STANDARDS, LATEST EDITION.
7. ALL MAIN LINE VALVES (4"–16") SHALL BE RESILIENT SEATED GATE VALVES.
8. THE CONTRACTOR WILL BE REQUIRED TO REMOVE AND REPLACE ITEMS ENCOUNTERED IN THE FIELD, i.e. SIGNS, FENCING, POST, ETC.
9. FOR THE REPLACEMENT OF PRIVATE OWNED CONCRETE CROSSINGS, THE CONTRACTOR SHALL SAW CUT BACK TO THE CLOSEST JOINT WITHIN THE RIGHT–OF–WAY AND REPLACE AS SHOWN IN DETAILS BELOW. FOR THE REPLACEMENT OF PRIVATE OWNED ASPHALT PAVEMENT DRIVES, THE CONTRACTOR SHALL REMOVE THE EXISTING ASPHALT AND REPLACE AS SHOWN IN DETAILS BELOW. ALL DRIVEWAYS MAY NOT BE SHOWN.
10. ALL WATER MAINS SHALL HAVE A MINIMUM OF 36" COVER. IN DITCH BOTTOMS, WATER MAINS AND SERVICE LINES SHALL HAVE A MINIMUM OF 36" COVER.
11. ANY INDIVIDUAL CREW OR INDIVIDUAL PERSON WORKING ON THE INSTALLATION OF ANY PART OF THIS PROJECT SHALL HAVE A SET OF PLANS AND SPECIFICATIONS WITH THEM AT ALL TIMES.
12. CONTRACTOR SHALL COORDINATE WITH GCEC'S ENGINEER 15 CALENDAR DAYS PRIOR TO PRESSURE TESTING AND BACTERIOLOGICAL TESTING SO A TESTING PLAN CAN BE ESTABLISHED.
13. ALL MAINS AND SERVICE LINES SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA C651. PRESSURE TESTING SHALL BE IN ACCORDANCE WITH AWWA C600. CONTRACTOR SHALL NOTIFY GCEC'S ENGINEER WITHIN 48 HOURS OF PRESSURE TESTING. NO EXCEPTIONS. GCEC'S ENGINEER SHALL BE PRESENT DURING BACTERIOLOGICAL SAMPLING AND PRESSURE TESTING. ALL WATER MAINS SHALL BE FLUSHED @ 3 FT PER SECOND AND 6 TIMES THE PIPE VOLUME SHALL BE FLUSHED.
14. BASE AND BACKFILL MATERIALS SHALL BE EITHER OF THE SAME TYPE AND COMPOSITION AS THE MATERIALS REMOVED, OR OF EQUAL OR GREATER STRUCTURAL ADEQUACY. MATERIALS CONTAMINATED WITH DELETERIOUS SUBSTANCES DURING EXCAVATION SHALL NOT BE USED FOR FILL.
15. ALL VALVE BOXES SHALL BE SET FLUSH AND TO FINISH GRADE.
16. ALL DISTURBED DRIVES SHALL BE CONNECTED TO THE EXISTING PAVEMENT IN A CONDITION EQUAL TO OR BETTER THAN ITS PREVIOUS CONDITION USING THE SAME MATERIALS THAT WERE REMOVED.
17. ALL PAVEMENT SHALL BE CUT AND PATCHED IN ACCORDANCE WITH ENGINEERING PLANS AND SPECIFICATIONS.
18. ALL CONCRETE DRIVEWAYS SHALL BE CUT AND PATCHED IN ACCORDANCE WITH ENGINEERING PLANS AND SPECIFICATIONS.
19. ALL GRAVEL DRIVEWAYS SHALL BE REMOVED AND REPLACED WITH NEW GRAVEL AND SHALL COVER THE DRIVEWAY FORM THE EDGE OF THE PAVEMENT OR GRADED ROAD TO THE PROPERTY LINE.
20. ALL SPOIL MATERIAL FROM EXCAVATION SHALL BE PLACED ON THE UPLAND SIDE OF ANY SLOPED CONSTRUCTION AREA.
21. CONTRACTOR SHALL VERIFY LOCATION OF ALL UTILITIES PRIOR TO EXCAVATION.
22. THE CONTRACTOR SHALL REPLACE ALL DRIVEWAYS, CULVERTS, LANDSCAPING, MAILBOXES, ETC. TO EQUAL OR BETTER CONDITION.
23. THE CONTRACTOR SHALL PROVIDE EROSION AND SEDIMENT CONTROL PER THE GUIDELINES OF THE FLORIDA DEVELOPMENT MANUAL.

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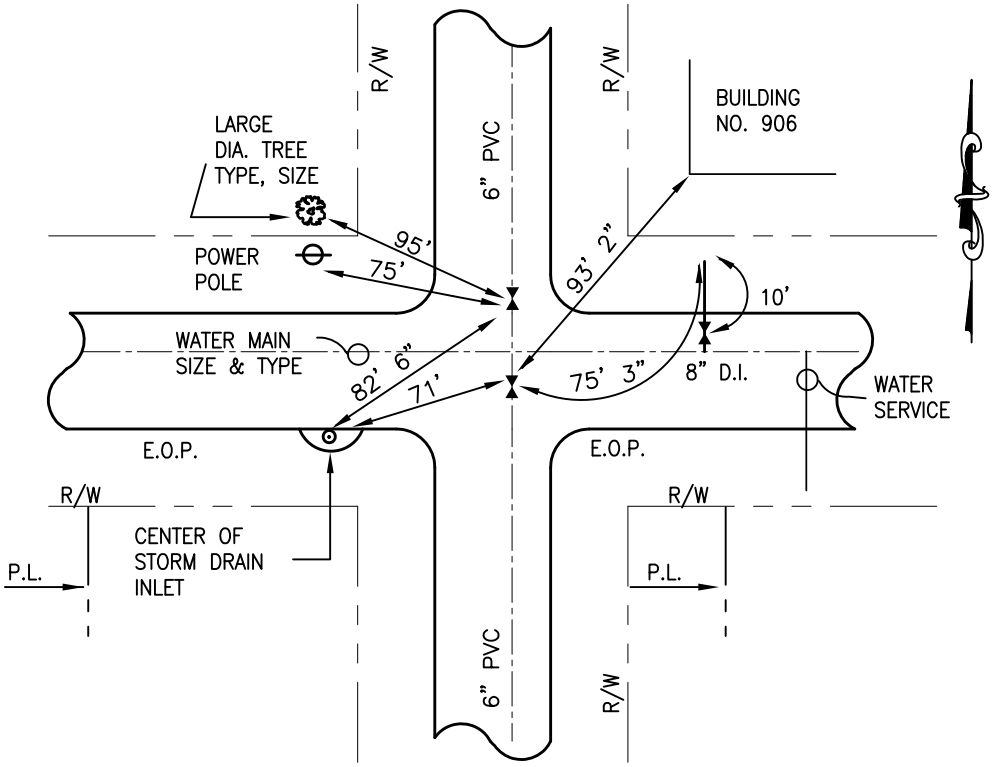
GENERAL NOTES

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W1
CHECKED: C. FOREHAND	



EXAMPLE FOR AS BUILT DRAWINGS OF WATER LINES AND VALVES

1. MUST IDENTIFY THE RESPONSIBLE SURVEYOR AND MAPPER.
2. SHALL STATE THE TYPE OF SURVEY IT DEPICTS AND THE PURPOSE OF THE SURVEY.
3. MUST BEAR THE NAME, CERTIFICATE OF AUTHORIZATION NUMBER, STREET AND MAILING ADDRESS OF THE BUSINESS ENTITY ISSUING THE AS–BUILT SURVEY, ALONG WITH THE NAME AND LICENSE NUMBER OF THE SURVEYOR IN RESPONSIBLE CHARGE.
4. MUST REFLECT A SURVEY DATE, WHICH IS THE DATE OF ACQUISITION. WHEN THE GRAPHICS OF THE AS–BUILT SURVEY ARE REVISED, BUT THE SURVEY DATE STAYS THE SAME, THE AS–BUILT SURVEY MUST LIST DATES FOR ALL REVISIONS.
5. MUST BE SIGNED AND SEALED BY THE SURVEYOR IN RESPONSIBLE CHARGE.
6. A DESIGNATED "NORTH ARROW" AND EITHER A STATED SCALE OR GRAPHIC SCALE SHALL BE SHOWN.
7. APPROPRIATE LINE TYPES, LINE WEIGHTS, AND LINE WIDTHS SHALL BE USED ON THE AS–BUILT DRAWING TO DIFFERENTIATE EXISTING FROM PROPOSED AND WATER FROM SEWER, RECLAIM, AND STORM. ALL PHYSICAL ITEMS (I.E. PIPES, VALVES, ETC.), SURVEYED BOUNDARIES, AND EASEMENTS SHOULD BE CLEARLY MARKED, AND DIMENSIONED, AND IDENTIFIED BY SIZE AND MATERIAL.
8. ALL UTILITIES IN THE PUBLIC RIGHT OF WAY AND WITHIN EASEMENTS OR TO THE END OF THE PUBLICLY OWNED PORTION OF THE UTILITY (I.E. METER AND BACKFLOW PREVENTER, CLEANOUT, ETC.) SHALL BE SHOWN WITH ASSOCIATED SIZES LABELED. THIS INCLUDES, BUT IS NOT LIMITED TO, STUB–OUTS/LATERALS, METERS, BFP'S, WATER MAINS, FORCE MAINS, GRAVITY SEWER MAINS, MANHOLES, STORM WATER PIPING AND ASSOCIATED STRUCTURES, VALVES, FIRE HYDRANTS, LIFT STATIONS, ETC. ALL PIPE LINE WORK MUST BE CONNECTED WITHIN THE SITE AS WELL AS THE CONNECTION TO EXISTING UTILITIES ADJACENT TO THE SITE (IT IS THE SURVEYOR'S RESPONSIBILITY TO COORDINATE WITH ALL CONTRACTORS FOR LOCATIONS AND SIZING). ALL UTILITY CONNECTIONS TO THE BUILDINGS MUST BE SHOWN.
9. ALL PROPOSED UTILITY/INGRESS/EGRESS EASEMENTS MUST BE SHOWN ON THE DRAWING AND MUST HAVE THE ASSOCIATED LEGAL DESCRIPTION WRITTEN.
10. EDGE OF PAVEMENT, ROADS (ASPHALT SHADED), CURBS, DRIVEWAY CONNECTIONS, BUILDINGS, PARKING LOTS, RIGHT–OF–WAY, AND STREET NAMES MUST BE SHOWN IN ALL APPLICATIONS. ALL ITEMS MENTIONED ABOVE MUST BE FIELD LOCATED.
11. PROPERTY BOUNDARY MUST BE CLEARLY LABELED AND DIMENSIONED.
12. INVERTS, GRATES, TOPS, RIMS MUST BE SHOWN FOR ALL STORM WATER DRAINAGE STRUCTURES. INVERTS (PIPES AND CLEANOUTS) AND RIMS MUST BE SHOWN FOR ALL GRAVITY SEWER MANHOLES. SLOPES MUST BE SHOWN ON EACH RUN OF PIPE FOR REVIEW AND APPROVAL.
13. *"AS–BUILT" PROFILE OF ALL DIRECTIONAL BORES AND JACK–AND–BORES INDICATING SURFACE GRADE AND ACTUAL PIPE ELEVATIONS AT TEN FOOT INTERVALS (INCREASE TO 20 FOOT INTERVALS ON BORES LONGER THAN 120 FEET) SHALL BE PROVIDED ON AS–BUILT PLAN SHEETS BASED ON BORE LOGS DEVELOPED BY BORING CONTRACTOR DURING INSTALLATION.*
14. NEARBY WETLANDS AND OTHER ENVIRONMENTALLY SIGNIFICANT RESOURCES CLEARLY LABELED.
15. THE ENGINEER OF RECORD SHALL REVIEW AND APPROVE THE AS–BUILT PRIOR TO SUBMISSION TO GCEC FOR FINAL APPROVAL. WRITTEN APPROVAL BY THE ENGINEER OF RECORD SHALL BE NOTED ON A TRANSMITTAL WITH A STATEMENT OF NO EXCEPTIONS TO A MINIMUM STANDARDS PROVIDED HEREIN.

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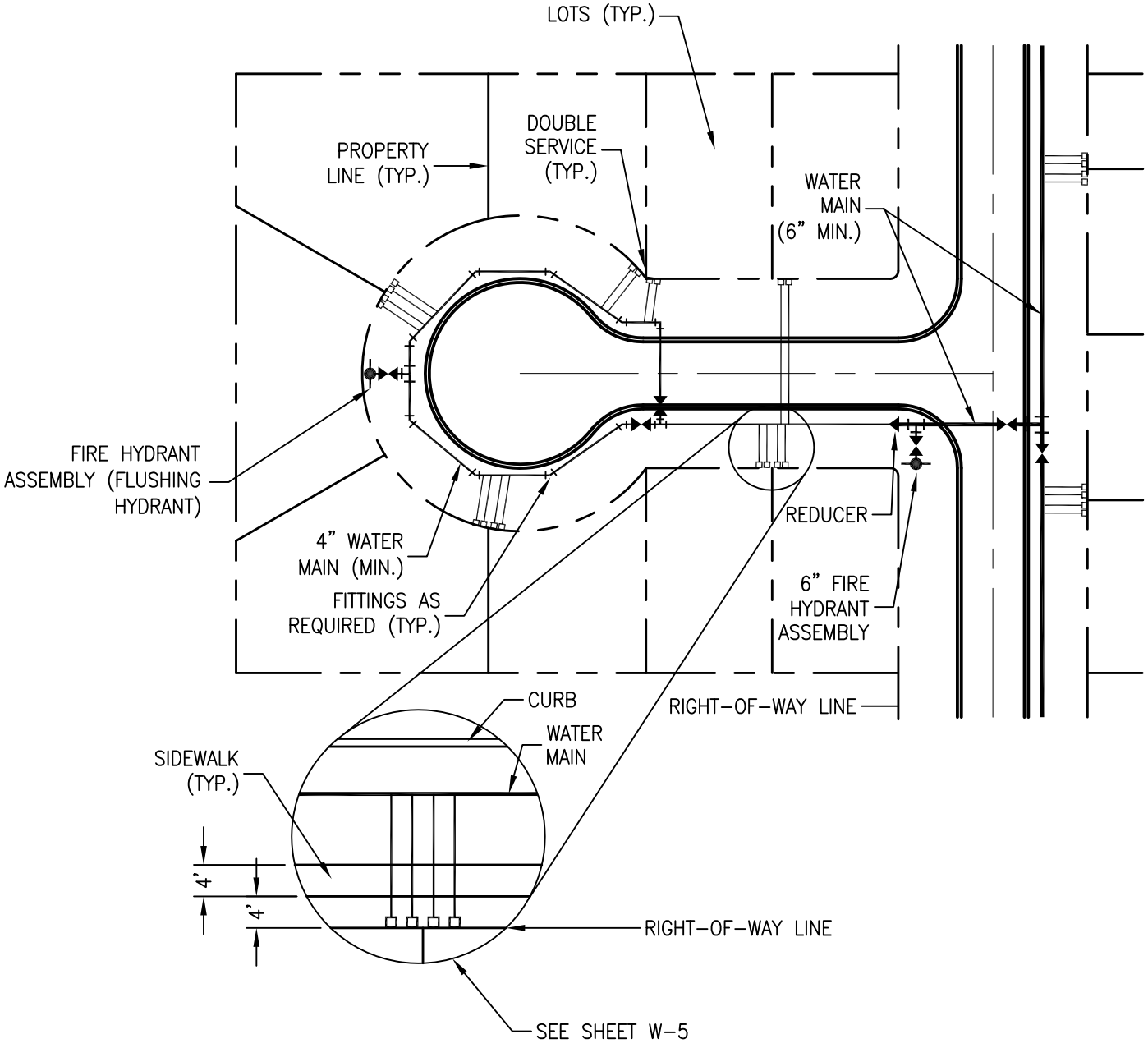
AS BUILT REQUIREMENTS

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W2
CHECKED: C. FOREHAND	



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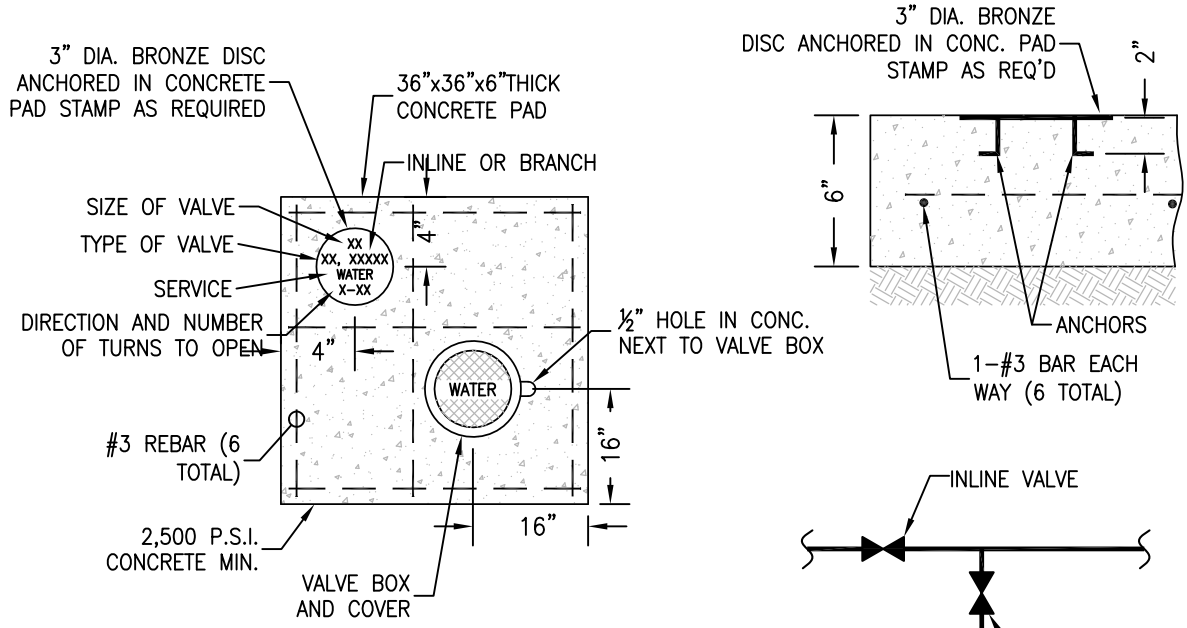
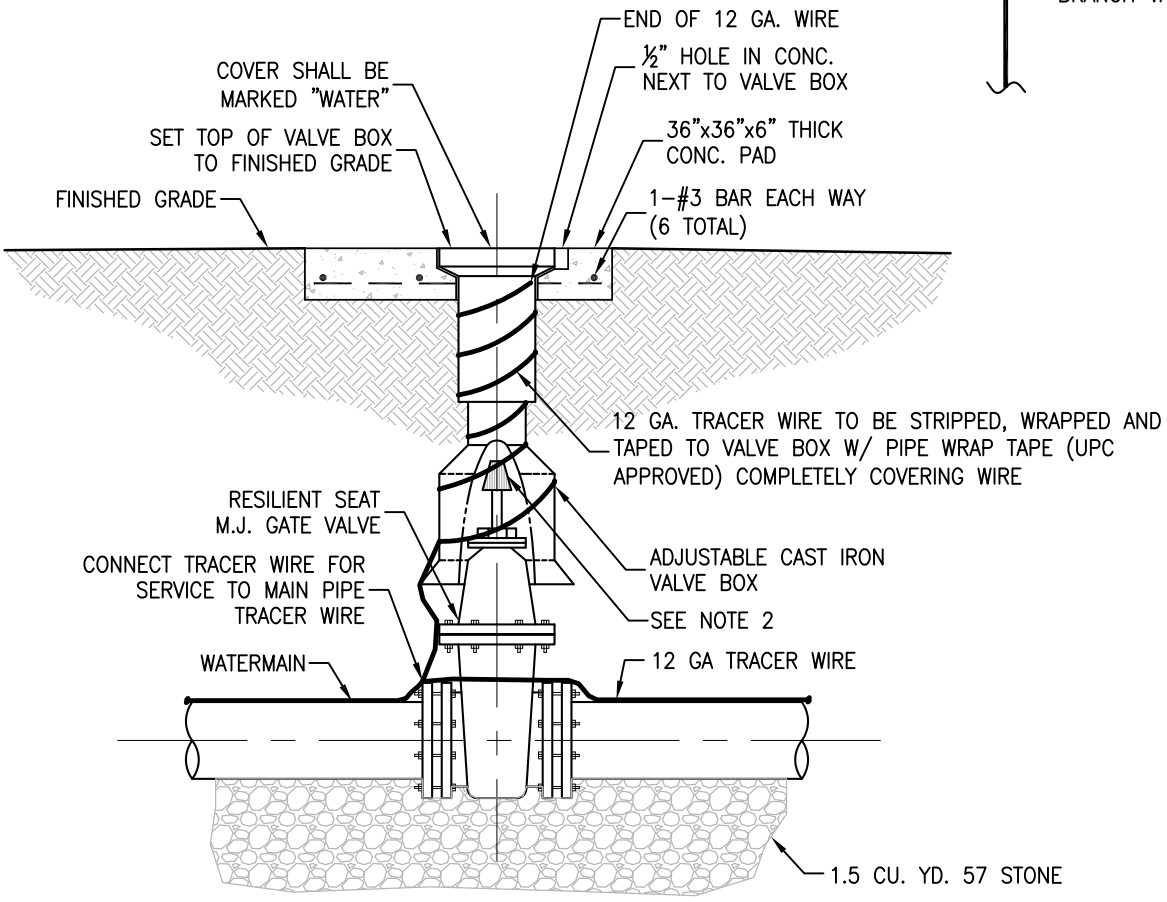
WATER SERVICE LOCATION

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W3
CHECKED: C. FOREHAND	





NOTES:

1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
2. THE ACTUATING NUT FOR DEEPER VALVES SHALL BE EXTENDED TO COME UP TO 4 FOOT DEPTH BELOW FINISHED GRADE.

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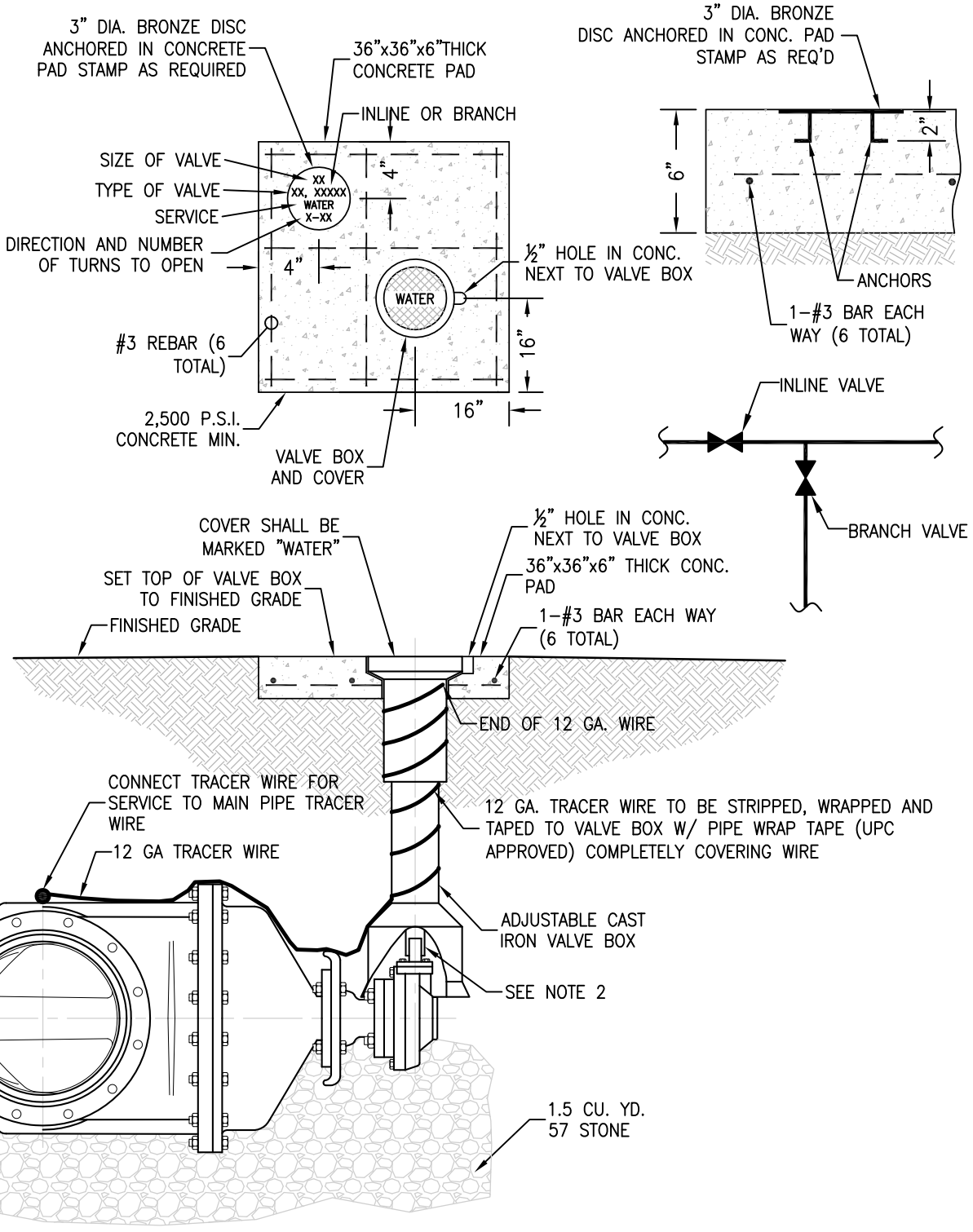
WATER GATE VALVE & BOX (3" TO 12")

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W4
CHECKED: C. FOREHAND	



NOTES:

1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
2. THE ACTUATING NUT FOR DEEPER VALVES SHALL BE EXTENDED TO COME UP TO 4 FOOT DEPTH BELOW FINISHED GRADE.

