

SECTION 01600 MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Material and equipment incorporated into the work:
1. Conform to applicable specifications and standards.
 2. Comply with size, make, type and quality specified, or as specifically approved in writing by the County.
 3. Manufactured and Fabricated Products:
 - a. Design, fabricate and assemble in accordance with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
 - c. Two or more items of the same kind shall be identical and manufactured by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
 4. Do not use material or equipment for any purpose other than that for which it is specified.
 5. All material and equipment incorporated into the project shall be new.

1.02 MANUFACTURER'S INSTRUCTIONS

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to County. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with County prior to proceeding. Do not proceed with work without clear instructions.

1.03 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.
1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals and that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.04 SUBSTITUTIONS AND PRODUCT OPTIONS

A. Contractor's Options:

1. For products specified only by reference standard, select any product meeting that standard.
2. For products specified by naming one or more products or manufacturers and "or equal", Contractor must submit a request for substitutions of any product or manufacturer not specifically named in a timely manner so as not to adversely affect the construction schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01620 STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until completion of Work.

1.02 STORAGE

- A. Store products immediately on delivery and protect until installed in the Work, in accord with manufacturer's instructions, with seals and labels intact and legible.
- B. Exterior Storage
 - 1. Provide substantial platform, blocking or skids to support fabricated products above ground to prevent soiling or staining.
 - a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 - b. Prevent mixing of refuse or chemically injurious materials or liquids.
- A. Arrange storage in manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
 - 1. State of storage facilities is adequate to provide required conditions.
 - 2. Required environmental conditions are maintained on continuing basis.
 - 3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.
- B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.
 - 1. Equipment shall not be shipped until approved by the County. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the County.
 - 2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the County until such time as the equipment is to be installed.
 - 3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
 - 4. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
 - 5. Lubricants shall be changed upon completion of installation and as frequently as

- required, thereafter during the period between installation and acceptance.
6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.04 PROTECTION AFTER INSTALLATION

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.
- B. Control traffic to prevent damage to equipment and surfaces.
- C. Provide coverings to protect finished surfaces from damage.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01700 CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the work.

1.02 SUBSTANTIAL COMPLETION

- A. The Contractor shall submit the following items when the Contractor considers the work to be substantially complete:
 - 1. A written notice that the work, or designated portion thereof, is substantially complete.
 - 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the County shall make an inspection to determine the status of completion.
- C. Project record documents and operations and maintenance manuals must be submitted before the project shall be considered substantially complete.
- D. If the County determines that the work is not substantially complete:
 - 1. The County shall notify the Contractor in writing, stating the reasons.
 - 2. The Contractor shall remedy the deficiencies in the work and send a second written notice of substantial completion to the County.
 - 3. The County shall reinspect the work.
- E. When the County finds that the work is substantially complete:
 - 1. The Engineer shall prepare and deliver to the County a tentative Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a tentative list of the items to be completed or corrected before final payment.
 - 2. The Engineer shall consider any objections made by the County as provided in Conditions of the Contract. When the Engineer considers the work substantially complete, he will execute and deliver to the County a definite Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a revised tentative list of items to be completed or corrected.

1.03 FINAL INSPECTION

- A. When the Contractor considered the work to be complete, he shall submit written certification stating that:
 - 1. The Contract Documents have been reviewed.
 - 2. The work has been inspected for compliance with Contract Documents.
 - 3. The work has been completed in accordance with Contract Documents.
 - 4. The equipment and systems have been tested in the presence of the County's representative and are operational.
 - 5. The work is completed and ready for final inspection.

- B. The County shall make an inspection to verify the status of completion after receipt of such certification.
- C. If the County determines that the work is incomplete or defective:
 - 1. The County shall promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2. The Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to County that the work is complete.
 - 3. The County shall reinspect the work.
- D. Upon finding the work to be acceptable under the Contract Documents, the County shall request the Contractor to make closeout submittals.
- E. For each additional inspection beyond a total of three (3) inspections for substantial and final completion due to the incompleteness of the work, the Contractor shall reimburse the County's fees.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO COUNTY

- A. Project Record Documents (prior to substantial completion).
- B. Operation and maintenance manuals (prior to substantial completion).
- C. Warranties and Bonds.
- D. Evidence of Payment and Release of Liens: In accordance with requirements of General and Supplementary Conditions.
- E. Certification letter from Florida Department of Transportation and Manatee County Department of Transportation, as applicable.
- F. Certificate of Insurance for Products and Completed Operations.
- G. Final Reconciliation, Warranty Period Declaration, and Contractor's Affidavit (Manatee County Project Management Form PMD-9).

1.05 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the County.
- B. Statement shall reflect all adjustments to the Contract Sum:
 - 1. The original Contract Sum.
 - 2. Additions and deductions resulting from:
 - a. Previous Change Orders
 - b. Unit Prices
 - c. Penalties and Bonuses
 - d. Deductions for Liquidated Damages
 - e. Other Adjustments
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.

5. Sum remaining due.

- C. Project Management shall prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01710 CLEANING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Execute cleaning during progress of the work and at completion of the work, as required by the General Conditions.

1.02 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with all Federal, State and Local codes, ordinances, regulations and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the work, the site and adjacent properties free from accumulation of waste materials, rubbish and wind-blown debris, resulting from construction operations.
- B. Provide on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

- C. Prior to final completion or County occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire work is clean.

END OF SECTION

SECTION 01720 PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

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

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. County's field orders or written instructions.
6. Approved shop drawings, working drawings and samples.
7. Field test records.
8. Construction photographs.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format.

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

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

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by the County.

1.04 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with construction progress.

C. Do not conceal any work until required information is recorded.

D. Drawings: Legibly mark to record actual construction:

1. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc. Locations of drainage ditches, swales, water lines and force mains shall be shown every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer. Dimensions at these locations shall indicate distance from

- centerline of right-of-way to the facility.
2. Field changes of dimension and detail.
3. Changes made by Field Order or by Change Order.
4. Details not on original contract drawings.
5. Equipment and piping relocations.
6. Locations of all valves, fire hydrants, manholes, water and sewer services, water and force main fittings, underdrain cleanouts, catch basins, junction boxes and any other structures located in the right-of-way or easement, shall be located by elevation and by station and offset based on intersection P.I.'s and centerline of right-of-way. For facilities located on private roads, the dimensioning shall be from centerline of paving or another readily visible baseline.
7. Elevations shall be provided for all manhole rim and inverts; junction box rim and inverts; catch basin rim and inverts; and baffle, weir and invert elevations in control structures. Elevations shall also be provided at the PVI's and at every other lot line or 200 feet, whichever is less, of drainage swales and ditches. Bench marks and elevation datum shall be indicated.
8. Slopes for pipes and ditches shall be recalculated, based on actual field measured distances, elevations, pipe sizes, and type shown. Cross section of drainage ditches and swales shall be verified.
9. Centerline of roads shall be tied to right-of-way lines. Elevation of roadway centerline shall be given at PVI's and at all intersections.
10. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
11. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be located every 200 feet or alternate lot lines, whichever is closer. Dimensions shall include distance from the right-of-way line and the back of curb and lot line or easement line.
12. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televising of the sewer following installation.
13. Elevations shall be provided on the top of operating nuts for all water and force main valves.
14. Allowable tolerance shall be ± 6.0 inches for horizontal dimensions. Vertical dimensions such as the difference in elevations between manhole inverts shall have an allowable tolerance of $\pm 1/8$ inch per 50 feet (or part thereof) of horizontal distance up to a maximum tolerance of ± 2 inch.
15. Properly prepared record drawings on mylar, together with two copies, shall be certified by a design professional (Engineer and/or Surveyor registered in the State of Florida), employed by the Contractor, and submitted to the County.

E. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by field order or by change order.

F. Shop Drawings (after final review and approval):

1. Five sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

1.05 SUBMITTAL

- A. Prior to substantial completion and prior to starting the bacteria testing of water lines, deliver signed and sealed Record Documents and Record Drawings to the County. These will be reviewed and verified by the inspector. If there are any required changes or additions, these shall be completed and the entire signed and sealed set resubmitted prior to final pay application.
- B. The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings. Record drawings shall be certified by the professional(s) (Engineer or Surveyor licensed in Florida), as stipulated by the Land Development Ordinance and submitted on signed and sealed paper drawings, signed and dated mylar drawings together with an AutoCAD version on a recordable compact disk (CD).
- C. The CD shall contain media in AutoCad Version 2004 or later, or in any other CAD program compatible with AutoCad in DWG or DXF form. All fonts, line types, shape files or other pertinent information used in the drawing and not normally included in AutoCad shall be included on the media with a text file or attached noted as to its relevance and use.
- D. Accompany submittal with transmittal letter, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Title and number of each Record Document.
 - 5. Signature of Contractor or his authorized representative.

Note: The data required to properly prepare these record drawings shall be obtained at the site, at no cost to the County by the responsible design professional or his/her duly appointed representative. The appointed representative shall be a qualified employee of the responsible design professional or a qualified inspector retained by the responsible design professional on a project-by-project basis.

PART 2 STANDARDS

2.01 MINIMUM RECORD DRAWING STANDARDS FOR ALL RECORD DRAWINGS SUBMITTED TO MANATEE COUNTY

- A. Record drawings shall be submitted to at least the level of detail in the contract documents. It is anticipated that the original contract documents shall serve as at least a background for all record information. Original drawings in CAD format may be requested of the County.
- B. Drawings shall meet the criteria of paragraph 1.04 D above.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01740 WARRANTIES AND BONDS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Compile specified warranties and bonds.
- B. Compile specified service and maintenance contracts.
- C. Co-execute submittals when so specified.
- D. Review submittals to verify compliance with Contract Documents.
- E. Submit to County for review and transmittal.

1.02 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.
- B. Number of original signed copies required: Two each.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
 - 1. Product or work item.
 - 2. Firm, with name of principal, address and telephone number.
 - 3. Scope.
 - 4. Date of beginning of warranty, bond or service and maintenance contract.
 - 5. Duration of warranty, bond or service maintenance contract.
 - 6. Provide information for County's personnel:
 - a. Proper procedure in case of failure.
 - b. Instances which might affect the validity of warranty or bond.
 - 7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
 - 1. Size 8-1/2 inch x 11 inch punched sheets for standard 3-ring binder. Fold larger sheets to fit into binders.
 - 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
 - a. Title of Project.
 - b. Name of Contractor.
- C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.04 TIME OF SUBMITTALS

- A. Make submittals within ten days after date of substantial completion and prior to final request for payment.
- B. For items of work, where acceptance is delayed materially beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.05 SUBMITTALS REQUIRED

- A. Submit warranties, bonds, service and maintenance contracts as specified in respective sections of Specifications.
- B. Approval by the County of all documents required under this section is a pre-requisite to requesting a final inspection and final payment

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DIVISION 2 SITE WORK

SECTION 02064 MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to modify, alter and/or convert existing structures as shown or specified and as required for the installation of piping, mechanical equipment and appurtenances. Existing piping and equipment shall be removed and dismantled as necessary for the performance of facility alterations in accordance with the requirements herein specified.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall cut, repair, reuse, excavate, demolish or otherwise remove parts of the existing structures or appurtenances, as indicated on the Contract Drawings, herein specified, or necessary to permit completion of the work under this Contract. The Contractor shall dispose of surplus materials resulting from the above work in an approved manner. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.
- B. The Contractor shall dismantle and remove all existing equipment, piping, and other appurtenances required for the completion of the work. Where called for or required, the contractor shall cut existing pipelines for the purpose of making connections thereto. Anchor bolts for equipment and structural steel removed shall be cut off one inch below the concrete surface. Surface shall be finished as specified in the Contract Documents.
- C. At the time that a new connection is made to an existing pipeline, additional new piping, extending to and including a new valve, shall be installed. Pipe anchorage, if required, is part of the installation shall also be installed as directed by the County.
- D. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the express approval of and to the extent approved by the County.
- E. When removing materials or portions of existing utility pipelines and/or structures or when making openings in walls and partitions, the Contractor shall take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work, and not to damage the structures or contents by falling or flying debris. Unless otherwise permitted, line drilling will be required in cutting existing concrete.
- F. Materials and equipment removed in the course of making alterations and additions shall remain the property of the County, except that items not salvageable, as determined by the County, shall become the property of the Contractor to be disposed of by him off the work

site at his own place of disposal. Operating equipment shall be thoroughly cleaned, lubricated, and greased for protection during prolonged storage.

- G. All alterations to existing utility pipes and structures shall be done at such time and in such manner as to comply with the approved time schedule. So far as possible before any part of the work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delay.
- H. All workmanship and new materials involved in constructing the alterations shall conform to the General Specifications for the classes of work insofar as such specifications are applicable.
- I. All cutting of existing concrete or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these Specifications covering the new work. When not covered, the work shall be carried on in the manner and to the extent directed by the Resident Project Representative.
- J. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.
- K. Non-shrink grout shall be used for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as shown.
- L. Where necessary or required for the purpose of making connections, the Contractor shall cut existing pipelines in a manner to provide an approved joint. Where required, he shall use flanges, or provide Dresser Couplings, all as required.
- M. The Contractor shall provide flumes, hoses, piping and other related items to divert or provide suitable plugs, bulkheads, or other means to hold back the flow of water or other liquids, all as required in the performance of the work under this Contract.
- N. Care shall be taken not to damage any part of existing buildings or foundations or outside structures.

3.02 CONNECTING TO EXISTING PIPING AND EQUIPMENT

The Contractor shall verify exact location, material, alignment, joint, etc. of existing piping and equipment prior to making the connections called out in the Drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection. A Manatee County representative must be present for all tie-ins for a visual inspection.

3.03 REMOVAL AND ABANDONMENT OF ASBESTOS CEMENT PIPE AND APPURTENANCES

- A. All work associated with the removal or abandonment of existing asbestos cement pipe and appurtenances shall be performed by a licensed asbestos abatement contractor or subcontractor registered in the State of Florida. After removal of the facilities, all trenches shall be backfilled in accordance with the Contract Documents. The cost of disposing of the removed materials shall be borne by the Contractor.
- B. The asbestos abatement contractor or subcontractor shall contact the appropriate regulatory agencies prior to removal or abandonment of any asbestos material and shall

obtain all required permits and licenses and issue all required notices. The Contractor shall be responsible for all fees associated with permits, licenses and notices to the governing regulatory agencies. An asbestos manifest form must accompany each and every shipment of such pipe or pipe material waste to the Manatee County Lena Road Landfill. Prior to each shipment, a minimum of 24 hours notice to the Landfill field office (Phone #748-5543) is required.

- C. All work associated with removal or abandonment of asbestos cement pipe and appurtenances shall be performed in accordance with the standards listed below and all other applicable local, State, or Federal standards.
 - 1. Florida Administrative Code, Chapter 62-257, "Asbestos Program".
 - 2. National Emission Standards Hazardous Air Pollution (NESHAP), 40 CFR, Part 61, Subpart M, latest revision.
 - 3. Occupational Safety and Health Act, 29 CFR, 1910.1001 - Asbestos.
 - 4. Title 40 CFR, Part 763, Asbestos.
 - 5. Florida Statute Title XXXII, Chapter 469, Asbestos Abatement.

3.04 IN-PLACE GROUTING OF EXISTING PIPE

- A. Where water and wastewater utility pipes are to be abandoned in place, they shall be filled with a sand/cement grout as specified herein. When such pipes are constructed with asbestos cement materials, the abandonment activities shall be performed by a licensed asbestos abatement contractor as specified in these Specifications.
- B. Grout shall be injected within the pipe sections indicated on the Drawings. The ends of these sections shall be capped and/or plugged. The grouting program shall consist of pumping sand-cement grout with suitable chemical additives at pressures necessary to fill the pipe sections shown on the Drawings to prevent the potential for future collapse.
- C. The pump used for grouting should be a continuous flow, positive displacement model with a pugmill type mixing vat having a minimum shaft speed of 60 rpm and incorporated as an integral part of the equipment. Alternate equipment may be used subject to the approval of the County. The rate of pumping shall not exceed six (6) cubic feet per minute. The pumping pressures shall be in the range of 100 to 150 psi.
- D. The Contractor shall provide standpipes and/or additional means of visual inspection as required by the County to determine if adequate grout material has filled the entire pipe section(s). The Contractor shall make necessary provisions for the County's representative to monitor all grouting operations.
- E. All pipe to be abandoned shall be capped or plugged with a fitting or material that will prevent soil or other material from entering the pipe. All caps and plugs shall be subject to approval by the County.

END OF SECTION

SECTION 02100 SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section covers clearing, grubbing and stripping of the project site and/or along the pipeline route.
- B. The Contractor shall clear and grub all of the area within the limits of construction or as required, which includes, but is not limited to utility easements. The width of the area to be cleared shall be reviewed by the County prior to the beginning of any clearing.
- C. The Contractor's attention is directed to any Soil Erosion and Sediment Control Ordinances in force in Manatee County. The Contractor shall comply with all applicable sections of these ordinances.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEARING

The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish and all other objectionable obstructions resting on or protruding through the surface of the ground. However, trees shall be preserved as hereinafter specified unless otherwise designated by the County. Clearing operations shall be conducted so as to prevent damage to existing structures and installations and to those under construction, so as to provide for the safety of employees and others. Soil erosion control devices such as hay bales and silt fences shall be installed to satisfy all Federal, State and County requirements.

3.02 GRUBBING

Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

3.03 STRIPPING

In areas so designated, topsoil shall be stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. The County shall have the option to receive all excess topsoil materials. The Contractor shall pay all equipment and labor cost to deliver excess top soil material to a remote site chosen by the County within a five mile radius of the construction site. Should County not choose to receive any or all excess topsoil materials, the Contractor shall dispose of said material at no additional cost to County.

3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

The Contractor shall dispose of all material and debris from the clearing and grubbing

operation by hauling such material and debris off site. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor; the cost of which shall be included in the prices bid for the various classes of work.

3.05 PRESERVATION OF TREES

Those trees which are not designated for removal by the County shall be carefully protected from damage. The Contractor shall erect such barricades, guards and enclosures as may be considered necessary by him for the protection of the trees during all construction operation.

3.06 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

- A. The Contractor shall exercise extreme care to avoid unnecessary disturbance of developed private property adjacent to proposed project site. Trees, shrubbery, gardens, lawns and other landscaping, which are not designated by the County to be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.
- B. All soil preservation procedures and replanting operations shall be under the supervision of a nursery representative experienced in such operations.
- C. Improvements to the land such as fences, walls, outbuildings and other structures which of necessity must be removed, shall be replaced with equal quality materials and workmanship.
- D. The Contractor shall clean up the construction site across developed private property directly after construction is completed upon approval of the County.

3.07 PRESERVATION OF PUBLIC PROPERTY

The appropriate paragraphs of these Specifications shall apply to the preservation and restoration of public lands, parks, rights-of-way, easements and all other damaged areas. This includes, but is not limited to the trimming of trees damaged by contractor's equipment.

END OF SECTION

SECTION 02220 EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Structural excavation shall consist of the removal of material for the construction of foundations for structures and other excavation designated on the drawings or in these specifications.
- B. Structural excavation and backfill shall consist of furnishing material, if necessary and placing and compacting backfill material around structures to the lines and grades designated on the drawings, as specified or directed by the County.
- C. Structural excavation and backfill shall include the furnishing of all materials, equipment and other facilities which may be necessary to perform the excavations, place and compact the backfill, install sheeting and bracing, and carry out any necessary dewatering. It shall also include the wasting or disposal of surplus excavated material in a manner and in locations approved by the County.
- D. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the plans. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to, protecting the root systems and adjusting grades as necessary for tree/root protection.

1.02 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. In place soil compaction tests shall be performed by a qualified testing laboratory.
 - 2. Compaction tests shall be taken every 500 feet, except in the road crossings or road shoulders. Tests are to be taken according to current FDOT Standards.
- B. Reference Standards:
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM D1557, Moisture-Density Relations of Soils Using 10-lb. (4.5-kg) Rammer and 18-in. (457-mm) Drop.

1.03 JOB CONDITIONS

- A. The Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavation, bases, pits, etc., free from seepage, standing or running water at all times throughout the period of construction.
- B. The Contractor shall assume all responsibility for the security of the excavation required, employing bracing, lining or other accepted means necessary to accomplish same.
- C. Excavated areas shall be cleared of all debris, water, slush, muck, clay and soft or loose earth and shall be conditioned to the entire satisfaction of the County.

- D. All excavated material unsuitable for use or which will not be used shall be disposed of in a manner consistent with State and County regulation.
- E. All unsuitable organic materials, roots, logs, etc., found during excavation shall be removed by the Contractor and the trench shall be refilled with suitable material.

PART 2 PRODUCTS

2.01 MATERIAL FOR CONTROLLED FILL

- A. Composition: Only approved material free from organic matter and lumps of clay, shall be used for backfill. Excavated earth free from debris or organic material may be used for backfilling foundations or fill.
- B. Crushed stone and shell shall meet or exceed current FDOT Standards.

2.02 UNSUITABLE MATERIAL

Unsuitable material shall be defined as highly organic soil per ASTM D2487 Group PT. This includes, but is not limited to, such items as topsoil, roots, vegetable matter, trash, debris, and clays that cannot be dried sufficiently to obtain specified compaction.

PART 3 EXECUTION

3.01 INSPECTION

- A. The Contractor shall verify that work preceding the affected work of this Section has been satisfactorily completed.
- B. Conditions adversely affecting the work of this Section shall be corrected to the satisfaction of the County.

3.02 REMOVAL OF UNSUITABLE MATERIALS

- A. The Contractor shall remove unsuitable material from within the limits of the Work.
- B. Materials meeting requirements for controlled fill shall be stockpiled as necessary and in such a manner satisfactory to the County.
- C. All material excavated shall be placed so as to minimize interference with public travel and to permit proper access for inspection of the work.

3.03 EXCAVATION

- A. When concrete or shell subbase footing is to rest on an excavated surface, care shall be taken not to disturb the natural soil. Final removal and replacement of the foundation material and subbase compaction to grade shall not be made until just before the concrete or masonry is placed.
- B. When any structural excavation is completed, the Contractor shall notify the County who will make an inspection of the excavation. No concrete or masonry shall be placed until the excavation has been approved by the County.

- C. The elevations of the footing bottom and the base slab as shown on the Drawings, shall be considered as approximate and the County may order in writing, such changes in dimensions or elevations of the footings and slab base as necessary to secure satisfactory foundations.
- D. All excavation shall be made within an area bounded by lines five feet outside and parallel to the exterior walls of the structure to allow for correct forming, shoring and inspection of foundation work. Pouring of concrete against earth side walls shall not be permitted.
- E. If the ground is excavated below the grade called for by the Drawings or becomes unstable due to the Contractor's carelessness or operations, the ground shall be excavated to undisturbed native soil before continuing concreting operations.
- F. If in the opinion of the County, the material at or below the normal grade of the bottom of the trench is unsuitable for pipe or structure foundation, it shall be removed to the depth directed by the County and if so directed, replaced by crushed stone or washed shell.

3.04 STRUCTURAL BACKFILL

- A. Structural backfill shall not be placed until the footings or other portions of the structure or facility have been inspected by the County and approved for backfilling.
- B. A minimum of 1-1/2" layer of lean concrete shall be placed as a working mat for the concrete base slabs and footings if required by the County.
- C. Fill shall be placed in uniform layers not more than 12" thick and compacted to a minimum of 98 percent of the maximum density determined by ASTM D1557, Method A or C, or as directed by the County. The Contractor shall securely tamp the backfill with pneumatic rammer around all wall foundations. The method of compaction shall be satisfactory to the County.
- D. Compaction of structural backfill by ponding and jetting may be permitted when, as determined by the County: the backfill material is of such character that it will be self-draining when compacted; foundation materials will not soften or be otherwise damaged by the applied water; no damage from hydrostatic pressure will result to the structure. Ponding and jetting within two feet below finished subgrade shall not be permitted in roadway areas. At the discretion of the County, ponding and jetting may be permitted with compaction layers not to exceed four feet.
- E. Surplus material not used on-site shall be removed and disposed of off-site by the Contractor. In no case shall surplus material be deposited on adjacent lands. Fill used for grading shall be placed in layers not to exceed 12 inches in thickness and shall be compacted to a density equal or greater to that of the surrounding natural ground.

3.05 BACKFILLING AROUND STRUCTURES

- A. Common fill and structural fill are specified for use as backfill against the exterior walls of the structures. Fill shall be placed in layers having a maximum thickness of eight (8) inches in loose state and shall be compacted sufficiently to prevent settlement. If compaction is by rolling or ramming, material shall be wetted down as required. Where material can be suitably compacted by jetting or puddling, the Contractor may use one of these methods. No boulders shall be allowed to roll down the slopes and hit the walls.

- B. Backfilling shall be carried up evenly on all walls of an individual structure simultaneously. A variation of two (2) feet in elevation will be the maximum allowable. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength. Backfilling shall be subjected to approval by the County.
- C. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least one foot above the bottom of the pipes:
 - 1. Place structural fill in such areas for a distance of not less than three feet either side of the center line of the pipe in level layers not exceeding 6-inches in depth.
 - 2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper to the satisfaction of the County.
 - 3. Structural fill shall be of the quality specified under Part 2 of this Section.
- D. The surface of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the grading plan. No soft spots or uncompacted areas shall be allowed in the work.
- E. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure and earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling.

3.06 FIELD QUALITY CONTROL

- A. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, Method A or C.

END OF SECTION

SECTION 02221 TRENCHING, BEDDING AND BACKFILL FOR PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals necessary to perform all excavation, backfill, fill, grading, trench protection or other related work required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not be limited to: vaults; duct conduit; pipe; roadways and paving; backfilling; required fill or borrow operations; grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing and dewatering.
- B. Prior to commencing work, the Contractor shall examine the site and review test borings if available, or undertake his own subsurface investigations and take into consideration all conditions that may affect his work.
- C. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the plans. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to protecting the root systems and adjusting grades as necessary for tree/root protection.

1.02 PROTECTION

- A. Sheeting and Bracing in Excavations:
 - 1. In connection with construction of underground structures, the Contractor shall properly construct and maintain cofferdams. These shall consist of: sheeting and bracing as 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 yard pipe and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.
 - 2. Trench sheeting for pipes: no sheeting is to be withdrawn if driven below, mid-diameter of any pipe and no wood sheeting shall be cut off at a level lower than one foot above the top of any pipe unless otherwise directed by the County. During the progress of the work, the County may direct the Contractor in writing to leave additional wood sheeting in place. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.
 - 3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specification, all sheeting and bracing shall be removed after completion of the piping or structure, care being taken not to disturb or otherwise injure the pipeline or finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specifically made for that purpose, by watering, or as may otherwise be directed.
 - 4. The Contractor shall construct, to the extent he deems it desirable for his method of operation, the cofferdams and sheeting outside the neat lines of the pipeline trench or foundation unless otherwise indicated on the Drawings or directed by the County.

Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing and cofferdams shall be adequate to withstand all pressures to which the pipeline or structure will be subjected. Pumping, bracing and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the pipeline or the enclosed masonry. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.

5. Drawings of the cofferdams and design computations shall be submitted to the County and approved prior to any construction. However, approval of these drawings shall not relieve the Contractor of the responsibility for the cofferdams. The drawings and computations shall be prepared and stamped by a Registered Professional Engineer in the State of Florida and shall be in sufficient detail to disclose the method of operation for each of the various stages of construction, if required, for the completion of the pipeline and substructures.