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WATER GATE VALVE & BOX (16" & LARGER w/ DEPTH LESS THAN 4')

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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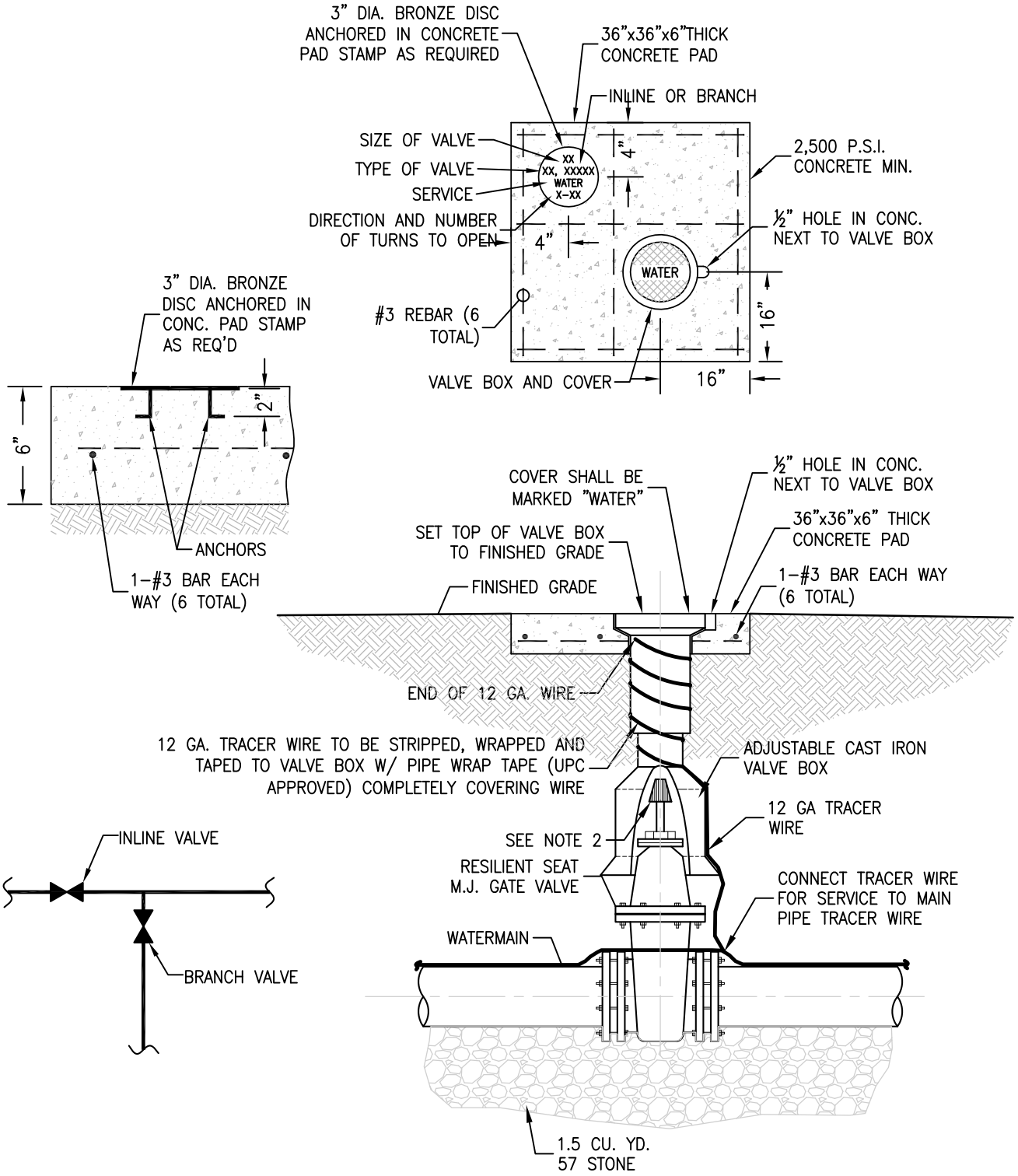

NOTES:

1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
2. THE ACTUATING NUT FOR DEEPER VALVES SHALL BE EXTENDED TO COME UP TO 4 FOOT DEPTH BELOW FINISHED GRADE.

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WATER GATE VALVE & BOX (16" & LARGER w/ DEPTH GREATER HAN 4')

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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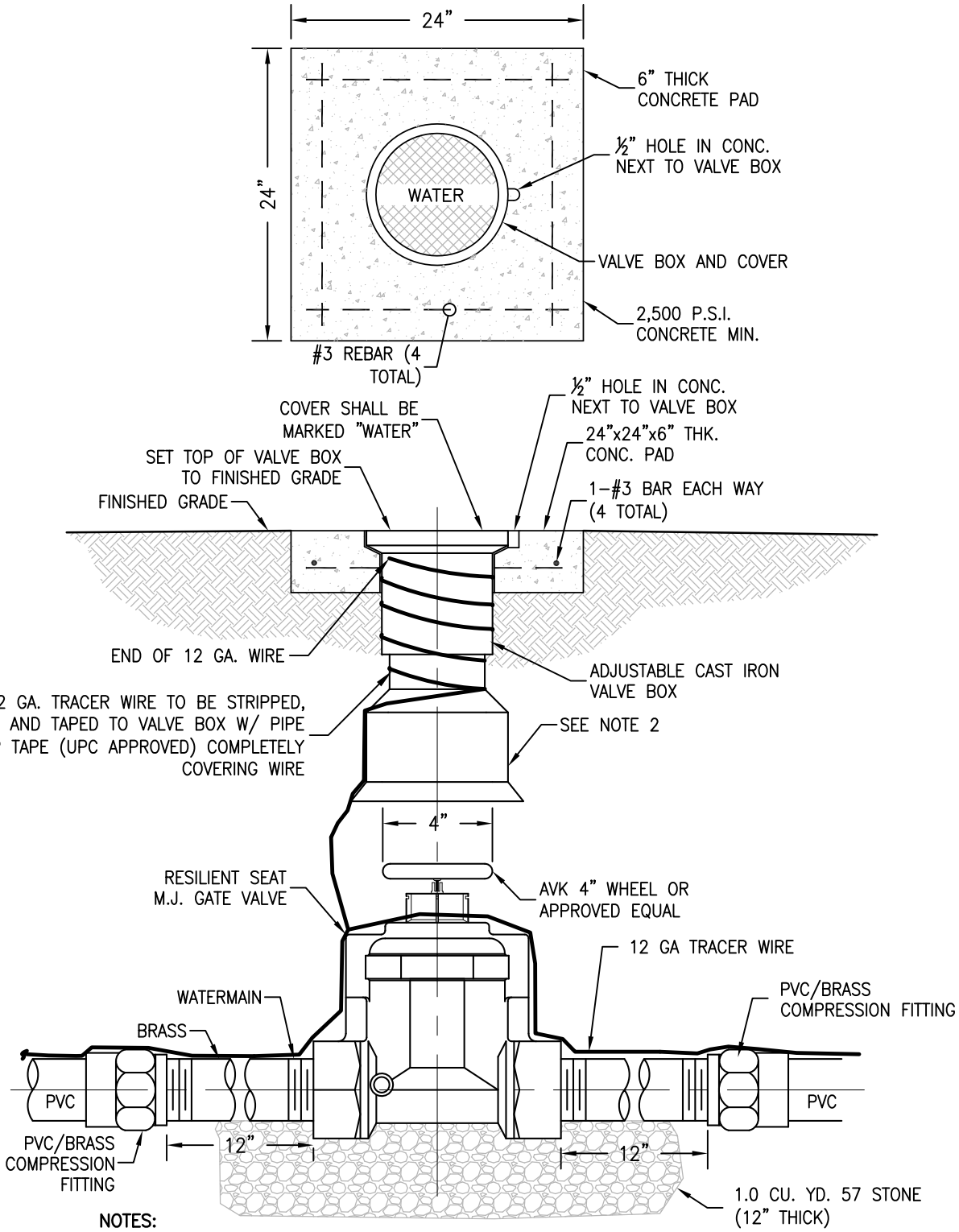

NOTES:

1. PVC EXTENSIONS SHALL BE USED ON VALVE BOX INSTALLATION FOR RISERS.
2. THE ACTUATING NUT FOR DEEPER VALVES SHALL BE EXTENDED TO COME UP TO 4 FOOT DEPTH BELOW FINISHED GRADE.
3. ALL WATERMAINS 2" & BELOW SHALL HAVE HAND WHEEL INSTEAD OF THE OPERATING NUT.
4. PRECAST "DONUT" VALVE COLLARS ARE NOT ACCEPTABLE UNLESS WRITTEN AUTHORIZATION IS PROVIDED BY THE GCEC.
5. ALL FITTINGS SHALL BE BRASS WITH COMPRESSION/PACK JOINT TYPE CONNECTIONS.

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WATER GATE VALVE (1 1/2" TO 2" DI)

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W7
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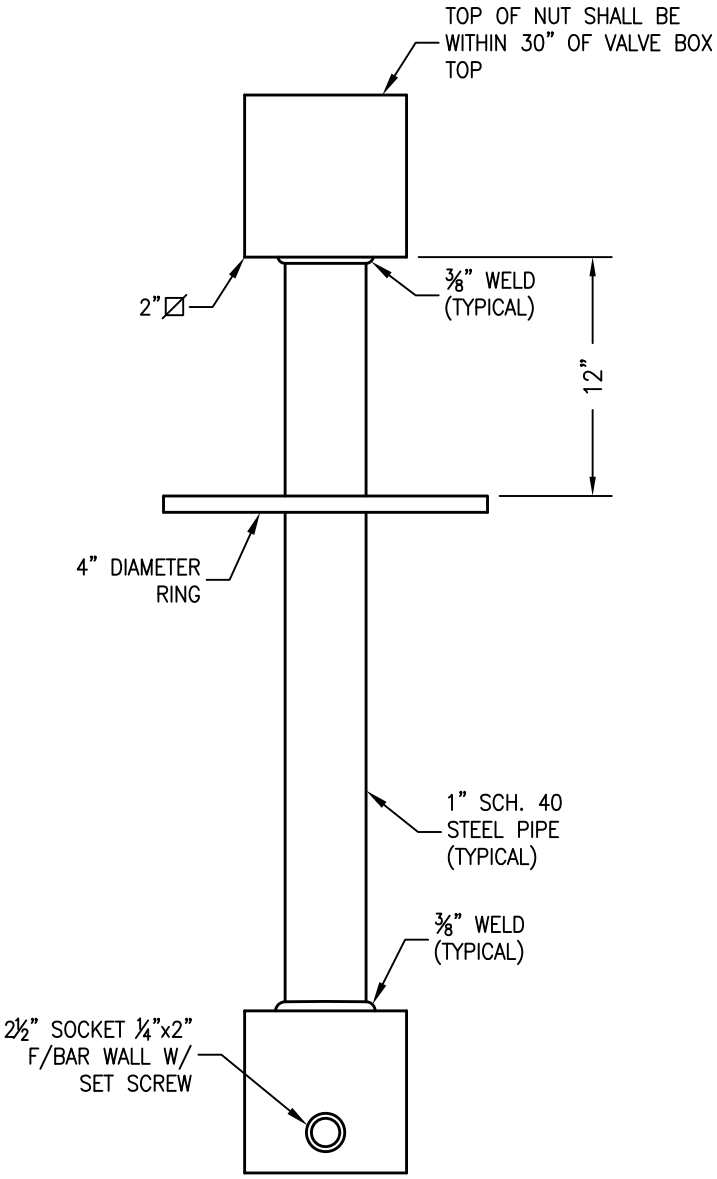

NOTES:

1.) EXTENSION SHALL BE INSTALLED IN ALL VALVE BOXES W/ VALVES THAT ARE GREATER THAN 5 FT IN DEPTH.

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VALVE EXTENSION

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
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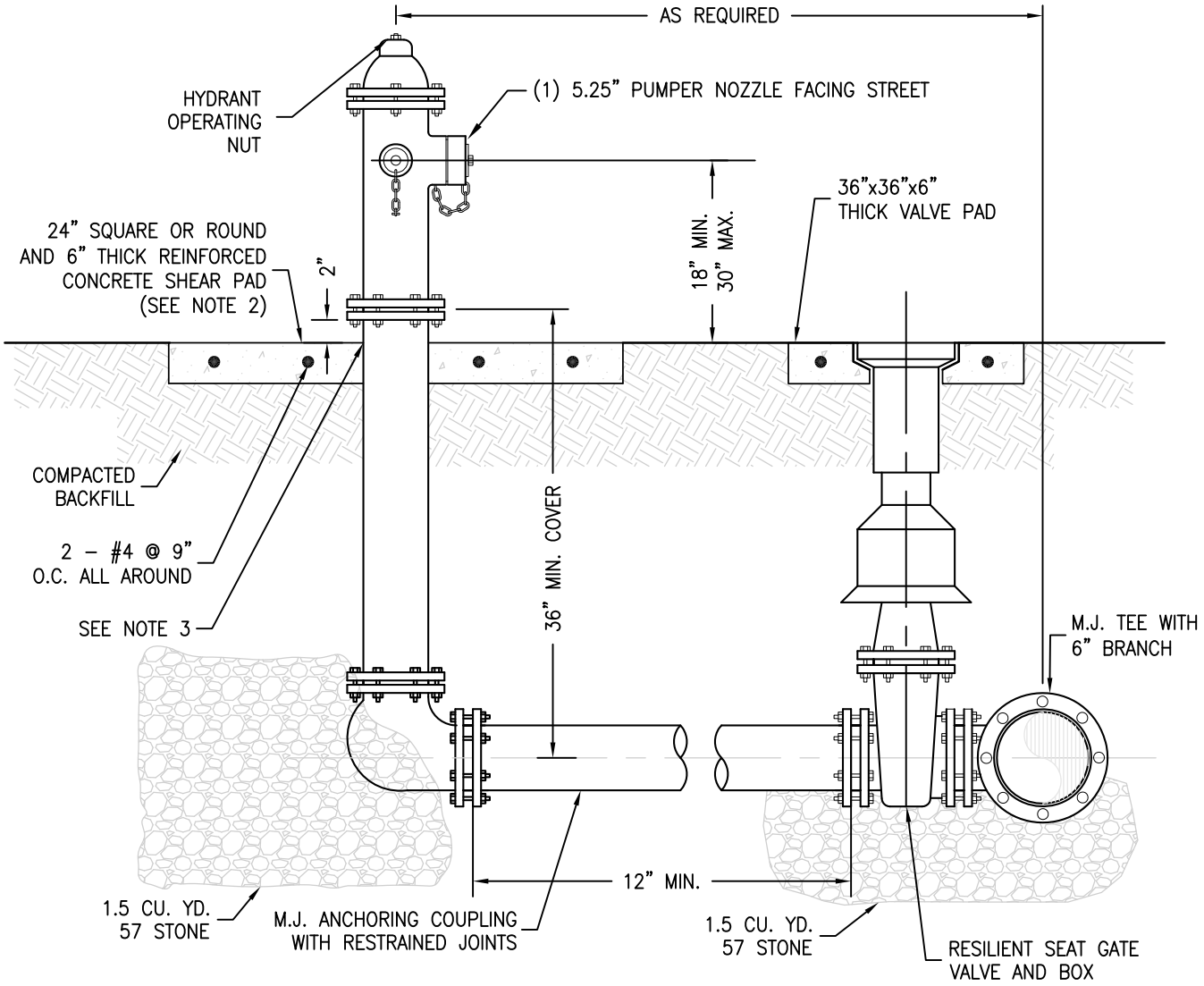

FIRE HYDRANT NOTES:

1. GATE VALVE IS TO BE RESTRAINED TO THE MAIN TO ALLOW REMOVAL OF FIRE HYDRANT WITHOUT BLOWING THE GATE VALVE OFF.
2. HYDRANT SHALL BE PLACED WITH NOZZLES FACING STREET.
3. HYDRANT SHALL BE AMERICAN DARLING, AVK, M&H, OR APPROVED EQUAL.
4. VALVE OPENING 5 1/4".
5. MINIMUM BURY IS 36"
6. SIX INCH M.J. CONNECTION TO MAIN
7. HOSE NOZZLES: 2EA - 2-1/2" HOSE NOZZLES & ONE STEAMER NOZZLE WITH 5-1/4" OPENING.
8. ALL PIPE FROM MAIN TO HYDRANT SHALL BE DUCTILE IRON. NO SUBSTITUTES.
9. HYDRANT PLACEMENT:
   CURB & GUTTER STREET -- BEHIND SIDEWALK AS NOTED PER PLAN.
   OPEN DITCH STREET -- TOP OF BACK SLOPE OF DITCH, ON THE R/W LINE.
10. IF HYDRANT IS CLOSE TO THE MAIN, MECHANICAL JOINTS MAY BE RESTRAINED WITH CLOW F-1058 RETAINER GLANDS GALV. THREADED RODS WITH EYE BOLTS OR ROMAC GRIP RINGS.
11. FIRE HYDRANT TEE MAY BE USED IN LIEU OF RESTRAINED TEE.
12. PROPER COMPACTION FOR BREAKAWAY WILL MEET 95% MODIFIED PROCTOR MAXIMUM DRY DENSITY.
13. ALL DEAD END HYDRANT TEES SHALL HAVE A BLIND FLANGE AND SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR FIRE HYDRANT ASSEMBLIES DUE TO ACTUAL FIELD CONDITIONS.
14. SOME FIRE HYDRANTS MAY REQUIRE RISER EXTENSIONS AT NO ADDITIONAL COST TO THE OWNER.
15. ALL EXTERNAL NUTS AND BOLTS (ABOVE GRADE) SHALL BE STAINLESS STEEL.
16. CONTRACTOR SHALL COVER ALL FIRE HYDRANTS W/ BLACK PLASTIC BAGS UNTIL THE LINE IS PLACED INTO SERVICE.
17. FIRE HYDRANT SHALL BE SUPPLIED WITHOUT A WEEP HOLE, OR WITH A PERMANENTLY PLUGGED WEEP HOLE.
18. THE SHEAR PAD MAY BE RECESSED UP TO 6" BELOW THE FINISHED GRADE.
19. CLEARANCE BETWEEN BOTTOM OF BOLTS AND TOP OF SHEAR PAD SHALL BE A 6" MINIMUM.

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STANDARD - FIRE HYDRANT ASSEMBLY

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W9
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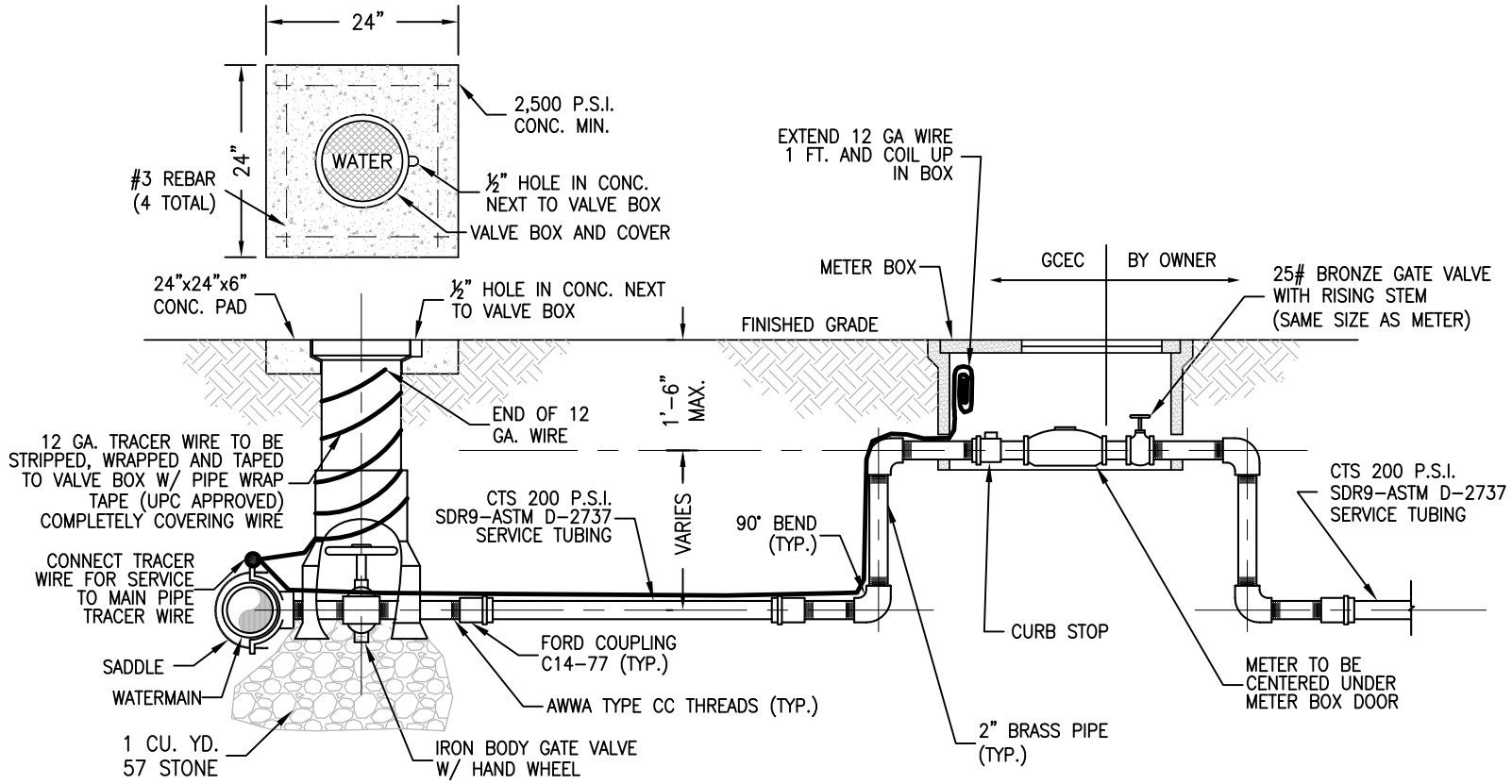

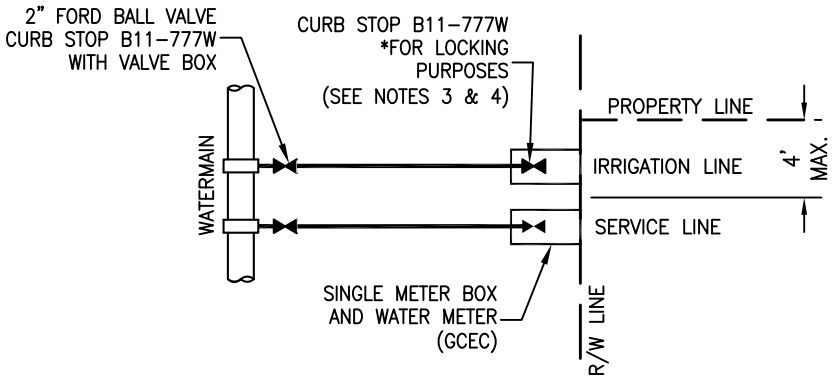

TYPICAL GCEC SERVICE

NOTES:

1. ALL FITTINGS SHALL BE BRASS WITH COMPRESSION/PACK JOINT TYPE CONNECTIONS.
2. NO SERVICE LINE SHALL TERMINATE UNDER A DRIVEWAY.
3. EACH SERVICE SHALL TERMINATE AT A BALL VALVE WHICH SHALL BE FASTENED TO A 1"x4"x30" STAKE PAINTED WHITE.
4. CURB STOP SHALL BE A 2" FORD BALL METER VALVE B14-777W OR GCEC APPROVED EQUAL.
5. ALL SERVICE TAPS TO BE LOCATED IN FIELD. TAPS SHALL BE NO CLOSER THAN AND WILL NOT BE SET IN DRAINAGE SWALES, EASEMENTS OR SIDEWALKS.