B. Dewatering, Drainage and Flotation

1. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding rock and limerock base course, in-the-dry. In addition, the Contractor shall make the final 24" of excavation for this work in-the-dry and not until the water level is a minimum of 6" below proposed bottom of excavation.
2. 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 excavation and keep 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 water levels to return to natural elevations.
3. 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.
4. Wellpoints may be required for dewatering the soil prior to final excavation for deeper in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed to avoid the structure, pipeline, or fill from becoming floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.
5. The Contractor shall furnish all materials and equipment to perform all work required to install and maintain the proposed drainage systems for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.
6. Where required, the Contractor shall provide a minimum of two operating groundwater observation wells at each structure to determine the water level during construction of the pipeline or structure. Locations of the observation wells shall be at structures and along pipelines as approved by the County prior to their installation. The observation wells shall be extended to 6 inches above finished grade, capped with screw-on caps protected by 24" x 24" wide concrete base and left in place at the completion of this Project.
7. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the County for approval. Such approval shall not relieve the Contractor of the responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils for damage to pipeline or structures caused by an inadequate

dewatering system or by interruption of the continuous operation of the system as specified.

8. As part of his request for approval of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge water shall be clear, with no visible soil particles in a one quart sample. Discharge water shall not flow directly into wetlands or Waters of the State as defined by FDEP and SWFWMD.
9. During backfilling and construction, water levels shall be measured in observation wells located as directed by the County.
10. Continuous pumping will be required as long as water levels are required to be below natural levels.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. Materials for use as fill and backfill shall be described below. For each material, the Contractor shall notify the County of the source of the material and shall furnish the County, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of such material.
2. Additional materials shall be furnished as required from off-site sources and hauled to the site.

B. Structural Fill

1. Structural fill in trenches shall be used below spread footing foundations, slab-on-grade floors and other structures as backfill within three feet of the below grade portions of structures.
2. Structural fill material shall be a minimum of 60 percent clean sand, free of organic, deleterious and/or compressible material. Minimum acceptable density shall be 98 percent of the maximum density as determined by AASHTO T-180. Rock in excess of 2-1/2" in diameter shall not be used in the fill material. If the moisture content is improper for attaining the specified density, either water shall be added or material shall be permitted to dry until the proper moisture content for compaction is reached.

C. Common Fill

1. Common fill material shall be free from organic matter, muck or marl and rock exceeding 2-1/2" in diameter. Common fill shall not contain broken concrete, masonry, rubble or other similar materials. Existing soil may be used to adjust grades over the site with the exception of the construction area.
2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the County, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials by the Contractor.

D. Crushed Stone

1. Crushed stone may be used for pipe bedding, manhole bases, as a drainage layer below structures with underdrains and at other locations indicated on the Drawings.

2. Crushed stone shall be size No. 57 with gradation as noted in Table 1 of Section 901 of Florida Department of Transportation, Construction of Roads and Bridges.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION AND BACKFILLING

- A. Excavation for all trenches required for the installation of pipes and electrical ducts 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 or installing the ducts within the trenches.
- B. Rock shall be removed to a minimum 6" clearance around the bottom and sides of all the pipe or ducts being laid.
- C. Where pipes or ducts are to be laid in limerock bedding 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.
- D. Where the pipes or ducts 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 manually, shall be done in such a manner that will give a flat bottom true to grade so that pipe or duct can be evenly supported on undisturbed material. Bell holes shall be made as required.
- E. Backfilling over pipes shall begin as soon as practicable after the pipe has been laid, jointed and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.
- F. Backfilling over ducts shall begin not less than three days after placing concrete encasement.
- G. All backfilling shall be prosecuted expeditiously and as detailed on the Drawings.
- H. Any space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, free from stones having a diameter greater than 2" and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of the pipe.
- I. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.
- J. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted by rolling, ramming, or puddling, as the County may direct, sufficiently to prevent subsequent settling.

END OF SECTION

**SECTION 02223 EXCAVATION BELOW GRADE AND CRUSHED STONE OR SHELL
REFILL**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. If in the opinion of the County, the material at or below the normal grade of the bottom of the trench is unsuitable for pipe or structure foundation, it shall be removed to the depth directed by the County and replaced by crushed stone or washed shell.

PART 2 PRODUCTS (NOT USED)

PART 3 MATERIALS

3.01 EXCAVATION AND DRAINAGE

- A. Whatever the nature of unstable material encountered or the groundwater conditions, trench stabilization shall be complete and effective.
- B. Should the Contractor excavate below the grade shown on the Contract drawings because of negligence or for his own convenience; due to failure in properly dewatering the trench; disturbs the subgrade before dewatering is sufficiently complete; he shall be directed by the County to excavate below grade. The work of excavating below grade and furnishing and placing the approved refill material shall be performed at the Contractor's expense.

3.02 REFILL

- A. Should the material at the level of trench bottom consist of fine sand, sand and silt or soft earth, the subgrade material shall be removed as directed by the County and the excavation shall be refilled with crushed stone or washed shell.

END OF SECTION

SECTION 02260 FINISH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall finish grade sub-soil.
- B. The Contractor shall cut out areas to receive stabilizing base course materials for paving and sidewalks.
- C. The Contractor shall place, finish grade and compact top soil.

1.02 PROTECTION

The Contractor shall prevent damage to existing fencing, trees, landscaping, natural features, bench marks, pavement and utility lines. Damage shall be corrected at no cost to the County.

PART 2 PRODUCTS

- A. Topsoil: Shall be friable loam free from subsoil, roots, grass, excessive amount of weeds or other organics, stones, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter. The Contractor may use topsoil stockpiles on site if they conform to these requirements.

PART 3 EXECUTION

3.01 SUB-SOIL PREPARATION

- A. The Contractor shall rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Uneven areas and low spots shall be eliminated. Debris, roots, branches or other organics, stones, and sub-soil shall be removed by the Contractor and disposed of in a manner consistent with the latest Manatee County Standards as well as any affected regulatory agency. Should contaminated soil be found, the Contractor shall notify the County.
- B. The Contractor shall cut out areas to sub-grade elevation to stabilize base material for paving and sidewalks.
- C. The Contractor shall bring sub-soil to required profiles and contour grades gradually; and blend slopes into level areas.
- D. The Contractor shall slope the structure grade a minimum of two (2) inches in ten (10) feet unless indicated otherwise on the Drawings.
- E. The Contractor shall cultivate sub-grade to a depth of 3 inches where the topsoil is to be placed. He shall repeat cultivation in areas where equipment use has compacted sub-soil.
- F. The Contractor shall not make grade changes which causes water to flow onto adjacent lands.

3.02 PLACING TOPSOIL

- A. The Contractor shall place topsoil in areas where seeding, sodding and planting is to be performed. He shall place from the following minimum depths, up to finished grade elevations:
 - 1. 6 inches for seeded areas
 - 2. 4-1/2 inches for sodded areas
 - 3. 24 inches for shrub beds
 - 4. 18 inches for flower beds
- B. The Contractor shall use topsoil in a dry state as determined by the County. He shall place the material during dry weather.
- C. The Contractor shall use fine grade topsoil eliminating rough and low areas to ensure positive drainage. He shall maintain levels, profiles and contours of the sub-grades.
- D. The Contractor shall remove stone, roots, grass, weeds, debris, and other organics or foreign material while spreading the material.
- E. The Contractor shall manually spread topsoil around trees, plants and structures to prevent damage which may be caused by grading equipment.
- F. The Contractor shall lightly compact and place the topsoil.

3.03 SURPLUS MATERIAL

- A. The Contractor shall remove surplus sub-soil and topsoil from site at his expense.
- B. The Contractor shall leave stockpile areas and entire job site clean and raked, ready for landscaping operations.

END OF SECTION

SECTION 02276 TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

- A. The work specified in this Section consists of the design, provision, maintenance and removal of temporary erosion and sedimentation controls as necessary.
- B. Temporary erosion controls include, but are not limited to: grassing, mulching, netting, watering, and the reseeding of on-site surfaces and spoil and borrow area surfaces, interceptor ditches at ends of berms and other such work at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the County.
- C. Temporary sedimentation controls include, but are not limited to: silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which shall ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the County.
- D. The Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.02 REFERENCE DOCUMENTS

- A. Florida Building Code.
- B. FDEP/COE Dredge and Fill Regulations and/or Permit as applicable.
- C. SWFWMD Permit Regulations and/or Permit as applicable.
- D. Florida Stormwater, Erosion and Sedimentation Control Inspector's Manual.

PART 2 PRODUCTS

2.01 EROSION CONTROL

- A. Netting - fabricated of material acceptable to the County.
- B. Seed and sod.

2.02 SEDIMENTATION CONTROL

- A. Bales - clean, seed free cereal hay type.
- B. Netting - fabricated of material acceptable to the County.
- C. Filter stone - crushed stone conforming to Florida Dept of Transportation specifications.
- D. Concrete block - hollow, non-load-bearing type.
- E. Concrete - exterior grade not less than one inch thick.

PART 3 EXECUTION

3.01 EROSION CONTROL

A. Minimum procedures for grassing shall be:

1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
3. Apply mulch loosely and to a thickness of between 3/4-inch and 1-1/2 inches.
4. Apply netting over mulched areas on sloped surfaces.
5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

A. The Contractor shall install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings. Deteriorated hay bales and dislodged filter stone shall be replaced by the Contractor at his expense.

3.03 PERFORMANCE

A. The Contractor, at his own expense, shall immediately take whatever steps are necessary to correct any deficiencies of the temporary erosion and sediment control measures employed if they fail to produce results or do not comply with the requirements of the State of Florida or any other federal, governmental or regulatory agency.

END OF SECTION

SECTION 02355 LUMBER LEFT IN PLACE

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish and install shoring and sheeting as necessary to provide adequate safety.

PART 2 PRODUCTS

2.01 MATERIALS

Wood for shoring and sheeting shall be green, rough cut hardwood planking.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The Contractor shall furnish, install and maintain sheeting and bracing required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below which is necessary for proper construction and to protect adjacent structures from undermining or other damage. If the County determines that insufficient or improper supports have been provided, he may order additional supports to be installed at the expense of the Contractor. Compliance with such orders shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting. Should voids form, they shall be immediately filled and rammed.
- B. The Contractor shall embed and leave in place all sheeting, bracing and other related items as shown on the Contract Drawings. The County may direct that sheeting and bracing timber be cut off at a specified elevation. No additional payment or compensation shall be made for this work.
- C. Sheeting and bracing not left in place shall be removed carefully in such manner as not to endanger other structures, utilities, property, or proposed construction.
- D. The County may order sheeting and bracing to be left in place; however, this shall not relieve the Contractor from liability for damages to persons or property due to negligence or the failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
- E. The Contractor shall receive no payment other than that included in the pipe bid item price for any timber used for sheeting bracing, or other related items.

END OF SECTION

SECTION 02485 SEEDING AND SODDING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials and equipment necessary to satisfactorily return all construction areas to their original conditions or better.
- B. Work shall include furnishing and placing seed or sod, fertilizing, planting, watering and maintenance until acceptance by County.

1.02 RELATED WORK NOT INCLUDED

Excavation, filling and grading required to establish elevation shown on the Drawings are included under other sections of these Specifications.

1.03 QUALITY ASSURANCE

- A. It is the intent of this Specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering and seeding or sodding at no additional cost to the County until a satisfactory stand is obtained. For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover over areas to be sodded or seeded, with grass free of weeds, alive and growing, leaving no bare spots larger than 3/4 square yard within a radius of 8 feet.
- B. All previously grassed areas where pipelines are laid shall be sodded. All sodding and grassing shall be installed in accordance with these Specifications or as directed by the County.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fertilizer: The fertilizer shall be of the slow-release type meeting the following minimum requirements: 12 percent nitrogen, 8 percent phosphorus, 8 percent potassium; 40 percent other available materials derived from organic sources. At least 50 percent of the phosphoric acid shall be from normal super phosphate or an equivalent source which will provide a minimum of two units of sulfur. The amount of sulfur shall be indicated on the quantitative analysis card attached to each bag or other container. Fertilizer shall be uniform in composition, dry and free flowing delivered to sites in original unopened containers bearing manufacturer's statement or guarantee.
- B. Seeding/Grassing: The Contractor shall grass all unpaved areas disturbed during construction which do not require sod. All grassing shall be completed in conformance with FDOT Specifications, Sections 570 and 981. The grassed areas shall be mulched and fertilized in accordance with FDOT Specifications, except that no additional payment will be made for mulching, fertilizing and/or watering.
- C. Sodding: Sod shall be provided as required on the construction drawings or at locations as directed by the County in accordance with Florida Department of Transportation, Specifications Section 575 and 981. The Contractor shall furnish bahia grass sod or match

existing sod. Placement and watering requirements shall be in accordance with FDOT Specifications Section 575, except that no additional payment will be made for placement and/or watering. This cost shall be included in the Contract price bid for sodding.

- D. Topsoil: Topsoil stockpiled during excavation may be used as necessary. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the County. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants and grassing specified herein.
- E. Water: It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements that may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

PART 3 EXECUTION

3.01 INSTALLATION

- A. When the trench backfill has stabilized sufficiently, the Contractor shall commence work on lawns and grassed areas, including fine grading as necessary and as directed by the County.
- B. Finish Grading: Areas to be seeded or sodded shall be finish graded, raked, and debris removed. Soft spots and uneven grades shall be eliminated. The County shall approve the finish grade of all areas to be seeded or sodded prior to seed or sod application.
- C. Protection: Seeded and sodded areas shall be protected against traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to acceptance by the County shall be repaired by the Contractor as directed by the County.

3.02 CLEANUP

Soil or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of seeding and sodding operations, all excess soil, stones and debris remaining shall be removed from the construction areas.

3.03 LANDSCAPE MAINTENANCE

- A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the County.
- B. Maintain landscape work for a period of 90 days immediately following complete installation of work or until County accepts project. Watering, weeding, cultivating, restoration of grade, mowing and trimming, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be included at no additional cost to the County.

3.04 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATORS

Lawn areas planted under this Contract and all lawn areas damaged by the Contractor's

operation shall be repaired at once by proper soil preparation, fertilizing and sodding, in accordance with these Specifications.

END OF SECTION

SECTION 02513 ASPHALT CONCRETE PAVING

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials and equipment necessary to complete all milling asphalt pavement and asphalt concrete paving (including restoration of driveways) as called out on the Contract Documents or as shown on the Drawings.

1.02 QUALITY ASSURANCE

- A. Qualifications of Asphalt Concrete Producer: The only materials permitted shall be furnished by a bulk asphalt concrete producer exclusively engaged in the production of hot-mix, hot-laid asphalt concrete.
- B. Qualification of Testing Agency: The County may employ a commercial testing laboratory to conduct tests and evaluations of asphalt concrete materials and design. The Contractor shall:
 - 1. Provide asphalt concrete testing and inspection service acceptable to County.
 - 2. Include sampling and testing asphalt concrete materials proposed, and tests and calculations for asphalt concrete mixtures.
 - 3. Provide field testing facilities for quality control testing during paving operations.
- C. Requirements of Regulatory Agencies: The Contractor shall comply with the applicable requirements of:
 - 1. Manatee County Utility Operations Department
 - 2. Manatee County Transportation Department
 - 3. State of Florida Dept. of Transportation

1.03 PAVING QUALITY REQUIREMENTS

- A. General: In addition to other specified conditions, the Contractor shall comply with the following minimum requirements:
 - 1. In-place asphalt concrete course shall be tested for compliance with requirements for density, thickness and surface smoothness.
 - 2. Final surface shall be provided of uniform texture, conforming to required grades and cross sections.
 - 3. A minimum of four inch diameter pavement specimens for each completed course shall be taken from locations as directed by the County.
 - 4. Holes from test specimens shall be repaved as specified for patching defective work.
- B. Density:
 - 1. When subjected to 50 blows of standard Marshall hammer on each side of an in place material specimen, densities shall be comparable to a laboratory specimen of same asphalt concrete mixture.
 - 2. The minimum acceptable density of in-place course material shall be 98% of the recorded laboratory specimen density.

- C. Thickness: In-place compacted thicknesses shall not be acceptable if less than the minimum thicknesses shown on the Drawings.
- D. Surface Smoothness:
 - 1. Finished surface of each asphalt concrete course shall be tested for smoothness, using a 10 ft. straightedge applied parallel to and at right angles to centerline of paved areas.
 - 2. Surface areas shall be checked at intervals directed by County.
 - 3. Surfaces shall not be acceptable if they exceed the following:
 - a. Base Course: 1/4 in. in 10 ft.
 - b. Surface Course: 3/16 in. in 10 ft.
 - c. Crowned Surfaces:
 - (1) Test crowned surfaces with a crown template, centered and at right angles to the crown.
 - (2) Surfaces will not be acceptable if varying more than 1/4 in. from the template.

1.04 SUBMITTALS

- A. Samples: The Contractor may be required to provide samples of materials for laboratory testing and job-mix design.
- B. Test Reports: The Contractor shall submit laboratory reports for following materials tests:
 - 1. Coarse and fine aggregates from each material source and each required grading:
 - a. Sieve Analysis: ASTM C 136 (AASHTO T 27).
 - b. Unit Weight of Slag: ASTM C29 (AASHTO T 19).
 - c. Soundness: ASTM C 88 (AASHTO T 104) for surface course aggregates only.
 - d. Sand Equivalent: ASTM D 2419 (AASHTO T 176).
 - e. Abrasion of Coarse Aggregate: ASTM C131 (AASHTO T 96), for surface course aggregates only.
 - 2. Asphalt cement for each penetration grade:
 - a. Penetration: ASTM D5 (AASHTO T49).
 - b. Viscosity (Kinematic): ASTM D2170 (AASHTO T 201).
 - c. Flash Point: ASTM D92 (AASHTO T 48).
 - d. Ductility: ASTM D 113 (AASHTO T 51).
 - e. Solubility: ASTM D 4 (AASHTO T 44).
 - f. Specific Gravity: ASTM D 70 (AASHTO T 43).
 - 3. Job-mix design mixtures for each material or grade:
 - a. Bulk Specific Gravity for Coarse Aggregate: ASTM C 117(AASHTO T 85).
 - b. Bulk Specific Gravity for Fine Aggregate: ASTM C 128(AASHTO T 84).
 - 4. Uncompacted asphalt concrete mix: Maximum Specific Gravity: ASTM D 2041 (AASHTO T 209).
 - 5. Compacted asphalt concrete mix:
 - a. Bulk Density: ASTM D 1188 (AASHTO T 166).
 - b. Marshall Stability and Flow: ASTM D 1559.
 - 6. Density and voids analysis:
 - a. Provide each series of asphalt concrete mixture test specimens, in accordance with A.I. MS-2 "Mix Design Methods for Asphalt Concrete".
 - b. Use Marshall method of mix design unless otherwise directed or acceptable to the County.
 - c. Report the quantity of absorbed asphalt cement in pounds of dry aggregate,

- percent air voids, and percent voids in mineral aggregate.
7. Sampling and testing of asphalt concrete mixtures for quality control during paving operations:
 - a. Uncompacted asphalt concrete mix.
 - (1) Asphalt Cement Content: ASTM D 2172 (AASHTO T 164).
 - (2) Penetration of Recovered Asphalt Cement: ASTM D 5(AASHTO T 49).
 - (3) Ductibility of Recovered Asphalt Cement: ASTM D 113(AASHTO T 51).
 - b. Compacted asphalt concrete mix:
 - (1) Bulk Density: ASTM D 1188 (AASHTO T 166).
Marshall Stability and Flow: ASTM D1559).
 - c. Perform at least one test for each day's paving.
 8. Asphalt plant inspection: ASTM D 290.
 9. Additional testing:
 - a. Retesting shall be required if previous tests indicate insufficient values, or if directed by the County.
 - b. Testing shall continue until specified values have been attained.
 10. Asphalt concrete materials which do not comply with specified requirements shall not be permitted in the work.

1.05 JOB CONDITIONS

A. Weather Limitations:

1. Apply bituminous prime and tack coats only when the ambient temperature in the shade is 50 degrees F. and when the temperature has not been below 35 degrees F. for 12 hours immediately prior to application.
2. Do not apply when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.
3. Construct asphalt concrete surface course only when atmospheric temperature is above 40 degrees F., when the underlying base is dry, and when weather is not rainy.
4. Base course may be placed when air temperature is not below 30 degrees F. and rising, when acceptable to the County.

B. Grade Control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.

C. Traffic Control: Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.

PART 2 PRODUCTS

2.01 MATERIALS

A. Soil Cement or Shell Base Course: as specified in FDOT Section 270, "Material for Base and Stabilized Base", and as called for in the Contract Documents.

B. Aggregate for Asphalt Concrete, General:

1. Sound, angular crushed stone, crushed gravel, or crushed slag: ASTM D 692.
2. Sand, stone, or slag screening: ASTM D 1073.

3. Provide aggregate in gradations for various courses to comply with local highway standards.
- C. Surface Course Aggregates:
1. Provide natural sand, unless sand prepared from stone, slag, or gravel or combinations are required to suit local conditions.
- D. Asphalt Cement: Comply with ASTM D 946 for 85-100 penetration grade.
- E. Prime Coat:
1. Cut-back liquid asphalt.
 2. Medium-Curing type: ASTM D 2027, Grade MC-70.

2.02 ASPHALT-AGGREGATE MIXTURES

- A. Job-mix criteria:
1. Provide job-mix formulas for each required asphalt-aggregate mixture.
 2. Establish a single percentage of aggregate passing each required sieve size, a single percentage of asphalt cement to be added to aggregate, and a single temperature at which asphalt concrete is to be produced.
 3. Comply with the mix requirements of local governing highway standards.
 4. Maintain material quantities within allowable tolerances of the governing standards.

2.03 TRAFFIC AND PARKING MARKING MATERIALS

- A. Traffic lane marking paint with chlorinated rubber base.
- B. Factory mixed, quick drying and non-bleeding, FS TT-P-115C, Type III.
- C. Color: Driving Lane Dividers - White
No Parking Zone - Yellow
Parking Dividers - White

PART 3 EXECUTION

3.01 SURFACE PREPARATION

- A. Subbase Preparation:
1. The Contractor shall remove from the area all organic substance encountered to a depth of six or eight inches (6" or 8"), or to such depth and width as directed by the County. The entire area shall be plowed and dragged prior to placing a stabilizing additive, if required to meet minimum bearing value.
 2. Subbase shall be compacted to a minimum density of 98 percent of the maximum as determined by the Modified Proctor Density AASHTO T-180, and shall have a minimum bearing value of 40 pounds per square inch as determined by the Florida Bearing Test.

- B. Base Course:
1. Check subgrade for conformity with elevations and section immediately before placing base material.
 2. Place base material in compacted layers not more than 6 inches thick, unless continuing tests indicate the required results are being obtained with thicker layers.
 3. In no case will more than 8-inches of compacted base be placed in one lift.
 4. Spread, shape, and compact all base material deposited on the subgrade during the same day.
 5. Compact base course material to be not less than 95% of maximum density: ASTM D 1557, Method D (98 percent maximum density: AASHTO T-180).
 6. Test density of compacted base course: ASTM D 2167.
 7. Conduct one test for each 250 sq. yds. of in-place material, but in no case not less than one daily for each layer.
- C. Loose and Foreign Material:
1. Remove loose and foreign material from compacted subbase surface immediately before application of paving.
 2. Use power brooms or blowers, and brooming as required.
 3. Do not displace subbase material.
- D. Prime Coat:
1. Uniformly apply at rate of 0.20 to 0.5 gal. per sq. yd. over compacted and cleaned subbase surface.
 2. Apply enough material to penetrate and seal, but not flood the surface.
 3. Allow to cure and dry as long as required to attain penetration and evaporation of volatile, and in no case less than 24 hours unless otherwise acceptable to the County.
 4. Blot excess asphalt with just enough sand to prevent pick-up under traffic.
 5. Remove loose sand before paving.
- E. Tack Coat:
1. Dilute material with equal parts of water and apply to contact surfaces of previously constructed asphalt concrete or portland cement concrete and similar surfaces.
 2. Apply at rate of 0.05 to 0.15 gal. per sq. yd. of surface.
 3. Apply tack coat by brush to contact surfaces of structures projecting into or abutting asphalt concrete pavement.
 4. Allow surfaces to dry until material is at condition of tackiness to receive pavement.

3.02 MANHOLE FRAME / VALVE BOX ADJUSTMENTS (IF APPLICABLE)

- A. Placing Manhole frames:
1. Surround manhole frames set to elevation with a ring of compacted asphalt concrete base prior to paving.
 2. Place asphalt concrete mixture up to 1 in. below top of frame, slope to grade, and compact by hand tamping.
- B. Adjust manhole frames to proper position to meet paving.
- C. If permanent covers are not in place, provide temporary covers over openings until

completion of rolling operations.

- D. Set cover manhole frames to grade, flush with surface of adjacent pavement.

3.03 PREPARING THE MIXTURE

- A. Comply with ASTM D 995 for material storage, control, and mixing, and for plant equipment and operation.

- B. Stockpiles:

1. Keep each component of the various-sized combined aggregates in separate stockpiles.
2. Maintain stockpiles so that separate aggregate sizes shall not be intermixed.

- C. Heating:

1. Heat the asphalt cement at the mixing plant to viscosity at which it can be uniformly distributed throughout mixture
2. Use lowest possible temperature to suit temperature-viscosity characteristics of asphalt.
3. Do not exceed 350 degrees F. (176.6 degrees C.).

- D. Aggregate:

1. Heat-dry aggregates to reduce moisture content to not more than 2.0%.
2. Deliver dry aggregate to mixer at recommended temperature to suit penetration grade and viscosity characteristics of asphalt cement, ambient temperature, and workability of mixture.
3. Accurately weigh or measure dry aggregates and weigh or meter asphalt cement to comply with job-mix formula requirements.

- E. Mix aggregate and asphalt cement to achieve 90-95% of coated particles for base mixtures and 85-90% of coated particles for surface mixture, when tested in accordance with ASTM D 2489.

- F. Transporting:

1. Transport asphalt concrete mixtures from mixing site in trucks having tight, clean compartments.
2. Coat hauling compartments with a lime-water mixture to prevent asphalt concrete mixture from sticking.
3. Elevate and drain compartment of excess solution before loading mix.
4. Provide covers over asphalt concrete mixture when transporting to protect from weather and to prevent loss of heat.
5. During periods of cold weather or for long-distance deliveries, provide insulation around entire truck bed surfaces.

3.04 EQUIPMENT

- A. Provide size and quantity of equipment to complete the work specified within project time schedule.

- B. Bituminous Pavers: Self-propelled that spread hot asphalt concrete mixtures without tearing, shoving or gouging surfaces, and control pavement edges to true lines without use of stationary forms.
- C. Rolling Equipment:
 1. Self-propelled, steel-wheeled and pneumatic-tired rollers that can reverse direction without backlash.
 2. Other type rollers may be used if acceptable to the County.
- D. Hand Tools: Provide rakes, lutes, shovels, tampers, smoothing irons, pavement cutters, portable heaters, and other miscellaneous small tools to complete the work specified.

3.05 PLACING THE MIX

- A. Place asphalt concrete mixture on prepared surface, spread and strike-off using paving machine.
- B. Spread mixture at a minimum temperature of 225 degrees F. (107.2 degrees C.).
- C. Inaccessible and small areas may be placed by hand.
- D. Place each course at thickness so that when compacted, it will conform to the indicated grade, cross-section, finish thickness, and density indicated.
- E. Paver Placing:
 1. Unless otherwise directed, begin placing along centerline of areas to be paved on crowned section, and at high side of sections on one-way slope, and in direction of traffic flow.
 2. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.
 3. Complete base courses for a section before placing surface courses.
 4. Place mixture in continuous operation as practicable.
- F. Hand Placing:
 1. Spread, tamp, and finish mixture using hand tools in areas where machine spreading is not possible, as acceptable to County.
 2. Place mixture at a rate that will insure handling and compaction before mixture becomes cooler than acceptable working temperature.
- G. Joints:
 1. Carefully make joints between old and new pavements, or between successive days' work, to ensure a continuous bond between adjoining work.
 2. Construct joints to have same texture, density and smoothness as adjacent sections of asphalt concrete course.
 3. Clean contact surfaces free of sand, dirt, or other objectionable material and apply tack coat.
 4. Offset transverse joints in succeeding courses not less than 24 inches.
 5. Cut back edge of previously placed course to expose an even, vertical surface for full course thickness.
 6. Offset longitudinal joints in succeeding courses not less than 6 inches.