1 1/2" & 2" WATER METER w/ IRON BODY GATE VALVE & HANDWHEEL

STANDARD DETAILS WATER MAIN CONSTRUCTION

GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE:	SCALE:	DRAWN:	CHECKED:
DEC. 2011	N.T.S.	S. RAY	C. FOREHAND

PROJECT NO. 094.015

SHEET W10

EB# 0006155

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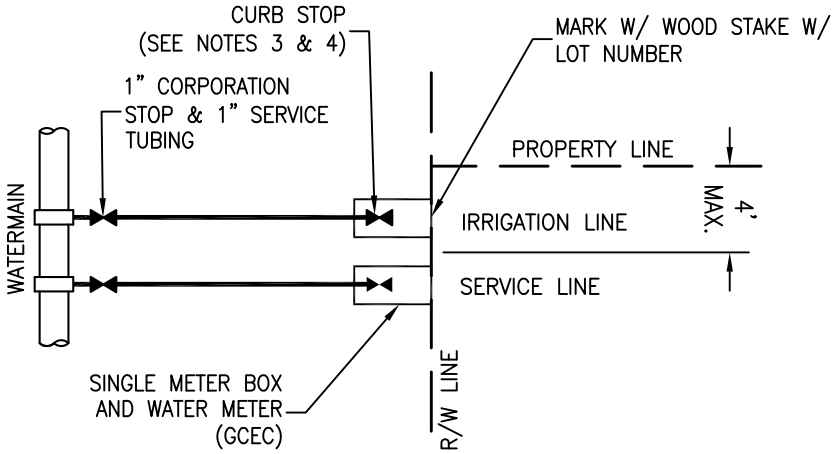
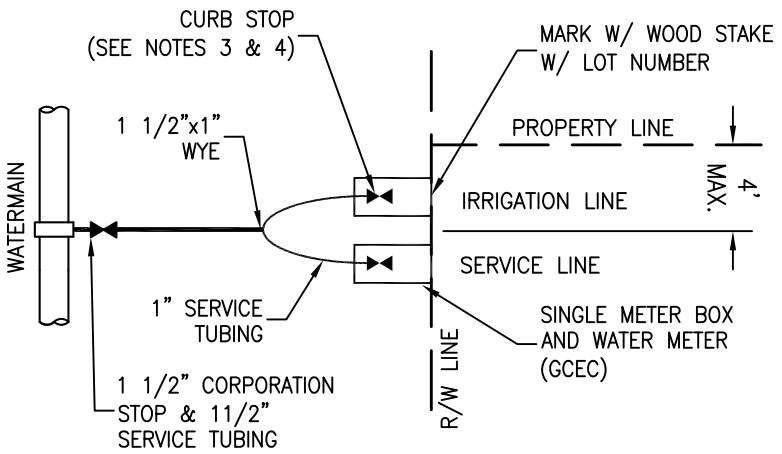
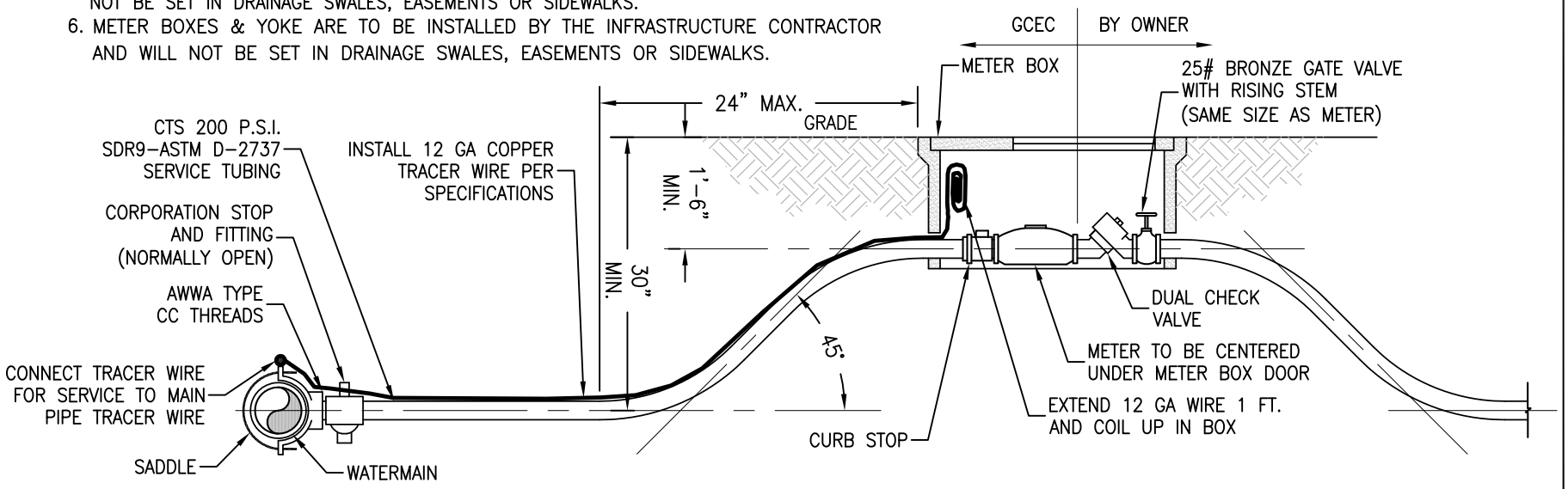


TYPICAL GCEC SERVICE
(PER. LOT OR COMMERCIAL SITE)



OPTIONAL GCEC SERVICE
(PER. LOT)

NOTES:
1. ALL FITTINGS SHALL BE BRASS WITH COMPRESSION/PACK JOINT TYPE CONNECTIONS.
2. NO SERVICE LINE SHALL TERMINATE UNDER A DRIVEWAY.
3. EACH SERVICE SHALL TERMINATE AT A CURB STOP WHICH SHALL BE FASTENED TO A 1" x 4" x 30" STAKE PAINTED WHITE AND MARKED WITH THE NUMBER OF THE LOT TO BE SERVED.
4. CURB STOP SHALL BE A FORD BALL METER VALVE B43-342W, B43-344W OR GCEC APPROVED EQUAL.
5. ALL SERVICE TAPS TO BE LOCATED IN FIELD. TAPS SHALL BE NO CLOSER THAN AND WILL NOT BE SET IN DRAINAGE SWALES, EASEMENTS OR SIDEWALKS.
6. METER BOXES & YOKE ARE TO BE INSTALLED BY THE INFRASTRUCTURE CONTRACTOR AND WILL NOT BE SET IN DRAINAGE SWALES, EASEMENTS OR SIDEWALKS.



3/4" & 1" WATER METER ASSEMBLY

STANDARD DETAILS WATER MAIN CONSTRUCTION

GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE:	SCALE:	PROJECT NO.
DEC. 2011	N.T.S.	094.015

DRAWN: S. RAY
CHECKED: C. FOREHAND
SHEET W11

EB# 0006155

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CIVIL • SURVEYING • SITE PLANNING
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(850) 522-0644

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1" WATER METER ASSEMBLY (COMMERICAL USE)

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011
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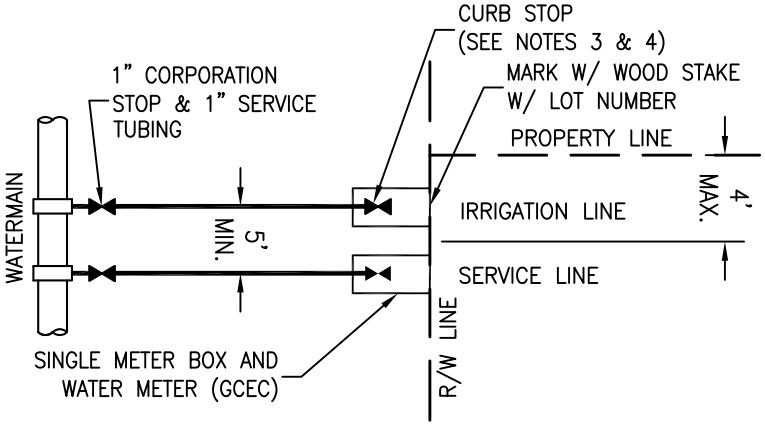
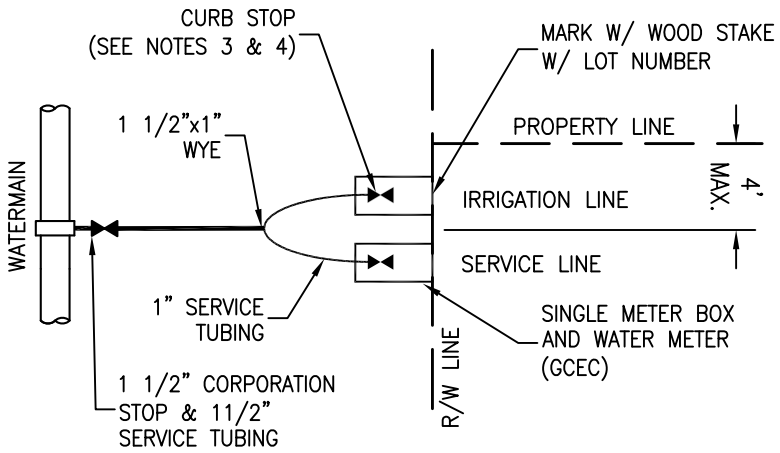
PROJECT NO. 094.015
SHEET W12
EB# 0006155

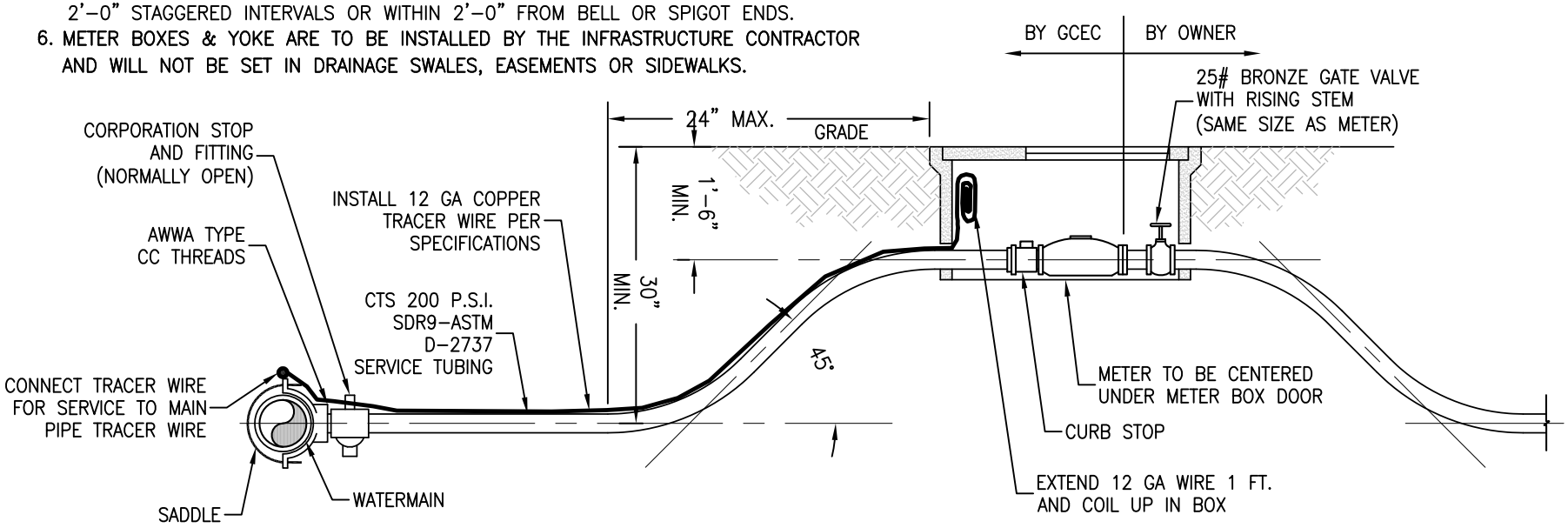


TYPICAL GCEC SERVICE
(PER. LOT OR COMMERCIAL SITE)



OPTIONAL GCEC SERVICE
(PER. LOT)

NOTES:
1. ALL FITTINGS SHALL BE BRASS WITH COMPRESSION/PACK JOINT TYPE CONNECTIONS.
2. NO SERVICE LINE SHALL TERMINATE UNDER A DRIVEWAY.
3. EACH SERVICE SHALL TERMINATE AT A CURB STOP WHICH SHALL BE FASTENED TO A 1" x 4" x 30" STAKE PAINTED WHITE AND MARKED WITH THE NUMBER OF THE LOT TO BE SERVED.
4. CURB STOP SHALL BE A FORD BALL METER VALVE B43-342W-G OR GCEC APPROVED EQUAL.
5. ALL SERVICE TAPS TO BE LOCATED IN FIELD. TAPS SHALL BE NO CLOSER THAN 2'-0" STAGGERED INTERVALS OR WITHIN 2'-0" FROM BELL OR SPIGOT ENDS.
6. METER BOXES & YOKE ARE TO BE INSTALLED BY THE INFRASTRUCTURE CONTRACTOR AND WILL NOT BE SET IN DRAINAGE SWALES, EASEMENTS OR SIDEWALKS.



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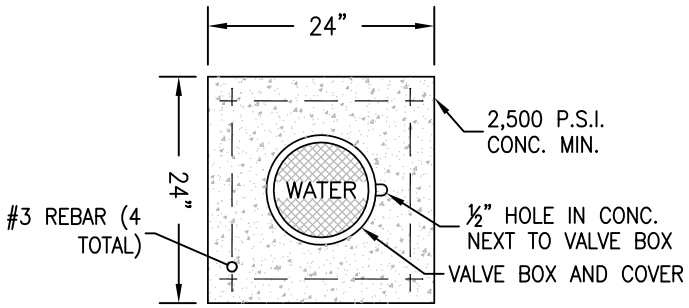
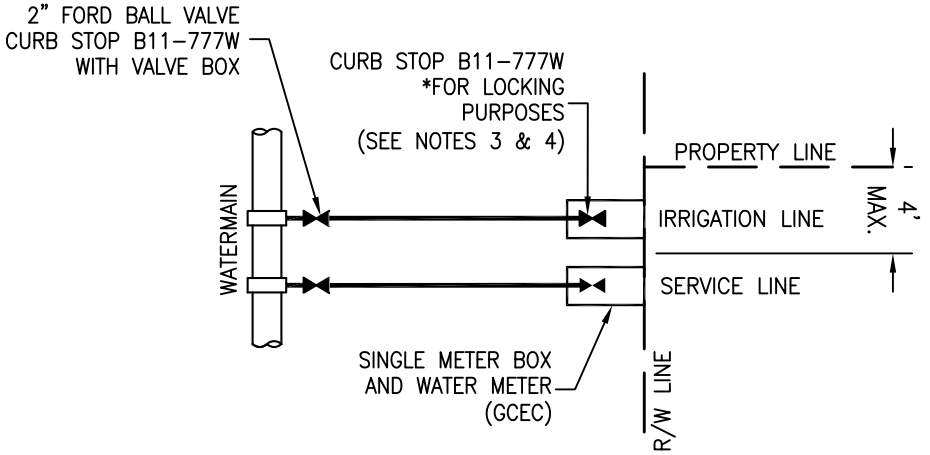
1 1/2" & 2" WATER METER ASSEMBLY

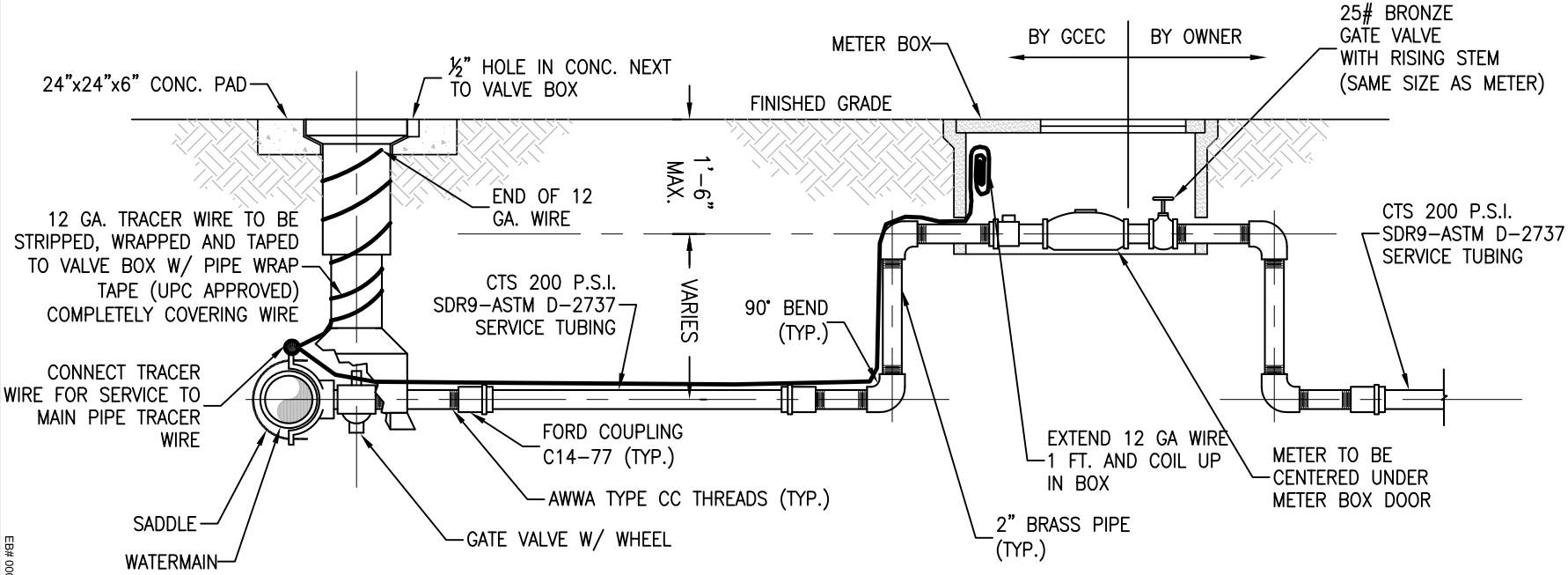
STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

NOTES:
1. ALL FITTINGS SHALL BE BRASS WITH COMPRESSION/PACK JOINT TYPE CONNECTIONS.
2. NO SERVICE LINE SHALL TERMINATE UNDER A DRIVEWAY.
3. EACH SERVICE SHALL TERMINATE AT A BALL VALVE WHICH SHALL BE FASTENED TO A 1" x 4" x 30" STAKE PAINTED WHITE.
4. CURB STOP SHALL BE A 2" FORD BALL METER VALVE B14-777W OR GCEC APPROVED EQUAL.
5. ALL SERVICE TAPS TO BE LOCATED IN FIELD. TAPS SHALL BE NO CLOSER THAN AND WILL NOT BE SET IN DRAINAGE SWALES, EASEMENTS OR SIDEWALKS.





TYPICAL GCEC SERVICE



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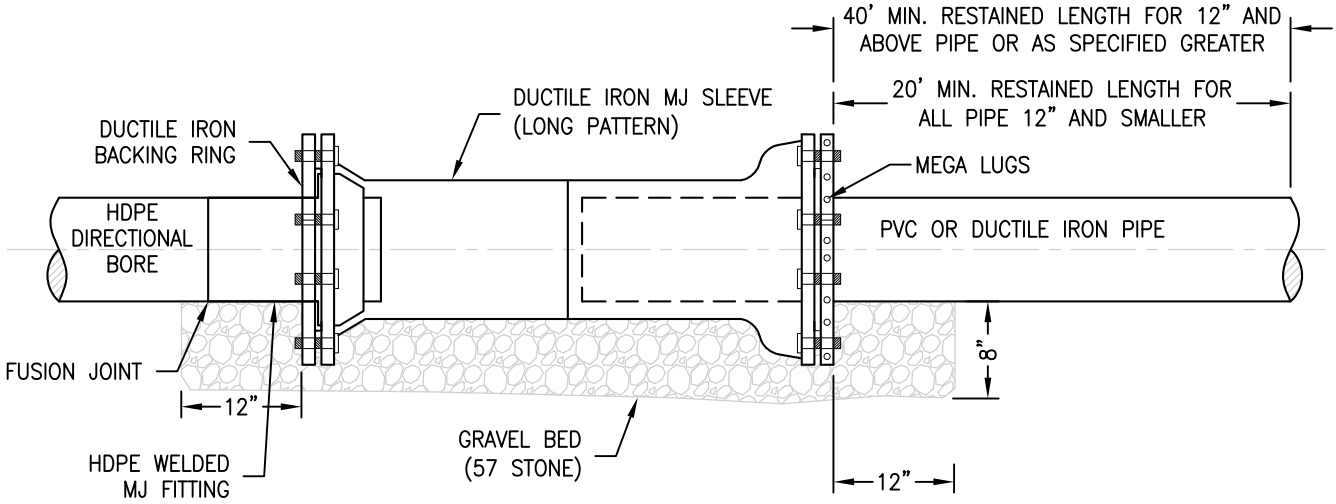
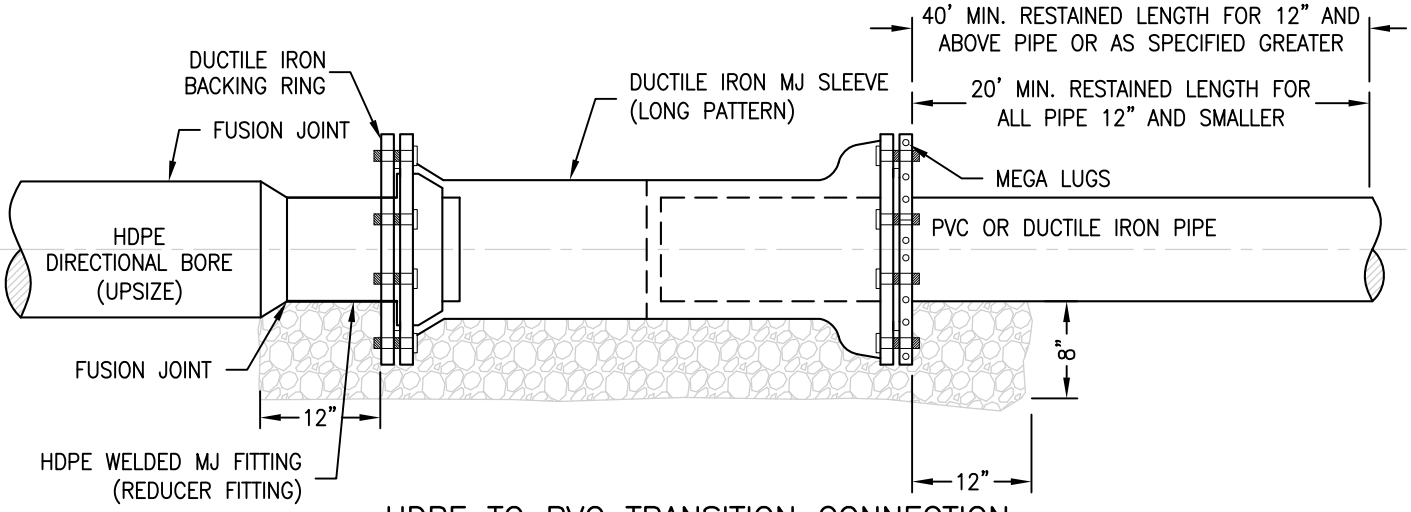


HDPE TO PVC TRANSITION CONNECTION



HDPE TO PVC TRANSITION CONNECTION (UPSIZING)

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TRANSITION CONNECTIONS

STANDARD DETAILS WATER MAIN CONSTRUCTION
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BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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CHECKED: C. FOREHAND	