7. When the edges of longitudinal joints are irregular, honeycombed, or inadequately compacted, cut back unsatisfactory sections to expose an even, vertical surface for full course thickness.

3.06 COMPACTING THE MIX

- A. Provide sufficient rollers to obtain the required pavement density.
- B. Begin rolling operations as soon after placing when the mixture will bear weight of roller without excessive displacement.
- C. Do not permit heavy equipment, including rollers to stand on finished surface before it has thoroughly cooled or set.
- D. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- E. Start rolling longitudinally at extreme lower side of sections and proceed toward center of pavement. Roll to slightly different lengths on alternate roller runs.
- F. Do not roll centers of sections first under any circumstances.
- G. Breakdown Rolling:
 1. Accomplish breakdown or initial rolling immediately following rolling of transverse and longitudinal joints and outside edge.
 2. Operate rollers as close as possible to paver without causing pavement displacement.
 3. Check crown, grade, and smoothness after breakdown rolling.
 4. Repair displaced areas by loosening at once with lutes or rakes and filling, if required, with hot loose material before continuing rolling.
- H. Second Rolling:
 1. Follow breakdown rolling as soon as possible, while mixture is hot and in condition for compaction.
 2. Continue second rolling until mixture has been thoroughly compacted.
- I. Finish Rolling:
 1. Perform finish rolling while mixture is still warm enough for removal of roller marks.
 2. Continue rolling until roller marks are eliminated and course has attained specified density.
- J. Patching:
 1. Remove and replace defective areas.
 2. Cut-out and fill with fresh, hot asphalt concrete.
 3. Compact by rolling to specified surface density and smoothness.
 4. Remove deficient areas for full depth of course.
 5. Cut sides perpendicular and parallel to direction of traffic with edges vertical.
 6. Apply tack coat to exposed surfaces before placing new asphalt concrete mixture.

3.07 MARKING ASPHALT CONCRETE PAVEMENT

A. Cleaning:

1. Sweep surface with power broom supplemented by hand brooms to remove loose material and dirt.
2. Do not begin marking asphalt concrete pavement until acceptable to the County.

B. Apply paint with mechanical equipment.

1. Provide uniform straight edges.
2. Not less than two separate coats in accordance with manufacturer's recommended rates.

3.08 CLEANING AND PROTECTION

A. Cleaning: After completion of paving operations, clean surfaces of excess or spilled asphalt materials to the satisfaction of the County.

B. Protection:

1. After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than 6 hours.
2. Provide barricades and warning devices as required to protect pavement.
3. Cover openings of structures in the area of paving until permanent coverings are placed (if applicable).

END OF SECTION

SECTION 02575 PAVEMENT REPAIR AND RESTORATION

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment, obtain County or State right-of-way permits and incidentals required and remove and replace pavements over trenches excavated for installation of water or sewer lines and appurtenances as shown on the Contract Drawings.

1.02 GENERAL

- A. The Contractor shall take before and after photographs.
- B. The Contractor shall repair in a manner satisfactory to the County or State, all damage done to existing structures, pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipe lines, conduits, drains, catch basin, flagstones, or stabilized areas or driveways and including all obstructions not specifically named herein, which results from this Project.
- C. The Contractor shall keep the surface of the backfilled area of excavation in a safe traffic bearing condition and firm and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. The repair shall conform to applicable requirements of Manatee County Transportation Department requirements for pavement repair and as described herein, including all base, subbase and asphalt replacement.
- D. All materials and workmanship shall meet or exceed the County requirements and as called for in the Contract Documents and nothing herein shall be construed as to relieve the Contractor from this responsibility.
- E. All street, road and highway repair shall be made in accordance with the FDOT and County details indicated on the Drawings and in accordance with the applicable requirements and approval of affected County and State agencies.

PART 2 PRODUCTS

2.01 PAVEMENT SECTION

- A. Asphaltic concrete shall consist of asphalt cement, coarse aggregate, fine aggregate and mineral filler conforming to FDOT Type S-III Asphalt. Pavement replacement thickness shall match that removed but in no case shall be less than 1-1/2" compacted thickness. All asphalt concrete pavement shall be furnished, installed and tested in accordance with FDOT Specifications for Road and Bridge Construction.
- B. Asphalt or crushed concrete or approved equal base material shall be furnished and installed under all pavement sections restored under this Contract. Asphalt base shall have a minimum 6" compacted thickness, meet requirements for FDOT ABC III (Minimum Marshall Stability of 1000) and be furnished, installed and tested in accordance with the requirements of the FDOT Standards. Crushed concrete base shall be 10" minimum compacted thickness. Crushed concrete aggregate material shall have a minimum LBR of

140 compacted to 98% T-180 AASHTO density. Asphalt base and crushed concrete base are acceptable. Other bases shall be submitted for approval.

- C. Prime and tack will be required and applied in accordance with Section 300 - FDOT Specifications: Prime and Tack Coat for Base Courses.

PART 3 EXECUTION

3.01 CUTTING PAVEMENT

- A. The Contractor shall saw cut in straight lines and remove pavement as necessary to install the new pipelines and appurtenances and for making connections to existing pipelines.
- B. Prior to pavement removal, the Contractor shall mark the pavement for cuts nearly paralleling pipe lines and existing street lines. Asphalt pavement shall be cut along the markings with a rotary saw or other suitable tool. Concrete pavement shall be scored to a depth of approximately two (2) inches below the surface of the concrete along the marked cuts. Scoring shall be done by use of a rotary saw, after which the pavement may be broken below the scoring with a jackhammer or other suitable equipment.
- C. The Contractor shall not machine pull the pavement until it is completely broken and separated along the marked cuts.
- D. The pavement adjacent to pipe line trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, the Contractor shall remove and replace the pavement. In addition, the base and sub-base shall be restored in accordance with these Specifications, Florida Dept. of Transportation Standard Specifications and as directed by the County.

3.02 PAVEMENT REPAIR AND REPLACEMENT

- A. The Contractor shall repair, to meet or exceed original surface material, all existing concrete or asphaltic pavement, driveways, or sidewalks cut or damaged by construction under this Contract. He shall match the original grade unless otherwise specified or shown on the Drawings. Materials and construction procedures for base course and pavement repair shall conform to those of the Florida Dept. of Transportation.
- B. The Contractor's repair shall include the preparation of the subbase and base, place and maintain the roadway surface, any special requirements whether specifically called for or implied and all work necessary for a satisfactory completion of this work. Stabilized roads and drives shall be finished to match the existing grade. Dirt roads and drives shall have the required depth of backfill material as shown on the Contract Drawings.
- C. The asphaltic concrete repairs shall be in accordance with the Manatee County Public Works Standards, Part I Utilities Standards Manual, Detail UG-12. The asphaltic concrete repairs shall extend the full width and length of the excavation or to the limits of any damaged section. The edge of the pavement to be left in place shall be cut to a true edge with a saw or other approved method so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities. The existing asphalt beyond the excavation or damaged section shall be milled 25' back from the saw cut. Final overlay shall match existing with no discernable "bump" at joint.

3.03 MISCELLANEOUS RESTORATION

Sidewalks or driveways cut or damaged by construction shall be restored in full sections or blocks to a minimum thickness of four inches. Concrete curb or curb and gutter shall be restored to the existing height and cross section in full sections or lengths between joints. RCP pipe shall be repaired or installed in accordance with manufacturer's specifications. Grassed yards, shoulders and parkways shall be restored to match the existing sections with grass sod of a type matching the existing grass.

3.04 SPECIAL REQUIREMENTS

The restoration of all surfaces, as described herein, disturbed by the installation of pipelines shall be completed as soon as is reasonable and practical. The complete and final restoration of both paved and shell stabilized roads within a reasonable time frame is of paramount importance. To this end, the Contractor shall, as part of his work schedule, complete the restoration of any area of road within five weeks after removing the original surface. Successful leak testing shall be performed prior to restoring any area of road. All restoration and replacement or repairs are the responsibility of the Contractor.

3.05 CLEANUP

After all repair and restoration or paving has been completed, all excess asphalt, dirt and other debris shall be removed from the roadways. All existing storm sewers and inlets shall be checked and cleaned of any construction debris.

3.06 MAINTENANCE OR REPAIR

All wearing surfaces shall be maintained by the Contractor in good order suitable for traffic prior to completion and acceptance of the work.

END OF SECTION

SECTION 02615 DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install ductile iron pipe and restrained joint ductile iron pipe and cast iron or ductile iron restrained joint fittings, complete, as shown on the Drawings and specified in these Standards.
- B. Fittings are noted on the drawings for the Contractor's convenience and do not relieve him from laying and jointing different or additional items where required.
- C. The Contractor shall furnish all labor, materials, equipment and incidentals required to install push-on joint or restrained joint ductile iron pipe, complete as shown on the Drawings and Specifications.
- D. Newly installed pipe shall be kept clean and free of all foreign matter.
- E. All ductile iron pipe and fittings installed underground shall be encased in polyethylene sleeve wrapped unless noted otherwise on the plans.

1.02 SUBMITTALS

- A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all ductile iron pipe and fittings.
- B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ductile iron pipe shall conform to ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. Thickness of pipe shall be Class 50 or pressure Class 350. All pipe not buried shall be Class 53. All ductile iron pipe shall be clearly marked on the outside of the barrel to readily identify it from cast iron.
- B. Unrestrained joint pipe shall be supplied in lengths not to exceed 21 feet. Unless otherwise called for in the Contract Documents, unrestrained joint pipe shall be either the rubber-ring type push-on joint or standard mechanical joint pipe as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, or approved equal.
- C. All mechanical joint fittings shall be pressure rated for 350 psi and meet the requirement of AWWA C110 or AWWA C153 except flanged fittings shall be rated for 250 psi. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be EPDM (Ethylene-Propylene Diene Monomer) rubber for potable water and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic

solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used where both classes of contaminants are found.

- D. Water Main and Reclaimed Water Main Coatings: All ductile iron pipe used in water and reclaimed water systems shall have a standard thickness cement lining on the inside in accordance with AWWA C104 and a standard 1-mil asphaltic exterior coating per AWWA C151. All ductile iron or gray iron fittings used in water and reclaimed water systems shall have standard thickness cement linings on the inside per AWWA C104 and an asphaltic exterior coating or they shall have factory-applied fusion bonded epoxy coatings both inside and outside in accordance with AWWA C550.
- E. Wastewater Main Coatings: All ductile iron pipe and fittings used in wastewater sewer systems shall have a factory applied dry film thickness 40-mil Protecto 401 or 40-mil Novocoat SP2000W amine cured novalac ceramic epoxy lining on the inside. The interior lining application is to be based on the manufacturer's recommendation for long-term exposure to raw sewage. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of lined pipe has passed holiday testing at the time of production per ASTM G62. The lining shall have a minimum ten year warranty covering failure of the lining and bond failure between liner and pipe. Exterior coatings for ductile iron pipe and fittings used in wastewater systems shall be either an asphaltic coating per AWWA C151 or a factory-applied epoxy coating per AWWA C550.
- F. Restrained joints shall be provided at all horizontal and vertical bends and fittings, at casings under roads and railroads and at other locations shown on the Contract Drawings. Restrained joint pipe fittings shall be designed and rated for the following pressures: 350 psi for pipe sizes up to and including 24" diameter; 250 psi for pipe sizes 30" diameter and above.
- G. Polyethylene Sleeve: Sleeves shall conform to the requirements of AWWA C105, either tubular 8-mil thick linear low-density film or 4-mil thick high-density cross-laminated film.

2.02 IDENTIFICATION

- A. Each length of pipe and each fitting shall be marked with the name of the manufacturer, size and class and shall be clearly identified as ductile iron pipe. All gaskets shall be marked with the name of the manufacturer, size and proper insertion direction.
- B. Pipe shall be polyethylene-wrapped blue for water mains, purple (Pantone 522 C) for reclaimed water mains and green for sewer mains, per AWWA C105. Pipe need not be entirely polyethylene wrapped if soil testing, which is performed by the Engineer of Record or the Contractor in accordance with AWWA C105, indicates that the soil at the site is not corrosive. If soil testing indicates that the soil at the site is not corrosive, pipe may be spiral wrapped with color coded polyethylene at a six-inch minimum spacing, or the ductile iron pipe (DIP) may be painted with a minimum 1-inch wide color coded stripe on the top and both sides of the DIP.
- C. All above ground potable water mains and appurtenances shall be painted safety blue.

END OF SECTION

SECTION 02616 DISINFECTING POTABLE WATER PIPE LINES

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to clean and disinfect potable water pipe lines. This work is required to place all types of pipe into service as potable water lines.

1.02 CLEANING WATER MAINS

At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipes to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period per Section 02618.

1.03 DISINFECTING POTABLE WATER PIPE LINES

- A. All record drawing requirements must be submitted to the County prior to starting the bacteriological testing of the water lines.
- B. Prior to being placed in service, all potable water pipe lines shall be chlorinated in accordance with AWWA 651, "Standard Procedure for Disinfecting Water Main". The procedure shall meet Health Department requirements. The location of the chlorination and sampling points shall be determined by the County. Taps for chlorination and sampling shall be uncovered and backfilled by the Contractor as required.
- C. The general procedure for chlorination shall be to flush all dirty or discolored water from the lines, then introduce chlorine in approved dosages through a tap at one end while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipe line for 24 hours.

Water for flushing, filling and disinfecting the new lines must be obtained without contaminating existing pipe lines. Water obtained from existing pipe lines for this purpose shall pass through an approved air gap or backflow prevention device.

- D. Following the chlorination period, all treated water shall be flushed from the lines at their extremities and replaced with water from the distribution system. Bacteriological sampling and analysis of the replacement water shall then be made by an approved laboratory or the Health Department in full accordance with the AWWA Manual C651. The line shall not be placed in service until the requirements of the State and County Public Health Department are met. Results of the bacteriological tests together with certified record drawings must be submitted to the Health Department (FDEP) within 30 days of the tests.
- E. Special disinfecting procedures when approved by the County, may be used where the method outlined above is not practical.

END OF SECTION

SECTION 02617 INSTALLATION AND TESTING OF PRESSURE PIPE

PART 1 GENERAL

1.01 INSTALLING PIPE AND FITTINGS

- A. The Contractor shall install all pipe in accordance with the recommendations of the pipe manufacturer and as specified herein.
- B. The Contractor shall take care in handling, storage and installation of pipe and fittings to prevent injury to the pipe or coatings. All pipe and fittings shall be examined before installation and pipe which is deemed to be defective by the County shall not be installed.
- C. The Contractor shall thoroughly clean and keep thoroughly clean, all pipe and fittings prior to during and after installation.
- D. The Contractor shall lay the pipe to the lines and grades shown on the Contract Drawings with bedding and backfill as shown on the Drawings or called out in the Contract Documents. Blocking under the pipe shall not be permitted except through casing sleeves.
- E. The Contractor shall keep the open ends of all pipe closed with a tightly fitting plug when installation is not in progress or the potential exists for dirt or debris to enter the pipe.
- F. The pipe or accessories shall not be dropped into the trench under any circumstances.
- G. The Contractor shall construct all water mains pursuant to the provisions of "Recommended Standards for Water Works", Part 8, incorporated by reference in Rule 17-555.330(3), F.A.C.
- H. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of pipe for potable water mains, reclaimed water mains and sanitary force mains at intervals no greater than 200 feet apart and at locations where there is a substantial grade change. The pipe markers shall indicate the pipe diameter and shall be labeled PWM in "safety" blue, RWM in purple, and FM in green, for potable water mains, reclaimed water mains and sanitary force mains, respectively. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of all pipe fittings (other than sanitary sewer service wyes, potable water saddles and reclaimed water saddles). The markers for fittings shall indicate the type of fitting and shall be labeled PWF in "safety" blue, RWF in purple, and FMF in green, for potable water fittings, reclaimed water fittings, and sanitary force main fittings, respectively. The Contractor is responsible for making the aforementioned markers available to the Surveyor. The Contractor shall field locate the mains and fittings when markers are not made available to the Surveyor.
- I. A PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor at the beginning and end of each horizontal directional drill (HDD). The HDD Contractor shall provide a certified report and bore log indicating the horizontal and vertical location every 25 linear feet or less along the pipe.
- J. A 2" PVC pipe marker with a painted end cap shall be inserted by the Contractor at the ROW line indicating each individual new service location or stub out. The marker shall be a 6 foot length of PVC pipe inserted 2 feet into the ground and shall be painted "safety" blue for potable water, purple for reclaimed water, and green for sewer.

1.02 PROCEDURE FOR TESTING WATER LINES, FORCE MAINS AND RECLAIMED WATER LINES

- A. A 48-hour notice is needed prior to testing. A letter stating the reasons testing should be scheduled ahead of other jobs must accompany all emergency testing requests.
- B. County and Contractor must be present for all testing, except for testing tapping valves and sleeves.
- C. All pressure pipe lines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipe lines shall be subjected to a hydrostatic pressure test for two (2) hours at full working pressure, but not less than 180 psi for water/reclaimed (150 psi for force main). Maximum length of pipe to be tested at one time is 2,600 feet. If line is longer than 2,600 feet and cannot be sectioned in 2,600 feet (max.) lengths, the allowable leakage will be figured at 2,600 feet.
- D. Allowable leakage shall be determined by AWWA C600 table for hydrostatic tests. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof; to maintain the test pressure after the air in the pipe line has been expelled and the pipe has been filled with water.
- E. All digging on the job site in the right-of-way must be completed before any testing of water or sewer. Any digging or boring across water or sewer lines after they have been tested may result in a retest of the lines at the County's request.
- F. If any revisions or changes are made after initial testing, lines will be re-tested at the County's request.
- G. Disconnect water supply during test.
- H. All force mains will be tested from the valves in the valve vault at the lift station to the point of connection whether it be against a valve on another force main or into a manhole.
- I. All services to be aboveground during test. The services should be the correct length so they will be one (1) foot inside right-of-way line.
- J. All fire hydrant gate valves to be open during test.
- K. All visible leaks are to be repaired, regardless of the amount of leakage.
- L. Check gauge pressure periodically during test. If test pressure drops to 175 psi for water/reclaimed lines or to 145 psi for force mains during test, the line must be repumped back to 180 psi for water/reclaimed (150 psi force mains) and the amount of leakage measured. The test will continue on with the remaining time left. At the end of the test, the line must be repumped again back to 180 psi (150 psi for force main) and the amount of leakage measured and added to any previous leakage determined earlier in the test.
- M. After the line passes the test, the pressure will be blown off from the opposite end of line from the gauge location. Fire hydrants, services and end-of-line blow offs will be opened to demonstrate they were on line during the test.
- N. At end of test, the test gauge must return to zero. The pressure gauge must read 0 psi to a maximum of 300 psi in 5 psi increments.

- O. The section of line being tested must be identified on the charge sheet. The length and size of pipe, the exact area being tested and the valves being tested against, must be identified. Use Station numbers if available.
- P. A punch list must be made at the end of all tests.
- Q. A copy of the charge sheet will be given to the County and the Contractor at the end of the test.

1.03 INSPECTION/TESTING PROCEDURE COVERING BORED PIPE LINES OR CASING AND CONDUITS INSTALLED ACROSS PREVIOUSLY TESTED AND/OR COUNTY ACCEPTED WATER AND SEWER PIPE WITHIN DEVELOPMENT PROJECTS UNDER ACTIVE CONSTRUCTION

- A. Prior to testing water and sewer lines, every effort will be made to install sleeves for underground utilities that will cross these water and sewer lines or services.
- B. Where it has not been possible to pre-install sleeves prior to testing and bores or conduits are required, it is the responsibility of the utility company and/or their Contractor performing the work to provide Manatee County Utility Operations Department or the Engineer of Record with accurate horizontal and vertical as-built information of the sleeves, bores and conduits installed by said utility company. This applies to all bores and conduits crossing water and sewer lines.
- C. Procedures to be followed for installation of conduits, pipe lines and bores that will cross, or be closer than 5'-0" horizontally and 18 inches vertically to, previously tested water and sewer lines that are still under the ownership of the developer/contractor.
 1. Notify the County and obtain the best as-built information available. Allow sufficient time for the County to field locate the existing pipe lines.
 2. Submit drawings of proposed location to the County and Manatee County Utility Operations Dept. Utility Locations Section for review.
 3. Obtain a County Right-of-Way Use Permit if the work area is within a dedicated area of right-of-way.
 4. Perform installation in the presence of a County representative. Call (941) 792-8811, ext. 5061 or ext. 5069 with at least two (2) working days notice.
 5. Submit two (2) copies of as-built information to the County to incorporate into the record drawings to be submitted to the County.
 6. Failure to follow steps 2) thru 5) will result in additional charges for retesting the previously tested water and sewer lines.
- D. Procedures to be followed for installation of conduits, pipe lines and bores crossing or closer than 5'-0" horizontally and 18 inches vertically to previously tested water and sewer lines that have been previously accepted by Manatee County:
 1. Obtain record drawing information from the County.
 2. If roadway has been dedicated to Manatee County, obtain Right-of-Way Use Permit and copy the Project Management Department Locations Section with proposed location drawing.
 3. Follow procedures in "Sunshine State One-Call", paying special attention to the requirements of Section VII.

- E. Should water or sewer lines be damaged during the bore pipe line or casing installation, the cost of any repairs and retesting will be paid for by the utility company that installed the bore. The actual clearance between a bored casing crossing a water or sewer pipe should not be less than 18 inches.

1.04 DETECTION

- A. Direct buried pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe and 12" below finished grade or 6" detectable tape between 12" and 24" below finished grade.
- B. Direct buried or horizontal directional drilled non-metallic pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

END OF SECTION

SECTION 02618 PIPELINE CLEANING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to clean all new lines 4" and larger, and existing pipelines as specified in this specification and as indicated on the Drawings.
- B. This work shall include the furnishing and installation of all pig launching and retrieval devices and the appropriate pigs for the cleaning procedure, and all necessary excavations, shutdowns, fittings and valves required.

1.02 RELATED WORK

- A. The contractor is responsible for all necessary supply water.
- B. The contractor is responsible for all necessary bypass pumping.
- C. The contractor is responsible for the proper disposal of any materials removed from the pipe lines as a result of the cleaning procedure.

1.03 SUBMITTALS

- A. The Contractor shall submit prior to construction, a cleaning plan, Shop Drawings, and layout diagram for approval to the County.
- B. The Contractor shall submit to the County a list of materials to be furnished, and the names of suppliers.

1.04 QUALIFICATIONS

- A. The Contractor performing this work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner.
- B. The Contractor shall also be capable of providing crews as needed to complete this work without undue delay.
- C. The County reserves the right to approve or disapprove the Contractor, based on the submitted qualifications.

PART 2 PRODUCTS

2.01 GENERAL

- A. The contractor shall be responsible for furnishing pigs in sufficient numbers and sizes, of appropriate densities, coatings and configurations to properly clean the piping systems.
- B. All pigs used for the cleaning of sewer or reclaimed water lines shall not be used in the cleaning of potable water lines.

2.02 MATERIALS

- A. The pig launching and retrieval equipment shall be of the latest design and construction and shall include the means to maintain constant monitoring of the in-line flows and pressures of the system being cleaned and the constant location of the cleaning pigs in the system. Launching and retrieval systems shall be fabricated, designed and manufactured according to ANSI standards and capable of withstanding working pressures of 150 psi. Launching and receiving devices shall be sized one diameter larger than the system to which it will be attached with a minimum length of 2.5 times the diameter.
- B. The contractor shall have available for immediate use an electronic pig detector for use in the system being cleaned to provide a means of tracking the passage of the pig in the system to locate areas of potential or suspected blockage and other disparities in the system.
- C. The pig shall be constructed of elastomer polyurethane with an open cell construction and a density equal to or suitable for use in the piping system being cleaned. Pig configuration shall consist of a parabolic nose with a concave base and coated with a resilient surface material that will maintain a peripheral seal and will effectively clean the piping system without over abrading the interior pipe wall. Pig characteristics shall include the ability to navigate through 90 degree bends, 180 degree turns, bi-directional fittings, full port valves, reduce its cross sectional area and return to its original design configuration and be propelled by hydraulic pressure.

PART 3 EXECUTION

3.01 PIPELINE CLEANING

- A. The cleaning of the pipe line shall be done by the controlled and pressurized passage of a polyurethane pig of varying dimensions, coatings and densities as determined by the County through the piping system.
- B. A series of pigs shall be entered into the system at a point as near to the beginning as is logistically and mechanically feasible.
- C. A launching assembly shall be used as the entrance point for the pig. This assembly shall allow for the following:
 - 1. The entering of pigs into the system by providing the means to induce flow from an external source, independent of the flows and pressures immediately available from the system, on the back of the pig to develop sufficient pressure to force the pig through the system.
 - 2. A means to control and regulate the flow.
 - 3. A means to monitor the flows and pressures.
 - 4. A means to connect and disconnect from the system without any disruption to the operation of the system.
- D. The pig shall be removed or discharged from the system at a point as near to the end as is logistically and mechanically feasible.
- E. The contractor shall be responsible for the retrieval of the pig at the discharge point. This may include setting a trap that will not disrupt normal flow and operations but will capture the pig and any debris. A retrieval assembly may also be used but said assembly shall be

able to connect and disconnect from the system without any disruption to the operation of the system.

- F. Alternative launching and retrieval methods shall be done with the prior approval of the County.
- G. Any pig that cannot progress through the piping system shall be located by the contractor and removed by excavation of the pipe in order to remove the blockage. All pipe repairs shall be the responsibility of the contractor and shall be performed with as little disruption to the system as possible.
- H. Any increase in pressure that cannot be accounted for, i.e. fittings or valves or additional cleaning runs, shall be investigated, per the Engineers' approval, by locating the pig at the beginning of the increased pressure and excavating to determine the cause of the pressure increase. All pipe repairs shall be the responsibility of the contractor and shall be performed with as little disruption to the system as possible.
- I. Final flushing of the cleansed lines shall be performed after the last successful run of the pig as determined by the County. The contractor shall be responsible for all applicable flushing and disinfection requirements for potable water lines.

3.02 ACCEPTANCE

- A. The contractor shall maintain and provide a report at the end of the cleaning procedure containing the following:
 - 1. The pressures in the pipe during the pigging procedure.
 - 2. Any inline problems encountered during the procedure including all excavations with detailed locations, reason for the excavation and any corrective measures taken to the pipeline.
 - 3. A record of the pigs used, their sizes, styles and other pertinent information regarding what materials were used during the cleaning.
 - 4. An analysis of the condition of the pipeline before and after the cleaning procedure.

END OF SECTION

SECTION 02619 HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to install all pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents by Horizontal Directional Drilling (HDD).

1.02 GENERAL

- A. All existing structures, water and sewer lines, storm drains, utilities, driveways, sidewalks, signs, mail boxes, fences, trees, landscaping, and any other improvement or facility in the construction area that the Contractor disturbs for his own construction purposes shall be replaced to original condition at no additional cost to the County.
- B. For "Navigable Waters of the U.S." reference 33 of the Code of Federal Regulations, Part 329.
- C. For "Waters of the U.S." reference 33 of the Code of Federal Regulations, Part 323.
- D. For "Waters of the State" reference Section 62-301 of the Florida Administrative Code.

1.03 TESTING

- A. In place soil compaction tests shall be performed by a qualified testing laboratory.
- B. Compaction tests shall be taken at every excavation, except in the road crossings or road shoulders; tests are to be taken according to current FDOT Standards.
- C. All pipe shall be tested in accordance with the appropriate material specifications.
- D. Reference Standards: American Society for Testing and Materials (ASTM), D1557, Moisture-Density Relations of Soils Using 10-lb. Rammer and 18-in. Drop.
- E. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, Method A or C.

1.04 QUALIFICATIONS

- A. Pipe Manufacture: All pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.
- B. Drilling Supervisor: The Contractor shall provide a competent boring specialist who shall remain on the project site during the entirety of the directional boring operation. This includes, but is not limited to, drilling fluid preparation, seaming, boring and pulling. The boring specialist shall have a minimum of five years of experience in supervising directional bores of similar nature, diameter, materials and lengths.
- C. Pipe Fusion: All boring and fusing equipment shall be certified for operation. The Contractor responsible for thermal butt fusing pipe and fittings shall have manufacturer certification for performing such work or a minimum of five years of experience performing this type of work.

If no certification is available, written documentation of the required work experience shall be submitted for approval.

- D. Drilling Fluid Specialist: The personnel responsible for supervising the supply, mixing, monitoring fluid quality, pumping and re-circulation system proposed for the drilling fluid shall have a written certification issued by the Drilling Fluid manufacturer for performing such work or a minimum of five years of experience performing this type of work. If no certification is available, written documentation of the required work experience for the proposed personnel shall be submitted for review and approval.

1.05 SUBMITTALS

- A. Detailed description including specifications and catalog cuts for:
1. Shop drawings and catalog data for all HDD equipment.
 2. The pipe manufacturer's maximum degree of radial bending allowed for the pipe when full and when empty and pullback force recommended setting.
 3. Steering and tracking devices including specific tracer wire.
 4. Drilling fluids; the drilling fluid submittal shall include the ratio of mixture to water, including any additives, based on the Contractor's field observations prior to construction, knowledge and experience with drilling in similar conditions, and any soil data provided in the Contract Documents, which shall be verified by the fluid specialist.
 5. Shop drawings for the breakaway swivel, including the method of setting the swivels' break point and set point to be used.
 6. Shop drawings for sizing of the mandrel for pull through testing
 7. Pipe assembly procedure, details of support devices, and staging area layout including methods to avoid interference with local streets, driveways, and sidewalks.
 8. Details of pipe fusion procedures and copies of the fusion technician qualification certification or documentation.
 9. Drilling fluid technician qualification certification or documentation
- B. If the Contractor proposes any changes to the pull-back distance or profile shown on the drawings, he may be required to submit a complete design for the proposed pipe including an analysis for pull-back forces, external loads including full hydrostatic pressure if empty, external forces due to borehole collapse, ovalization during pull-back, thermal stress while exposed to Sun-light, shortening after release of pull-back force, and tensile stress during pull-back.
- C. Bore Plan: For all contiguous piping installations over 300 feet in length or any installations for piping larger than 4" in diameter, the Contractor shall submit a Bore Plan that includes the following:
1. Contact information and experience for the drilling fluid specialist.
 2. The number of passes the bore will include to get the product pipe installed.
 3. The pilot bore and all reaming bore sizes including the final pullback with the product pipe.
 4. Drilling rod length in feet.
 5. The pilot bore, pre-ream bores (if any) and pullback production rate in minutes per (drilling) rod to maintain adequate mud flow.
 6. Details of the entry and exit pit locations along with entry and exit angles for the bore, drawn to scale, depicting the position of all required equipment, access points, existing facilities to remain in place, existing traffic lanes to be maintained in

- operation, office trailers and storage sites.
 - 7. The method of fusing or joining pipe of adjacent bores to ensure that the joint is on grade with the installed pipe.
- D. Furnish a Bore Path Report to the County within seven days of the completion of each bore path. Data collected by the County Representative does not relieve the Contractor from the responsibility of recording his own data. Include the following in the report:
 - 1. Location of project, project name and number
 - 2. Name of person collecting data, including title, position and company name
 - 3. Investigation site location (Contract plans station number or reference to a permanent structure within the project right-of-way)
 - 4. Driller's Log & identification of the detection method used
 - 5. Elevations and offset dimensions of installed pipe as referenced to the drawings
 - 6. Data log of pullback force during product pipe installation
 - 7. All failed bores. Include length of pipe left in place and explanation of failed installation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Incidental materials that may or may not be used to install the product depending on field requirements are not paid for separately and will be included in the cost of the installed product.
- B. Drilling Fluids shall use a mixture of bentonite clay or other approved stabilizing agent mixed with potable water with a pH of 8.5 to 10.0 to create the drilling fluid for lubrication and soil stabilization. Vary the fluid viscosity to best fit the soil conditions encountered. Contractor shall have appropriate additives for drilling fluid available for different soil conditions that may be encountered. Do not use any other chemicals or polymer surfactants in the drilling fluid without written consent from the County. Certify to the County in writing that any chemicals to be added are environmentally safe and not harmful or corrosive to the product pipe.
- C. For drilling operations that will be below waters of the State of Florida, only bentonite free drilling fluids shall be used. Acceptable products are BioMax, manufactured by M-I Swaco, Inc., P.O. Box 2216, Laurel, Mississippi 39440, Phone: (800) 731-7331 or Bio-Bore, manufactured by Baroid Drilling Fluids, Inc., P.O. Box 1675, Houston, Texas 77251, Phone: (731) 987-5900 or approved equal.
- D. Identify the source of water for mixing the drilling fluid. Approvals and permits are required for obtaining water from such sources as streams, rivers, ponds or fire hydrants. Any water source used other than potable water may require a pH test.
- E. The tracer wire to be used for all directional drills shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.
- F. Breakaway connectors shall be supplied by DCD Design & Manufacturing, Condux International, Inc. or approved equal.

PART 3 EXECUTION

3.01 SITE CONDITIONS

- A. Carry out excavation for entry, exit, recovery pits, slurry sump pits, or any other excavation as specified in the Contract documents. Sump pits are required to contain drilling fluids if vacuum devices are not operated throughout the drilling operation, unless approved by the County.
- B. Within 48 hours of completing installation of the boring product, clean the work site of all excess slurry or spoils. Take responsibility for the removal and final disposition of excess slurry or spoils. Ensure that the work site is restored to pre-construction conditions or as identified on the plans.
- C. Exposure of product pipe to sunlight shall be limited to 14 consecutive days unless approved by the County.
- D. The pipe shall be supported at intervals along its length with rollers or Teflon pads to minimize frictional forces when being pulled, and to hold the pipe above the ground. Surface cuts or scratches greater than or equal to the maximum defect depth in 3.08 E are not acceptable.

3.02 DAMAGE RESTORATION & REMEDIATION

- A. The Contractor shall take responsibility for restoration for any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid (frac-out), or the directional drilling operation, at no cost to the County.
- B. When required by the County, provide detailed plans which show how damage to any roadway facility will be remedied. These details will become part of the Record Drawings Package. Remediation Plans must follow the same guidelines for development and presentation of the Record Drawings. When remediation plans are required, they must be approved by the County before any work proceeds.
- C. For HDD operations that will be below waters of the State of Florida, the contractor shall be responsible for any damage caused by the drilling operation, including, but not limited to, fracturing of the channel bottom. Any State or Federal required environmental cleanup due to the release of drilling fluids into State waters shall be at the Contractor's expense. The Contractor may at his own expense increase the depth of his drilling operations upon the approval from the County.

3.03 QUALIFICATIONS FOR REJECTION OF DIRECTIONAL BORE

- A. The County may reject any portion of the work that is deemed to be non-responsive to the Contract requirements or not in conformance with approved plans and submittals, and for other factors including the following:
 - 1. Failed Bore: When there is any indication that the installed product has sustained damage, stop all work, notify the County and investigate damage. The County may require a pressure and / or mandrel test at no additional cost to the County and shall have a County representative present during the test. Perform all testing within 24 hours unless otherwise approved by the County. Furnish a copy of the test results and all bore logs to the County for review and approval. The County is allowed up to

5 working days to approve or determine if the product installation is not in compliance with the specifications.

2. Obstructions: If an obstruction is encountered during boring which prevents completion of the installation in accordance with the design location and specification, the pipe may be taken out of service and left in place at the discretion of the County.
3. Pull-back Failure: If the installed breakaway device should fail during pull back.
4. Loss of Drilling Fluids: If the drilling fluid is "lost" during the pull back of the product and cannot be regained within the required timeframe of the manufacturer or if more than a reasonable amount of fluid is used to fill an unknown void and flow cannot be regained. No pipe shall be pulled without visible flow of drilling fluid.
5. Test Failure: If the pipe shall fail a hydraulic pressure test or mandrel test as specified by the County.
6. Damaged Pipe: If at any time when the product is pulled back and any exposed areas have a greater than allowable "gouging" or visible marring of the pipe per the table in 3.08 E.
7. Alignment Tolerance Exceeded: If the vertical and horizontal limits are not within tolerances.
8. Defective Material: Any other defect in material or workmanship which would affect the quality, performance, or installation life of the installed pipeline.

- B. Remediation: All rejected bores shall be at the Contractors expense to correct and provide a satisfactory installed product. The Contractor shall submit to the County a revised installation plan and procedure for approval before resuming work. The County may require non-compliant installations to be filled with excavatable flowable fill or to be completely removed at no additional cost to the County.

3.04 PRODUCT LOCATING AND TRACKING

- A. The County recognizes walkover, wire line, and wire line with surface grid verification, or any other system as approved by the County, as the accepted methods of tracking directional bores. Use a locating and tracking system capable of ensuring that the proposed installation is installed as intended. The locating and tracking system must provide information on:
1. Clock and pitch information
 2. Depth
 3. Transmitter temperature
 4. Battery status
 5. Position (x,y)
 6. Azimuth, where direct overhead readings (walkover) are not possible (i.e. sub aqueous)
- B. Ensure proper calibration of all equipment before commencing directional drilling operation.
- C. Prepare the Driller's Log. Take and record alignment readings or plot points such that elevations on top of and offset dimensions from the center of the product to a permanent fixed feature are provided. Such permanent fixed feature must have prior approval of the County. Provide elevations and dimensions at all bore alignment corrections (vertical and horizontal) with a minimum distance between points of 10 feet. Provide a sufficient number of elevations and offset distances to accurately plot the vertical and horizontal alignment of the installed product.

D. Installation Location Tolerances: The location of the initial bored hole shall be deemed acceptable by the County if the deviations of the bore from the design alignment or approved adjustments do not exceed the following tolerances:

1. Profile:
 - a. 2.0 feet within a length of 100 feet
 - b. No reverse curvature within 200 feet
 - c. Total deviation not to exceed 5 feet
2. Alignment:
 - a. 3.0 feet within a length of 200 feet
 - b. No reverse curvature
 - c. Total deviation not to exceed 7.0 feet

3.05 PRODUCT BORE HOLE DIAMETER

Minimize potential damage from soil displacement/settlement by limiting the ratio of the bore hole to the product size. The size of the back reamer bit or pilot bit, if no back reaming is required, will be limited relative to the product diameter to be installed as follows:

Maximum Pilot or Back-Reamer Bit Diameter When Rotated 360 Degrees	
Nominal Inside Pipe Diameter Inches	Bit Diameter Inches
2	4
3	6
4	8
6	10
8	12
10	16
12 and greater	Maximum Product OD plus 6

3.06 EQUIPMENT REQUIREMENTS

- A. The HDD equipment selected by the Contractor shall be capable of drilling, steering, tracking, reaming and installing the pipeline through all the subsurface conditions that may be present at the site.
- B. Match equipment to the size of pipe being installed. Obtain the County’s approval for installations differing from the above chart. Ensure that the drill rod can meet the bend radius required for the proposed installation.
- C. All HDD equipment shall have an electronic data logger to record pull back force during all pipe installations.
- D. All HDD equipment that has the capability to exceed the maximum recommended pulling force shall have a breakaway swivel properly attached to the product pipe that will release if the pullback force exceeds the pipe manufacturers recommended pulling force.

3.07 THRUST / PULLBACK REQUIREMENTS

The Contractor shall provide as part of the required working drawings submittal complete data regarding the operational and maximum thrust or pulling forces to be used for the initial drill head and back-reamer installations, and the final pull-back of the pipe. Gages or other

measurement tools shall be used to monitor the forces being used.

3.08 INSTALLATION PROCESS

- A. Ensure adequate removal of soil cuttings and stability of the bore hole by monitoring the drilling fluids such as the pumping rate, pressures, viscosity and density during the pilot bore, back reaming and pipe installation. Relief holes can be used as necessary to relieve excess pressure down hole. Obtain the County's approval of the location and all conditions necessary to construct relief holes to ensure the proper disposition of drilling fluids is maintained and unnecessary inconvenience is minimized to other facility users.
- B. The Contractor shall determine the pull-back rate in order to allow the removal of soil cuttings without building excess down-hole pressure and to avoid local heaving, or spills. Contain excess drilling fluids at entry and exit points until they are recycled and separated from excavated materials, or removed from the site or vacuumed during drilling operations. Ensure that entry and exit pits and storage tanks are of sufficient size to contain the expected return of drilling fluids and soil cuttings. The bored hole shall always be maintained full of drilling fluids for support of surfaces, and the fluid re-circulation equipment shall operate continuously until the pipe installation is completed and accepted by the County.
- C. Ensure that all drilling fluids are disposed of or recycled in a manner acceptable to the appropriate local, state, or federal regulatory agencies. When drilling in suspected contaminated ground, test the drilling fluid for contamination and appropriately dispose of it. Remove any excess material upon completion of the bore. If in the drilling process it becomes evident that the soil is contaminated, contact the County immediately. Do not continue drilling without the County's approval.
- D. The timing of all boring processes is critical. Install a product into a bore hole within the same day that the pre-bore is completed to ensure necessary support exists. Once pullback operations have commenced, the operation shall continue without interruption until the pipe is completely pulled into the borehole.
- E. All prepared pipe that is being used for installation shall be adequately supported off the ground along the entire length to avoid damaging of the material during pullback due to ground surface conditions. Surface cuts or scratches greater than or equal to the maximum defect depth are not acceptable.

Pipe Size	Max. Defect Depth
In.	In.
4	1/16
6	1/11
8	5/32
10	3/16
12	1/4
> 12	Per Pipe Manufacturer's Recommendations

- F. The drilling fluid specialist shall remain on the project site during the entirety of the directional boring operation to ensure proper mixture and production of drilling fluids needed for the bore.
- G. Upon successful completion of the pilot hole, the borehole shall be reamed to a minimum of 25 percent greater than the outside diameter of the pipe being installed.

- H. For bores with more than two radii of curvature (entrance and exit), the borehole should be reamed up to 50 percent larger than the outside diameter of the carrier pipe. Prereaming may be necessary dependent on size of material to be pulled.
- I. Additional passes for prereaming may be required for larger pipe. Incremental increases shall be used as needed until appropriate bore hole size has been achieved.
- J. Prereaming must be accomplished with no product attached to the reamer head on all bore pipe 6" and larger. The bore product maybe pulled back on final pass of prereaming upon prior approval from the County.
- K. After reaming the borehole to the required diameter, the pipe shall be pulled through the hole. In front of the pipe shall be a breakaway swivel and barrel reamer to compact the borehole walls.
- L. The Contractor shall not attempt to ream at a rate greater than the drilling equipment and drilling fluid system are designed to safely handle.
- M. Install all piping such that their location can be readily determined by electronic designation (tracer wire) after installation.
 - 1. For non-conductive installations, externally attach two (2) tracer wires; see Section 2.01 - Materials, Part I. above, to the top of product pipe and secure in place with duct tape or 10-mil thickness polyethylene pressure sensitive tape at every joint and at 5 foot intervals.
- N. Connect any break in the conductor line before construction with an electrical clamp, or solder, and coat the connection with a rubber or plastic insulator to maintain the integrity of the connection from corrosion. Clamp connections must be made of brass or copper and of the butt end type with wires secured by compression. Soldered connections must be made by tight spiral winding of each wire around the other with a finished length minimum of 3 inches overlap. Tracking conductors must extend 2 feet beyond bore termini. Test conductors for continuity. Each conductor that passes must be identified as such by removing the last 6 inches of the sheath. No deductions are allowed for failed tracking conductors. Upon completion of the directional bore, the Contractor shall demonstrate to the County that the wire is continuous and unbroken through the entire run of the pipe by providing full signal conductivity (including splices) when energizing for the entire run in the presence of the County Representative. If the wire is broken, the Contractor shall repair or replace it at no additional cost to the County.

3.09 PIPELINE TESTING

A. HYDROSTATIC TESTING

- 1. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7.

B. MANDREL DEFLECTION TESTING PROCESS

- 1. The deflection test for flexible pipe systems shall be performed by pulling a mandrel through the pipe line. The mandrel shall have a diameter equal to 80 percent of the inside diameter of the pipe system being tested. When the mandrel cannot be pulled through the pipe line the Contractor shall locate and correct the defect to the

satisfaction of the County. After the defect is corrected and trench backfilled, the section of line shall then be retested to compliance.

2. Deflection tests shall be performed not sooner than 30 days after completion of placement and densification of backfill. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.
 3. The mandrel types that can be used are:
 - a. a rigid, nonadjustable, odd number of legs (9 legs minimum), mandrel having an effective length not less than its nominal diameter; and (2) be fabricated of steel, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size and be furnished in a suitable carrying case labeled with the same data as stamped or engraved on the mandrel.
 - b. If approved by the County, a smaller diameter piece of similar pipe material that is approximately 3 feet long and meets the 80% reduction of the inside diameter of the pipe being tested.
 4. The mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded or that "necking" has not occurred. Prior to use, the mandrel shall be inspected by County personnel. Use of an unapproved mandrel or a mandrel altered or modified after inspection will invalidate the test. If the mandrel fails to pass, the pipe will be deemed overdeflected or necked.
 5. Overdeflected or necked pipe shall be abandoned and reinstalled. The replaced pipe shall be tested for deflection not sooner than 30 days after installation.
- D. The following deficiencies in the flexible pipe system installation shall be corrected by the Contractor at no cost to the County:
1. Overdeflections
 2. Stretched or "Necked" Pipe
 3. Damaged Pipe
 4. Improper Pipe Welds
 5. Infiltration Points
 6. Debris in the line
- E. The County will not accept a credit, maintenance bond, or any other form of compensation in lieu of corrective measures that may be required to correct any sections of flexible pipe system that are improperly installed or do not meet the requirements of these specifications. In addition, all corrective measures proposed by the Contractor shall be approved by the County. In addition, should repairs of the flexible pipe system be accomplished by the use of any unauthorized materials or procedure, the County will require replacement of those substandard portions or repairs made to conform to the requirements of these specifications.

END OF SECTION

SECTION 02620 POLYETHYLENE (PE) PRESSURE PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install polyethylene pressure pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents and these Standards.
- B. Newly installed pipe shall be kept clean and free of all foreign matter & gouges.
- C. All pipe shall be correctly color coded / identified.

1.02 QUALIFICATIONS

All polyethylene pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

1.03 SUBMITTALS

- A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all polyethylene pipe and fittings.
- B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.
- C. The Contractor shall submit shop drawings showing installation method and the proposed method and specialized equipment to be used.

PART 2 PRODUCTS

2.01 POLYETHYLENE PRESSURE PIPE

- A. Polyethylene pipe 4" diameter and larger shall be high-density bimodal PE3408/PE 100/PE4710 polyethylene resin with a minimum cell classification of 445574 per ASTM D3350, Class 160, DR 11, Performance Pipe DriscoPlex 4000, or an approved equal, meeting the requirements of AWWA C906. All pipe materials used in potable water systems shall comply with NSF Standard 61. Outside diameters of water, reclaimed water and pressure sewer HDPE pipes shall be ductile-iron sizing system (DIPS).
- B. Polyethylene tubing 2 inches in diameter and smaller for potable water and reclaimed water shall be high density PE 3408 polyethylene resin per ASTM D2737, Pressure Class 200, Copper Tube Size (CTS), SDR 9, Performance Pipe DriscoPlex 5100, Endot EndoPure, Charter Plastics or an approved equal, meeting the requirements of AWWA C901. Butt fusion or CTS brass connections shall be used. All pipe materials used in potable water systems shall comply with NSF Standard 61.
- C. Polyethylene pipe 3 inches in diameter (for potable water and reclaimed water), and 3 inches in diameter and smaller (for wastewater force mains) shall be high-density PE 3408 polyethylene, per ASTM D2737, Pressure Class 160, iron pipe size (IPS) outside diameter,

DR 11, Performance Pipe DriscoPlex 4100 or an approved equal, meeting the requirements of ASTM D 3035 and AWWA C901.

2.02 JOINTS

- A. Where PE pipe is joined to PE pipe, it shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the written instructions of the pipe manufacturer and fusion equipment supplier. The installer of the thermal butt fused PE pipe shall have received training in heat fusion pipe joining methods and shall have had experience in performing this type of work.
- B. Where thermal butt fusion cannot be used, or when specifically called for on the plans, electro-fused couplings may be used. Fusion shall be in accordance with the written instructions of the fitting manufacturer.
- C. Flanged joints, mechanical joints, tapping saddles, and molded fittings shall be in accordance with AWWA C901, C906 or C909, ASTM D3350 and D3140, as applicable. Fusion and mechanical connections are allowed, chemical (solvents, epoxies, etc.) are not allowed.

2.03 DETECTION

- A. Direct buried HDPE pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe and 12" below finished grade or 6" detectable tape between 12" and 24" below finished grade.
- B. Direct buried or horizontal directional drilled HDPE pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal. Two tracer wires shall be installed with horizontal directional drilled HDPE pipe.

2.04 IDENTIFICATION

- A. Pipe shall bear identification markings in accordance with AWWA C906.
- B. Pipe shall be color coded blue for water, purple (Pantone 522 C) for reclaimed water or green for pressure sewer using a solid pipe color or embedded colored stripes. Where stripes are used, there shall be a minimum of three stripes equally spaced.

2.05 END SEALS FOR HDPE CASING

- A. End seals shall be a circumferential rib molded seal made of flexible synthetic 1/8" thick rubber sized to fit casing and carrier pipe. The end seals shall be secured with stainless steel banding straps with worm gear mechanisms to ensure a water tight seal. The end seals shall be PSI Standard Pull-on (Model S), Advances Products and Systems Model AM, or approve equal.

PART 3 EXECUTION

3.01 INSTALLING POLYETHYLENE PRESSURE PIPE AND FITTINGS

All polyethylene pressure pipe shall be installed by direct bury, directional bore, or a method

approved by the County prior to construction. If directional bore is used, or if directed by the County, the entire area of construction shall be surrounded by silt barriers during construction.

3.02 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak test per section 02617.

END OF SECTION

**SECTION 02622 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS
(AWWA SPECIFICATIONS C-900 & C-905)**

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to install the plastic piping, fittings and appurtenances complete and ready for use as specified in the Contract Documents and these Standards.

1.02 DESCRIPTION OF SYSTEM

The Contractor shall install the piping in the locations as shown on the Drawings.

1.03 QUALIFICATIONS

All plastic pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, qualified and specializes in the manufacture of the items to be furnished. The pipe and fittings shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.04 SUBMITTALS

- A. The Contractor shall submit shop drawings to the County including, but not limited to, dimensions and technical specifications for all piping.
- B. The Contractor shall submit to the County, samples of all materials specified herein.
- C. The Contractor shall submit and shall comply with pipe manufacturer's recommendation for handling, storing and installing pipe and fittings.
- D. The Contractor shall submit pipe manufacturer's certification of compliance with these Specifications.

1.05 TOOLS

The Contractor shall supply special tools, solvents, lubricants, and caulking compounds required for proper installation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pressure Class-Rated Polyvinyl Chloride (PVC) Pipe
 - 1. Pressure class-rated PVC pipe and accessories four to twelve inches (4"-12") in diameter, shall meet the requirements of AWWA Specification C-900 "Polyvinyl Chloride (PVC) Pressure Pipe". Pipe shall be Class 235, meeting requirements of Dimension Ratio (DR) 18 and shall have the dimension of ductile iron outside diameters. Each length of pipe shall be hydrostatically tested to four (4) times its class pressure by the manufacturer in accordance with AWWA C-900.

2. Fourteen inch (14") thru thirty-six (36") PVC pipe for sewer force mains shall meet AWWA C-905 requirements for dimension ratio (DR) 18. Each length of pipe shall be tested at twice the pressure rating (PR 235 psi) for a minimum dwell of five seconds in accordance with AWWA C-905.

PVC pipe shall not be used for potable and reclaim waterlines 16 inches and larger.

Pipe shall be listed by Underwriters Laboratories. Provisions shall be made for expansion and contraction at each joint with an elastomeric ring, and shall have an integral thickened bell as part of each joint. PVC Class pipe shall be installed as recommended by the manufacturer. Pipe shall be furnished in nominal lengths of approximately 20 feet, unless otherwise directed by the County. Pipe and accessories shall bear the NSF mark indicating pipe size, manufacturer's names, AWWA and/or ASTM Specification number, working pressure, and production code.

3. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be EPDM (Ethylene-Propylene Diene Monomer) rubber for potable water and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal.
4. PVC pipe 3" and less in diameter may be constructed using pipe conforming to ASTM D2241 with push-on joints. Pipe shall be 200 psi pipe-SDR 21 unless otherwise specified by the County. This PVC pipe shall not be used for working pressures greater than 125 psi.
5. Pipe shall be blue for potable water mains, green for sewage force mains and purple for reclaimed water mains. All potable water pipe shall be NSF certified and copies of lab certification shall be submitted to the County.
6. Where colored pipe is unavailable, white PVC color coded spiral wrapped pipe shall be installed.

B. Joints

1. The PVC joints for pipe shall be of the push-on type unless otherwise directed by the County so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment. The push-on joint shall be a single resilient gasket joint designed to be assembled by the positioning of a continuous, molded resilient ring gasket in an annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and annular recess shall be designed and shaped so that the gasket is locked in place against displacement as the joint is assembled.

The resilient ring joint shall be designed for thermal expansion or contraction with a total temperature change of at least 75 degrees F in each joint per length of pipe. The bell shall consist of an integral wall section with a solid cross section elastomeric ring which shall meet requirements of ASTM F-477. The thickened bell section shall be designed to be at least as strong as the pipe wall. Lubricant furnished for lubricating joints shall be nontoxic, shall not support the growth of bacteria, shall have no deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water. Gaskets shall be suitable for use with potable water, reclaimed water or sanitary sewer as applicable.

2. Restrained joints shall be provided at all horizontal and vertical bends and fittings, at casings under roads and railroads and at other locations shown on the Contract Drawings. PVC joints for pipe shall be restrained by the following methods: thrust blocks, restraining glands such as Certa-Lok Restraining Joint Municipal Water Pipe by the Certain Teed Corporation of Valley Forge, PA, or approved equal. All Grip, Star Grip by Star Products, MJR by Tyler Pipe, Tyler, Texas. Restrained joint PVC pipe shall be installed in strict accordance with the manufacturer's recommendation.

C. Fittings

1. All fittings for class-rated PVC pipe shall be ductile iron with mechanical joints and shall conform to the specifications for ductile iron fittings, unless otherwise directed. Class 200, C-900 PVC fittings are allowable for sewage force main applications up to and including 12" diameter only. DR ratio shall be the same as the pipe.
2. The manufacturer of the pipe shall supply all polyvinyl chloride accessories as well as any adapters and/or specials required to perform the work as shown on the Drawings and specified herein. Standard double bell couplings will not be accepted where the pipe will slip completely through the coupling.

PART 3 EXECUTION

3.01 INSTALLATION

The Contractor shall install the plastic pipe in strict accordance with the manufacturer's technical data and printed instructions. Direct bury pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe 12" below finished grade or 6" detectable tape between 12" and 24" below grade.

3.02 INSPECTION AND TESTING

All pipe lines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipe lines shall be subjected to a hydrostatic pressure test for two (2) hours at full working pressure, but not less than 180 psi for water/reclaimed (150 psi for force main). All visible leaks shall be repaired and retested for approval by the County. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests.