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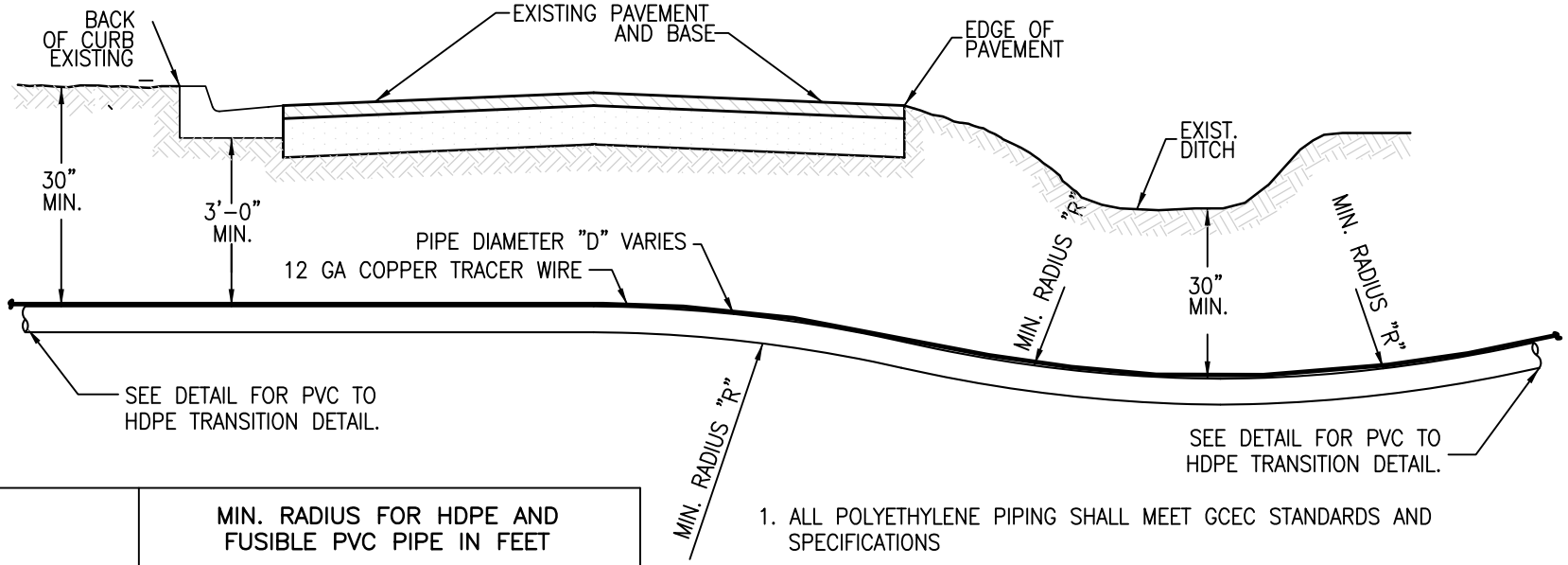
DIRECTIONAL BORES ROADWAY CROSSINGS

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA



	MIN. RADIUS FOR HDPE AND FUSIBLE PVC PIPE IN FEET
PIPE DIAMETER "D" IN INCHES	MIN. RADIUS "R" HDPE FOR SDR-11
2	4
3	6
4	8
6	12
8	16
10	20
12	24
16	32
18	36
20	40

1. ALL POLYETHYLENE PIPING SHALL MEET GCEC STANDARDS AND SPECIFICATIONS
2. SDR-11, CLASS 160 FOR POTABLE WATER, COLOR CODED BLUE.
3. THE COLOR CODING SHALL MEETING REQUIREMENTS IN ACCORDANCE WITH SUBPARAGRAPH 62-555.320 (21)(B) 3 F.A.C. AND SHALL BE CO-EXTRUDED DURING PIPE MANUFACTURING.
4. ALL HDPE PIPE MUST BE DIPS.
5. ALL DIRECTIONAL BORES SHALL BE A MINIMUM OF 36 INCHES UNDER ALL ROADWAYS AND START AND TERMINATE A MINUMUM OF 6 FEET OFF THE EDGE OF PAVEMENT.
6. CONTRACTOR SHALL PROVIDE A DETAILED "AS-BUILT" PROFILE OF ALL DIRECTIONAL BORE AND JACK AND BORE LOCATION OF ACTUAL PIPE ELEVATIONS AT 10 FOOT INTERVALS ON AS-BUILT PLAN SHEETS.

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PROJECT NO. 094.015
SHEET W15
EB# 0006155

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DIRECTIONAL BORE ROADWAY CROSSINGS

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

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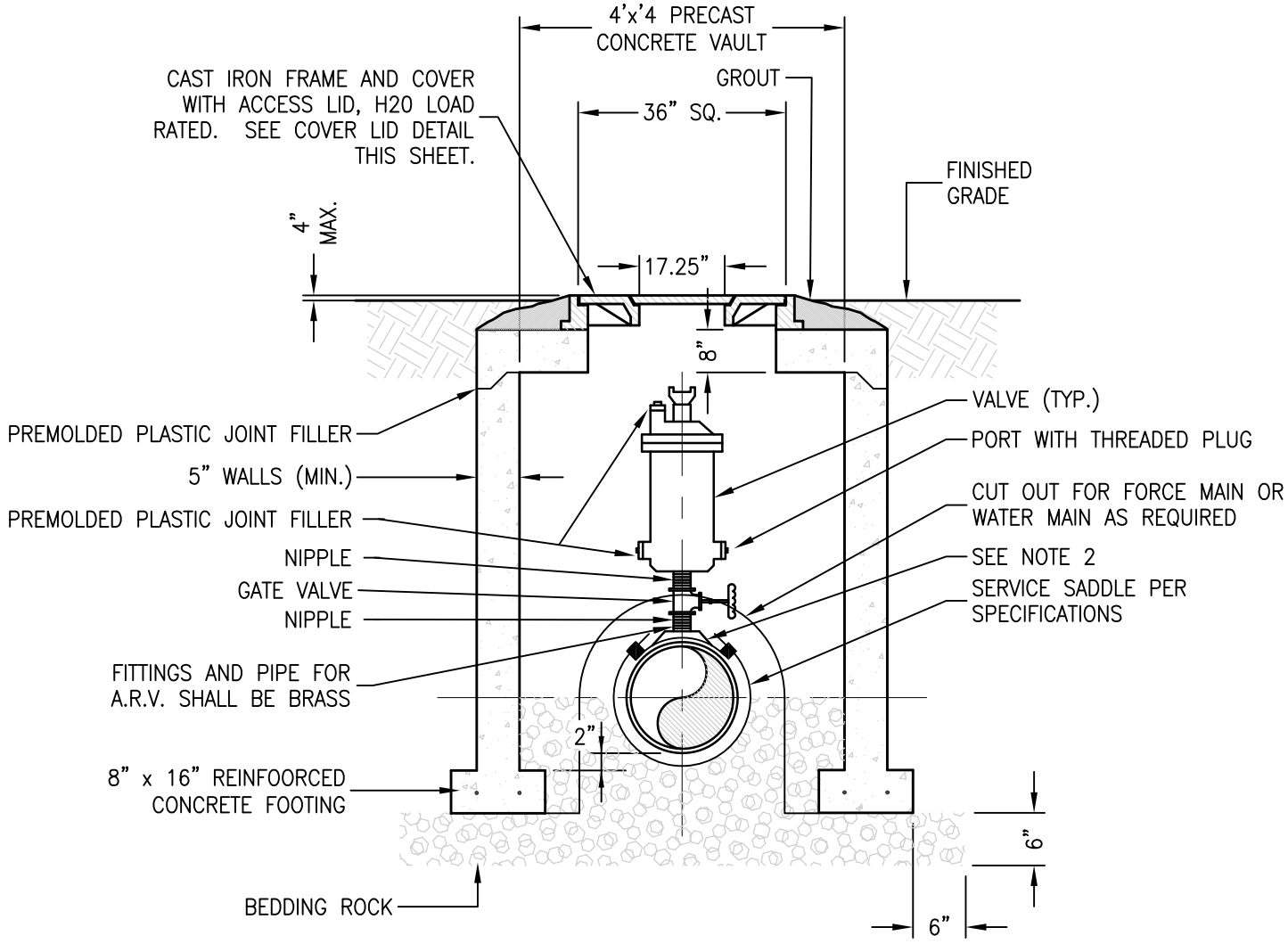
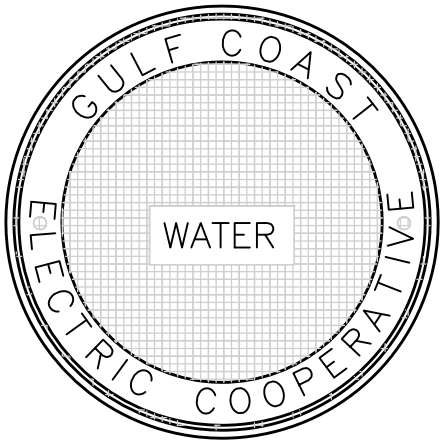


NOTES:

1. ABOVE DETAIL IS BASED ON 2" COMBINATION AIR/VACUUM RELEASE VALVE. CHANGE PIPE AND FITTINGS ACCORDINGLY FOR OTHER VALVE SIZES AND TYPES. VALVE SIZES TO BE DETERMINED BY THE ENGINEER AND APPROVED BY GCEC'S ENGINEER.
2. THE MINIMUM DIMENSION FROM TOP OF PIPE TO FINISHED GRADE SHALL BE 4.0 FEET.



COVER LID DETAIL

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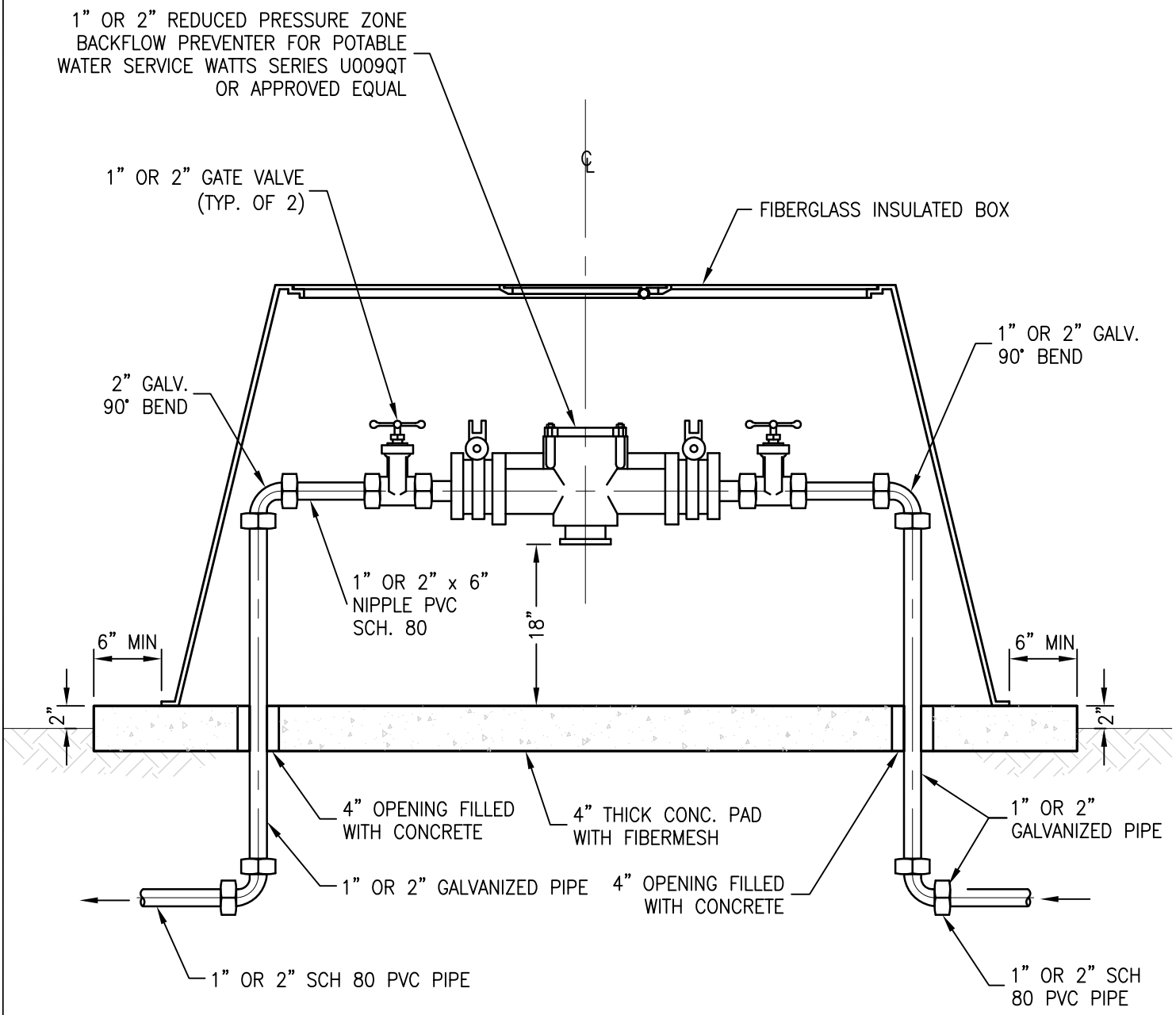
AIR AND/OR VACUUM RELEASE VALVE

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W16
CHECKED: C. FOREHAND	



NOTE: CONCRETE PAD SHALL BE 6" LARGER THAN FOOTPRINT OF INSULATED BOX.

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1" & 2" RPZ & DOUBLE CHECK VALVE BACKFLOW PREVENTER

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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DRAWN: S. RAY	SHEET W17
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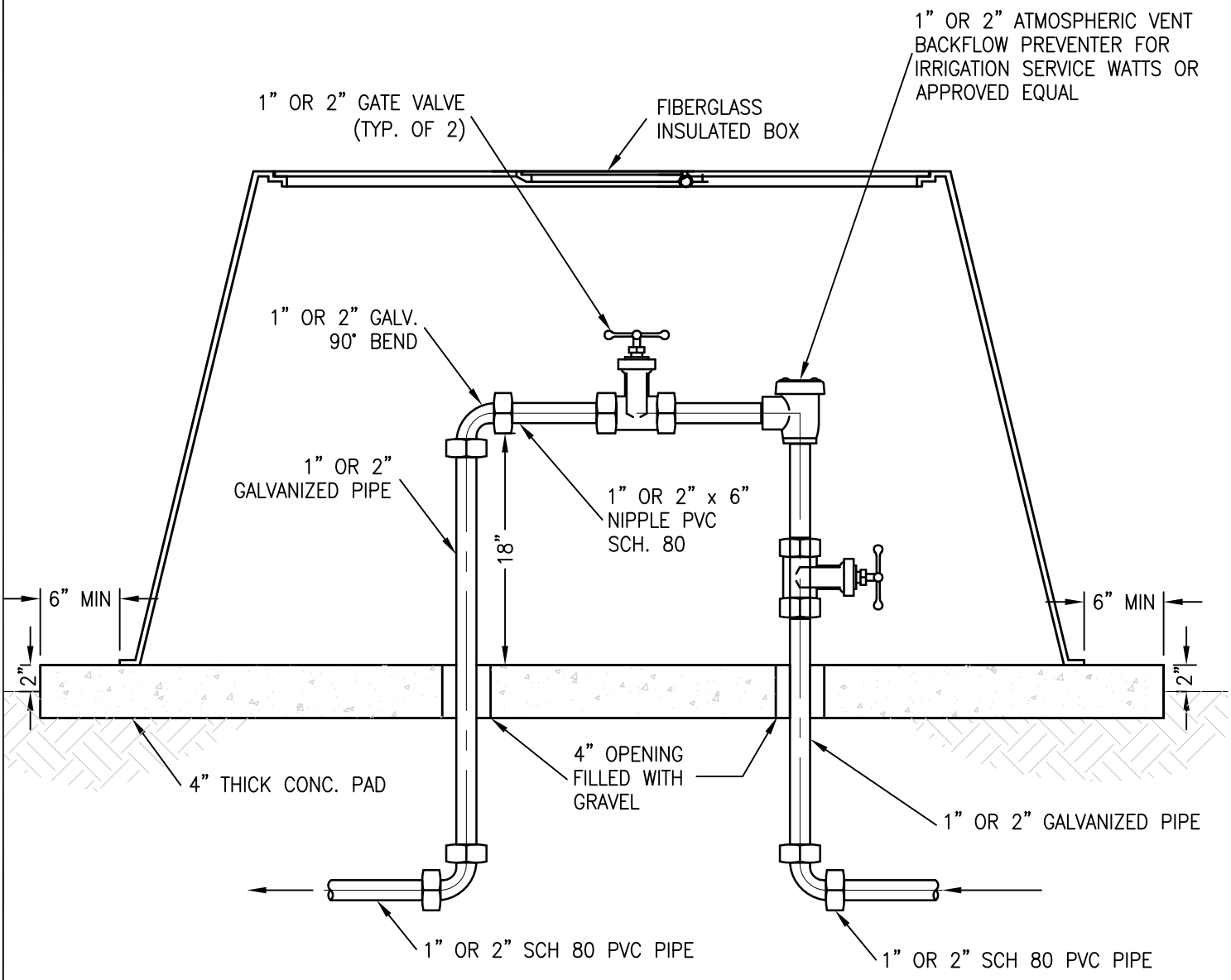

NOTES:

1. ALL PIPE AND FITTINGS 2" AND SMALLER SHALL BE THREADED SCHEDULE 40 GALVANIZED STEEL OR BRASS.
2. PROVIDE PROTECTION AGAINST FREEZING.
3. TWO PIPE SUPPORTS REQUIRED.
4. ALL ITEMS ABOVE GRADE SHALL HAVE ONE COAT OF APPROVED RUST RESISTANT BLUE ENAMEL PAINT.

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1" & 2" ATMOSPHERIC VENT BACKFLOW PREVENTER

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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DRAWN: S. RAY	SHEET W18
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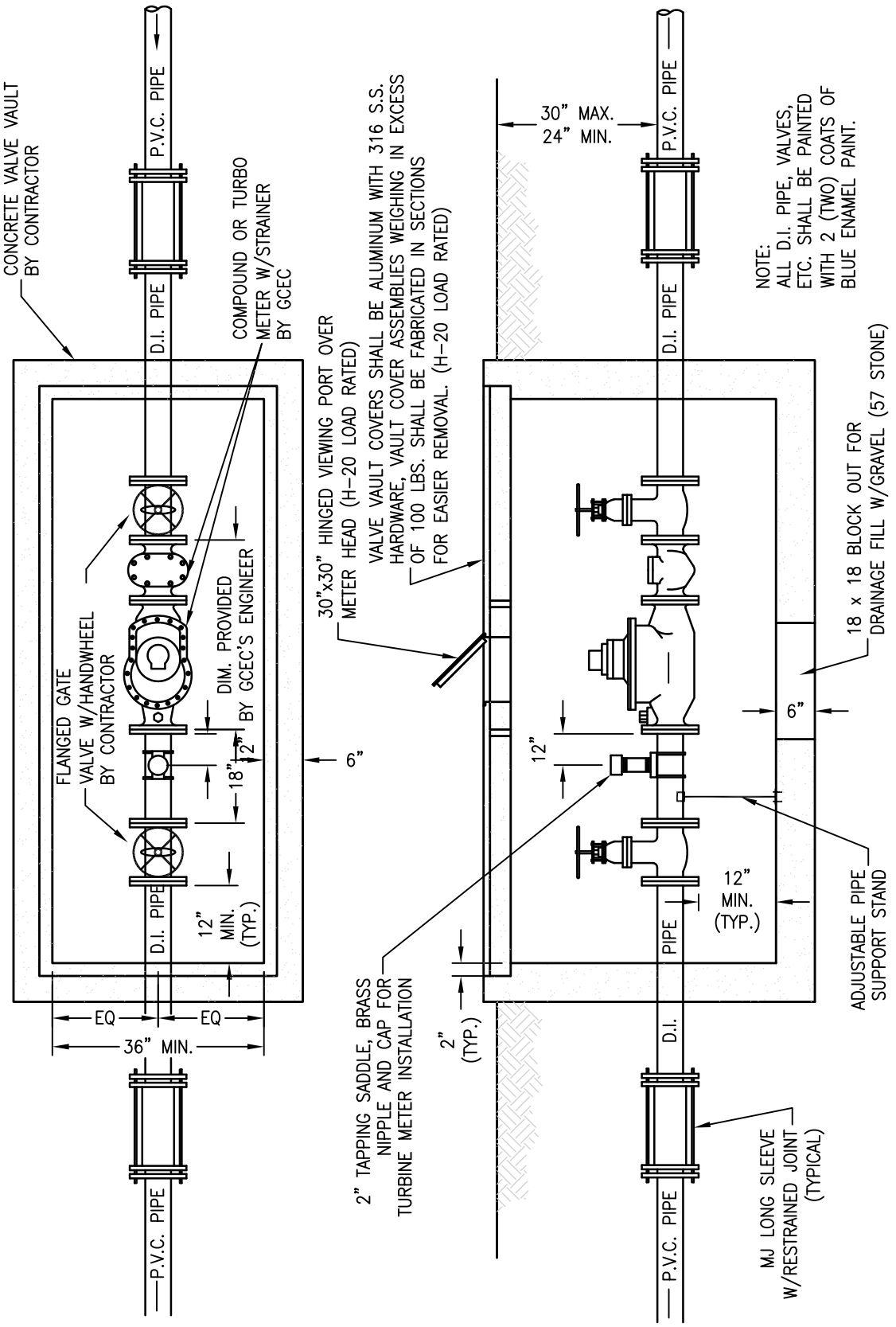

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3" WATER METER INSTALLATION

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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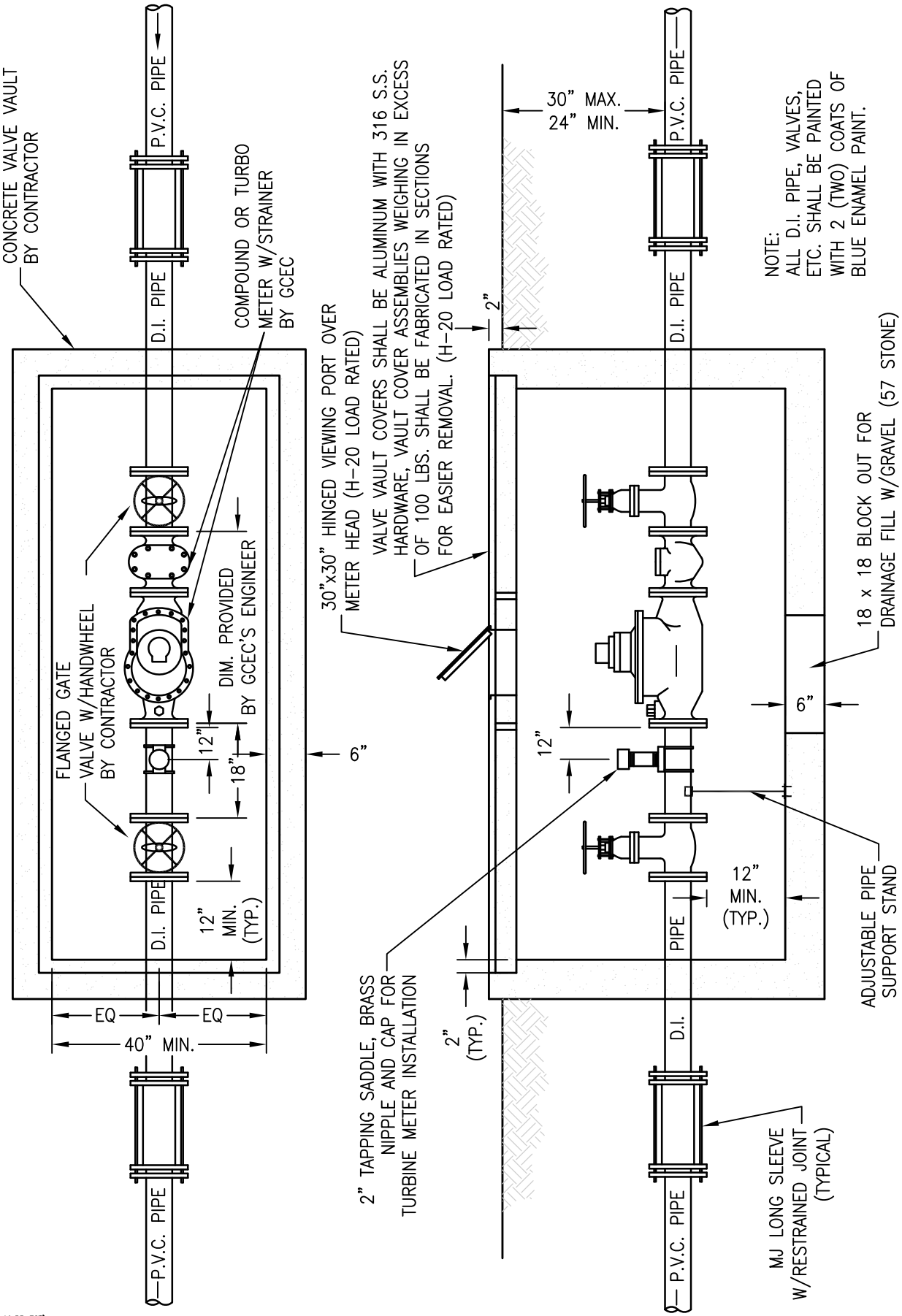