END OF SECTION

SECTION 02640 VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.
- B. All valves and appurtenances shall be of the size shown on the Drawings and, to the extent possible, all equipment of the same type on the Project shall be from one manufacturer.
- C. All valves and appurtenances shall have the name of the manufacturer and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.
- D. All valves shall have a factory applied, fusion bonded epoxy coating on interior and exterior unless noted otherwise in the plans or this specification.
- E. All valves are to be holiday free and have current testing certification papers stating the valve passed holiday free testing.
- F. The equipment shall include, but not be limited to, the following:
 - 1. Gate valves (Sec. 2.01)
 - 2. Pressure Sustaining and Check Valves (Sec. 2.02)
 - 3. Ball Valves (Sec. 2.03)
 - 4. Butterfly Valves (Sec. 2.04)
 - 5. Plug Valves (Sec. 2.05)
 - 6. Valve Actuators (Sec. 2.06)
 - 7. Air Release Valves (Sec. 2.07)
 - 8. Valves Boxes (Sec. 2.08)
 - 9. Corporation Cocks (Sec. 2.09)
 - 10. Flange Adapter Couplings (Sec. 2.10)
 - 11. Flexible Couplings (Sec. 2.11)
 - 12. Hose Bibs (Sec. 2.12)
 - 13. Slow Closing Air and Vacuum Valves (Sec. 2.13)
 - 14. Surge Anticipator Valve (Sec. 2.14)
 - 15. Check Valves (Sec. 2.15)
 - 16. Hydrants (Sec. 2.16)
 - 17. Restrained Joints (Sec. 2.17)
 - 18. Tapping Sleeves and Tapping Valves (Sec. 2.18)
 - 19. Single Acting Altitude Valves (Sec. 2.19)

1.02 DESCRIPTION OF SYSTEMS

All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water, reclaim water, wastewater, etc., depending on the applications.

1.03 QUALIFICATIONS

All of the types of valves and appurtenances shall be products of well established reputable 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. Valves shall be as covered under mechanical devices in Section 8 of ANSI/NSF Standard 61.

1.04 SUBMITTALS

- A. Submit to the County within 30 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.
- B. Complete shop drawings of all valves and appurtenances shall be submitted to the County for approval in accordance with the Specifications.

1.05 TOOLS

Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

PART 2 PRODUCTS

2.01 GATE VALVES

- A. All buried valves shall have cast or ductile iron three (3) piece valve bodies.
- B. Where indicated on the drawings or necessary due to locations, size, or inaccessibility, chain wheel operators shall be furnished with the valves. Such operators shall be designed with adequate strength for the valves with which they are supplied and provide for easy operation of the valve. Chains for valve operators shall be galvanized.
- C. Where required, gate valves shall be provided with a box cast in a concrete slab and a box cover. Length of box shall include slab thickness. Box cover opening shall be for valve stem and nut. Valve wrenches and extension stems shall be provided by the manufacturer to actuate the valves. The floor box and cover shall be equal to those manufactured by Rodney Hunt Machine Company, Orange, Massachusetts, Clow, DeZurik or approved equal.
- D. Gate valves with 3"-20" diameters shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or C515 and UL/FM of 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.
- E. Wrench nut shall be provided for operating the valve.
- F. Gate valves meeting AWWA C509 requirements shall be rated for an operating pressure of 200 psi and shall be tested in accordance with AWWA C509. Valves meeting AWWA C515 requirements shall be rated for an operating pressure of 250 psi and shall be tested in accordance with AWWA C515.
- G. All bonnet bolts, nuts and studs shall be stainless steel.

2.02 PRESSURE SUSTAINING AND CHECK VALVE

- A. Pressure sustaining and check valve shall be pilot operated diaphragm actuated valve with cast iron body, bronze trim, and 125-pound flanged ends. The valve shall be hydraulically operated, diaphragm type globe valve. The main valve shall have a single removable seat and a resilient disc, of rectangular cross section, surrounded on three and a half sides. The stainless steel stem shall be fully guided at both ends by a bearing in the valve cover, and an integral bearing in the valve seat. It shall be sleeved at both ends with delrin. No external packing glands are permitted and there shall be no pistons operating the main valve or any controls. The valve shall be equipped with isolation cocks to service the pilot system while permitting flow if necessary. Main valve and all pilot controls shall be manufactured in the United States of America. Valve shall be single chamber type, with seat cut to 5 degrees taper.
- B. Valve shall maintain a minimum (adjustable) upstream pressure to a preset (adjustable) maximum. The pilot system shall consist of two direct acting, adjustable, spring loaded diaphragm valves.
- C. Valve shall be cast iron (ASTM A48) with main valve trim of brass (QQB-B-626) and bronze (ASTM B61). The pilot control valves shall be cast brass (ASTM B62) with 303 stainless steel trim. All ferrous surfaces inside and outside shall have a 2-part epoxy coating. Valve shall be similar in all respects to CLA-VAL Company, Model 692G-01ABKG, as manufactured by CLA-VAL Company, Winter Park, Florida, or similar pressure sustaining and check valve as manufactured by Golden Alderson; or approved equal.

2.03 BALL VALVES FOR PVC PIPE

- A. Ball valves for water and reclaimed water, in sizes 3/4-inch through 2-inch, shall be brass body, stem and ball per ASTM B 62, alloy 85-5-5-5, full port, full flow, 1/4-turn check, ball curb valves, rated for 300 psi, Mueller 300 (as specified in the table below), Ford B-Series, or approved equal, with compression, pack joint, flare, threaded or flanged ends as required. Ball valves for wastewater, 2-inch through 3-inch, shall be 316 stainless steel body, cap, stem and ball per ASTM A351, full port, full flow, 1/4-turn check, ball valves, steam rated for 150 psi, pressure rating 1,000 psi CWT, Apollo 76F or approved equal, with threaded or flanged ends as required.

Curb Stops for Water and Reclaimed Water

Pipe Material	Type of Connection	Model
HDPE	Compression x FIP	B-25170 *
HDPE	Pack Joint x FIP	P-25170 *
Copper	Compression x FIP	B-25170
Copper	Flare x FIP	B-25166
Stainless Steel	FIP x FIP Thread	B-20200
* Insert required, part number per manufacturer product information		

- B. All valves shall be mounted in such a position that valve position indicators are plainly visible. Above grade ball valves shall have a vinyl coated lever handle. Lever handle, handle nut, and lever packing gland shall be 304 or 316 stainless steel.
- C. Potable plastic service pipe material and compression and pack joint connectors shall not

be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.

2.04 BUTTERFLY VALVES

- A. Butterfly valves shall conform to the AWWA Standard Specifications for Rubber Seated Butterfly Valves, Designated C504, except as hereinafter specified. Valves shall be Class 250 and equal to those manufactured by Henry Pratt Company, DeZurik, Mueller, or approved equal. M&H/Kennedy/Clow are not generally approved equals. Ductile iron conforming to ASTM A536, Grade 65-45-12 shall be provided. All valves shall be leak tested at 200 psi.
- B. The face-to-face dimensions of flanged end valves shall be in accordance with Table 1 of above mentioned AWWA Specification for short-body valve. Adequate two-way thrust bearings shall be provided. Flange drilling shall be in accordance with ANSI B16.1.
- C. Valve seats shall be an EPDM elastomer. Valve seats 24 inches and larger shall be field adjustable and replaceable without dismounting operator disc or shaft and without removing the valve from the line. All retaining segments and adjusting devices shall be of corrosion resistant material with stainless Nylock screws and be capable of the 1/8-inch adjustment. Valves 20 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C 504. Where the EPDM seat is mounted on the valve body, the mating edge of the valve disc shall be 18-8 stainless steel or Nickel-Chrome, 80-20%. Where the EPDM seat is mounted on the valve disc, the valve body shall be fitted with an 18-8 stainless steel seat offset from the shaft, mechanically restrained and covering 360 degrees of the peripheral opening or seating surface.
- D. The valve body shall be constructed of ductile iron or close grain cast iron per ASTM A126, Class B with integrally cast hubs for shaft bearing housings of the through boss-type. Butterfly valves of the "wafer" or "spool" type will not be accepted.
- E. The valve shaft shall be turned, ground, and polished constructed of 18-8, ASTM A-276, Type 304 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. Shaft bearings shall be teflon or nylon, self-lubricated type.
- F. All valves shall be subject to hydrostatic and leakage tests at the point of manufacture. The hydrostatic test shall be performed with an internal hydrostatic pressure equal to 500 psi applied to the inside of the valve body of each valve for a period of five minutes. During the hydrostatic test, there shall be no leakage through the metal, the end joints or the valve shaft seal. The leakage test shall be performed at a differential pressure of 230 psi and against both sides of the valve. No adjustment of the valve disc shall be necessary after pressure test for normal operation of valve.
- G. In general, the butterfly valve operators shall conform to the requirements of Section 3.8 of the AWWA Standard Specifications for Rubber Seated Butterfly Valves, Designation C504, insofar as applicable, and as herein specified.
- H. Gearing for the operators shall be totally enclosed in a gear case in accordance with paragraph 3.8.3 of the above mentioned AWWA Standard Specification.

- I. Operators shall be capable of seating and unseating the disc against the full design pressure of velocity, as specified for each class, into a dry system downstream and shall transmit a minimum torque to the valve. Operators shall be rigidly attached to the valve body.
- J. The manufacturer shall certify that the required tests on the various materials and on the completed valves have been satisfactory and that the valves conform with all requirements of this Specification and the AWWA standard.
- K. Where indicated on the Drawings, extension stems, floor stands, couplings, stem guides, and floor boxes as required shall be furnished and installed.

2.05 PLUG VALVES

- A. All plug valves shall be eccentric plug valves capable of sustaining 150 psi in either direction without leaking.

Exception: Single direction plug valves may be used if it is clearly demonstrated they will never be required to resist pressure in both directions either in service or during pipe line testing.

- B. Plug valves shall be tested in accordance with current AWWA Standard C-504-80 Section 5. Each valve shall be performance tested in accordance with paragraph 5.2 and shall be given a leakage test and hydrostatic test as described in paragraphs 5.3 and 5.4. Plug valves shall be Kennedy or Dezurik.
- C. Plug valves shall be of the non-lubricated eccentric type with resilient faced plugs and shall be furnished with end connections as shown on the Plans. Flanged valves shall be faced and drilled to the ANSI 150 lb. standard. Mechanical joint ends shall be to the AWWA Standard C111-72. Bell ends shall be to the AWWA Standard C100-55 Class B. Screwed ends shall be to the NPT standard.
- D. Plug valve bodies shall be of ASTM A126 Class B ductile iron, 31,000 psi tensile strength minimum in compliance with AWWA Standard C507-73, Section 5.1 and AWWA Standard C504-70 Section 6.4.
- E. Plug valves shall have a minimum 100% circular cross sectional area and full port. All exposed nuts, bolts, springs, washers, etc. shall be 316 stainless steel. Resilient plug facings shall be of Hycar or Neoprene.
- F. Plug valves shall be furnished with permanently lubricated stainless steel or oil-impregnated bronze upper and lower plug stem bushings. These bearings shall comply with current AWWA Standards.

2.06 VALVE ACTUATORS

- A. General
 - 1. All valve actuators shall conform to Section 3.8 of the AWWA Standard Specification and shall be either manual or motor operated.
 - 2. Actuators shall be capable of seating and unseating the disc against the full design pressure and velocity, as specified for each class, into a dry system downstream, and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached

- to the valve body.
3. Butterfly valve actuators shall conform to the requirements of Section 3.8 of the AWWA Standard specifications for Rubber Seated Butterfly Valves, Designated C504, insofar as applicable and as herein specified.

B. Manual Actuators

1. Manual actuators shall have permanently lubricated, totally enclosed gearing with handwheel and gear ratio sized on the basis of actual line pressure and velocities. Actuators shall be equipped with handwheel, position indicator, and mechanical stop-limiting locking devices to prevent over travel of the disc in the open and closed positions. They shall turn counter-clockwise to open valves. Manual actuators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Actuators shall be fully enclosed and designed to produce the specified torque with a maximum pull of 80 pounds on the handwheel or chainwheel. Actuator components shall withstand an input of 450 foot pounds for 30" and smaller and 300 foot pounds for larger than 30" size valves at extreme actuator positions without damage. Valves located above grade shall have handwheel and position indicator, and valves located below grade shall be equipped with a two inch (2") square AWWA operating nut located at ground level and cast iron extension type valve box. Valve actuators shall conform to AWWA C504, latest revision.

C. Motor Actuators (Modulating)

1. The motor actuated valve controller shall include the motor, actuator unit gearing, limit switch gearing, limit switches, position transmitter which shall transmit a 4-20 mA DC signal, control power transformer, electronic controller which will position the valve based on a remote 4-20 milliamp signal, torque switches, bored and keywayed drive sleeve for non-rising stem valves, declutch lever and auxiliary handwheel as a self-contained unit.
2. The motor shall be specifically designed for valve actuator service using 480 volt, 60 Hertz, three phase power as shown, on the electrical drawings. The motor shall be sized to provide an output torque and shall be the totally enclosed, non-ventilated type. The power gearing shall consist of helical gears fabricated from heat treated alloy steel forming the first stage of reduction. The second reduction stage shall be a single stage worm gear. The worm shall be of alloy steel with carburized threads hardened and ground for high efficiency. The worm gear shall be of high tensile strength bronze with hobbled teeth. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout. Preference will be given to units having a minimum number of gears and moving parts. Spur gear reduction shall be provided as required.
3. Limit switches and gearing shall be an integral part of the valve control. The limit switch gearing shall be made of bronze and shall be grease lubricated, intermittent type and totally enclosed to prevent dirt and foreign matter from entering the gear train. Limit switches shall be of the adjustable type capable of being adjusted to trip at any point between fully opened valve and fully closed valve.
4. The speed of the actuator shall be the responsibility of the system supplier with regard to hydraulic requirements and response compatibility with other components within the control loop. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing. The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Gear limit switches must be geared to the driving mechanism and in step

at all times whether in motor or manual operation. Provision shall be made for two additional rotors as described above, each to have two normally open and two normally closed contacts. Each valve controller shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve, should excessive load be met by obstructions in either direction of travel. The torque switch shall be provided with double-pole contacts.

5. A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operations, but must be responsive to manual operation at all times except when being electrically operated. The motor shall not rotate during hand operation nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve operator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. This movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running. The gear limit switches and torque switches shall be housed in a single easily accessible compartment integral with the power compartment of the valve control. All wiring shall be accessible through this compartment. Stepping motor drives will not be acceptable.
6. The motor with its control module must be capable of continuously modulating over its entire range without interruption by heat protection devices. The system, including the operator and control module must be able to function, without override protection of any kind, down to zero dead zone.
7. All units shall have strip heaters in both the motor and limit switch compartments.
8. The actuator shall be equipped with open-stop-close push buttons, an auto-manual selector switch, and indicating lights, all mounted on the actuator or on a separate locally mounted power control station.
9. The electronics for the electric operator shall be protected against temporary submergence.
10. Actuators shall be Limitorque L120 with Modutronic Control System containing a position transmitter with a 4-20MA output signal or equal.

D. Motor Actuators (Open-Close)

1. The electronic motor-driven valve actuator shall include the motor, actuator gearing, limit switch gearing, limit switches, torque switches, fully machined drive sleeve, declutch lever, and auxiliary handwheel as a self-contained unit.
2. The motor shall be specifically designed for valve actuator service and shall be of high torque totally enclosed, nonventilated construction, with motor leads brought into the limit switch compartment without having external piping or conduit box.
 - (a) The motor shall be of sufficient size to open or close the valve against maximum differential pressure when voltage to motor terminals is 10% above or below nominal voltage.
 - (b) The motor shall be prelubricated and all bearings shall be of the anti-friction type.
3. The power gearing shall consist of helical gears fabricated from heat treated steel and worm gearing. The worm shall be carburized and hardened alloy steel with the threads ground after heat treating. The worm gear shall be of alloy bronze accurately cut with a hobbing machine. All power gearing shall be grease lubricated.

- Ball or roller bearings shall be used throughout.
4. Limit switches and gearing shall be an integral part of the valve actuator. The switches shall be of the adjustable rotor type capable of being adjusted to trip at any point between fully opened valve and fully closed valve. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing (influent valves require additional contacts to allow stopping at an intermediate position). The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Additional switches shall be provided if shown on the control and/or instrumentation diagrams. Limit switches shall be geared to the driving mechanism and in step at all times whether in motor or manual operation. Each valve actuator shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve should excessive load be met by obstructions in either direction of travel. Travel and thrusts shall be independent of wear in valve disc or seat rings.
 5. A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operation except when being electrically operated. The motor shall not rotate during hand operation, nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve actuator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. Movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running.
 6. Valve actuators shall be equipped with an integral reversing controller and three phase overload relays, Open-Stop-Close push buttons, local-remote-manual selector switch, control circuit transformer, three-phase thermal overload relays and two pilot lights in a NEMA 4X enclosure. In addition to the above, a close coupled air circuit breaker or disconnect switch shall be mounted and wired to the valve input power terminals for the purpose of disconnecting all underground phase conductors.
 7. The valve actuator shall be capable of being controlled locally or remotely via a selector switch integral with the actuator. In addition, an auxiliary dry contact shall be provided for remote position feedback.
 8. Valve A.C. motors shall be designed for operation on a 480 volt, 3-phase service. Valve control circuit shall operate from a fuse protected 120 volt power supply.
 9. Motor operators shall be as manufactured by Limitorque Corporation, Type L120 or approved equal.

2.07 AIR RELEASE VALVES

The air release valves for use in water or force mains shall be installed as shown on the Drawings. The valves shall have a cast iron body cover and baffle, stainless steel float, bronze water diffuser, Buna-N or Viton seat, and stainless steel trim. The fittings shall be threaded. Reference the Manatee County Public Works Standards for acceptable models.

2.08 VALVE BOXES

- A. Buried valves shall have adjustable cast iron or HDPE valve boxes. Lids shall be cast iron drop type, and shall have "WATER", "SEWER", or "RECLAIM", as applicable, cast into the

top. Lids will be painted “safety” blue for potable, purple for reclaimed, and green for sanitary sewer.

- B. Cast iron boxes shall be two-piece, or three-piece, as required, screw type, Tyler Pipe, 6850 Series, Box 461-S through 668-S, with extensions, as required to make the desired box length, or an approved equal. Bottom barrel shall be 5-1/4 inches inside diameter, with a flanged bottom with sufficient bearing area to prevent settling.
- C. HDPE boxes shall be two-piece, adjustable, 1/4-inch thick minimum heavy wall, high-density polyethylene, with cast iron top and galvanized steel adjustable stem, Trench Adapter, as manufactured by American Flow Control, or an approved equal. Bottom barrel shall have flanged bottom to prevent settling. All bolts, screws and pins shall be stainless steel.
- D. Reclaimed Valve Boxes shall be square 9-inch x 9-inch load bearing marked “Reclaimed Water” and painted Pantone 522C purple.
- E. All valves shall either have operating nuts within 4 feet below the top of the lid or shall have extension stems with centering guides to provide an extended operating nut within 4 feet below the lid. Extension stems shall be fixed to the valve operating nut with a stainless steel fastener.
- F. All potable water, sewer, and reclaimed water grade-adjustment risers shall be cast iron material just like the valve box.
- G. A centering device AFC part no. B 59434 or equal shall be installed in the valve box.
- H. Stand pipe shall match color code of the system being installed, (blue for potable, Pantone purple 522 C for reclaimed, and green for sanitary sewer).

2.09 CORPORATION STOPS

- A. Corporation stops for connections to ductile iron and PVC water and reclaimed water mains shall be all red brass, alloy 85-5-5-5, per ASTM B 62, and shall conform to AWWA C800. 1-inch through 2-inch corporation stops shall be ball type, 300 psi working pressure rated, with AWWA MIP threaded inlets and compression, pack joint, flare, or FIP threaded joint outlets, Mueller as shown in the table below, or an approved equal. All joints made to CTS size HDPE tubing shall use stainless steel insert stiffeners.

Corporation Stops

Pipe Material	Type of Connection	Mueller 300 Model
HDPE	Compression x AWWA IP Thread	B-25028 (Saddle) *
HDPE	Compression x AWWA Taper Thread	B-25008 (Direct Tap) *
HDPE	Pack Joint x AWWA IP Thread	P-25028 (Saddle) *
HDPE	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap) *
Copper	Compression x AWWA IP Thread	B-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	B-25008 (Direct Tap)
Copper	Pack Joint x AWWA IP Thread	P-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap)
Copper	Flare x AWWA IP Thread	B-25028 (Saddle)
Copper	Flare x AWWA Taper Thread	B-25008 (Direct Tap)
Stainless Steel	FIP Thread x AWWA IP Thread	B-20046 (Saddle)

Stainless Steel	FIP Thread x AWWA Taper Thread	B-20045 (Direct Tap)
* Insert required, part number per manufacturer product information		

- B. Potable plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.
- C. Water and reclaimed water service connections to PVC and DIP mains shall be made using red brass saddles, alloy 85-5-5-5, per ASTM B 62. Straps, washers and nuts shall be brass or stainless steel. No ductile iron, cast iron or steel saddles will be allowed. Saddles shall be Smith Blair 325 Bronze saddles with Stainless Steel or brass extra wide strap or equivalent.
- D. Connections to PVC sanitary force mains for services up to 2 inches shall be made using Romac Style 306 double bolt stainless steel service saddles or equivalent.
- E. Service and air release valve (ARV) connections to HDPE water, reclaimed water and sewer mains may be made using Romac Style 306H saddle or approved equal. All saddles shall be properly sized per the manufacturer product information and be installed according to the manufacturer's written instructions. Connections to HDPE mains shall not be made using narrower saddles similar to the Smith-Blair 325.

2.10 FLANGE ADAPTER COUPLINGS

Plain end couplings and adapters shall be fusion-bonded epoxy coated carbon steel with Ethylene Propylene Diene Monomer (EPDM) rubber gaskets and stainless steel nuts, bolts and spacers. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used for potable water mains if the soil is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons, and is also contaminated with low molecular-weight petroleum products or organic solvents. Couplings shall be Dresser Style 38, or another approved equal. Flange adapters shall have a plain end compression seal similar to the style 38, with an ANSI 125 Class flange on the opposite end, and shall be Dresser Style 128W or an approved equal. Stainless steel backup rings shall be used for force mains that are located in corrosive environments including wet wells and valve vaults.

2.11 FLEXIBLE COUPLINGS

Flexible couplings shall be either the split type or the sleeve type as shown on the Drawings.

- A. Split type coupling shall be used with all interior piping and with exterior pipings noted on the Drawings. The couplings shall be mechanical type for radius groove piping. The couplings shall mechanically engage and lock grooved pipe ends in a positive couple and allow for angular deflection and contracting and expansion.
- B. Couplings shall consist of malleable iron, ASTM Specification A47, Grade 32510 housing clamps in two or more parts, a single chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and two or more oval track head type bolts with hexagonal heavy nuts conforming to ASTM Specification A 183 and A194 to assemble the housing clamps. Bolts and nuts shall be hot

dipped galvanized after fabrication.

- C. Victaulic type couplings and fittings may be used in lieu of flanged joints. Pipes shall be radius grooved as specified for use with the Victaulic couplings. Flanged adapter connections at fittings, valves, and equipment shall be Victaulic Vic Flange Style 741, equal by Gustin-Bacon Group, Division of Certain-Teed Products, Kansas City, Kansas, or approved equal.
- D. Sleeve type couplings shall be used with all buried piping. The couplings shall be of steel and shall be Dresser Style 38 or 40, as shown on the Drawings, or equal. The coupling shall be provided with stainless steel bolts and nuts unless indicated otherwise.
- E. All couplings shall be furnished with the pipe stop removed.
- F. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.

2.12 HOSE BIBS

Hose bibs shall be 3/4" or 1" brass, polished chromium plated brass, with vacuum breaker as noted on the drawings.

2.13 SLOW CLOSING AIR AND VACUUM VALVES

- A. The Contractor shall furnish and install slow closing air and vacuum valves as shown on the Drawings which shall have two (2) independent valves bolted together. The air and vacuum valve shall have all stainless steel float, guided on both ends with stainless shafts. The air and vacuum valve seat shall be Buna-N to insure drop tight closure. The Buna-N seat shall be fastened to the cover stainless shoulder screws in a manner to prevent distortion of the seat. The float shall be guided at both ends with stainless steel bushings.
- B. The valve cover shall have a male lip designed to fit into the body register for accurate alignment of the float into the Buna-N seat. The valve cover shall have 250-pound class flanged outlet connection.
- C. The surge check valve shall be bolted to the inlet of the air and vacuum valve and consist of a body, seat, disc, and compression spring. A surge check unit shall operate on the interphase between the kinetic energy and relative velocity flows of air and water, so that after air passes through, and water rushes into the surge check, the disc starts to close, reducing the rate of flow of water into the air valve by means of throttling orifices in the disc to prevent water hammer in the air valves. The surge check orifices must be adjustable type for regulation in the field to suit operating conditions. Valve shall be rated for 250-pound class working pressure.
- D. The complete slow closing air and vacuum valve with air release valve shall have been flow tested in the field, substantiated with test data to show reduction of surge pressure in the valve. Flow test data shall be submitted with initial shop drawings for approval.
- E. Valve exterior to be painted Red Oxide, Phenolic TT-P86, Primer or approved equal for high resistance to corrosion.
- F. All materials of construction shall be certified in writing to conform to ASTM specifications as follows:

Air Valve Cover, Body, and Surge Check Body	Cast Iron	ASTM A48, Class 30
Float	Stainless Steel	ASTM A240
Surge Check Seat and Disc	Stainless Steel	ASTM A582
Air Valve Seat	Buna-N	
Spring	Stainless Steel	T302

2.14 SURGE ANTICIPATOR VALVES

- A. Surge anticipator valves shall be furnished for the pumping systems as shown on the Drawings. The valve shall be hydraulically operated, pilot controlled, and diaphragm or piston actuated. The main valve shall be cast iron conforming to ASTM A48 with bronze trim conforming to ASTM B61 and flanged ends conforming to ANSI B161.1. The main valve shall be globe type with a single removable seat and a resilient disc.
- B. The diaphragm actuated valve shall have a stainless steel stem guided at both ends by a bearing in the valve cover and an integral bearing surface in the seat. No external packing glands shall be permitted. The valve shall be fully serviceable without removing it from the line. The pilot system shall be of noncorrosive construction and provided with isolation cocks.
- C. The piston actuated valve shall operate on the differential piston principle. The valve piston shall be guided on its outside diameter. The valve shall be able to operate in any position and shall be fully serviceable without removing it from the line. The pilot system shall be provided with isolation cocks, and be of noncorrosive materials of construction.
- D. The valve shall be designed specifically to minimize the effects of water hammer, resulting from power failure at the pumping station, or from normal stopping and starting of pumping operators. The valve shall open hydraulically on a down surge, or low pressure wave created when the pump stops, remain open during the low pressure cycle in order to be open when the high pressure wave returns. The high pressure pilot shall be adjustable over a 20 to 200 psi range and the low pressure pilot shall be adjustable over a 15 to 75 psi range. The valve shall be the 250 Class.

2.15 CHECK VALVES

- A. Check valves shall be swing type, weighted lever, conforming to AWWA C508. Valves shall be iron-body, bronze-mounted, single disk, 175 psi working pressure for 2- through 12-inch, 150 psi for 14- through 30-inch, with ANSI B16.1 Class 125 flanged ends, by Mueller; No. A-2600-6-01 (sewer), No. A-2602-6-01 (water), or AVK Series 41, or an approved equal.
- B. When there is no flow through the line, the disc shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the waterway.
- C. Check valves shall have bronze seat and body rings, extended bronze hinge pins and

stainless steel nuts on the bolts of bolted covers

- D. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and weight.

2.16 HYDRANTS

Hydrants shall be AVK Series 2780 Barrel (nostalgic style with stainless steel bolts) American Darling B-84-B or Mueller Super Centurian 250, or approved equal and shall conform to the "Standard Specification for Fire Hydrants for Ordinary Water Works Service", AWWA C502, and UL/FM certified, and shall in addition meet the specific requirements and exceptions which follow:

- A. Hydrants shall be according to manufacturer's standard pattern or nostalgic style and of standard size, and shall have one 5-inch Storz connection or equivalent with two 2½- inch hose nozzles.
- B. Hydrant inlet connections shall have mechanical joints for 6-inch pipe.
- C. Hydrant valve opening shall have an area at least equal to that area of a 5 1/4-inch minimum diameter circle and be obstructed only by the valve rod. Each hydrant shall be able to deliver 500 gpm minimum through its two 2 1/2 -inch hose nozzles when opened together with a loss of not more than 2 psi in the hydrant per AWWA C502.
- D. The upper and lower stem rod shall be stainless steel and shall have a breakable stem-rod coupling of stainless steel, or cast iron or ductile iron with a fusion bonded epoxy coating, with stainless steel pins and clips.
- E. Hydrants shall be hydrostatically tested as specified in AWWA C502 and shall be rated at 250 psi minimum.
- F. The operating nut shall be 1 ½ -inch pentagon shaped with a protective weather cover, and open counter clockwise.
- G. All nozzle threads shall be American National Standard.
- H. Each nozzle cap shall be provided with a Buna N rubber washer.
- I. All hydrants shall be traffic break away type and allow for 360 degree rotation to position the Storz connection/nozzle in the desired direction after installation.
- J. Hydrants must be capable of being extended without removing any operating parts.
- K. Hydrant extensions shall be fusion bonded epoxy coated inside and outside with a stainless steel stem. The breakaway coupling can be fusion bonded epoxy coated or stainless steel. Only one hydrant extension is allowed per hydrant.
- L. Weepholes shall be excluded from fire hydrants.
- M. Hydrant main valve closure shall be of the compression type opening against the pressure and closing with the pressure. The main valve shall be faced or covered with EPDM elastomer, which shall seat on a bronze ring.

- N. Hydrant bonnets, weather cover, nozzle section, caps and shoe shall be cast iron or ductile iron, and shall be holiday free fusion-bonded epoxy coated at the factory, per AWWA C550, inside and outside. Lower barrel shall be fusion bonded epoxy coated inside and outside. Aboveground parts shall also have a top coat of Sherwin-Williams Acrolon 218 HS acrylic polyurethane or approved equal; color Safety Yellow for fire hydrants that are connected to the potable water system or Pantone 522C purple for fire hydrants that are connected to the reclaimed water system.
- O. Exterior nuts, bolts and washers shall be stainless steel. Bronze nuts may be used below grade.
- P. All internal operating parts shall be removable without requiring excavation.resistant polyester coating or have two shop coats of paint per AWWA C502. The lower stand pipe or barrel shall be protected with asphaltic coatings per AWWA C502.
- Q. Exterior nuts, bolts and washer shall be stainless steel. Bronze nuts may be used below grade.
- R. All internal operating parts shall be removable without requiring excavation.

2.17 RESTRAINED JOINTS

- A. Pipe joints shall be restrained by poured-in-place concrete thrust blocks or by other mechanical methods, including stainless steel tie rods, Stargrip and Allgrip, as manufactured by Star Pipe Products or Megaflange and 2000 PV, as manufactured by EBAA Iron Sales. Flanged joints may be used above ground.
- B. Restrained joints may also be Lok-Ring, as manufactured by American Cast Iron Pipe Company, or an approved equal.
- C. Restrained joint designs which require wedges and/or shims to be driven into the joints in order to disassemble the pipe shall not be allowed.

2.18 TAPPING SLEEVES AND VALVES

- A. Tapping valves shall meet the requirements of AWWA C509/C515 with ductile iron body and shall be rated for a pressure of 250 psi. The valves shall be flanged with alignment ring by mechanical joint with a nonrising stainless steel stem. All bolts, nuts and washers shall be stainless steel. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the valve's thrust collar. Valve shall be designed for vertical burial and shall open counterclockwise. Operating nut shall be AWWA standard 2-inch square for valves 2 inches and up. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve to accommodate full size shell cutter. Gaskets shall cover the entire area of the flange surface and be 1/8-inch minimal thickness of red rubber. The wedge shall be ductile iron fully encapsulated with EPDM rubber. All bolts, nuts and washers between the sleeve and valve shall be stainless steel.
- B. Tapping sleeves and saddles shall seal to the pipe by the use of a confined "O" ring gasket, and shall be able to withstand a pressure test of 180 psi for water lines or 150 psi for sewer force mains for one hour with no leakage in accordance with AWWA C110. A stainless steel 3/4-inch NPT test plug shall be provided for pressure testing. All bolts joining the two

halves shall be stainless steel and shall be included with the sleeve or saddle. Sleeves and saddles shall be fusion applied epoxy coated, or be made of 18-8 Type 304 stainless steel. Saddle straps shall be 18-8 Type 304 stainless steel.

2.19 SINGLE ACTING ALTITUDE VALVES

A. Function

1. The altitude control valve shall be of the single acting type, closing off tightly when the water reaches the maximum predetermined level in the tank to prevent overflow; and opening to permit replenishing of the tank supply when the water level drops approximately 6" to 12" below the maximum level.
2. A hand operated valve in the power water line to the top of the piston shall permit adjustment of the speed of valve closing. The tank water level control shall be by means of a diaphragm operated, spring loaded, three way pilot which directs power water to or from the top of the main valve piston. The three way pilot shall be of bronze construction. The diaphragm surface exposed to the tank head shall be not less than 57 sq. inches. It shall be possible to adjust the spring above the diaphragm for water level control approximately 20% above or below the factory setting.

B. Description

1. The main valve shall operate on the differential piston principle such that the area on the underside of the piston is no less than the pipe area on the upper surface of the piston is of a greater area than the underside of the piston.
2. The valve piston shall be guided on its outside diameter by long stroke stationary Vee ports which shall be downstream of the seating surface to minimize the consequences of throttling. Throttling shall be done by the valve Vee ports and not the valve seating surfaces.
3. The valve shall be capable of operating in any position and shall incorporate only one flanged cover at the valve top from which all internal parts shall be accessible. There shall be no stems, stem guides, or spokes within the waterway. There shall be no springs to assist the valve operation.

C. Construction

1. The valve body shall be of cast iron ASTM A-126 with flanges conforming to the latest ANSI Standards. The valve shall be extra heavy construction throughout. The valve interior trim shall be bronze B-62 as well as the main valve operation.
2. The valve seals shall be easily renewable while no diaphragm shall be permitted within the main valve body.
3. All controls and piping shall be of non-corrosive construction.
4. A visual valve position indicator shall be provided for observing the valve piston position at any time.

D. Figure Number

The valves shall be the 20" Globe type (Fig. 3200-D) as manufactured by GA Industries of Mars, Pennsylvania, or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All valves and appurtenances shall be installed in the location shown, true to alignment and rigidly supported. Any damage occurring to the above items before they are installed shall be repaired to the satisfaction of the County.
- B. After installation, all valves and appurtenances shall be tested at least two hours at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the County.
- C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.
- D. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections.
- E. Flanged joints and mechanical joints shall be made with high strength, low alloy Corten or 316 stainless steel bolts, nuts and washers.
- F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- G. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8". Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6" from the end.
- H. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and the top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

3.02 HYDRANTS

- A. Hydrants shall be set at the locations designated by the County and/or as shown on the Drawings and shall be bedded on a firm foundation. A drainage pit on crushed stone as shown on the Drawings shall be filled with gravel or crushed stone and satisfactorily compacted. During backfilling, additional gravel or crushed stone shall be brought up

around and 6" over the drain port. Each hydrant shall be set in true vertical alignment and shall be properly braced. Concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be as shown on the plans. Felt paper shall be placed around the hydrant elbow prior to placing concrete. CARE MUST BE TAKEN TO INSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS. Concrete used for backing shall be as specified herein.

- B. When installations are made under pressure, the flow of water through the existing main shall be maintained at all times. The diameter of the tap shall be a minimum of 2" less than the inside diameter of the branch line.
- C. The entire operation shall be conducted by workmen thoroughly experienced in the installation of tapping sleeves and valves, and under the supervision of qualified personnel furnished by the manufacturer. The tapping machine shall be furnished by the Contractor if tap is larger than 12" in diameter.
- D. The Contractor shall determine the locations of the existing main to be tapped to confirm the fact that the proposed position for the tapping sleeve will be satisfactory and no interference will be encountered such as the occurrence of existing utilities or of a joint or fitting at the location proposed for the connection. No tap will be made closer than 30" from a pipe joint.
- E. Tapping valves shall be set in vertical position and be supplied with a 2" square operating nut for valves 2" and larger. The valve shall be provided with an oversized seat to permit the use of full sized cutters.
- F. Tapping sleeves and valves with boxes shall be set vertically or horizontally as indicated on the Drawings and shall be squarely centered on the main to be tapped. Adequate support shall be provided under the sleeve and valve during the tapping operation. Sleeves shall be no closer than 30" from water main joints. Thrust blocks shall be provided behind all tapping sleeves. Proper tamping of supporting earth around and under the valve and sleeve is mandatory. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean.

3.03 SHOP PAINTING

Ferrous surfaces of valves and appurtenances shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.04 FIELD PAINTING

All metal valves and appurtenances specified herein and exposed to view shall be painted. All above ground potable water main valves shall be painted safety blue.

3.05 INSPECTION AND TESTING

Completed pipe shall be subjected to hydrostatic pressure test for two hours at 180 psi. All leaks shall be repaired and lines retested as approved by the County. Prior to testing, the pipelines shall be supported in an approved manner to prevent movement during tests.

END OF SECTION

DIVISION 3 CONCRETE

SECTION 03200 CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Reinforcing steel bars and welded steel wire fabric for cast-in-place concrete, complete with tie wire.
- B. Support chairs, bolsters, bar supports and spacers, for reinforcing.

1.02 QUALITY ASSURANCE

Perform concrete reinforcing work in accordance with ACI 318 unless specified otherwise in this Section.

1.03 REFERENCES

- A. ACI 318 - Building Code Requirements for Reinforced Concrete.
- B. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- C. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- D. CRSI 63 - Recommended practice for placing reinforcing bars.
- E. CRSI 65 - Recommended practice for placing bar supports, specifications and nomenclature.
- F. ACI 315 - American Concrete Institute - Manual of Standard Practice.

1.04 SHOP DRAWINGS

- A. Submit shop drawings in accordance with Contract Documents.
- B. Indicate bar sizes, spacings, locations and quantities of reinforcing steel and wire fabric, bending and cutting schedules and supporting and spacing devices.
- C. Manufacturer's Literature: Manufacturer's specifications and installation instructions for splice devices.

PART 2 PRODUCTS

2.01 REINFORCING

- A. Reinforcing steel: Grade 60, Minimum Yield Strength 60,000 psi, deformed billet steel bars, ASTM A615; plain finish.
- B. Welded steel wire fabric: Deformed wire, ASTM A497; smooth wire ASTM A185 in flat sheets; plain finish.

2.02 ACCESSORY MATERIALS

- A. Tie wire: Minimum 16 gauge annealed type, or patented system accepted by County.
- B. Chairs, bolsters, bar supports, spacers: Sized and shaped for strength and support of reinforcing during construction conditions.
- C. Special chairs, bolsters, bar supports, spacers (where adjacent to architectural concrete surfaces): Stainless steel type sized and shaped as required.

2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with ACI 315.
- B. Locate reinforcing splices, not indicated on Drawings, at points of minimum stress. Location of splices shall be reviewed by County.
- C. Where indicated, weld reinforcing bars in accordance with AWS D12.1.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Reinforcing shall be supported and secured against displacement. Do not deviate from true alignment.
- B. Before placing concrete, ensure reinforcing is clean, free of loose scale, dirt, or other foreign coatings which would reduce bond to concrete.

3.02 QUALITY ASSURANCE

- A. Acceptable Manufacturers: Regularly engaged in manufacture of steel bar and welded wire fabric reinforcing.
- B. Installer Qualifications: Three years experience in installation of steel bar and welded wire fabric reinforcing.
- C. Allowable Tolerances:
 - 1. Fabrication:
 - a. Sheared length: +1 in.
 - b. Depth of truss bars: +0, -1/2 in.
 - c. Stirrups, ties and spirals: $\pm 1/4$ in.
 - d. All other bends: ± 1 in.
 - 2. Placement:
 - a. Concrete cover to form surfaces: $\pm 1/4$ in.
 - b. Minimum spacing between bars: 1 in.
 - c. Top bars in slabs and beams:
 - (1) Members 8 in. deep or less: $\pm 1/4$ in.
 - (2) Members more than 8 in.: $\pm 1/2$ in.
 - d. Crosswise of members: Spaced evenly within 2 in. of stated separation.
 - e. Lengthwise of members: Plus or minus 2 in.

3. Maximum bar movement to avoid interference with other reinforcing steel, conduits, or embedded items: 1 bar diameter.

3.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length.
- B. Handle and store materials to prevent contamination.

3.05 INSTALLATION

- A. Placement:
 1. Bar Supports: CRSI 65.
 2. Reinforcing Bars: CRSI 63.
- B. Steel Adjustment:
 1. Move within allowable tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
 2. Do not move bars beyond allowable tolerances without concurrence of County.
 3. Do not heat, bend, or cut bars without concurrence of County.
- C. Splices:
 1. Lap splices: Tie securely with wire to prevent displacement of splices during placement of concrete.
 2. Splice devices: Install in accordance with manufacturer's written instructions.
 3. Do not splice bars without concurrency of County, except at locations shown on Drawings.
- D. Wire Fabric:
 1. Install in longest practicable length.
 2. Lap adjoining pieces one full mesh minimum, and lay splices with 16 gauge wire.
 3. Do not make end laps midway between supporting beams, or directly over beams of continuous structures.
 4. Offset end laps in adjacent widths to prevent continuous laps.
- E. Cleaning: Remove dirt, grease, oil, loose mill scale, excessive rust, and foreign matter that will reduce bond with concrete.
- F. Protection During Concreting: Keep reinforcing steel in proper position during concrete placement.

END OF SECTION

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

Poured-in-place concrete slabs, thrust blocks, pile caps and pipe support cradles.

1.02 QUALITY ASSURANCE

Perform cast-in-place concrete work in accordance with ACI 318, unless specified otherwise in this Section.

1.03 TESTING LABORATORY SERVICES

- A. Inspection and testing will be performed by the testing laboratory currently under contract to Manatee County in accordance with the Contract Documents.
- B. Provide free access to work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of work.
- D. Tests of cement and aggregates may be performed to ensure conformance with requirements stated herein.
- E. Three concrete test cylinders will be taken for every 100 cu. yds. or part thereof of each class of concrete placed each day. Smaller pours shall have cylinders taken as directed by the County.
- F. One slump test will be taken for each set of test cylinders taken.

1.04 REFERENCES

- A. ASTM C33 - Concrete Aggregates
- B. ASTM C150 - Portland Cement
- C. ACI 318 - Building Code Requirements for Reinforced Concrete
- D. ASTM C260 - Air Entraining Admixtures for Concrete
- E. ASTM C94 - Ready-Mixed Concrete
- F. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
- G. ACI 305 - Recommended Practice for Hot Weather Concreting

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: Moderate-Type II, High early strength-Type III, Portland type, ASTM C150.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.

2.02 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Chemical: ASTM C494 Type A - water reducing admixture.

2.03 ACCEPTABLE MANUFACTURERS

Acceptable Products:

- 1. Pozzolith
- 2. WRDA

2.04 ACCESSORIES

Non-shrink grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2400 psi in 2 days and 7000 psi in 28 days.

2.05 CONCRETE MIXES

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete of following strength:
 - 1. Required concrete strengths as determined by 28 day cylinders shall be as shown on the Drawings, but shall not be less than 3000 psi.
 - 2. Select proportions for normal weight concrete in accordance with ACI 301 3.8 Method 1, Method 2, or Method 3. Add air entraining agent to concrete to entrain air as indicated in ACI 301 Table 3.4.1.
 - 3. All mixes shall be in accordance with FDOT Specifications.
- C. Use set-retarding admixtures during hot weather only when accepted by County.
- D. Add air entraining agent to concrete mix for concrete work exposed to exterior.

2.06 FORMS

- A. Forms shall be used for all concrete masonry, including footings. Form shall be so constructed and placed that the resulting concrete will be of the shape, lines, dimensions, appearance and to the elevations indicated on the Drawings.

- B. Forms shall be made of wood, metal, or other approved material. Wood forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots; where used for expose surfaces, boards shall be dressed and matched. Plywood shall be sanded smooth and fitted with tight joints between panels. Metal forms shall be of an approved type for the class of work involved and of the thickness and design required for rigid construction.
- C. Edges of all form panels in contact with concrete shall be flush within 1/32-inch and forms for plane surfaces shall be such that the concrete will be plane within 1/16-inch in four feet. Forms shall be tight to prevent the passage of mortar and water and grout.
- D. Forms for walls shall have removable panels at the bottom for cleaning, inspection and scrubbing-in of bonding paste. Forms for walls of considerable height shall be arranged with tremies and hoppers for placing concrete in a manner that will prevent segregation and accumulation of hardened concrete on the forms or reinforcement above the fresh concrete.
- E. Molding or bevels shall be placed to produce a 3/4-inch chamfer on all exposed projecting corners, unless otherwise shown on the Drawings. Similar chamfer strips shall be provided at horizontal and vertical extremities of all wall placements to produce "clean" separation between successive placements as called for on the Plans.
- F. Forms shall be sufficiently rigid to withstand vibration, to prevent displacement or sagging between supports and constructed so the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.
- G. Forms, including new pre-oiled forms, shall be oiled before reinforcement is placed, with an approved nonstaining oil or liquid form coating having a non-paraffin base.
- H. Before form material is re-used, all surfaces in contact with concrete shall be thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn, all protrusions smoothed and in the case of wood forms pre-oiled.
- I. Form ties encased in concrete shall be designed so that after removal of the projecting part, no metal shall be within 1-inch of the face of the concrete. That part of the tie to be removed shall be at least 1/2-inch diameter or be provided with a wood or metal cone at least 1/2-inch in diameter and 1-inch long. Form ties in concrete exposed to view shall be the cone-washer type equal to the Richmond "Tyscru". Throughbolts or common wire shall not be used for form ties.

PART 3 EXECUTION

3.01 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304.
- B. Notify County minimum 24 hours prior to commencement of concreting operations.
- C. Verify anchors, seats, plates and other items to be cast into concrete are placed, held securely and will not cause hardship in placing concrete. Rectify same and proceed with work.
- D. Maintain records of poured concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

- E. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- F. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's recommendations.
- G. Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
- H. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solidly with non-shrink grout.
- I. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify County upon discovery.
- J. Conform to ACI 305 when concreting during hot weather.

3.02 SCREEDING

Screed surfaces level, maintaining flatness within a maximum deviation of 1/8" in 10 feet.

3.03 PATCHING

Allow County to inspect concrete surfaces immediately upon removal of forms. Patch imperfections as directed. All patching procedures shall be submitted to and approved by the County prior to use.

3.04 DEFECTIVE CONCRETE

- A. Modify or replace concrete not conforming to required lines, details and elevations.
- B. Repair or replace concrete not properly placed resulting in excessive honeycomb and other defects. Do not patch, fill, touch-up, repair, or replace exposed architectural concrete except upon express direction of County for each individual area.

3.05 CONCRETE FINISHING

Provide concrete surfaces to be left exposed, columns, beams and joists with smooth rubbed finish.

3.06 CURING AND PROTECTION

Beginning immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury. Maintain concrete with minimal moisture loss at relatively constant temperature for a period of 7 days or until concrete strengths reaches 75% of the 28 day design strength.

Protection against moisture loss may be obtained with spray on curing compounds or plastic sheets. Protection against heat or cold may be obtained with insulated curing blankets or forms.

3.07 CONCRETE DRIVEWAY RESTORATION

Concrete driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place ½ inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

3.08 CONCRETE SIDEWALK RESTORATION

Concrete sidewalks across driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place ½ inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

Concrete sidewalks outside of driveways shall be restored with 4 inches of 3,000 psi concrete per FDOT Design Standards, Sections 522 & 310

END OF SECTION

SECTION 03350 CONCRETE FINISHES

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to finish cast-in-place concrete surfaces as specified herein.

1.02 SUBMITTALS

Submit to the County as provided in the Contract Documents, the proposed chemical hardener manufacturer's surface preparation and application procedures.

1.03 SCHEDULE OF FINISHES

- A. Concrete for the Project shall be finished in the various specified manners either to remain as natural concrete or to receive an additional applied finish or material under another Section.
- B. The base concrete for the following conditions shall be finished as noted and as further specified herein:
 - 1. Exterior, exposed concrete slabs and stairs - broomed finish.
 - 2. Interior, exposed concrete slabs - steel trowel finish.
 - 3. Concrete on which process liquids flow or in contact with sludge - steel trowel finish.
 - 4. Concrete where not exposed in the finished work and not scheduled to receive an additional applied finish or material - off-form finish.
 - 5. Provide concrete surfaces to be left exposed such as walls, columns, beams and joists with smooth rubbed finish.

1.04 RESPONSIBILITY FOR CHANGING FINISHES

- A. The surface finishes specified for concrete to receive additional applied finishes or materials are the finishes required for the proper application of the actual products specified under other Sections. Where different products are approved for use, it shall be the Contractor's responsibility to determine if changes in finishes are required and to provide the proper finishes to receive these products.
- B. Changes in finishes made to accommodate product different from those specified shall be performed at no additional cost to the County. Submit the proposed new finishes and their construction methods to the County for approval.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Portland cement and component materials required for finishing the concrete surfaces shall be as specified in the Contract Documents.
- B. Hardener shall be Lapidolith as manufactured by Sonneborn Building Products or approved equal. Hardener shall be used on all floors, stair treads and platforms.

PART 3 EXECUTION

3.01 FORMED SURFACES

- A. Forms shall not be stripped before the concrete has attained a strength of at least 50 percent of the ultimate design strength. This is equivalent to approximately five "100 day-degrees" of moist curing.
- B. Care shall be exercised to prevent damaging edges or obliterating the lines of chamfers, rustications, or corners when removing the forms or doing any work adjacent thereto.
- C. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to the satisfaction of the County.
- D. Off-form finish. Fins and other projections shall be removed as approved. Tie cone holes and other minor defects shall be filled with non-shrink grout specified under the Contract Documents.

3.02 FLOORS AND SLABS

- A. Floors and slabs shall be screeded to the established grades and shall be level with a tolerance of 1/8-inch when checked with a 10 foot straight edge, except where drains occur, in which case floors shall be pitched to drains as indicated. Failure to meet either of above shall be cause for removal, grinding, or other correction as approved by the County.
- B. Following screeding as specified above, power steel trowel as follows:
 - 1. Immediately after final screeding, a dry cement/sand shake in the proportion of 2-sacks of portland cement to 350-pounds of coarse natural concrete sand shall be sprinkled evenly over the surface at the rate of approximately 500 pounds per 1,000 square feet of floor. Neat, dry cement shall not be sprinkled on the surface. This shake shall be thoroughly floated into the surface with an approved disc type power compacting machine weighing at least 200 pounds if a 20-inch disc is used or 300 pounds if a 24-inch disc is used (such as a "Kelly Float" as manufactured by the Weisner-Rapp Corporation of Buffalo, New York). A mechanical blade-type float or trowel is not acceptable for this work.
NOTE: This operation (application of the cement/sand shake) may be eliminated at the discretion of the County if the base slab concrete exhibits adequate fattiness and homogeneity.
 - 2. In lieu of power steel troweling, small areas as defined by the County shall be compacted by hand steel troweling with the dry cement/sand shake as ordered.
 - 3. The floor or slab shall be compacted to a smooth surface and the floating operation continued until sufficient mortar is brought to the surface to fill all voids. The surfaces shall be tested with a straight edge to detect high and low spots which shall be eliminated.
 - 4. Compaction shall be continued only until thorough densification is achieved and a small amount of mortar is brought to the surface. Excessive floating shall be avoided.
- C. After Paragraph 3.02 A and B procedures are accomplished, floors and slabs for particular conditions shall be completed as scheduled in one of the following finishes:
 - 1. Wood float finish. Hand wood float, maintaining the surface tolerance to provide a

- grained, nonslip finish as approved.
 - 2. Broomed finish. Hand wood float maintaining the surface tolerance and then broom with a stiff bristle broom in the direction of drainage to provide a nonslip finish as approved.
 - 3. Steel trowel finish. Hand steel trowel to a perfectly smooth, hard even finish free from high or low spots or other defects as approved.
- D. Floors, stair treads and platforms shall be given a floor hardener. Application shall be according to manufacturer's instructions.

3.03 APPROVAL OF FINISHES

- A. All concrete surfaces will be inspected during the finishing process by the County.
- B. Surfaces which, in the opinion of the County, are unsatisfactory shall be refinished or reworked until approved by the County.

END OF SECTION

DIVISION 5 METALS

SECTION 05550 AIR RELEASE ENCLOSURE

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to install the above ground air release enclosure as listed in the specifications and as shown on the Drawings.

1.02 RELATED WORK

The contractor shall be responsible for any related work necessary for the proper installation of enclosure. This shall include, but is not limited to, any required bypass pumping, any required earthwork and any required concrete work.

1.03 SUBMITTALS

- A. Submit to the County shop drawings and schedules of all enclosure systems and appurtenances required. Submit design data and specification data sheets listing all parameters used in the enclosure system design.
- B. Submit to the County the name of the enclosure supplier and a list of materials to be furnished.

1.04 REFERENCE STANDARDS

- A. American Water Works Association (AWWA).
- B. American Society for Testing and Materials (ASTM).
- C. Where reference is made to the above standard, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

The enclosure manufacturer shall be a company specializing in the manufacture of such enclosures with at least five (5) years of successful field experience and being lab certified as meeting A.S.S.E 1060 requirements.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and placing to avoid damaging. Any material damaged in shipment shall be replaced as directed by the County.
- B. Any material showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

PART 2 PRODUCTS

2.01 GENERAL

All enclosures shall comply with the standard detail for shape and size and shall include a 24"W x 30"H access door with a hasp for a padlock. The enclosure shall be securely attached to a concrete base with anchor brackets installed on the interior of the enclosure, through the flange base of the enclosure itself or through a stainless steel anchor hinge.

2.02 ALUMINUM ENCLOSURE

- A. The roof, walls and access panels shall be constructed of mill finish aluminum, ASTM B209, solid sheet construction, with a wall thickness of one eighth inch.
- B. All structural members shall be aluminum. No wood or "particle board" shall be allowed in assembly.
- C. Multi-sectional enclosures shall fit together with overlapping "tongue and groove" joints and be secured internally with mechanical fasteners.
- D. All assembly fasteners shall be stainless steel or aluminum.

2.03 STAINLESS STEEL ENCLOSURE

- A. The roof, walls and access panels shall be constructed stainless steel, type 316, solid sheet construction, with a wall thickness of one eighth inch.
- B. All structural members shall be stainless steel. No wood or "particle board" shall be allowed in assembly.
- C. Multi-sectional enclosures shall fit together with overlapping "tongue and groove" joints and be secured internally with mechanical fasteners.
- C. All assembly fasteners shall be stainless steel.