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4" WATER METER INSTALLATION

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GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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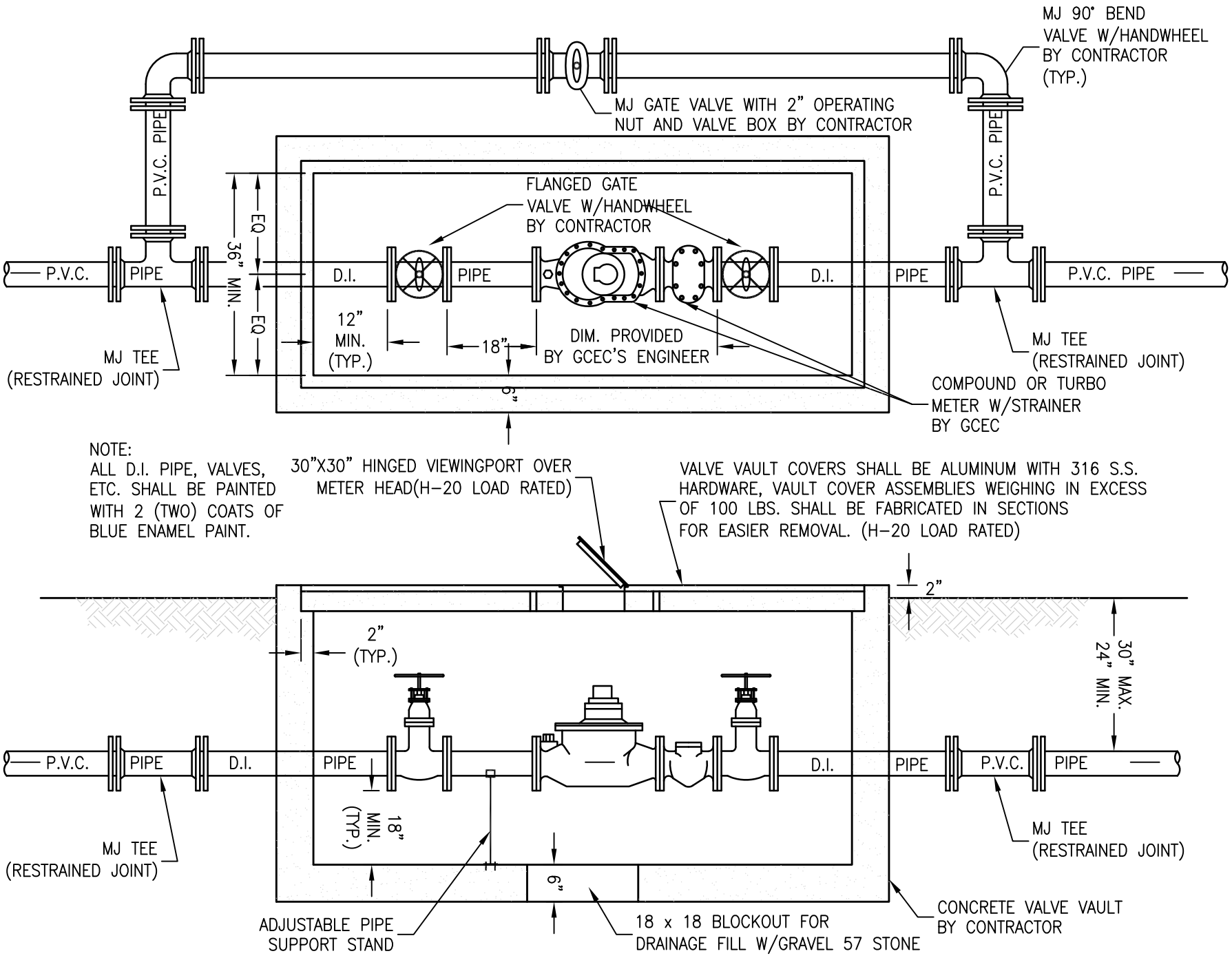
4" & 6" WATER METER INSTALLATION

STANDARD DETAILS WATER MAIN CONSTRUCTION

GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA



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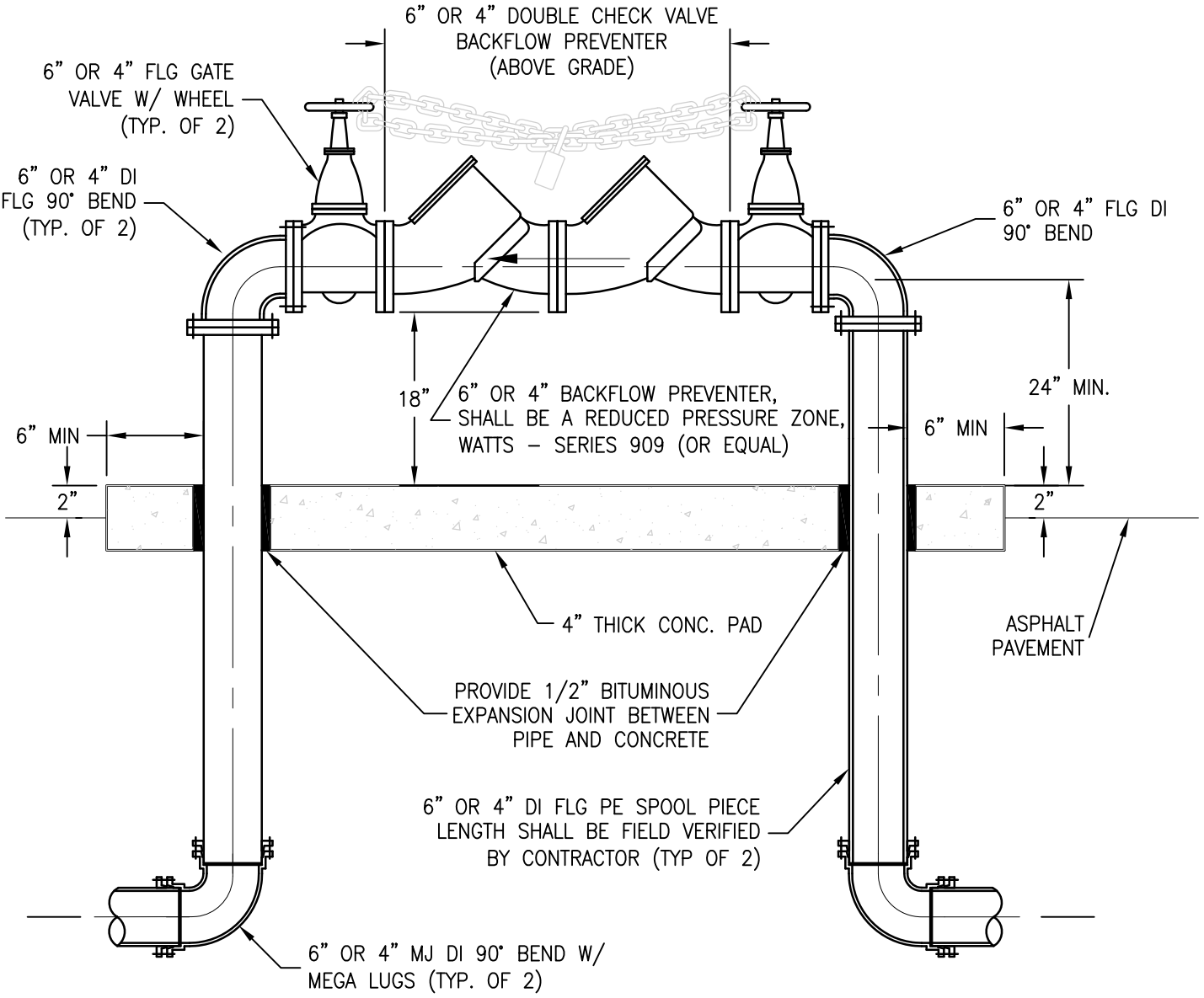
PROJECT NO. 094.015

SHEET W21

EB# 0006155



NOTES:

1. METER WILL BE PROVIDED BY GCEC, AND INSTALLED BY CONTRACTOR.
2. ALL ABOVE GROUND PIPE AND FITTINGS SHALL BE FLANGED DUCTILE IRON.
3. ALL ITEMS ABOVE GRADE SHALL HAVE TWO COATS OF APPROVED EPOXY BLUE ENAMEL PAINT.
4. ALL VALVES SHALL HAVE HANDWHEELS.
5. VALVE(S) SHALL BE CHAINED AND PADLOCKED IN OPENED POSITION.
6. BACKFLOW DEVICE SHALL BE RPZ OR DC TYPE AS APROVED BY GCEC.
7. REDUCER AS REQUIRED IF METER SIZE DIFFERS FROM PIPE SIZE.

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4" & 6" WATER METER & BACKFLOW INSTALLATION

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

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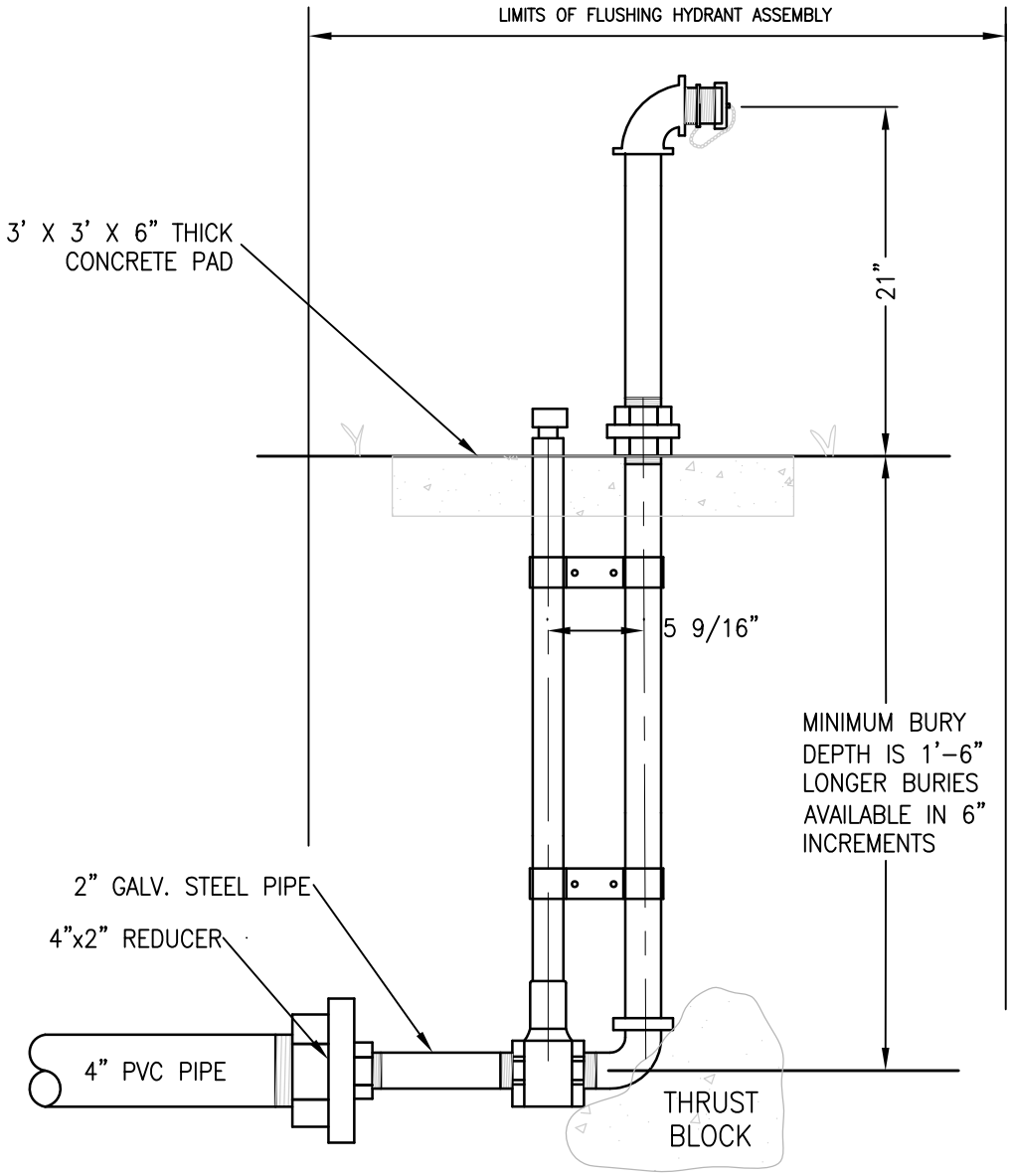

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FLUSHING STAND

STANDARD DETAILS WATER MAIN CONSTRUCTION
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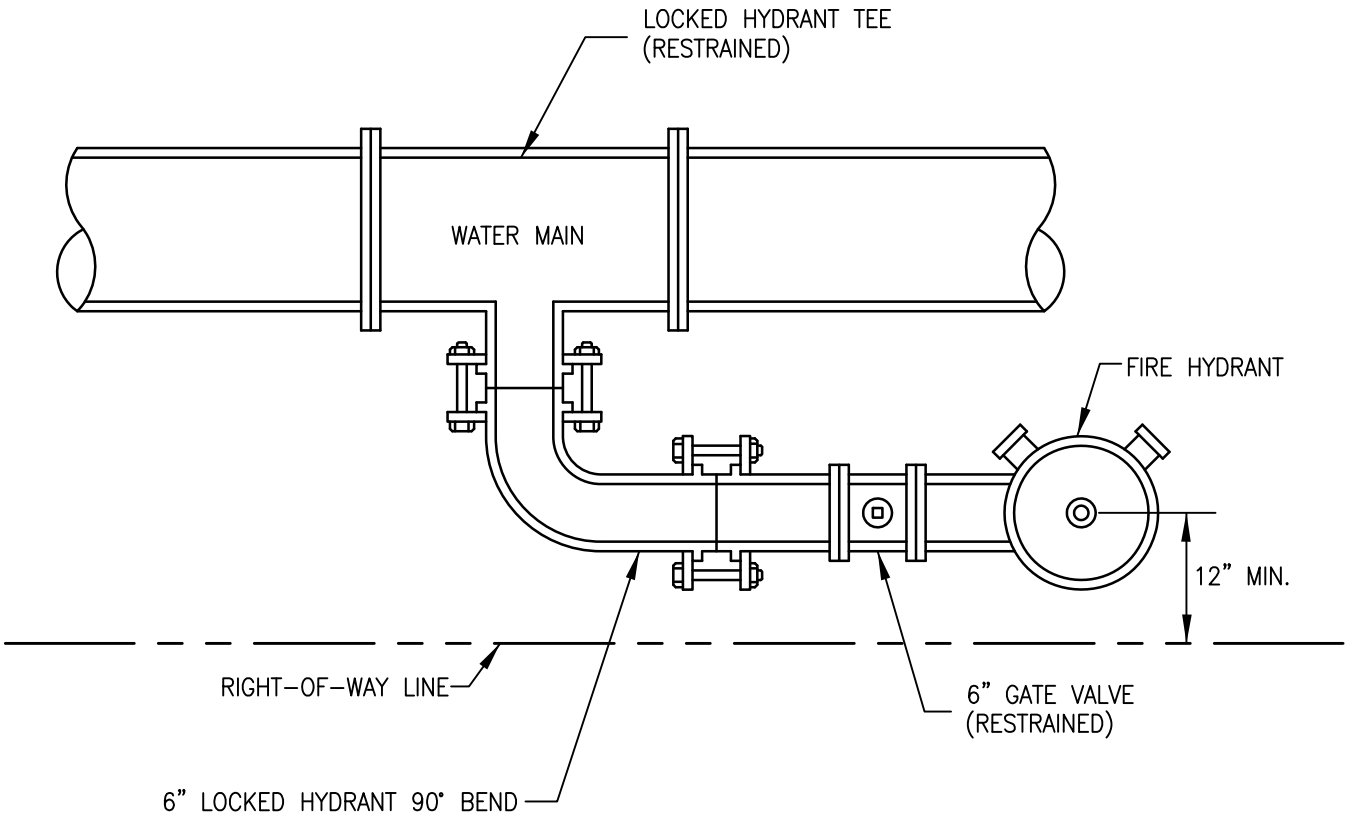

PLAN

NOTE:

THIS DETAIL FOR USE ONLY WHEN THE WATER MAIN IS LOCATED TOO CLOSE TO THE RIGHT-OF-WAY LINE.

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FIRE HYDRANT WITH LOCKED 90° BEND

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
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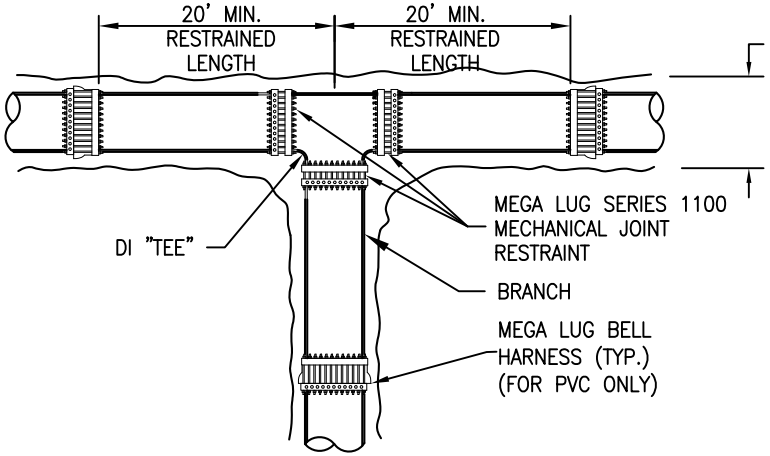
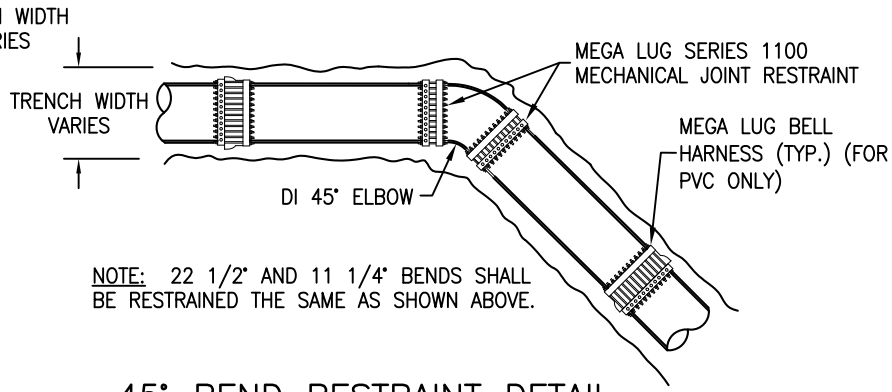
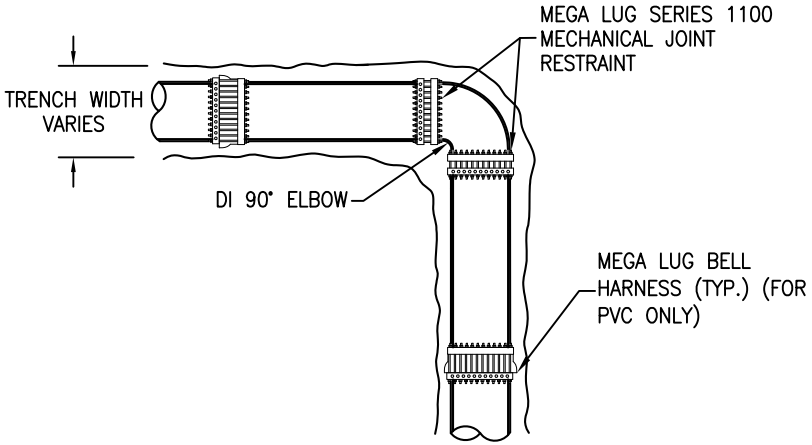


TEE RESTRAINT DETAIL



45° BEND RESTRAINT DETAIL



90° BEND RESTRAINT DETAIL

NOTES:

1.) RESTRAIN TO NEXT FULL JOINT BEYOND GIVEN LENGTH.

2.) RESTRAIN 11.25° BENDS 50% OF LENGTH FOR 22.5° BENDS.

3.) ALL VALVES AND FITTINGS SHALL BE RESTRAINED TO THE CONNECTING SECTIONS OF PIPE.

4.) ALL VALVES MUST BE PROPERLY ANCHORED OR RESTRAINED TO RESIST A 200 PSI TEST PRESSURE IN EITHER DIRECTION.

5.) PIPE SIZES ARE GIVEN IN INCHES.

6.) PIPE LENGTHS ARE GIVEN IN FEET.

7.) LENGTHS SHOWN ARE FOR A TEST PRESURE OF 150 PSI.

8.) RESTRAIN LENGTHS ARE TO BE USED FOR WATER.

9.) THE RESTRAINED LENGTHS SHOWN IN THESE TABLES ARE BASED ON THE USE OF LIGHTLY COMPACTED CLEAN SAND WITH AT LEAST A 95% COARSE PARTICLE CONTENT. ACTUAL SOIL CONDITIONS MUST BE DETERMINED BY THE ENGINEER OF RECORD AND THE RESTRAINED LENGTHS MODIFIED ACCORDINGLY. SAFTY FACTOR OF 1.5:1 TO BE CALCULATED WITH A "SM" SOIL TYPE AND TRENCH TYPE "3".