2.04 FIBERGLASS ENCLOSURE

- A. Enclosure shall be a 1 piece molded fiberglass enclosure with a base flange for mounting to the concrete slab and a full recessed door opening with a lip. Enclosure shall be by Allied Molded Products, or approved equal. Color shall be as directed by the County.
- B. Full length piano style hinge, door latch, padlock hasp and all bolts and other hardware shall be of stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION

Enclosure shall be assembled and mounted plumb, level and square on the concrete pad according to the manufacturer's instructions and the contract drawings.

END OF SECTION

DIVISION 9 PAINTING
SECTION 09900 PAINTING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, tools, materials, equipment, scaffolding or other structures and incidentals necessary to complete this Contract in its entirety.
- B. The work includes painting and finishing of all new interior and exterior exposed items above and below grade and surfaces, such as structural steel, miscellaneous metals, ceilings, walls, floors, doors, frames, transoms, roof fans, construction signs, guardrails, posts, fittings, valves, tanks, equipment and all other work obviously required to be painted unless otherwise specified herein or on the Drawings. The omission of minor items in the Schedule of Work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of the Specification as stated herein.
- C. The following items shall not be painted:
 - 1. Any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
 - 2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts, unless otherwise indicated.
 - 3. Aluminum handrails (except where in contact with concrete) walkways, windows, louvers and grating unless otherwise specified herein.
 - 4. Signs and nameplates.
 - 5. Finish hardware.
 - 6. Chain link fence.
 - 7. Piping buried in the ground or embedded in concrete.
 - 8. Concealed surfaces of pipe or crawl space.
 - 9. Nonferrous metals, unless specifically noted otherwise.
 - 10. Electrical switchgear and motor control centers.
 - 11. Stainless steel angles, tubes, pipe, etc.
 - 12. Products with polished chrome, aluminum, nickel or stainless steel finish.
 - 13. Plastic switch plates and receptacle plates.
 - 14. Flexible couplings, lubricated bearing surfaces, insulation and metal and plastic pipe interior.
 - 15. Sprinkler heads.
 - 16. Lifting chain on cranes and hoists
 - 17. Electrical cable, festooned conductor system, cables, collector pole brackets, etc.
- D. All work shall be done in strict accordance with this Specification, the Design Drawings and the painting package, including manufacturer's printed instructions.
- E. The Contractor will obtain, at its own expense, all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the Work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".

1.02 DEFINITIONS

- A. Field Painting is the painting of new or rebuilt items at the job site. Field painting shall be the responsibility of the Contractor.
- B. Shop Painting is the painting of new or rebuilt items in the shop prior to delivery to the jobsite.
- C. Abbreviations The abbreviations and definitions listed below, when used in this specification, shall have the following meanings:
 - 1. SSPC - Steel Structures Painting Council
 - 2. Exterior - Outside, exposed to weather
 - 3. Interior Dry - Inside, concealed or protected from weather
 - 4. Interior Wet - Inside, subject to immersion services
 - 5. ASTM - American Society of Test Materials
 - 6. NACE - National Association of Corrosion Engineers
 - 7. NSF - National Sanitation Foundation
 - 8. AWWA - American Water Works Association
- D. Dry Film Thickness shall be in Mils.

1.03 RESOLUTION OF CONFLICTS

- A. It shall be the responsibility of the Contractor to arrange a meeting prior to the start of painting, or flooring installation between the Contractor, the Paint Manufacturer, whose products are to be used, and the County. All aspects of surface preparation, application and coating systems as covered by this Specification will be reviewed at this meeting.
- B. Clarification shall be requested promptly from the County when instructions are lacking, conflicts occur in the Specifications, or the procedure seems improper or inappropriate for any reason.
- C. Copies of all manufacturer's instructions and recommendations shall be furnished to the County by the Painting Contractor.
- D. It shall be the responsibility of the Coating Manufacturer to have their factory representative meet in person with the Contractor and County a minimum of three times during the job as a consultant on surface preparation, mil thickness of coating and proper application of coating unless meeting is determined to be unnecessary by the County.

1.04 SUBMITTALS

- A. Contractor shall submit catalog data and cut sheets for the painting system being used if not the TNEMEC materials specified.
- B. Samples as detailed in 3.01 B shall be submitted regardless of system being used, showing each color to be used.
- C. Hazardous Material Disposal documentation shall be submitted if applicable.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Effective oil and water separators shall be used in all compressed air lines serving spray painting and sandblasting operations to remove oil or moisture from the air before it is used. Separators shall be placed as far as practicable from the compressor.
- B. All equipment for application of the paint and the completion of the work shall be furnished by the Contractor in first-class condition and shall comply with recommendations of the paint manufacturer.
- C. Contractor will provide free of charge to the County a "Nordson-Mikrotest" or "Positest" dry film thickness gauge for ferrous metal and an OG232 "Tooke" gauge or equal for non-ferrous and cementitious surface, to be used to inspect coatings by the County and Contractor. The gauges may be used by the Contractor and returned each day to the County. County will return gauges to Contractor at completion of job.

2.02 MATERIALS

- A. All materials specified herein are manufactured by the TNEMEC Company, Inc., North Kansas City, Missouri. These products are specified to establish standards of quality and are approved for use on this Project.
- B. Equivalent materials of other manufacturers may be substituted on approval of the County. Requests for substitution shall include manufacturer's literature for each product giving the name, generic type, descriptive information and evidence of satisfactory past performance and an independent laboratory certification that their product meets the performance criteria of the specified materials.
- C. Abrasion - Fed. Test Method Std. No. 141, Method 6192, CS-17 Wheel, 1,000 grams load.
- D. Adhesion - Elcometer Adhesion Tester.
- E. Exterior Exposure - Exposed at 45 degrees facing the ocean (South Florida Marine Exposure)
- F. Hardness - ASTM D3363-74
- G. Humidity - ASTM D2247-68
- H. Salt Spray (Fog) - ASTM B117-73
- I. Substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved. Prime and finish coats of all surfaces shall be furnished by the same manufacturer.
- J. All coatings to be shop applied must meet the requirements for volatile organic compounds (VOC) of not more than 3.5 lbs/gallon after thinning.
- K. Colors, where not specified, shall be as selected by the County or their Representative.
- L. All coatings in contact with potable water need to be NSF Certified in accordance with

ANSI/NSF Standard 61.

- M. All above ground potable water mains and appurtenances shall be painted safety blue.

PART 3 EXECUTION

3.01 INSPECTION OF SURFACES

- A. Before application of the prime coat and each succeeding coat, all surfaces to be coated shall be subject to inspection by the County. Any defects or deficiencies shall be corrected by the Contractor before application of any subsequent coating.
- B. Samples of surface preparation and of painting systems shall be furnished by the Contractor to be used as a standard throughout the job, unless omitted by the County.
- C. When any appreciable time has elapsed between coatings, previously coated areas shall be carefully inspected by the County, and where, in his opinion, surfaces are damaged or contaminated, they shall be cleaned and recoated at the Contractor's expense. Recoating times of manufacturer's printed instructions shall be adhered to.
- D. Coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" "Positest" Coating Thickness Gauge (or equal) for ferrous metal or an OG232 "Tooke" Paint Inspection gauge (or equal) for non-ferrous and cementitious surfaces. Please note that use of the "Tooke" gauge is classified as a destructive test.

3.02 SURFACE PREPARATION

The surface shall be cleaned as specified for the paint system being used. All cleaning shall be as outlined in the Steel Structures Painting Council's Surface Preparation Specification, unless otherwise noted. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.

3.03 STANDARDS FOR SURFACE PREPARATION

- A. Chemical and/or Solvent Cleaning: Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter and contaminates, etc. by one of the following methods: steam cleaning, alkaline cleaning, or volatile solvent cleaning.
- B. Hand Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by hand chipping, scraping, sanding and wire brushing.
- C. Power Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by power tool chipping, descaling, sanding, wire brushing and grinding.
- D. Flame Cleaning: Dehydrating and removal of rust, loose mill scale and some light mill scale by use of flame, followed by wire brushing.
- E. White Metal Blast Cleaning: Complete removal of all mill scale, rust, rust scale, previous coating, etc., leaving the surface a uniform gray-white color.
- F. Commercial Grade Blast Cleaning: Complete removal of all dirt, rust scale, mill scale, foreign matter and previous coating, etc., leaving only shadows and/or streaks caused by

rust stain and mill scale oxides. At least 66% of each square inch of surface area is to be free of all visible residues, except slight discoloration.

- G. Brush-Off Blast Cleaning: Removal of rust scale, loose mill scale, loose rust and loose coatings, leaving tightly-bonded mill scale, rust and previous coatings. On concrete surfaces, brush-off blast cleaning shall remove all laitance, form oils and solid contaminants. Blasting should be performed sufficiently close to the surface so as to open up surface voids, bugholes, air pockets and other subsurface irregularities, but so as not to expose underlying aggregate.
- H. Pickling: Complete removal of rust and mill scale by acid pickling, duplex pickling or electrolytic pickling (may reduce the resistance of the surface to corrosion, if not to be primed immediately).
- I. Near-White Blast Cleaning: Removal of all rust scale, mill scale, previous coating, etc., leaving only light stains from rust, mill scale and small specks of previous coating. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.
- J. Power Tool Cleaning to Bare Metal: Complete removal of rust, rust scale, mill scale, foreign matter and previous coatings, etc., to a standard as specified on a Commercial Grade Blast Cleaning (SSPC-SP-6, NACE-3) by means of power tools that will provide the proper degree of cleaning and surface profile.
- K. Visual standards "Pictorial Surface Preparation Standards for Painting Steel Surfaces", and the National Association of Corrosion Engineer, "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.
- L. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to Solvent Cleaning under this Specification.
- M. Weld flux, weld spatter and excessive rust scale shall be removed by Power Tool Cleaning as per these Specifications.
- N. All weld seams, sharp protrusions and edges shall be ground smooth prior to surface preparation or application of any coatings.
- O. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the County.
- P. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be cleaned by thorough Power Tool as specified in these Specifications.
- Q. Touch-up systems will be same as original specification except that approved manufacturer's organic zinc-rich shall be used in lieu of inorganic zinc where this system was originally used. Also strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the County's attention; otherwise, Contractor assumes full responsibility.

3.03 PRETREATMENTS

When specified, the surface shall be pretreated in accordance with the specified pretreatment prior to application of the prime coat of paint.

3.04 STORAGE

Materials shall be delivered to the job site in the original packages with seals unbroken and with legible unmutilated labels attached. Packages shall not be opened until they are inspected by the County and required for use. All painting materials shall be stored in a clean, dry, well-ventilated place, protected from sparks, flame, direct rays of the sun or from excessive heat. Paint susceptible to damage from low temperatures shall be kept in a heated storage space when necessary. The Contractor shall be solely responsible for the protection of the materials stored by himself at the job site. Empty coating cans shall be required to be neatly stacked in an area designated by the County and removed from the job site on a schedule determined by the County. County may request a notarized statement from Contractor detailing all materials used on the Project.

3.05 PREPARATION OF MATERIALS

- A. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint prior to use where required by manufacturer's instructions; thorough hand mixing will be allowed for small amounts up to one gallon. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs. All mixing shall be done in accordance with SSPC Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.
- B. Catalysts or thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.

3.06 APPLICATION

- A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather, unless otherwise allowed by the paint manufacturer. Except as provided below, painting shall not be permitted when the atmospheric temperature is below 50 deg F, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period.
- B. No coatings shall be applied unless surface temperature is a minimum of 5deg above dew point; temperature must be maintained during curing.
- C. See coating schedule for actual coating systems to be used on this project.

3.07

DEW POINT CALCULATION CHART

DEW POINT CALCULATION CHART

Ambient Air Temperature - Fahrenheit

Relative Humidity	20	30	40	50	60	70	80	90	100	110	120
90%	18	28	37	47	57	67	77	87	97	107	117
85%	17	26	36	45	55	65	76	84	95	104	113
80%	16	25	34	44	54	63	73	82	93	102	110
75%	15	24	33	42	52	62	71	80	91	100	108
70%	13	22	31	40	50	60	68	78	88	96	105
65%	12	20	29	38	47	57	66	76	85	93	103
60%	11	20	27	36	45	55	64	73	83	92	101
55%	9	17	25	34	43	53	61	70	80	89	98
50%	6	15	23	31	40	50	59	67	77	86	94
45%	4	13	21	29	37	47	56	64	73	82	91
40%	1	11	18	26	35	43	52	61	69	78	87
35%	-2	8	16	23	31	40	48	57	65	74	83

SURFACE TEMPERATURE AT WHICH CONDENSATION OCCURS

Dew Point

Temperature at which moisture will condense on surface. No coatings should be applied unless surface temperature is a minimum of 5deg above this point. Temperature must be maintained during curing.

Example

If air temperature is 70 deg F and relative humidity is 65%, the dew point is 57 deg F. No coating should be applied unless surface temperature is 62 deg F minimum.

- A. No coating shall be applied unless the relative humidity is below 85%.
- B. Suitable enclosures to permit painting during inclement weather may be used if provisions are made to control atmospheric conditions artificially inside the enclosure, within limits suitable for painting throughout the painting operations.
- C. Field painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the County.
- D. Extreme care shall be exercised in the painting of all operable equipment, such as valves, electric motors, etc., so that the proper functioning of the equipment will not be affected.
- E. The Contractor's scaffolding shall be erected, maintained and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observation shall be cleaned immediately after paint application.

- F. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation whose covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the County.
- G. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint manufacturer.
- H. Each coat of paint shall be recoated as per manufacturer's instructions. Paint shall be considered recoatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion.
- I. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.
- J. Finish colors shall be in accordance with the COLOR SCHEDULE and shall be factory mixed (i.e., there shall be no tinting by the Contractor, unless authorized by the County).
- K. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) of the 2nd coat prior to application of the full 2nd coat.
- L. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A.

3.08 WORKMANSHIP

- A. The Contractor must show proof that all employees associated with this Project shall have been employed by the Contractor for a period not less than six (6) months.
- B. Painting shall be performed by experienced painters in accordance with the recommendations of the paint manufacturer. All paint shall be uniformly applied without sags, runs, spots, or other blemishes. Work which shows carelessness, lack of skill, or is defective in the opinion of the County, shall be corrected at the expense of the Contractor.
- C. The Contractor shall provide the names of at least three other projects of similar size and scope that they have successfully completed under their current company name.

3.09 APPLICATION OF PAINT

- A. By Brush and/or Rollers
 - 1. Top quality, properly styled brushes and rollers shall be used. Rollers with a baked phenol core shall be utilized.
 - 2. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks.
 - 3. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.
 - 4. It may require two coats to achieve the specified dry film thickness if application is by brush and roller.

B. Air, Airless or Hot Spray

1. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied and shall be equipped with suitable pressure regulators and gauges.
2. Paint shall be applied in a uniform layer, with a 50% overlap pattern. All runs and sags should be brushed out immediately or the paint shall be removed and the surface resprayed.
3. High build coatings should be applied by a cross-hatch method of spray application to ensure proper film thickness of the coating.
4. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.
5. Special care shall be taken with thinners and paint temperatures so that paint of the correct formula reaches the receiving surface.
6. Nozzles, tips, etc., shall be of sizes and designs as recommended by the manufacturer of the paint being sprayed.
7. The first coat on concrete surfaces in immersion service should be sprayed and back rolled.

3.10 PROTECTION AND CLEANUP

- A. It shall be the responsibility of the Contractor to protect at all times, in areas where painting is being done, floors, materials of other crafts, equipment, vehicles, fixtures, and finished surfaces adjacent to paint work. Cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before start of painting work.
- B. At the option of the County during the course of this project, the Contractor will contain all spent abrasives, old paint chips, paint overspray and debris by means suitable to the County, including, but not limited to, full shrouding of the area.
- C. If shrouding is required, the Contractor must provide a complete design of the intended shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.
- D. At completion of the work, remove all paint where spilled, splashed, spattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted and unpainted surfaces.
- E. After completion of all painting, the Contractor shall remove from job site all painting equipment, surplus materials and debris resulting from this work.
- F. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the job site in accordance with Local, State and Federal requirements as outlined by the Environmental Protection Agency.
- G. A notarized statement shall be presented to the County that all hazardous materials have been disposed of properly including, but not limited to: name of disposal company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and EPA registration number.

3.11 TOUCH-UP MATERIALS

The Contractor shall provide at the end of the Project at least one (1) gallon of each generic topcoat in each color as specified by the County for future touch-up. Two gallons may be required for (2) component materials.

3.12 ON-SITE INSPECTION

During the course of this Project, the County will reserve the option of incorporating the services of a qualified inspection service. The inspection service will be responsible for assuring the proper execution of this Specification by the successful Contractor.

3.13 STEEL - STRUCTURAL, TANKS, PIPES AND EQUIPMENT

A. EXTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 73-1: Epoxy/High Build Urethane

This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. Provides 3-4 times the color and gloss retention of conventional paints. Second coat to be same color or close to finish color. Specify Series 74 Endura-Shield for gloss finish.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 66-1211 Epoxoline Primer	3.0 - 4.0		
2nd Coat: 66-Color Hi-Build Epoxoline	2.0 - 3.0		
3rd Coat: 73-Endura-Shield III	<u>2.0 - 3.0</u>		
		Dry Film Thickness	7.0 - 10.0
		Minimum	8.0 Mils

2. System No. 73-2: High Build Urethane for Marginally Cleaned Surfaces or Topcoating Existing System

This system can be used over factory finish paint or cover non-sandblasted steel and offer the high performance of a urethane coating. Specify Series 74 Endura-Shield for gloss finish.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning or SSPC-SP3 Power Tool Cleaning

Shop Coat: Manufacturer Standard Primer (or existing coating)	1.5 - 2.0		
2nd Coat: 135 Chembuild	3.0 - 5.0		
3rd Coat: 73-Color Endura-Shield	<u>2.0 - 3.0</u>		
		Dry Film Thickness	6.5 - 10.0
		Minimum	7.5 Mils

3. System No. 82-1: Silicone Alkyd Enamel - Gloss

Coating system for outstanding color and gloss retention and weatherability. This system will provide better performance than alkyd enamel, but not as good as a

urethane. Series 82 includes a minimum of 30% silicone resin and conforms to SSPC-Paint 21-78, Type 1.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 37H-77 Chem Prime	2.0 - 3.5		
2nd Coat: 23-Color Enduratone	2.0 - 3.0		
3rd Coat: 82-Color Silicone Alkyd Enamel	<u>1.0 - 2.0</u>		
	Dry Film Thickness	5.0 - 8.5	
	Minimum	6.0 Mils	

4. System 90-97: Zinc/Epoxy/Urethane

This system offers the added corrosion protection of a zinc rich primer. Series 90-97 Tneme-Zinc is an organic zinc-rich primer that can be used for field touch up of a zinc primer or for touch up of galvanized surfaces that are damaged.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 90-97 Tneme-Zinc	2.5 - 3.5		
2nd Coat: 66-Color Hi-Build Epoxoline	2.0 - 3.0		
3rd Coat: 73 Endurashield III	<u>2.0 - 3.0</u>		
	Dry Film Thickness	6.5 - 9.5	
	Minimum	8.0 Mils	

B. INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 69.1: High Solids Epoxy

This coating will provide maximum protection. It offers chemical and corrosion resistance for long-term protection against salt spray, moisture, corrosive fumes, and chemical attack. Series 69 is a polyamidoamine cured epoxy. Primer coat must be touched-up before second coat is applied.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 69-1211 Epoxoline Primer II	3.0 - 5.0		
2nd Coat:			
69-Color Hi-Build Expoxoline II	<u>4.0 - 6.0</u>		
	Dry Film Thickness	7.0 - 11.0	
	Minimum	9.0 Mils	

2. System No.66-2: High Build Epoxy

This system will provide chemical and corrosion resistance against abrasion, moisture, corrosion fumes, chemical contact and immersion in non-potable water. Primer coat must be touched-up before second coat is applied. Substitute Series 161 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Shop Coat: 69-1211 Epoxoline Primer	3.0 - 5.0		
2nd Coat: 69-Color Hi-Build Expoxoline	<u>4.0 - 6.0</u>		
		Dry Film Thickness	7.0 - 11.0
		Minimum	9.0 Mils

3. System No. 66-6: High Build Epoxy (Over OEM Finishes)

This system is to be used over standard manufacturer's primer to offer a high performance epoxy finish. Excellent for areas of rust not able to be completely cleaned.

Surface Preparation: Spot SSPC-SP6 Commercial Blast Cleaning or SSPC- SP11 Power Tool Cleaning to Bare Metal

Shop Coat: Manufacturer's Standard (or existing coating)	1.0 - 2.0		
2nd Coat: 50-330 Poly-Ura-Prime	2.0 - 3.0		
3rd Coat: 66-Color Hi-Build Expoxoline	<u>2.0 - 4.0</u>		
		Dry Film Thickness	5.0 - 9.0
		Minimum	7.0 Mils

C. IMMERSION

1. System No. 69-2: High Solids Epoxy (Non-Potable Water)

This system provides maximum protection in immersion service. Scarify the surface before topcoating if the Series 69 has been exterior-exposed for 90 days or longer. If primer coat is damaged, it must be touched-up before second coat is applied.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat:			
69-1211 Hi-Build Epoxoline II	3.0 - 5.0		
2nd Coat:			
69-Color Hi-Build Expoxoline II	<u>6.0 - 8.0</u>		
		Dry Film Thickness	9.0 - 13.0
		Minimum	11.0 Mils

2. System No. 66-2: High Solids Epoxy (Non-Potable Water)

This system will provide chemical and corrosion resistance for protection against abrasion, moisture, corrosive fumes, chemical contact and immersion. Primer coat must be touched-up before second coat is applied. Scarify the surface before topcoating if the Series 66 has been exterior-exposed for 60 days or longer. Substitute Series 161 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat: 66-1211 Epoxoline Primer	3.0 - 5.0		
2nd Coat: 66-Color Hi-Build Expoxoline	3.0 - 5.0		
3rd Coat: 66-Color Hi-Build Expoxoline	<u>3.0 - 5.0</u>		
		Dry Film Thickness	9.0 - 15.0
		Minimum	11.0 Mils

3. System No. 20-1: Epoxy-Polyamide (Potable Water)

This system meets American Water Works Association AWWA D 102 Inside Paint System Number 1. Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Substitute Series FC20 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat:			
20-WH02 Pota-Pox (Tank White)	3.0 - 5.0		
2nd Coat: 20-1255 Pota-Pox (Beige)	4.0 - 6.0		
3rd Coat: 20-WH02 Pota-Pox (Tank White)	<u>4.0 - 6.0</u>		
		Dry Film Thickness	11.0 - 17.0
		Minimum	12.0 Mils

4. System No. 140: High Solids Epoxy (Potable Water)

Series 140 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

Shop Coat: 140-1255 Pota-Pox II (Beige)	6.0 - 8.0		
2nd Coat:			
140-WH02 Pota-Pox II (Tank White)	<u>6.0 - 8.0</u>		
		Dry Film Thickness	12.0 - 16.0
		Minimum	14.0 Mils

5. System No. 46-30: Coal Tar-Epoxy (Non-Potable Water Only)

May be applied in a two-coat application. Review critical recoat time if utilized.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning*

One Coat: 46H-413 Hi-Build Tneme Tar		Minimum Dry Film Thickness	14.0 - 20.0
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*SSPC-SP-6 Commercial Blast Cleaning may be used for non-immersion service.

6. System No. 46-26: Coal Tar Epoxy (Non-Potable Water Only)

Must be recoated within four days at 75deg F. Higher temperature will shorten recoat time.

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning*

1st Coat: 46-413 Tneme Tar	8.0 - 10.0		
2nd Coat: 46-413 Tneme Tar	<u>8.0 - 10.0</u>		
		Dry Film Thickness	16.0 - 20.0
		Minimum	16.0 Mils

*SSPC-6 Commercial Blast Cleaning may be used for non-immersion service.

3.14 OVERHEAD METAL DECKING, JOIST

A. INTERIOR EXPOSURE

System No. 15-1: Uni-Bond

This system should be used on ceiling areas where a one-coat system is desired. Can be applied over steel, galvanized and aluminum decking, joist, beams, conduits and concrete.

Surface Preparation: Surfaces must be dry, clean and free of oil, grease and other contaminates. Allow concrete to cure 28 days.

Coating: 15-Color Uni-Bond

Dry Film Thickness 2.5 - 3.5

B. EXTERIOR EXPOSURE

System No. 135-1: Chembuild

This system can be applied over a wide variety of coatings and factory finishes. It can also be applied direct to galvanized aluminum decking, joists, conduits and tight rust.

Surface Preparation: Pressure clean to remove all dirt, oil, grease, chemicals and foreign contaminates. Remove loose paint and all rust by hand and power tool cleaning (SSPC-SP 2 & 3)

Coating: 135-Color Chembuild

Dry Film Thickness 3.0 - 5.0

3.15 MILL COATED STEEL PIPE

A. EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

System No. 66-3: Epoxy-Polyamide

This system can be applied directly to mill coated steel pipe without sandblasting for use in non-immersion. There may be some bleed through with the 1st coat. Do not apply over glossy varnish type mill coatings.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 66-1211 Epoxoline Primer	3.0 - 4.0		
2nd Coat: 66-Color Hi-Build Epoxoline	4.0 - 6.0		
3rd Coat: (If required)	<u>(4.0 - 6.0)</u>		
		Dry Film Thickness	11.0 - 16.0
		Minimum	11.0 Mils

3.16 GALVANIZED STEEL - PIPE AND MISCELLANEOUS FABRICATIONS

A. EXTERIOR / (NON-IMMERSION)

System No. 73-1: Epoxy/High Build Urethane

Series 66 has excellent adhesion to galvanized steel. This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. Provides 3-4 times the color and gloss retention of conventional paints. First coat to be same color as or close to the finish color. Specify Series 74 Endura-Shield for gloss finish.

Surface Preparation: SSPC-SP1 Solvent Cleaning

1st Coat: 66-Color Hi-Build Epoxoline	2.0 - 4.0		
2nd Coat: 73-Color Endura-Shield	<u>2.0 - 4.0</u>		
		Dry Film Thickness	4.0 - 8.0
		Minimum	5.0 Mils

B. INTERIOR EXPOSURE (NON IMMERSION) AND ALUMINUM IN CONTACT WITH CONCRETE

System No. 66-6: Polyamide Epoxy

Surface Preparation: SSPC-SP1 Solvent Cleaning

1st Coat: 66-Color Hi-Build Epoxoline	2.0 - 4.0		
2nd Coat: 66-Color Hi-Build Epoxoline	<u>2.0 - 4.0</u>		
		Dry Film Thickness	4.0 - 8.0
		Minimum	5.0 Mils

C. IMMERSION (POTABLE WATER)

System No. 20-1: Epoxy-Polyamide (Potable Water)

Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Substitute Series FC20 for low temperature cure of quick recoat.

Surface Preparation: SSPC-SP 7 Brush Off Blast Cleaning

1st Coat: 20-1255 Pota-Pox Primer	3.0 - 5.0		
2nd Coat: 20-WH02 Pota-Pox Finish	<u>4.0 - 6.0</u>		
		Dry Film Thickness	7.0 - 11.0
		Minimum	9.0 Mils

3.17 CHAIN-LINK FENCES

A. GALVANIZED STEEL & NON-FERROUS METAL

System No. 22-1: Oil-Cementitious

Surface Preparation: Surface shall be clean and dry

One Coat: 22-Color Galv-Gard

Dry Film Thickness 3.0 - 4.0

3.18 CONCRETE

A. EXTERIOR - ABOVE GRADE

1. System No. 52-1 Modified Epoxy - Sand Texture

Series 52 is a high build, decorative sand texture finish that hides minor surface irregularities and gives long-term protection against weather, driving rain, ultraviolet exposure, alternate freezing and thawing. Series 52 will actually become part of the concrete. Available in Series 55, Tneme-Crete smooth finish. For porous substrates, a second coat of Series 52 is required. Substitute Series 180 or 181 W.B. Tneme-Crete when specified over existing acrylic or latex coatings.