RESTRAINED JOINT

STANDARD DETAILS WATER MAIN CONSTRUCTION

GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE:	DEC. 2011
SCALE:	N.T.S.
DRAWN:	S. RAY
CHECKED:	C. FOREHAND
PROJECT NO.	094.015
SHEET	W25

EB# 0006155

MAIN PIPE SIZE	HORIZ. BENDS			TEES					REDUCERS			PLUGS
	90°	45°	22.5°	SIZE / LENGTH					SIZE / LENGTH			
48	128	53	26	X48 / 219	X42 / 162	X36 / 106	X30 / 48	X24 / 1	X42 / 75	X36 / 139	X30 / 194	321
42	117	49	24	X42 / 191	X36 / 134	X30 / 74	X24 / 13	X20 / 1	X36 / 75	X30 / 140	X24 / 192	289
36	106	44	21	X36 / 163	X30 / 102	X24 / 39	X20 / 1	X16 / 1	X30 / 78	X24 / 141	X20 / 175	257
30	93	39	19	X30 / 132	X24 / 68	X20 / 22	X16 / 1	X12 / 1	X24 / 78	X20 / 121	X16 / 156	222
24	79	33	16	X24 / 99	X20 / 53	X16 / 3	X12 / 1	X10 / 1	X20 / 56	X16 / 101	X12 / 137	185
20	68	29	14	X20 / 75	X16 / 26	X12 / 1	X10 / 1	X8 / 1	X16 / 56	X12 / 100	X10 / 117	159
16	57	24	12	X16 / 51	X12 / 1	X10 / 1	X8 / 1		X12 / 56	X10 / 78	X8 / 96	131
12	45	19	9	X12 / 35	X10 / 1	X8 / 1	X6 / 1		X10 / 30	X8 / 54	X6 / 74	102
10	39	16	8	X10 / 11	X8 / 1	X6 / 1			X8 / 29	X6 / 53	X4 / 71	87
8	33	14	7	X8 / 1	X6 / 1	X4 / 1			X6 / 31	X4 / 52		72
6	25	11	5	X6 / 1	X4 / 1				X4 / 29			55
4	18	8	4	X4 / 1								39

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EB# 0006155

PREBLE-RISH, INC.
CONSULTING ENGINEERS AND SURVEYORS
CIVIL • SURVEYING • SITE PLANNING
203 ABERDEEN PKWY, PANAMA CITY, FL 32405
(850) 522-0644

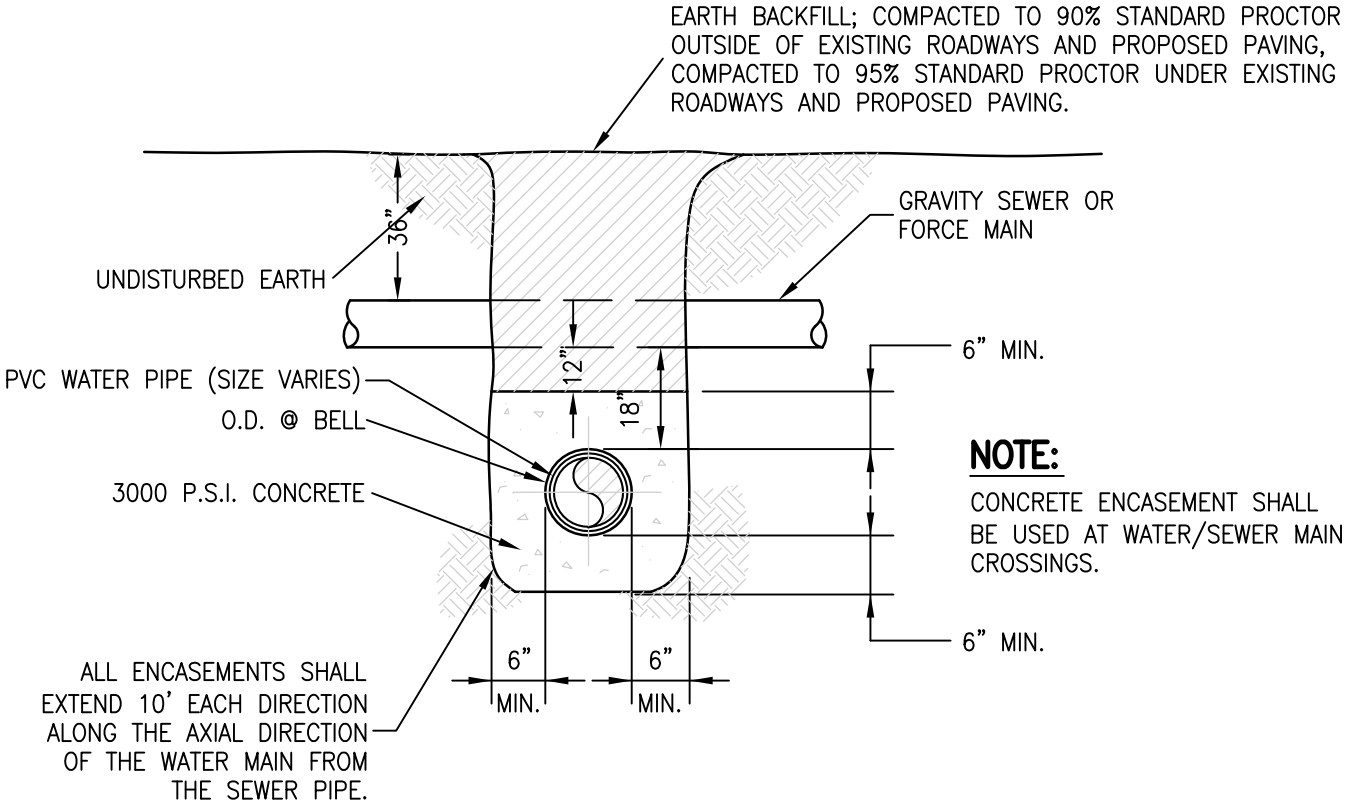
RESTRAINED JOINT CHART

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011
SCALE: N.T.S.
DRAWN: S. RAY
CHECKED: C. FOREHAND

PROJECT NO. 094.015

SHEET W26



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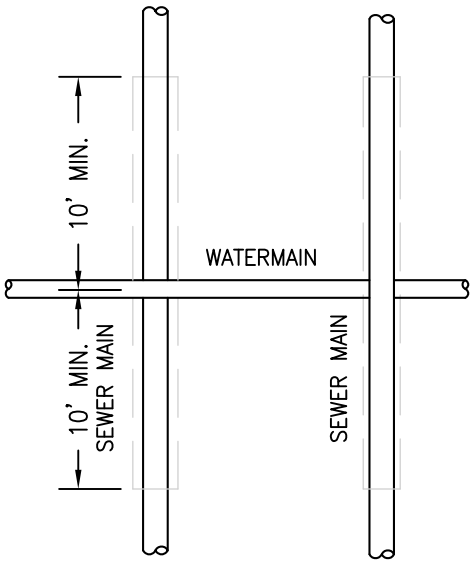
(850) 522-0644

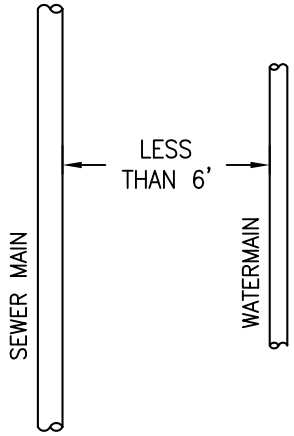
CONCRETE ENCASEMENT

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W27
CHECKED: C. FOREHAND	



PLAN



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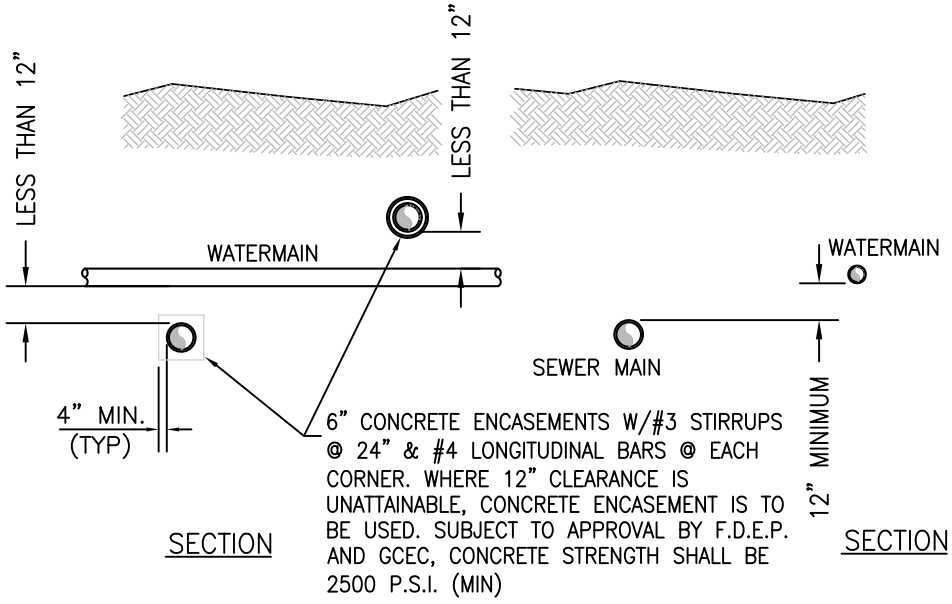

SECTION

6" CONCRETE ENCASEMENTS W/#3 STIRRUPS @ 24" & #4 LONGITUDINAL BARS @ EACH CORNER. WHERE 12" CLEARANCE IS UNATTAINABLE, CONCRETE ENCASEMENT IS TO BE USED. SUBJECT TO APPROVAL BY F.D.E.P. AND GCEC, CONCRETE STRENGTH SHALL BE 2500 P.S.I. (MIN)

SECTION

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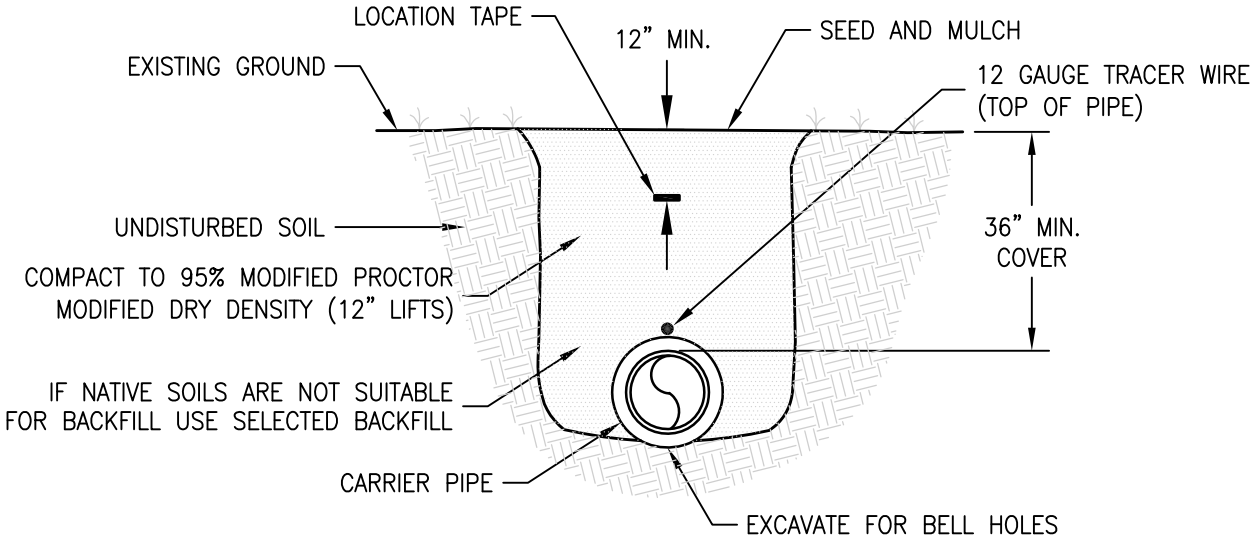
WATER/SEWER SEPARATION

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W28
CHECKED: C. FOREHAND	



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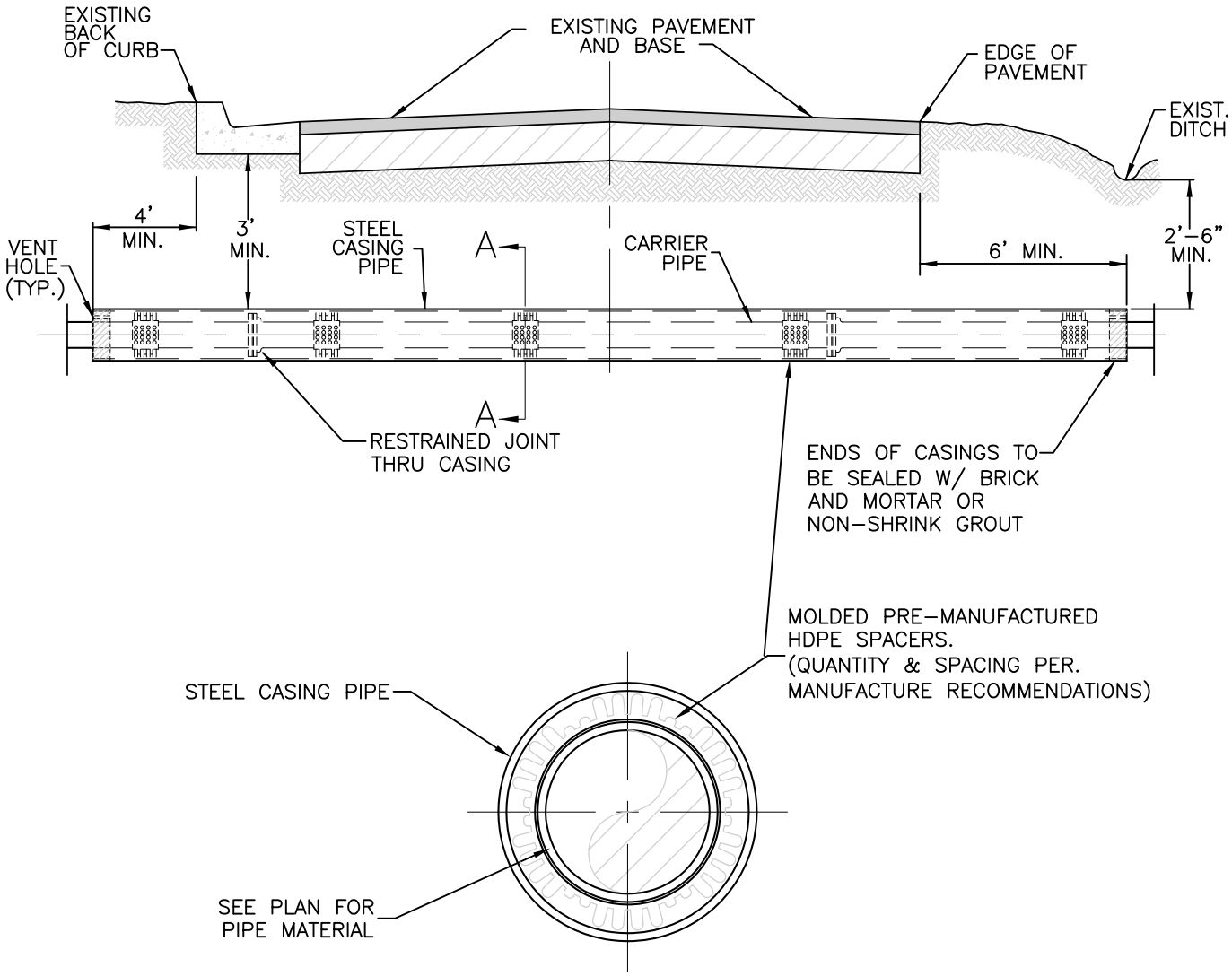
(850) 522-0644

STANDARD BEDDING

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W29
CHECKED: C. FOREHAND	



SECTION A–A

NOTES:

1. WHEN CONSTRUCTION IS WITHIN FDOT JURISDICTION, ADDITIONAL REQUIREMENTS OF THE UTILITY ACCOMMODATION GUIDE SHALL BE MET.

2. WHERE PRACTICAL, CASING SHALL EXTEND 10' BEYOND EDGE OF PAVEMENT AND SHALL NOT BE LESS THAN 6' BEYOND EDGE OF PAVEMENT IN ANY CASE. GCEC MAY REQUIRE LONGER CASING FOR DEEPER BORES.

3. CASING PIPE JOINTS SHALL BE MADE BY USING A FULL CIRCUMFERENCE COMPLETE PENETRATION GROOVE WELD.

CARRIER & CASING SIZE							
CARRIER	4"	6"	8"	10"	12"	14"	16"
CASING	12"	14"	16"	18"	20"	24"	30"
CASING / WALL THICKNESS	0.250"	0.250"	0.250"	0.250	0.250"	0.250"	0.312"

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JACK AND BORE

STANDARD DETAILS WATER MAIN CONSTRUCTION
GULF COAST ELECTRIC COOPERATIVE
BAY COUNTY, FLORIDA

DATE: DEC. 2011	PROJECT NO. 094.015
SCALE: N.T.S.	
DRAWN: S. RAY	SHEET W30
CHECKED: C. FOREHAND	

GULF COAST ELECTRIC COOPERATIVE
APPROVED MATERIALS AND MANUFACTURERS

WATER MAIN MATERIALS

Air Release Valves	**1. Cla-Val** **2. Valmatic**
Casing Spacers	**1. Cascade** **2. Approved Equal**
Corporation Stops	**1. Ford** **2. Mueller**
Curb Stops	**1. Ford** **2. Mueller**
Expansion Joints	**1. EBBA Iron** **2. Approved Equal**
Fire Hydrants	**1. Mueller** **2. American AVK** **3. American**
Fittings	**1. Union** **2. U.S. Pipe** **3. American** **4. Tyler** **5. Star**
Gate Valves (16" & smaller) **Resilient Seated Only**	**1. Clow** **2. Mueller** **3. U.S. Pipe** **4. American** **5. M & H** **6. American AVK**
Painting: Aerial Piping, Fittings & Valves	
A. Field Primer	**1. Glidden (ICI) paints**
Pipe (DI)	**1. American** **2. U.S. Pipe**

Pipe (PVC)	**1. CertainTeed** **2. Can-Tex** **3. North Star** **4. J-M** **5. Capco** **6. Consolidated**
Polyethylene Tubing	**1. Plexco** **2. Orangeburg** **3. Contube**
Restrained Joints	**1. EBAA Iron Inc.** **2. Approved Equal**
Service Saddles	**1. Ford** **2. Mueller**
Tapping Sleeves, **Fabricated Steel**	**1. Ford** **2. Mueller**
Tapping Sleeves, M.J.	**1. U.S. Pipe** **2. Mueller** **3. Tyler** **4. Clow** **5. M & H** **6. American-Darling** **7. Ford**
Tapping Valves	**1. Kennedy** **2. M & H** **3. American-Darling** **4. U.S. Pipe** **5. Clow** **6. Mueller**
Valve Boxes	**1. Tyler** **2. Approved Equal**
Vault Frame and Cover **For Air Release Valves**	**1. U.S. Foundry** **2. approved Equal**

AVERAGE AND PEAK DAILY FLOWS

The flows for all residences shall be calculated as follows:

One (1) Residence = 300 gpcd = ADF

Peak Daily Flow = 2.5 (ADF)

Peak Hour Flow = 4.0 (PHF)

The flows for all commercial users shall use Standard Engineering Practice and shall include minimum required fire flow.

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The flows for all commercial users shall use Standard Engineering Practice and shall include minimum required fire flow.

GULF COAST ELECTRIC COOPERATIVE
CROSS-CONNECTION PROGRAM

SECTION I - RULES AND REGULATIONS GOVERNING CROSS-CONECTION CONTROL

1.1 Statement Concerning Protection of the Water Supply System

In order to protect the public water supply system from contamination due to Cross-Connections, Gulf Coast Electric Cooperative (GCEC) herby establishes the following statements.

a) No installation of potable water supply piping or part thereof shall be made in such a manner that it will be possible for any used, unclean, polluted or contaminated water, mixtures or substances to enter any portion of such piping from any tank receptacle, equipment, or plumbing fixture by reason of back-siphonage, or any other cause, either during normal use and/or operation thereof or when any suck tank, receptacle, equipment, or plumbing fixture is flooded, or subject to pressure in excess of the pressure in the hot or cold water piping.

b) No person shall make a connection or allow one to exist between pipes or conduits carrying domestic water supplied by any public or private water service system, and any pipes, conduits, or fixtures containing or carrying water from any other source or containing or carrying water which has been used for any purpose whatsoever, or any piping carrying chemicals, liquids, gases, or any substances whatsoever, unless there is provided an approved backflow prevention device. The approval of the Director of GCEC must be obtained prior to any connection made between the domestic potable water supply and any contaminated, polluted or auxiliary water system.

c) No plumbing fixture, device or connection shall be installed or maintained or shall be connected to any domestic potable water supply, when such installation or connection may provide a cross-connection between a distribution system of potable water for drinking and other domestic purposes and water which may become contaminated by such plumbing fixture, device, or connection unless there is provided an approved backflow prevention device.

d) No water piping supplied by any private water supply system or industrial piping system shall be connected to the public potable water supply system without the approval of the Director of GCEC.

1.2 Excerpts from State Codes and Regulations

a) Rules of the State of Florida Department of Environmental Protection Section 17-555.200 (16) and 17-555.330:

Cross-connection, which is the physical arrangement whereby a public water supply is connected, directly or indirectly with any other water supply system, sewer, drain, conduit; pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewage or other waste, or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply as a result of backflow. By-pass arrangements, jumper connections, removable sections, swivel or changeable devices, and other temporary or permanent devices through which or because of which could occur are considered to be cross-connections.

No contaminant which creates or has the potential to create an imminent and substantial danger to the public shall be introduced into a public water system.

b) Standard Plumbing Code – Chapter 12, Section 1204.l:

Potable water supplying piping, water discharge outlets, backflow prevention devices, or similar equipment shall be so located as to make impossible their submergence in any polluted liquid or substance.

c) Standard Plumbing Code – Appendix D, Section D-2(a)-(d)

The Public Utilities Director or other representative shall enforce the provisions of this Code so as to ensure the potability of the customers' water supply, from the point of entrance to the public water supply to the extremities of the customer's water system, including new installations, alterations or repairs of existing water supply systems.

The GCEC Water System is primarily responsible for the prevention of contamination and pollution of the public water mains, but only within its jurisdictional boundaries. Such responsibility begins at the point of origin of the public water supply, i.e., at the discharge of the high service pumps at the water treatment plant, and ends at the point of entrance to the customer's water system, provided adequate backflow and back siphonage protection is maintained on all water supply systems directly connected to GCEC's public water system.

The Public Utilities Director is responsible for supervising the prevention of contamination and pollution of the public water main, all water supply systems, and all water sources. Such responsibility extends from the point of origin of the public water supply to and including all extremities of the customers supply and its actual use. The Public Utilities Director has prime supervisory responsibility for the administration and enforcement of those portions of the Cross-Connection, Backflow and Back-Siphonage Control Program applicable to existing water supply systems and water sources. The customer has the prime responsibility of preventing contaminants and pollutants from entering the water supply system, and from entering the public water main or water source from his own water supply system. The customer shall protect his water supply system against actual or potential cross-connection, backflow, or back-siphonage, as required by the Program and other applicable regulations. He shall assure that all protective devices are tested and maintained in the working condition required. He shall

assure the necessary permits are obtained for new water supply system installations, and for alterations or repair to existing systems, as required by this Program.

d) Standard Plumbing Code – Appendix D-104.1.1

No water service connection to any premises shall be installed or maintained unless the potable water and water supply are protected against actual or potential contamination of pollution in the manner required.

1.3 Results of Non-Compliance

Service of water to any premises shall be disconnected by GCEC Utility Department if a backflow prevention device required by law, rule, or regulation is not installed, tested, and maintained; or if it has been found that a backflow prevention device has been removed or by-passed, or if unprotected cross-connections exist on the premises and there is inadequate backflow protection at the service connection. Water service will not be restored until such conditions or defects are corrected. All turn-on and turn-off service charges shall be paid by the customer.

GULF COAST ELECTRIC COOPERATIVE
CROSS-CONNECTION PROGRAM

SECTION II - DEFINITIONS

2.1 Approved. Accepted by the GCEC Public Utilities Director or his designated representative.

2.2 Auxiliary Water Supply. Any water supply on or available to the premises other than the purveyor's approved public potable water supply. These auxiliary waters may include water from another purveyor's public potable water supply or any natural source(s) such as a well, spring, river, stream, harbor, etc., or "used waters" or "industrial fluids". These waters may be polluted or contaminated or they may be objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

2.3 Backflow. The flow of water or other liquids, mixtures, or substances under pressure into the distribution piping of a potable water supply system from any source or sources other than its intended source.

2.4 Back-siphonage. The flow of water or other liquids, mixtures, or substances into the distribution piping of a potable water supply system from any source other than its intended source caused by the sudden reduction of pressure in the potable water supply system.

2.5 Backflow-Preventer.

a) Air-Gap. The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of said vessel. An approved air-gap shall be at least double the diameter of the supply pipe, measured vertically, above the top of the rim of the vessel; and in no case less than one inch. When an air-gap is used at the service connection to prevent the contamination or pollution of the public potable water system, an emergency by-pass shall be installed around the air-gap system and an approved reduced pressure principal device shall be installed in the by-pass system.

b) Reduced Pressure Principle System. An assembly of two in independently operating approved check valves with an automatically operating differential relief valve between the two check valves, tightly closing shut-off valves on either side of the check valves, plus properly located test cocks for the testing of the check and relief valves. The entire assembly shall meet design and performance specifications and approval of a recognized and GCEC sanctioned testing agency for backflow prevention assemblies.

The device shall operate to maintain the pressure in the zone between the two check valves at a level less than the pressure on the public water supply side of the device. At cessation of normal flow, the pressure between the two check valves shall be less than the pressure on the public water supply side of the device. In case of leakage of either of the check valves, the differential relief valve shall operate to maintain the reduce pressure in the zone between the check valves by discharge to the atmosphere. When the inlet pressure is two pounds per square inch or less, the relief valve shall open to the atmosphere. To be approved, these devices must be readily accessible for in line testing and maintenance and be installed in a location where no part of the device shall be submerged.

c) Double Check Valve Assembly. An assembly of two independent operating approved check valves with tightly closing shut-off valves on each side of the check valves, plus properly located test cocks on each side of the check valve. The entire assembly shall meet design and performance specifications and approval of a recognized and GCEC sanctioned testing agency for backflow prevention devices. To be approved, these devices must be readily accessible for in-line testing and maintenance.

2.6 Contamination. Means an impairment of the quality of the potable water supply system by sewage, industrial fluids, or waste fluids, compounds, or other materials to a degree which creates an actual hazard to the public health through poisoning or through the spread of disease.

2.7 Cross-Connection. Any physical connection or arrangement of piping or fixtures between two otherwise separate piping systems, one of which contains potable water and the other non-potable water or industrial fluids of questionably safety, through which, or because of which, backflow or back-siphonage may occur into the potable water system. A water service connection between a public potable water distribution system and a customer's water distribution system which is cross-connected to a contaminated fixture, industrial fluid system, or with potentially contaminated supply or auxiliary water system, constitutes one type of cross-connection. Other types of cross-connections include connectors such as swing connections, removable sections, four-way valves, spools, dummy sections of pipe, swivel or change-over devices, sliding multiport tubes, solid connections, etc.

2.8 Cross-Connection Controlled. A connection between a potable water system and a non-potable water system with an approved backflow prevention device properly installed that will continuously afford the protection commensurate with the degree of hazard.

2.9 Cross-Connection Control by Containment. The installation of an approved backflow prevention device at the water service connection to any customer's premises where it is physically and economically infeasible to find and permanently eliminate or control all actual or potential cross-connections within the customer's water system; or it shall mean the installation of an approved backflow prevention device on the service line leading to and supplying a portion of a customer's water system where there are actual or potential

cross-connections which cannot be effectively eliminated or controlled at the point of cross-connection.

2.10 Hazard, Degree of. The term is derived from an evaluation of the potential risk to public health and the adverse effect of the hazard upon the potable water system.

a) Hazard, Health. Any condition, device or practice in the water supply system and its operation which could create, or in the judgment of GCEC, may create a danger to the health and well-being of the water customer. An example of a health hazard is a structural defect, including cross-connections, in a water supply system.

b) Hazard, Plumbing. A plumbing type cross-connection in a customer's potable water system that has not been properly protected by a vacuum breaker, air-gap separation or backflow prevention device. Unprotected plumbing type cross-connections are considered to be a health hazard.

c) Hazard, Pollutional. An actual or potential threat to the physical properties of the water supply system or to the potability of the public or the customer's potable water system, but which would constitute a nuisance or be aesthetically objectionable or could cause damage to the system or its appurtenances, but would not be dangerous to health.

d) Hazard, System. An actual or potential threat of severe damage to the physical properties of the public water supply system or the customer's potable water system or of a pollutant or contaminant which would have a protracted effect on the quality of the potable water in the system.

2.11 Industrial Fluids System. Any system containing fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration such as would constitute a health, system, pollutional or plumbing hazard if introduced into an approved water supply. This may include, but not be limited to: Polluted or contaminated waters; all types of process waters and "used waters" originating from the public potable water system which may have deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalies; circulated cooling towers that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, rivers, bays, harbors, seas, irrigation canals or systems, etc.; oils gases, glycerine, paraffin, caustic and acid solutions and other liquids and gaseous fluids used in industrial or other purposes or for fire-fighting purposes.

2.12 Pollution. Means the presence of any foreign substance (organic, inorganic or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of quality of the water to a degree which does not create an actual hazard to the public health, but which does adversely and unreasonable affect such waters for domestic use.

2.13 Public Utility Director/Designated Agent. The Public Utility Director in charge of the Utility Department of GCEC is vested with the authority for the implementation of an effective cross-connection control program and for the enforcement of the provisions of this program. The Public Utilities Director may assign the enforcement of this program to the agent, or employee of his choice.

2.14 Water, Potable. Any water which, according to recognized standards, is safe for human consumption.

2.15 Water, Non-Potable. Water which is not safe for human consumption or which is of questionable potability.

2.16 Water Purveyor. This term shall mean the owner or operator of the public potable water system supplying an approved water supply to the public. As used herein, the terms water purveyor and GCEC may be used synonymously.

2.17 Water, Service Connections. The terminal end of a service connection from the public potable water system, i.e., where the water purveyor loses jurisdiction and sanitary control over the water at its point of delivery to the customer's water system. If a meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the meter. There should be no unprotected takeoffs from the service line ahead of any meter or backflow prevention device located at the point of delivery to the customer's water system. Service connections shall also include water service connections from a fire hydrant and all other emergency or temporary water service connections from the public potable water system.

2.18 Water, Used. Any water supplied by a water purveyor from a public potable water system to a customer's water system after it has passed through the point of delivery and is not longer under the sanitary control of the water purveyor.

GULF COAST ELECTRIC COOPERATIVE
CROSS-CONNECTION PROGRAM

SECTION III- PROCEDURES

3.1 Existing Facilities:

a) All premises of the type where potential back-flow or cross-connections are or may be suspect to possibly occur shall be surveyed by GCEC to determine if a further detailed inspection will be required.

b) The owners of the premises in question shall be notified in writing thirty (30) days in advance to verify an appointment date and time for a physical inspection of the premises. The owner of his authorized representative will be required to accompany the inspector during the tour of the premises.

c) An inspection form will be completed by the inspector and signed by the owner or his representative. The owner shall be made aware of any corrective measures that may be required to be made.

d) An official letter of notification shall be sent to the owner indicating what corrective measures must be taken, if any, together with specific time limits for the completion of said corrections.

e) Upon completion of the corrective requirements in the notification letter, the owner shall have each backflow device tested and certified by an approved backflow prevention device tester. The certification report shall be submitted to GCEC for review and final acceptance.

f) Within thirty (30) days of final acceptance, GCEC shall send a letter of "Testing/Overhaul Frequency Schedule" to the owner of the premises. In this letter will be listed each backflow prevention device and how frequently it must be tested and overhauled. Only a backflow prevention device tester from GCEC's approved list may test, repair, overhaul, and/or certify a device.

3.2 New Facilities:

a) If GCEC determines that a potential cross-connection does or may exist, the Public Utilities Department will notify the owner in writing and arrange a meeting to discuss the requirements for backflow prevention. An appropriate backflow prevention device will be assigned for each potential point of cross-connection.

b) Upon completion of construction, the owner shall have each backflow device tested and certified by an approved backflow prevention device tester. The certification report shall

be submitted to the Public Utility Department prior to receiving a "Certificate of Occupancy" and initiation of water service.

g) Within thirty (30) days of final acceptance the Utility Department shall send a letter of "Testing/Overhaul Frequency Schedule" to the owner(s) of the premises. In this letter will be listed each backflow prevention device and how frequently it must be tested and overhauled. Only a backflow prevention device tester from GCEC's approved list may test, repair, overhaul, and/or certify a device.

3.3 Certification of Backflow Prevention Device Testers:

a) Any person wishing to become certified as a Backflow Prevention Device Tester must possess a valid certification from a training agency recognized and approved by the Florida Department of Environmental Protection.

b) If a person wishes to be placed on the GCEC's list of Approved Backflow Prevention Device Testers, that person must submit such request in writing to the Public Utilities Director with a copy of their Certificate of Completion from an approved training agency. GCEC's Utilities Department shall notify the individual in writing as to their approval or denial.

3.4 Records and Maintenance:

a) The owner of a backflow prevention device shall be notified thirty (30) days in advance by GCEC's Utilities Department as to when their particular device will require inspection.

b) Attached to the above mentioned notification of inspection shall be a Test and Maintenance form which must be completed by the owner's certified Backflow Prevention Tester. This form, once completed, shall be submitted to GCEC's Utilities Department no later than thirty (30) days from the date of inspection. Failure to do so could result in discontinuance of water service.

GULF COAST ELECTRIC COOPERATIVE
CROSS-CONNECTION PROGRAM

SECTION IV- CONSTRUCTION STANDARDS

4.1 Typical Facilities Requiring Protection Against Cross-Connection

There are varying degrees of hazard, and the degree of protection should be commensurate with the degree of hazard. The following list of facilities shall be served by an approved backflow prevention device of the type designated.

Type of Hazard:	High Hazard	=	H
	Medium Hazard	=	M
	Low Hazard	=	L

Type of Device:	Double Check Valve	=	DC
	Reduce Pressure	=	RP
	Pressure Vacuum Breaker	=	PVB

	TYPE OF BUSINESS	HAZARD H, M, OR L	TYPE OF DEVICE
1	Apartment complexes over 3 stories	H	RP
2	Apartment complexes 3 stories or under	M	DC
3	Airports	H	RP
4	Air conditioning shops (non-automotive)	M to H	DC or RP
5	Automobile repair shops (any auto repair)	H	RP
6	Antique shops (repairs, restoration and sales)	H	RP
7	Barber shops and beauty salons	H	RP
8	Banks	L	DC
9	Battery Shops	H	RP
10	Beer distributors	H	RP
11	Bingo centers	L	DC
12	Blue printing shops	H	RP
13	Bottling plants	M to H	DC or RP
14	Bowling centers	M	DC or RP
15	Brick and stone companies	M	DC or RP

	TYPE OF BUSINESS	HAZARD H, M, OR L	TYPE OF DEVICE
16	Bus stations	M	DC
17	Business offices	L	DC
18	Churches	M to H	DC or RP
19	Car, boat, RV, motorcycle lots	M to H	DC or RP
20	Concrete contractors	M to H	DC or RP
21	Cleaning/Chemical supply companies	H	RP
22	Carpet cleaning companies	H	RP
23	Car washes	H	RP
24	Cabinetmaker shop	M to H	DC or RP
25	Convenience stores	M to H	DC or RP
26	Chiropractors	M	D
27	Condominiums	H	R
28	Contractor equipment supply companies	M to H	DC or RP
29	Copy machine dealers and supplies	M to H	DC or RP
30	Cosmetic supply	M to H	DC or RP
31	Dentists	H	R
32	Department stores	M to H	DC or RP
33	Donut shops	M to H	DC or RP
34	Daycare centers	H	R
35	Dry cleaners	H	R
36	Dance studios	L to M	DC or RP
37	Dry ice plants	M to H	DC or RP
38	Electronics repair shop	M to H	DC or RP
39	Funeral homes	H	RP
40	Factories	H	RP
41	Fairgrounds	M to H	DC or RP
42	Fuel supply	H	RP
43	Florist	M to H	DC or RP
44	Fruit and vegetable stand	L to M	DC

	TYPE OF BUSINESS	HAZARD H, M, OR L	TYPE OF DEVICE
45	Gas stations	H	RP
46	Garbage collection agencies	H	RP
47	Glass manufacturers (auto, window, ornamental)	M to H	DC or RP
48	Hospitals	H	RP
49	Health clubs or spas	H	RP
50	Hardware or building material stores	M to H	DC or RP
51	Hotels and motels	M to H	DC or RP
52	Heating contractors	M to H	DC or RP
53	Industrial and medical gas suppliers	H	RP
54	Ice plants	M	DC
55	Janitorial services/equipment and supply	M to H	DC or RP
56	Jewelers	M to H	DC or RP
57	Junkyards	M to H	RP
58	Kennels, animal shelters, and pet groomers	H	RP
59	Laundromats/uniform service companies	H	RP
60	Lounges, bars, night clubs, pool halls	M	DC or RP
61	Libraries	L	DC
62	Laboratories (medical)	H	RP
63	Laboratories (dental)	H	RP
64	Medical offices/clinics	H	RP
65	Movie theaters	M to H	DC or RP
66	Moving and storage companies	M	DC
67	Marinas	H	RP
68	Meat companies/butcher shops	H	RP
69	Machine shops	H	RP
70	Mobile home parks	M	DC
71	Motor repair (any gas or diesel)	H	RP
72	Nursing homes	H	RP

	TYPE OF BUSINESS	HAZARD H, M, OR L	TYPE OF DEVICE
73	Nurseries (plants)	M	DC or RP
74	Natural gas companies	H	RP
75	Newspaper publishers	H	RP
76	Offices of office buildings	L	DC
77	Optometrists	M	DC or RP
78	Paint stores	H	RP
79	Prosthetic centers	M to H	RP
80	Psychologist/counselor offices	L	DC
81	Pharmacies	M	DC or RP
82	Pest control services	H	RP
83	Photography studios/developers	H	RP
84	Photography equipment and supply	M	DC or RP
85	Plumbers/plumbing contractors	M to H	DC or RP
86	Printers	H	RP
87	Restaurants/cafeterias	H	RP
88	Retail stores not selling/working with chemicals	L	DC
89	Retails stores selling/working with chemicals	H	RP
90	Retirement homes	M	RP
91	Radio stations	L	DC
92	Rental centers	M to H	DC or RP
93	Rehabilitational institutions	H	RP
94	Refrigerator equipment and supply	L to H	DC or RP
95	Supermarkets/grocery stores	H	RP
96	Seafood markets/warehouses	H	RP
97	Schools	H	RP
98	Sand and gravel supply	L to H	DC or RP
99	Sandblasting companies	M to H	DC or RP
100	Screen printers	H	RP

	TYPE OF BUSINESS	HAZARD H, M, OR L	TYPE OF DEVICE
101	Shipbuilders/repairs	M to H	DC or RP
102	Shoe repair store	L to H	DC or RP
103	Sign manufacturer	L to H	DC or RP
104	Skating rinks	M	DC
105	Spa/hot tub sales	H	RP
106	Swimming pool companies	H	RP
107	Steel fabricators	H	RP
108	TV stations	M to H	DC or RP
109	Tattoo parlors	H	RP
110	Townhouses	M to L	DC or RP
111	Taxidermist	M to H	DC or RP
112	Tire/brake dealers	M to H	RP
113	Upholstery shops	L to H	DC or RP
114	Veterinarian	H	RP
115	Water softener/pump service and repair	L to H	DC or RP
116	Waterbed dealers	H	RP
117	Welding/welding supply companies	L to H	DC or RP
118	Wine, beer, alcohol stores	M	DC or RP
119	Businesses with sinks and commodes only	M	DC or RP
120	Businesses with sinks and commodes plus use/sell chemicals	H	RP
121	Businesses with outdoor hose bib near high hazard location.	H	RP
122	Shipyards	H	RP
123	Antifreeze plants	H	RP
124	Irrigation systems (sprinkler lines)	L	PVB

** This list should in no way be considered complete. Device(s) are always determined by type of hazard determined by cross-connection field inspection.

a) Devices shall be installed as close as possible to the service connection in an accessible location approved by the GCEC Utility Department, and a minimum of twelve (12) inches above grade or flood level.

b) Approved testing procedures for each type of backflow device shall be available for certified testers at GCEC's Utility Department.

In addition, the following list of plumbing devices shall be provided with appropriate backflow prevention devices, the purpose of which is to protect the quality of potable water and thereby safeguard the public health.

1. Air Conditioning.
2. Air Conditioned Chill Water/
3. Air Conditioned Cooling Tower.
4. Aspirators, Medical.
5. Autoclave and Sterilizer and Steam Tables.
6. Below the rim or inverted supply inlets in aquariums, bidets, baptisteries, bedpan washers, birdbaths, fish ponds, foot tubs, sinks, drinking fountains, siphon flush tanks, lavatories, tanks, laundry and other tubs, vats, laboratory apparatus therapeutic baths, x-ray developing tanks, etc.
7. Boiler Industrial Feeder Line.
8. Condensers, Medical and Industrial.
9. Commercial Dishwashing Machines.
10. Chlorinators, Suction Side Pump.
11. Degreasing Equipment.
12. Digesters, Hospitals.
13. Dye Vats and Tanks.
14. Direct Connections, County Water and Sewage Pumps; Hydraulic Elevators and Industrial Processes.
15. Dental Cuspidors and Saliva Ejectors.

16. Etching Tanks.

17. Floor Drains with Trap Primers or Flushing Connections.

18. Garbage Can Washers.

19. Industrial In-Plant Plumbing Systems.

20. Lawn Sprinkler Systems with Fertilizer Injection Pump.

21. Laundry Machine, Hospital.

22. Meter, Protection Industrial Plants.

23. Processing Tanks.

24. Pumps for Unsafe Materials Primed by Water.

25. Rubber Hose Equipped with Hand Control or Self Closing Faucet.

26. Swimming Pools, Commercial.

27. Swimming Pools, Home.

28. Sprinkler Systems Fire Protection with or without Chemical Additives.

29. Steam Tables.

30. Watering Troughs, Dairy and Stables.

31. Water Troughs with Vaccine, etc. added for Poultry, etc.

32. Water Operated Ejectors.

GULF COAST ELECTRIC COOPERATIVE

Hydrostatic Pressure Test for PVC Pipe (AWWA C900)		
Project Name:		
Project Number:		
Date:		
Inspector:		
Duration of Test:		
Description of area tested:		
Length of Pipe tested:		
Time in:	**Pressure Reading @ test pressure:**	
Time out:	**Final reading after test period:**	
Pressure Drop:		
Allowable Leakage: **Applicable: yes no**		
Length of Pipe: **/lenth of one section of pipe =** **joints of pipe**		
L = ND(P^ 1/2) /7,400		

N = number of joints, D = diameter of pipe being tested, P = test pressure
Note: Test pressure is 1.5 times the working pressure

L = allowable leakage in gallons per hour

Calculations for allowable leakage:

Amount of water to pump the system back up to the test pressure:
Allowable leakage:

Test Passed **Test Failed**

GULF COAST ELECTRIC COOPERATIVE

Hydrostatic Pressure Test for PVC Pipe (AWWA C900)		
Project Name:		
Project Number:		
Date:		
Inspector:		
Duration of Test:		
Description of area tested:		
Length of Pipe tested:		
Time in:	**Pressure Reading @ test pressure:**	
Time out:	**Final reading after test period:**	
Pressure Drop:		
Allowable Leakage: **Applicable: yes no**		
Length of Pipe: **/lenth of one section of pipe =** **joints of pipe**		
L = ND(P^ 1/2) /7,400		

N = number of joints, D = diameter of pipe being tested, P = test pressure
Note: Test pressure is 1.5 times the working pressure

L = allowable leakage in gallons per hour

Calculations for allowable leakage:

Amount of water to pump the system back up to the test pressure:
Allowable leakage:

Test Passed **Test Failed**

GULF COAST ELECTRIC COOPERATIVE

Hydrostatic Pressure Test for Ductile Iron Pipe (AWWA C600)		
Project Name:		
Project Number:		
Date:		
Inspector:		
Duration of Test:		
Description of area tested:		
Length of Pipe tested:		
Time in:	**Pressure Reading @ test pressure:**	
Time out:	**Final reading after test period:**	
Pressure Drop:		
Allowable Leakage: **Applicable: yes no**		
Length of Pipe:		
L=(SD(P)^1/2)/(133200)		

S=length of pipe tested in feet D = diameter of pipe being tested, P = test pressure

Note: Test pressure is 1.5 times the working pressure

L = allowable leakage in gallons per hour

Calculations for allowable leakage:

Amount of water to pump the system back up to the test pressure:

Allowable leakage:

Test Passed **Test Failed**

GULF COAST ELECTRIC COOPERATIVE

Hydrostatic Pressure Test for HDPE		
Project Name:		
Project Number:		
Date:		
Inspector:		
Duration of Test:		
Description of area tested:		
Length of Pipe tested:		
Time in:	**Pressure Reading @ test pressure:**	
Time out:	**Final reading after test period:**	
Amount of replacement water required to return to the test pressure:		
Does the replacement water exceed the maximum allowable?		
	Test Passed	**Test Failed**

See attached Testing Procedure from manufacturer.

BBC 150,000 GAL
ELEV TANK #2842

GCEC 8" METER

GCEC 10" METER

SABRE DR

BEACON BEACH ROAD

HWY 98

EMERGENCY
WELL #4

BAY COUNTY SOUTHEAST
BOOSTER STATION

BAY COUNTY
MASTER METER #1

BAY COUNTY
MASTER METER #2

EMERGENCY WELL #3

EMERGENCY WELL #2

BAY COUNTY
MASTER METER #3

GCEC 250,000 GAL
ELEV TANK #733

HWY 98

MATCHLINE - SEE SHEET F2

GRAPHIC SCALE

2400 0 1200 2400 4800

(IN FEET)

LEGEND:

- 2" & 3" WATER LINES
- 4" WATER LINES
- 6" WATER LINES
- 8" WATER LINES
- 10" WATER LINES
- 12" WATER LINES
- 14" WATER LINES
- 16" WATER LINES
- 18" WATER LINES

NO.	DATE:	APPR.	REVISION:
1			
2			
3			
4			
5			

PREBLE-RISH INC
CONSULTING ENGINEERS AND SURVEYORS
CIVIL • SURVEYING • SITE PLANNING
203 ABERDEEN PKWY, PANAMA CITY, FL 32405
(850) 522-0644

EXISTING WATER MAINS BY SIZE
TAFB WATER SYSTEM ASSESSMENT
GULF COAST ELECTRIC CO-OP
BAY COUNTY, FLORIDA

EB# 0006155

PROJECT NO.	DATE:	SCALE:	DRAWN:	CHECKED:
094.049	NOV 2011	1"=2400'	B.ROCHER	S.PRICE

SHEET 3A

November 18, 2011 (10:02:11 EST)
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November 18, 2011 (10:02:11 EST)
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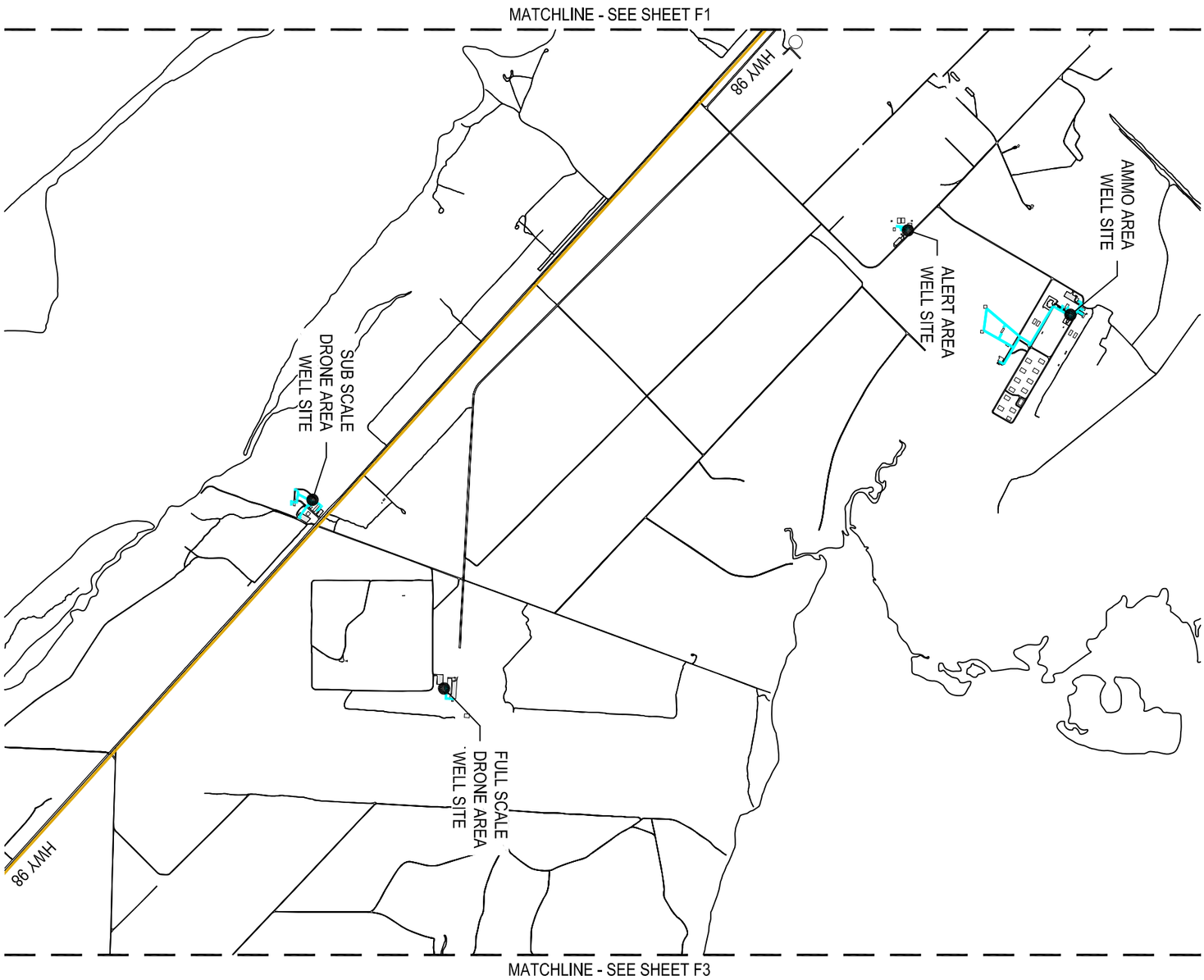

LEGEND:

- 18" WATER LINES
- 10" WATER LINES
- 8" WATER LINES
- 6" WATER LINES
- 4" WATER LINES
- 2" & 3" WATER LINES

GRAPHIC SCALE
(IN FEET)
2400 0 1200 2400 4800

EB# 0006155

PROJECT NO.	094.049
DATE:	NOV 2011
SCALE:	1"=2400'
SHEET	3B
DRAWN:	B.ROCHER
CHECKED:	S.PRICE

EXISTING WATER MAINS BY SIZE
TAFB WATER SYSTEM ASSESSMENT
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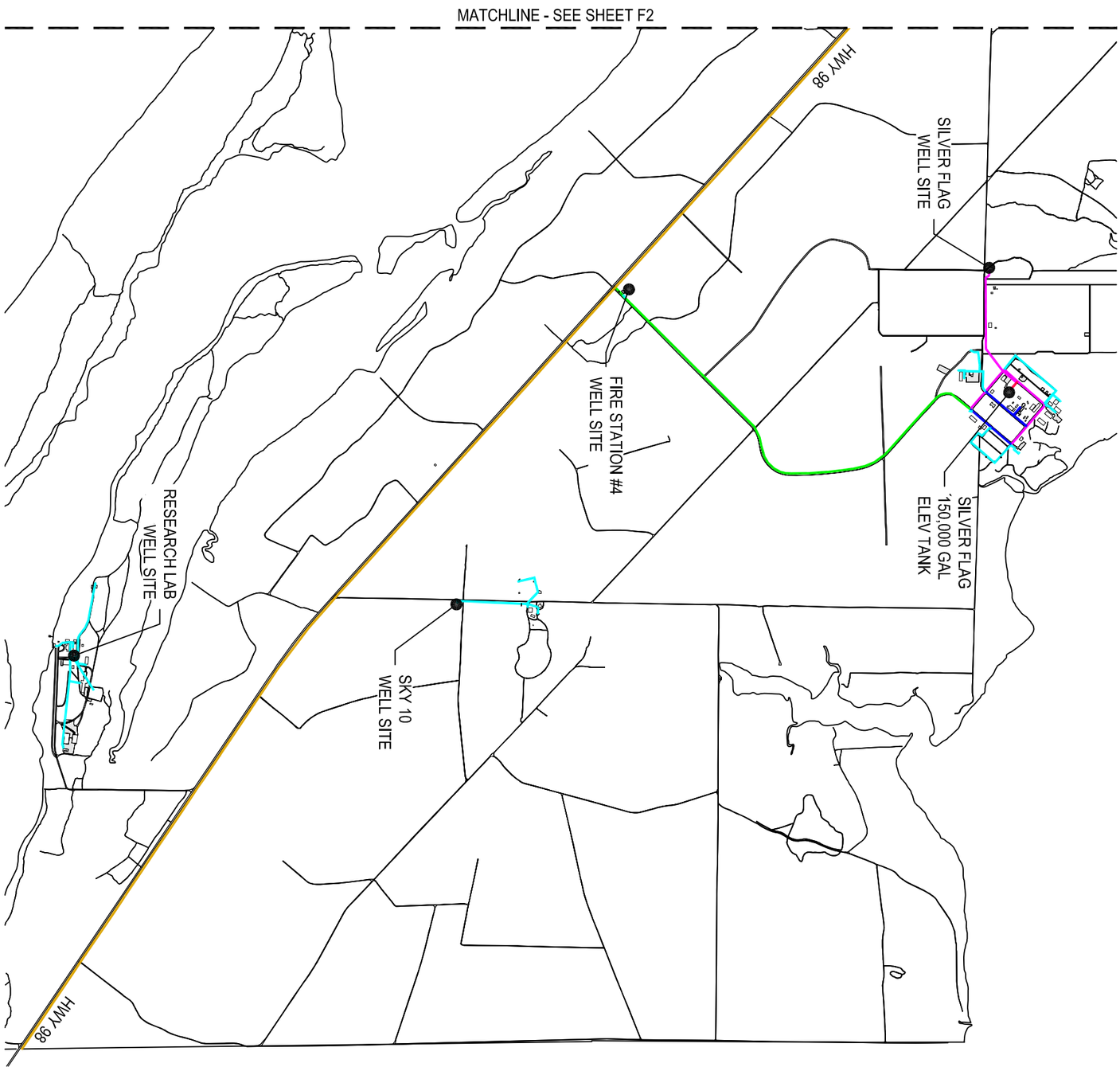

LEGEND:

- 2" & 3" WATER LINES
- 4" WATER LINES
- 6" WATER LINES
- 8" WATER LINES
- 10" WATER LINES
- 18" WATER LINES

GRAPHIC SCALE
(IN FEET)
2400 0 1200 2400 4800

EB# 0006155

PROJECT NO.	094.049
DATE:	NOV 2011
SCALE:	1"=2400'
SHEET	3C
DRAWN:	B.ROCHER
CHECKED:	S.PRICE

EXISTING WATER MAINS BY SIZE
TAFB WATER SYSTEM ASSESSMENT
GULF COAST ELECTRIC CO-OP
BAY COUNTY, FLORIDA

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NO.	DATE:	APPR.	REVISION:
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Tyndall AFB
Utilities Privatization
Frequently Asked Questions

Utilities Privatization – General

1. Question: What is the Utilities Privatization (UP) Contract?
Answer: The Tyndall AFB UP Contract is a 50-year service contract under which the installation privatized the primary electrical distribution, domestic water distribution, and natural gas distribution utility systems in 2010 as part of the USAF utilities UP effort. As such, the utility system owner is the owner and sole provider of these utility services to the installation and are responsible for providing utility services, to include operation, maintenance, repair, renewals, and replacements for the systems. The electrical and domestic water utility system owner (SO) is Gulf Coast Electric Cooperative (GCEC) and the natural gas utility distribution system owner is TECO, Peoples Gas (PGS).

2. Question: What is the difference between GCEC & TECO's and Altuiiq's service contracts?
Answer: GCEC and TECO have 50-year service contracts that require them as SOs to operate, maintain, repair, renew, and replace the electrical, water, and natural gas distribution systems on Tyndall AFB. The Base Operations Services (BOS) service contract awarded in 2017 to Altuiiq includes providing resources for utilities infrastructure services, pavement/heavy equipment services, grounds maintenance, pest control, unaccompanied housing maintenance, and environmental services to include wetlands/wildlife habitats.

3. Question: How is the ownership of the privatized utility distribution systems defined?
Answer: GCEC and TECO own the electric, water, and natural gas infrastructure from the point of interconnection outside the installation up to the Points of Demarcation (PODs) defined by the UP service contract. The 325th Civil Engineer Squadron (CES) is responsible for the infrastructure downstream of these PODs though the BOS contractor, Altuiiq. All PODs and contractual exclusions have been provided to AFCEC/CF and USACE for Military Construction (MILCON) and Facilities Sustainment, Restoration and Modernization (FSRM) planning. Utility SOs will ensure designs meet current Utility Industry Standards, which may be different from Unified Facilities Criteria (UFC). If there is a conflict between Unified Facilities Criteria (UFC) and SO's criteria, the SO criteria shall govern.

4. Question: How is utility ownership defined for new infrastructure construction?
Answer: If the SO installs the infrastructure components connecting the existing privatized utility system to the POD, it will be owned by the SO and no conveyance is required. If a Third Party Contractor installs the utility system components, the property is then owned by the government and will require an Amended Bill of Sale (ABoS) for conveyance to the utility SO which is not the desired state.

Privatized Utilities – Electrical &Water

5. Question: What is GCEC and TECO's involvement in the MILCON and FSRM process?
Answer: As the utility SO, GCEC and TECO are now required key stakeholders in the design (approval), construction (new service connection) and demolition (removal of service or service disconnection) involving electrical, water, and natural gas utility systems.

- Designs that require installing, alteration, or connection to the privatized systems must incorporate the utility system owner's design standards. The utility SO must review and approve design submittals.
- Each contracting agency will include a scope of work indicated on the drawings and included in the specifications. The design firm shall provide the utility cost as part of their cost estimate broken out by line items to validate the DD1391. The SOs will participate in developing the scope of work and cost estimate. Estimates for construction for each utility SO which will result in immediate SO ownership and responsibility.
- Any demolition activity involving the utility SO distribution systems must be coordinated with the Contracting Officer's Representative (COR) and the SO. This work must be consistent with the signed Memorandum of Agreement (MOA) between contractor and 325th CES. The MOA can be obtained from the UP COR and will be located on the USACE SharePoint site.

6. Question: How will the electric & water meters for bldgs. be programmed, installed and who owns?
Answer: Each zone AE firm will include electrical and water meter installation as part of their project. The general contractor will install all meters and tie into the Facility Related Control System (FRCS). Installation location for the electrical meters will be inside the building or on the secondary.

7. Question: What is the process to remove abandoned privatized utilities for construction projects?
Answer: A MOA was put in place in Nov 2019 by the 325th CE Commander that allows third party contractors under the direction of the 325th CES and in coordination with GCEC to execute the removal of designated parts of the electric and water utilities owned by GCEC. The contractor must sign the MOA between GCEC and the 325th Civil Engineer Squadron (CES), which will constitute a defense, hold harmless, and indemnification agreement, and follow the associated execution checklist before legally permitted to demolish any privatized utility lines. This demolition MOA can be obtained from the UP COR.

8. Question: How does the AE include SO responsibilities in their Request for Proposal (RFP)?
Answer: Each AE firm, for each project, will develop a scope of work and will include the scope of work in the drawings and specs for each SO. The scope of work in the specifications and drawings will eventually be used by DLA to solicit a proposal from the system owner for the proposed work. Each AE will reflect all SO work in their cost estimate. The scope of work will include the following three defined contract and construction requirements:

1) Work from Facility to UP contract POD
2) UP contract POD to the utility corridor including the connection: SO per modification to the UP contract paid for by the facility project
3) Utility corridor: SO per modification to the UP contract paid for by the infrastructure project

9. Question: What exterior lighting on Tyndall AFB is owned by GCEC?
Answer: GCEC owns all outdoor lighting on the installation that is not attached to a structure unless noted otherwise. Recent modification to the GCEC UP contract includes responsibility for all the static display lights for Flag Park. GCEC lighting specifications can be found on GCEC's Utility Fact Sheet for Design, Cost Estimate and Construction, USACE's SharePoint site and can be obtained from UP COR.

For questions, contact Utility Privatization (UP) Contracting Officer's Representatives (COR), Mr. Bill Kuehl (primary) or Major David Brost (Operations Flight Chief)

Developed in collaboration with UP team, by AFCEC/CIUU and USACE:
John Dixon, Ana Lemmon & Chuck Ford

FOR OFFICIAL USE ONLY

Current as of: 24 Sep 20

PRIVATIZED UTILITIES FACT SHEET
For
DESIGN, COST ESTIMATES and CONSTRUCTION
Serving
TYNDALL AIR FORCE BASE

DISCLAIMER:
All information contained within this document is to aid in meeting privatized utilities requirements and is not intended to convey any commitment or directive on the part of the Utility Service Providers, 325th Civil Engineers, USACE, or AFCEC/CIUU. The intent of this document is to serve as a clearinghouse for pertinent information associated with working with the system owners on Tyndall.

SCOPE OF THIS DOCUMENT
The purpose of this document is to address common questions associated with the design, cost estimating, and general construction guidelines for Military Construction (MILCON) Program, Facility Sustainment FSRM construction projects performed at Tyndall, AFB (TAFB) that will in any manner or possibility impact or utilize the Utilities Privatization (UP) Program.

UTILITIES PRIVATIZATION (UP)
The TAFB UP Contract is a 50-year service contract under which the installation privatized the electrical distribution, domestic water distribution, and natural gas distribution utility systems in 2010. The UP System Owners (SO) are: Gulf Coast Electric Cooperative (GCEC) for the Electrical and Water utilities and TECO, Peoples Gas for Natural Gas. Government oversight and UP contract administration is exercised thru Defense Logistics Agency (DLA) Energy with advisory input from Tyndall 325th Civil Engineer Squadron (CES) Contracting Officer's Representative (COR).

DESIGN REQUIREMENTS

Codes and Standards

Criteria for design of the utility portions of construction projects at TAFB will follow the TAFB Utility Owner's Specifications and Design Requirements provided thru the USACE Share Point Site. Notable exceptions to the design process are Zones 1 and 4. These Zones are being designed by third party contractors whose designs WILL BE coordinated with the UP SO's.

Standard PoDs: Defined in Section J, Table 9 in the UP contract; examples include:
- Where the service line enters the structure
- Downstream side meter/valve/pressure regulator
- Secondary terminal of pad transformer

Unique PoDs: Defined in Section J, Table 10 in the UP contract; "Anomalous points on the utility system that don't fit any general descriptions."
- Airfield Beacon on water tower, 733 - POD is where wires & beacon physically come in contact with water tower

Current as of: 24 Sep 20

Service Entrance

The utility SO is responsible for the utility system up to the following Points of Demarcation (POD):

Gas

- The utility SO owns up to and including the Meter, Regulator and Shut - Off Valve.
- The SO will provide an outlet valve after the meter for the customer's use.

Water

- The utility SO owns up to and including the Backflow Preventer on the exterior of the building *except* on the fire system.
- Backflow Preventers located inside Constructed Facilities are owned by others.
- In that scenario the utility SO owns up to and including the Shut-Off Valve.
- Utility SO does not own, supply or install secondary metering. Meters provided by TAFB.

Electricity

- The utility SO owns the utility system up to and including the Transformer.
- Utility SO does not own, supply or install secondary metering. Meters provided by TAFB.
- Utility SO owns and maintains all Exterior Lighting. (Parking, Walkway, Accent, Flag)
- Utility SO does not own, supply or install lighting attached to a Building / Facility / Real Property.

Design Documents

The utility SO requires the following documents for Design, Cost Estimates and Scheduling purposes.

Site Plan to include:

Gas

- Required Gas Delivery Pressure (typ. demand on TAFB 2psig.). TECO will adjust the system pressure to meet the facility requirements.
- The system services range from ½" to 2" and the system mains are 2" and 4" both are PE and cathodically protected wrapped steel.
- The underground system operates at a maximum allowable pressure of 60 psig
    - POD for the gas system is the outlet valve provided by the system owner.

Water

- Required Systems Delivery Pressure (domestic vs. fire suppression and / or fire pump)
- Required Systems Delivery Pipe Size (domestic vs. fire suppression and / or fire pump)
- POD for the following:
    - Fire Hydrants (determine the source i.e. Domestic or Fire Suppression)
    - Domestic Backflow Preventer
    - Fire Suppression System Backflow Preventer and
    - System Shut-Off Valves

Electricity

- Fire Pump size POD and connection requirements (amps, voltage, phase, disconnecting means and location)
- The utility SO requires Lighting Photo Metrics for Parking Lots, Walkways, and Accent Lights.

Any lighting on the opposite side of the structure from the Transformer location will require a suitably sized disconnect to service the exterior lights on the far – side of the facility. The SO will own the Disconnecting means and all of the equipment down-stream from that location fed from the facility.

- POD for the following:
  - Parking Lot Lights
  - Walk-way Lights
  - Accent Lights / Flag Lights
  - GCEC will provide "Turtle Safe" lights
  - Transformer KVA, Phase, Secondary Voltage
  - Transformer Secondary side feeder conduit stub outs (size and quantity)
  - Pad and Transformer sizing to be determined and or coordinated by or with the consent of the utility SO
  - Transformer Grounding performed by the utility SO
  - Transformers require 10' clearance around the Transformer Pad
  - Transformers located within enclosed mechanical yards will require:
    - Unobstructed access to the front of the Transformer by heavy equipment
    - If enclosed by gates the utility SO will require access
  - Appendix A, provides proposed mechanical yard transformer placement details
  - Appendix B, provides proposed transformer placement details

ELECTRICAL SPECIFIC CONSTRUCTION

- The SO costs for transformers, transformer pads, and exterior pole mounted lighting with associated devices will be included in the SO's proposal to DLA for each Zone project, as determined by USACE.
- GCEC will size the transformer according to the zone/facility AE contractor load requirements.
- The feeders to the transformer will be the responsibility of Zone 4, utility corridor.
- 325th CES will process the DLA contract mod accordingly for the purchase and installation of this equipment.

CONSTRUCTION GUIDELINES

- Under no circumstances will any entity perform work on utility SO assets without prior coordination and consent from the utility SO which owns that system.
- All Construction Project Schedules and Notices to Proceed (NTP) pertaining to the UP SO's will be coordinated by the General Contractor and USACE. The requests and documents will then be sent to the AFCEC Program Management Office and to the DLA-COR (Mr. William Kuehl). The DLA-COR will then provide notice to the DLA-Energy Contracting Officer (Ms. Carly Dubernas). The DLA-CO will then give direction to the UP SO's.
- Temporary utilities fed from UP SO equipment will NOT be metered. General Contractors will coordinate with the UP SO's for temporary utility connections. Costs incurred for temporary utility construction will be included in the RFP process by the General Contractor.
- System outages required to perform work within UP SO equipment performed by a third party will require a current Dig Permit that will cover the period of performance for the work to be executed and will be submitted two (2) weeks prior to any work activities being performed in, on or around UP SO equipment. USACE will verify that Dig Permit requirements are outlined in the contract documents.

- No equipment, devices, meters or framework will be affixed to or mounted on any utility SO equipment without prior permission from the utility SO.
- No equipment, signage, backboards or stored items will be placed within ten (10) feet of utility SO equipment without consent from the utility SO. Coordination for work related encroachment upon the UP SO setbacks will be performed by the USACE – COR
- All work performed by the UP SO's will be inspected by the DLA-COR and a project completion form will be submitted to DLA-Energy

UP CONTRACT LATERAL EXTENT OF UTILITY RIGHT OF ACCESS

The Lateral extent of the Utility System Right of Access for GCEC, Electric and Water is:

- Where the utility system is installed above ground, 26-feet-wide, extending 13 feet on each side of the utility system, as installed.
- Where the utility system is installed above ground vertical limits imposed by Tyndall AFB (normally to accommodate flight operations) or the Federal Aviation Administration will not be exceeded.
- Where the utility system is installed on or under the ground, 26-feet-wide, extending 13 feet on each side of the utility system, as installed.
- For pipe sizes of 24 inches in diameter or less, 26-feet-wide, extending 13 feet on each side of the utility system, as installed.
- For pipe sizes greater than 24 inches in diameter, 50-feet-wide, extending 25 feet on each side of the utility system, as installed.

The Lateral extent of the Utility System Right of Access for TECO People's Gas (PGS) is:

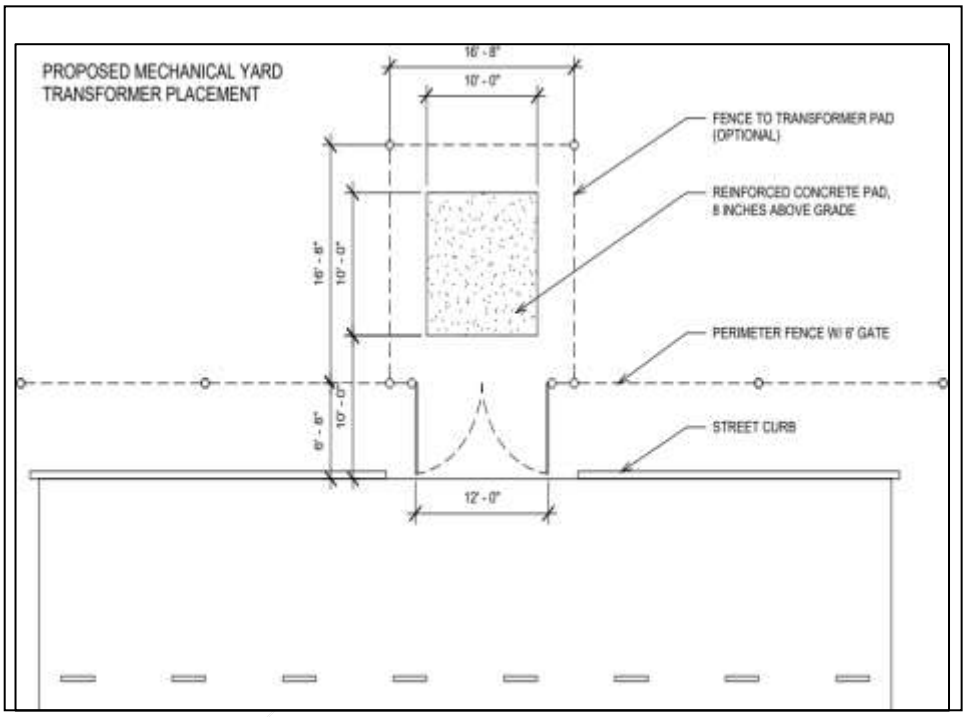
- 26-feet-wide, extending 13 feet on each side of the utility system, as installed.

For questions pertaining to the technical fact sheet data and supporting appendices, contact 325th CES Utilities Privatization (UP) Contracting Officer's Representatives (COR), Mr. Bill Kuehl or Major David Brost (Ops Chief)

Developed in collaboration with Rebuild Stakeholders, by John Dixon & Ana Lemmon, AFCEC/CIUU and Mark Crawford & Chuck Ford, USACE

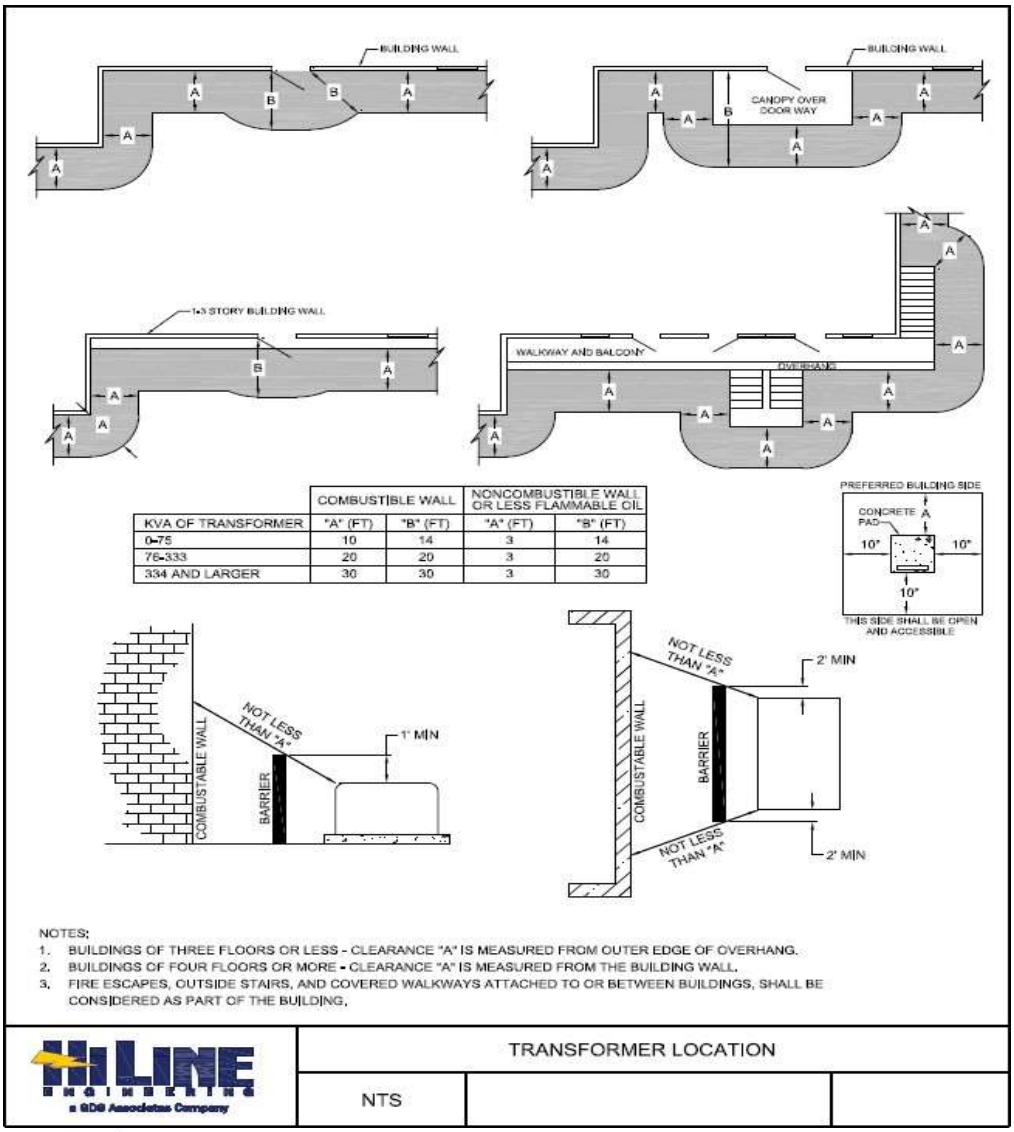
APPENDIX A:
Proposed Mechanical Yard Transformer Placement

The following is proposed location for Transformers that are located within enclosed Mechanical Yards on Tyndall AFB.



Current as of: 24 Sep 20

APPENDIX B:
Proposed Transformer Placement



KVA OF TRANSFORMER	COMBUSTIBLE WALL "A" (FT)	COMBUSTIBLE WALL "B" (FT)	NONCOMBUSTIBLE WALL OR LESS FLAMMABLE OIL "A" (FT)	NONCOMBUSTIBLE WALL OR LESS FLAMMABLE OIL "B" (FT)
0-75	10	14	3	14
76-333	20	20	3	20
334 AND LARGER	30	30	3	30

For questions pertaining to the technical fact sheet data and supporting appendices, contact 325th CES Utility Privatization (UP) Contracting Officer's Representatives (COR), Mr. Bill Kuehl or Major David Brost (Ops Chief)

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