Surface Preparation: Surface shall be clean and dry.

One Coat: 52-Color Tneme-Crete

Dry Film Thickness 8.0 - 10.0

2. System No. 6-1: Acrylic Emulsion Low Sheen

If semi-gloss finish is desired, use Series 7 Tneme-Cryl SG as the second coat.

Surface Preparation: Surface must be clean and dry.

1st Coat: 6-Color Tneme-Cryl

2.0 - 3.0

2nd Coat: 6-Color Tneme-Cryl

2.0 - 3.0

Dry Film Thickness 4.0 - 6.0

Minimum 5.0 Mils

3. System No. 156-1: Modified Acrylic Elastomer

If texture is needed, use 157 Enviro-Crete TX (medium texture) or 159 Enviro-Crete XTX (coarse texture). For application over previously applied coatings, use TNE MEC Series 151 Elasto-Grip at 1.0 - 2.5 mils DFT prior to the application of Series 156 Enviro-Crete.

Surface Preparation: Surface must be clean and dry.

1st Coat: 156-Color Enviro-Crete

4.0 - 8.0

2nd Coat: 156-Color Enviro-Crete

4.0 - 8.0

Dry Film Thickness 8.0 - 16.0

Minimum 10.0 Mils

B. EXTERIOR - BELOW GRADE

1. System No. 46-61: Coal Tar Pitch Solution

Surface Preparation: Surface must be clean and dry, Level all protrusions.

1st Coat: 46-465 H.B. Tnemecol	8.0 - 12.0		
2nd Coat: 46-465 H.B. Tnemecol	<u>8.0 - 12.0</u>		
		Dry Film Thickness	16.0 - 24.0
		Minimum	16.0 Mils

2. System No. 46-31: Coal Tar-Epoxy

Surface Preparation: Surface shall be clean and dry.

One Coat: 46H-413 Hi-Build Tneme-Tar		Dry Film Thickness	14.0 - 20.0
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3. System No. 100-1: Crystalline Waterproofing

This system can be applied to concrete that is still wet or has not developed final cure. It can be used where wet surface conditions exist or where there is the potential for water intrusion due to hydrostatic pressure. Application shall be per Xypex specification manual.

Surface Preparation: Surface to be clean and roughened by Brush Blasting or Acid Etching.

1st Coat: XYPEX Concentrate at 1.5 lbs/SY
2nd Coat: XYPEX Modified at 1.5 lbs/SY

C. EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 6-1: Acrylic Emulsion, Low Sheen (Interior/Exterior)

This system will provide a decorative coating with good exterior durability, color retention, and a high vapor transmission rate. For Semi-Gloss finish, use 7-Color Tneme-Cryl S/G.

Surface Preparation: Surface shall be clean and dry. Allow concrete to cure for 28 days.

1st Coat: 6-Color Tneme-Cryl	2.0 - 3.0		
2nd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>		
		Dry Film Thickness	4.0 - 6.0
		Minimum	5.0 Mils

2. System No. 66-4: Epoxy-Polyamide (Interior/Exterior)

Series 66 provides excellent protection from abrasion, moisture, corrosive fumes and chemical contact. For exterior exposures, topcoat with Series 73, or 74 Endura-Tone for gloss and color retention.

Surface Preparation: Surfaces shall be clean and dry. Allow concrete to cure for 28 days. SSPC-SP-7 Brush-Off Blast Clean.

1st Coat: 66-Color Hi-Build Epoxoline	3.0 - 5.0		
2nd Coat: 66-Color Hi-Build Epoxoline	<u>4.0 - 6.0</u>		
		Dry Film Thickness	7.0 -11.0
		Minimum	9.0 Mils

3. System No. 83-1: High Solids Catalyzed Epoxy
(Interior)

Surface Preparation: Surface shall be clean and dry. Allow concrete to cure for 28 days. SSPC-SP-7 Brush Off Blast Clean. Concrete block surfaces: Allow to cure 28 days. Level fins, protrusions and mortar splatter.

1st Coat: 83-Color Ceramlon II	6.0 - 10.0		
2nd Coat: 83-Color Ceramlon II	<u>6.0 - 10.0</u>		
		Dry Film Thickness	12.0 - 20.0
		Minimum	14.0 Mils

D. IMMERSION - POTABLE & NON-POTABLE WATER

1. System No. 66-4: Epoxy Polyamide (Non-Potable Water)

Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer.

Surface Preparation: SSPC-SP-7 Brush-Off Blast Cleaning

1st Coat: 66-Color Hi-Build Epoxoline	4.0 - 6.0		
2nd Coat: 66-Color Hi-Build Epoxoline	<u>4.0 - 6.0</u>		
		Dry Film Thickness	8.0 -12.0
		Minimum	10.0 Mils

2. System No. 104-5: High Solids Epoxy (Non-Potable Water)

Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer.

Surface Preparation: SSPC-SP-7 Brush-Off Blast Cleaning

1st Coat: 104-1255 H.S. Epoxy Primer	6.0 - 10.0		
2nd Coat: 104 Color H.S. Epoxy	<u>6.0 - 10.0</u>		
		Dry Film Thickness	12.0 - 20.0
		Minimum	14.0 Mils

3. System No. 46-31: Coal Tar-Epoxy (Non-Potable Water)

May be applied in a two-coat application. Review critical recoat time is utilized. Surface irregularities and bugholes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer.

Surface Preparation: Brush-Off Blast Cleaning

One Coat: 46H-413 Hi-Build Tneme-Tar

Dry Film Thickness 14.0-20.0

4. System No. 45-27: Coal Tar Epoxy (Non-Potable Only)

Must be recoated within four days at 75deg F. Higher temperature will shorten recoat time.

Surface Preparation: Brush-Off Blast Cleaning

1st Coat: 46-413 Tneme Tar 8.0 - 10.0

2nd Coat: 46-413 Tneme Tar 8.0 - 10.0

Dry Film Thickness 16.0 - 20.0
Minimum 16.0 Mils

5. System No. 20-2 Epoxy-Polyamide (Potable Water)

This system meets American Water Works Association AWWA D 102 Inside System No. 1. Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer. (NSF Standard 61 approved). Substitute Series FC20 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

1st Coat: 20-1255 Pota-Pox 4.0 - 6.0

2nd Coat: 20-WH02 Pota-Pox Finish 4.0 - 6.0

Dry Film Thickness 8.0 - 12.0
Minimum 10.0 Mils

6. System No. 139-2: Epoxy-Polyamine (Potable Water)

Series 139 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler and Surfacer. (NSF Standard 61 approved.)

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

1st Coat: 139-1255 Pota-Pox II 6.0 - 8.0

2nd Coat: 139-WH02 Pota-Pox II 6.0 - 8.0

Dry Film Thickness 12.0 - 16.0
Minimum 14.0 Mils

E. INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 104-3: High Solids Epoxy

This system will produce a slick, tile-like finish that has excellent chemical and water

resistance. Surface will be easy to clean.

Surface Preparation: Surface to be clean and dry.

1st Coat: 104-Color H.S. Epoxy	6.0 - 8.0		
2nd Coat: 104-Color H.S. Epoxy	<u>6.0 - 8.0</u>		
		Dry Film Thickness	12.0 - 16.0
		Minimum	14.0 Mils

2. System No. 113-1: Acrylic-Epoxy Semi-Gloss

This system will provide high performance and can be applied directly over existing coatings without lifting. Can be used when low odor is required during application. Specify Series 114 Tneme-Tuffcoat for Gloss Finish.

Surface Preparation: Surface must be clean and dry.

One Coat: 113-Color Tneme-Tuffcoat		Dry Film Thickness	4.0 - 6.0
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3.19 CONCRETE FLOORS

A. EPOXY FLOOR COATINGS

1. System No. 67-1: Epoxy-Polyamide

This system will provide a durable, long-wearing coating that bonds tightly to concrete and stands up under heavy foot traffic, frequent cleaning and spillage of water, oil, grease, or chemical.

Surface Preparation: Acid Etch or Brush-Off Blast Cleaning

1st Coat: 67-Color Tnema-Tread	2.0 - 3.0		
2nd Coat: 67-Color Tnema-Tread	<u>2.0 - 3.0</u>		
		Dry Film Thickness	4.0 - 6.0
		Minimum	5.0 Mils

2. System No. S67-1: Epoxy-Polyamide (Non-Skid)

This system will provide the same protection and durability as System 67-1 with the addition of a non-skid finish.

Surface Preparation: Acid Etch or Brush-Off Blast Cleaning

1st Coat: S67-Color Tneme-Tread	2.0 - 3.0		
2nd Coat: 67-Color Tneme-Tread	<u>2.0 - 3.0</u>		
		Dry Film Thickness	4.0 - 6.0
		Minimum	5.0 Mils

3. System No. 73-12: Epoxy/Urethane

This system will provide maximum protection against chemical splash and spillage, wet conditions and abrasion. Specify Series 70 Endura-Shield for Gloss finish. First

coat must be thinned 20% prior to application. For non-skid finish, specify Series S67 Tneme-Tread for the first and second coat.

Surface Preparation: Acid Etch or Brush-Off Blast Cleaning

1st Coat: 67-Color Tneme-Tread	2.0 - 3.0		
2nd Coat: 67-Color Tneme-Tread	2.0 - 3.0		
3rd Coat: 71-Color Endura-Shield	<u>1.5 - 2.5</u>		
		Dry Film Thickness	5.5 - 8.5
		Minimum	6.5 Mils

4. System No. 281-1: High Build Polyamine-Epoxy Floor

Please refer to manufacturer's Installation Guide and Technical Data for proper installation.

Surface Preparation: Abrasive blast cleaning (refer to Installation Guide of manufacturer.

1st Coat: 201 Epoxoprime	6.0 - 8.0		
2nd Coat: 281 Tneme-Glaze	<u>6.0 - 8.0</u>		
		Dry Film Thickness	12.0 - 16.0
		Minimum	14.0 Mils

5. System No. 221/281: Functional Flooring (Non-Slip)

Please refer to manufacturer's Installation Guide and Technical Data for proper installation.

Surface Preparation: Abrasive blast cleaning (refer to Installation Guide of manufacturer.

1st Coat: 201 Epoxoprime	6.0 - 8.0		
2nd Coat: 221 Lami-Tread (2 cts. @ 1/16" ea.)	1/8"		
3rd Coat: 281 Tneme-Glaze	<u>8.0 - 12.0</u>		
		Minimum Dry Film Thickness	1/4"+

3.20 POROUS MASONRY

A. EXTERIOR/INTERIOR EXPOSURE

1. System No. 52-2: Modified Epoxy - Sand Texture

First coat of Tneme-Crete will act as a filler coat while the second coat will completely seal and finish. Long-term life and high performance. Available in Series 55 Tneme-Crete smooth finish.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 52-Color Tneme-Crete	60 - 80 SF
2nd Coat: 52-Color Tneme-Crete	Per Gal/Per Coat

2. System No. 6-2: Acrylic Emulsion, Low Sheen

This system will fill the block and provide a sealed surface. For Semi-Gloss Finish, use 7-Color Tneme-Cryl S/G.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 54-562 Modified Epoxy Masonry Filler

80 SF Gal

2nd Coat: 6-Color Tneme-Cryl

2.0 - 3.0

3rd Coat: 6-Color Tneme-Cryl

2.0 - 3.0

*4.0 - 6.0

*Total Dry Film Thickness of Topcoats Only.

3. System No. 66-15: Epoxy-Polyamide (Interior)

Block Filler is a modified epoxy designed for high moisture.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 54-660 Epoxy Masonry Filler 100 SF/Gal

2nd Coat: 66-Color Hi-Build Epoxoline 4.0 - 6.0

3rd Coat: 66-Color Hi-Build Epoxoline 4.0 - 6.0

*8.0 - 12.0

*Total Dry Film Thickness of Topcoats Only.

4. System No. 104-6: High Solids Epoxy (Interior Only)

This system will produce a film thickness of 16 mils. The surface will be tile-like for easy cleaning and will provide protection against chemical attack, corrosive fumes, high humidity and wash down. Backfold first coat to fill porosity.

Surface Preparation: Surface to be clean and dry.

1st Coat: 104-Color H.S. Epoxy 6.0 - 10.0

2nd Coat: 104-Color H.S. Epoxy 6.0 - 10.0

Dry Film Thickness 12.0 - 20.0
Minimum 14.0 Mil

5. System No. 113-1: Acrylic-Epoxy Semi-Gloss (Interior Only)

Series 113 Tneme-Tufcoat has very low odor and can be used when painting in occupied areas. Specify Series 114 Tneme-Tufcoat for a gloss finish.

Surface Preparation: Surface must be clean and dry.

1st Coat: 130 Envirofill 100 SF/Gal

2nd Coat: 113-Color Tnema-Tufcoat* 4.0 - 6.0

**4.0 - 6.0

* Two coats may be required if applied by roller

** Total Dry Film Thickness of Topcoats Only

6. System No. 156-1: Modified Acrylic Elastomer

If texture is needed, use 157 Enviro-Crete TX (medium texture of 159 Enviro-Crete XTX - coarse texture). For application over previously applied coatings, use TNEMEC 151 Elasto-Grip at 1.0 - 2.5 mils DFT.

Surface Preparation: Surfaces must be clean and dry.

1st Coat: 130 Envirofil	100 SF/Gal		
2nd Coat: 156-Color Enviro-Crete	4.0 - 8.0		
3rd Coat: 156-Color Enviro-Crete	<u>4.0 - 8.0</u>		
		Dry Film Thickness	8.0 - 16.0
		Minimum	10.0 Mils
			(For 2nd & 3rd Coats)

3.21 GYPSUM WALLBOARD

A. INTERIOR EXPOSURE

1. System No. 111-5: Acrylic-Epoxy

Surface Preparation: Surface must be clean and dry.

1st Coat: 51-792 PVA Sealer	1.0 - 2.0		
2nd Coat: 113 H.B. Tnemetufcoat*	<u>4.0 - 5.0</u>		
		Dry Film Thickness	5.0 - 7.0
		Minimum	6.0 Mils

*Two coats may be required if application is by brush and roller.

2. System No. 66-22: Hi-Build Epoxoline

Surface Preparation: Surface must be clean and dry.

1st Coat: 51-792 PVA Sealer	1.0 - 2.0		
2nd Coat: 66-Color Hi-Build Epoxoline*	<u>4.0 - 6.0</u>		
		Dry Film Thickness	5.0 - 8.0
		Minimum	5.0 Mils

*Two coats may be required if applied by roller

3. System No. 6-1: Acrylic Emulsion, Low Sheen (Interior/Exterior Exposure)

This system is designed for mild use areas like office walls, laboratory ceilings, stairwells, etc. For Semi-Gloss finish, use 7-color Tneme-Cryl S/G.

Surface Preparation: Surface must be dry and clean.

1st Coat: 6-Color Tneme-Cryl	2.0 - 3.0		
2nd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>		
	Dry Film Thickness	4.0 - 6.0	
	Minimum	5.0 Mils	

3.22 WOOD

A. EXTERIOR/INTERIOR EXPOSURE

1. System No. 23-4: Alkyd Semi-Gloss

Specify Series 2H Hi-Build Tneme-Gloss for High Gloss finish.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 36-603 Undercoater	2.5 - 3.5		
2nd Coat: 23 Enduratone	1.5 - 3.5		
3rd Coat: 23 Enduratone	<u>1.5 - 3.5</u>		
	Dry Film Thickness	5.5 - 10.5	
	Minimum	6.0 Mils	

2. System No. 6-5: Acrylic Latex

Substitute Series 7 if semi gloss finish is desired.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 36-603 Undercoater	2.0 - 3.5		
2nd Coat: 6-Color Tneme-Cryl	2.0 - 3.0		
3rd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>		
	Dry Film Thickness	6.0 - 9.5	
	Minimum	7.5 Mils	

3.23 PVC PIPE

A. EXTERIOR OR INTERIOR

System No. 66-23: Epoxy-Polyamide

Optional topcoat of Series 73/74 Endura-Shield would give long-term color and gloss retention for exterior exposure.

Surface Preparation: Surface shall be clean and dry.

One Coat: 66-Color Hi-Build Epoxoline

Dry Film Thickness 4.0 - 6.0

3.24 INSULATED PIPE

A. INTERIOR EXPOSURE

System No. 6-1: Acrylic Emulsion, Low Sheen

For semi-gloss finish, use 7-Color Tneme-Cryl S/G.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 6-Color Tneme-Cryl	2.0 - 3.0		
2nd Coat: 6-Color Tneme-Cryl	<u>2.0 - 3.0</u>		
		Dry Film Thickness	4.0 - 6.0
		Minimum	5.0 Mils

3.25 HIGH HEAT COATING

A. EXTERIOR/INTERIOR EXPOSURE

1. System No. 39-2: Silicone Aluminum (1200deg F Maximum)

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning - 1.0 Mil Surface Profile

1st Coat: 39-1261 Silicone Aluminum	1.0 - 1.5		
2nd Coat: 39-1261 Silicone Aluminum	<u>1.0 - 1.5</u>		
		Dry Film Thickness	2.0 - 3.0
		Minimum	2.0 Mils

2. System No. 39-4: Silicone Aluminum (600deg F Maximum)

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning - 1.0 Mil Surface Profile

1st Coat: 39-661 Silicone Aluminum	1.0 - 1.5		
2nd Coat: 39-661 Silicone Aluminum	<u>1.0 - 1.5</u>		
		Dry Film Thickness	2.0 - 3.0
		Minimum	2.0 Mils

3.26 SURFACES EXPOSED TO H2S/H2SO4 (SEVERE EXPOSURE/IMMERSION)

A. CEMENTITIOUS SURFACES

System No. 120-1: Vinester

Surface Preparation: Abrasive blast clean to remove all laitance, fines and contamination.

1st Coat: 120-5002 Vinester	6.0 - 10.0*		
2nd Coat: 120-5003 Vinester F&S	As Required**		
3rd Coat: 120-5002 Vinester	12.0 - 18.0		
4th Coat: 120-5001 Vinester	<u>12.0 - 18.0</u>		
		Dry Film Thickness	30.0 - 46.0
		Minimum	36.0 Mils+

*First coat is to be applied by roller application or spray applied followed by backrolling.

**All surface voids, cracks, pinholes and other defects must be filled flush with the adjacent surfaces by putty knife, trowel, float, squeegee, or other suitable method.

B. FERROUS METAL SURFACES

System No. 120-2: Vinyl Ester

Surface Preparation: SSPC-SP-5 White Metal Blast Cleaning (3.0 Mil Profile)

1st Coat: 120-5002 Vinester	12.0 - 18.0		
2nd Coat: 120-5001 Vinester	<u>12.0 - 18.0</u>		
		Dry Film Thickness	24.0 - 36.0
		Minimum	30.0 Mils

3.27 EXTERIOR OF PRESTRESSED CONCRETE TANKS

A. System No. 156-1: New Tanks

Surface Preparation: Surface to be clean and dry.

1st Coat: 156-Color Envirocrete	4.0 - 6.0		
2nd Coat: 156-Color Envirocrete	<u>4.0 - 6.0</u>		
		Dry Film Thickness	8.0 - 12.0
		Minimum	10.0 Mils

B. System No. 156-2: Existing Tanks (Previously Painted)

Major cracks (wider than 1/64") can be repaired with TNEMEC Series 152 Tneme-Tape per instructions.

Surface Preparation: Remove all dirt, oil, grease, chalk, and loose paint per high pressure water blast (min. 3500 psi).

1st Coat: 151 Elasto-Grip	1.0 - 2.5		
Stripe Coat: Stripe all hairline cracks with a brushed coat of Series 156 Envirocrete	3.0 - 5.0		
Topcoat: 156-Envirocrete	<u>4.0 - 6.0</u>		
		Dry Film Thickness (Cracks)	8.0 - 13.5
		Dry Film Thickness (Other)	5.0 - 8.5

3.28 SECONDARY CONTAINMENT AREAS

A. System No. 66-4: Epoxy Polyamide

This system will provide excellent resistance to most chemicals including petrochemicals.

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast)

Primer: 66-Color Hi-Build Epoxoline	4.0 - 6.0		
Topcoat: 66-Color Hi-Build Epoxoline	<u>4.0 - 6.0</u>		
		Dry Film Thickness	8.0 - 12.0
		Minimum	10.0 Mils

B. System No. 61-1: Amine Epoxy

This system offers superior chemical resistance to a wide range of chemicals. Use TNEMEC Series 63-1500 between coats as a filler and surfacer wherever it is required.

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast).

Primer: 61-5002 Tneme-Liner (Beige)	8.0 - 12.0		
Topcoat: 61-5001 Tneme-Liner (Gray)	<u>8.0 - 12.0</u>		
		Dry Film Thickness	16.0 - 24.0

C. System 262-1: Flexible Polyurethane

Multiple passes may be required to achieve recommended film thickness. See Elasto-Shield application guide for additional instructions. This product is only available in black.

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast)

Coating: 262 Elasto Shield (Black)
 Minimum Dry Film Thickness 50.0

3.29 CLEAR WATER REPELLENT FOR CONCRETE, MASONRY AND BRICK

A. Silane Sealer (Min. 20% Solids)

Surface Preparation: Allow new concrete to cure 28 days. Clean surfaces to be sealed by abrasive blasting or waterblasting.

COATING: BRICK, CONCRETE
 HULS Chem-Trete BSM 20....75-200 SF/GAL

SPLIT FACED OR POROUS MASONRY
 HULS Chemtrete PB.....35-100 SF/GAL

3.30 MANHOLES, WET WELLS AND LIFT STATIONS

A. System No. 120-1: Vinester

Surface Preparation: Abrasive blast clean to remove all laitance, fines and contamination.

1st Coat: 120-5002 Vinester	6.0 - 10.0*		
2nd Coat: 120-5003 Vinester F&S	As Required**		
3rd Coat: 120-5002 Vinester	12.0 - 18.0		
4th Coat: 120-5001 Vinester	<u>12.0 - 18.0</u>		
		Dry Film Thickness	30.0 - 46.0
		Minimum	36.0 Mils+

*First coat to be applied by roller application or spray applied followed by backrolling.

**All surface voids, cracks, pinholes and other defects must be filled flush with the adjacent surfaces by putty knife, trowel, float, squeegee, or other suitable method.

B. System No. 100-1: Crystalline Waterproofing

This system can be applied to concrete that is still wet or has not developed final cure. It can be used where wet surface conditions exist or where there is the potential for water intrusion due to hydrostatic pressure.

Surface Preparation: Surface to be clean and roughened by Brush Blasting or Acid Etching.

1st Coat: XYPEX Concentrate @ 1.5 lbs./SY

2nd Coat: XYPEX Modified @ 1.5 lbs./SY

3.31 CANAL PIPE CROSSINGS

A. System 90-97: Zinc/Epoxy/Urethane for New Pipe or Pipe Requiring Removal of Existing Coatings

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

Primer: 90-97 Tneme-Zinc 2.5 - 3.5

2nd Coat: 66-Color Hi-Build Epoxoline 2.0 - 3.0

3rd Coat: 74-Color Endurashield 2.0 - 3.0

Dry Film Thickness 6.5 - 9.5
Minimum 8.0 Mills

B. System No. 135-2: High Build, High Gloss Urethane for Marginally Cleaned Surfaces or Topcoating Over Existing Systems

Surface Preparation: High Pressure Water Blast (min. 3500 psi) or Solvent Clean (SSPC-SP1) and Spot Hand and Power Tool Clean (SSPC-SP 2 & 3) or Brush Blast (SSPC-SP7). Existing coatings must be clean, dry and tightly adhering prior to application of coatings.

1st Coat: 135-Color Chembuild 3.0 - 4.0

2nd Coat: 74-Color Endurashield 2.0 - 3.0

Minimum Dry Film Thickness 5.0

C. Ductile Iron Pipe (Above grade)

A test patch is always recommended to insure proper adhesion to existing coatings without lifting of existing coatings.

Surface Preparation: Clean and dry. (Do not solvent clean.)

1st Coat: TNEMEC Series 66* 3.0 - 5.0

2nd Coat: TNEMEC Series 66 3.0 - 5.0

Minimum Dry Film Thickness 6.0 - 10.0

*Allow the black asphaltic coating to "bleed" through the first coat. After the first coat is cured, apply second coat.

3.32 PROJECT DESIGNER SYSTEMS REFERENCE GUIDE

A. STEEL

EXTERIOR (NON-IMMERSION)

- A.1 System No. 73-1: Epoxy/High Build Urethane
- A.2 System No. 73-2: High Build Urethane
- A.3 System No. 2H-3: Alkyd Gloss
- A.4 System 90-97: Zinc/Epoxy/Urethane

INTERIOR EXPOSURE (NON-IMMERSION)

- B.1 System No. 69-1: High Solids Epoxy
- B.2 System No. 66-2: High Build Epoxy
- B.3 System No. 66-6: High Build Epoxy

IMMERSION

- C.1 System No. 69-2: High Solids Epoxy (Non-Potable)
- C.2 System No. 66-2: High Build Epoxy (Non-Potable)
- C.3 System No. 20-1: Epoxy-Polyamide (Potable)
- C.4 System No. 140: High Solids Epoxy (Potable Water)
- C.5 System No. 46-30: High Build Coat Tar Epoxy (Non-Potable Only)
- C.6 System No. 46-26: Coal Tar Epoxy (Non Potable Water Only)

B. OVERHEAD METAL DECKING, JOIST (INTERIOR EXPOSURE)

System No. 15-1: Uni-Bond

C. OVERHEAD METAL DECKING, JOINT (EXTERIOR EXPOSURE)

System No. 135-1: Chembuild

D. MILL COATED STEEL PIPE

System No. 66-3: Epoxy Polyamide

E. GALVANIZED STEEL-PIPE AND MISCELLANEOUS FABRICATORS

System No. 73-1: Epoxy/High Build Urethane

F. GALVANIZED STEEL-INTERIOR EXPOSURE (NON-IMMERSION) AND ALUMINUM IN CONTACT WITH CONCRETE

System No. 66-6: Polyamide Epoxy

G. GALVANIZED STEEL - IMMERSION (POTABLE WATER)

System No. 20-1: Epoxy Polyamide (Potable Water)

H. CHAIN LINK FENCES

System No. 22-1: Oil-Cementitious

I. CONCRETE

EXTERIOR-ABOVE GRADE

- A.1 System No. 52-1: Modified Epoxy-Sand Texture
- A.2 System No. 6-1: Acrylic Emulsion Low Sheen
- A.3 System No. 156-1: Modified Acrylic Elastomer

EXTERIOR-BELOW GRADE

- B.1 System No. 46-61: Coal Tar Pitch Solution
- B.2 System No. 46-31: Coal Tar Epoxy
- B.3 System No. 100-1: Crystalline Waterproofing

EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

- C.1 System No. 6-1: Acrylic Emulsion Low Sheen
- C.2 System No. 66-4: Epoxy-Polyamide
- C.3 System No. 83-1: High Solids Catalyzed Epoxy

IMMERSION (POTABLE & NON-POTABLE)

- D.1 System No. 66-4: Epoxy-Polyamide (Non-Potable)
- D.2 System No. 104-5: High Solids Epoxy (Non-Potable)
- D.3 System No. 46-31: High Build Coal Tar Epoxy (Non-Potable Only)
- D.4 System No. 46-27: Coal Tar Epoxy (Non Potable Only)
- D.5 System No. 20-2: Epoxy Polyamide (Potable)
- D.6 System No. 139-2: Epoxy Polyamide (Potable)

INTERIOR EXPOSURE (NON-IMMERSION)

- E.1 System No. 104-3: High Solids Epoxy
- E.2 System No. 113-1: Acrylic Epoxy Semi-Gloss

J. CONCRETE FLOORS

- A.1 System No. 67-1: Epoxy-Polyamide
- A.2 System No. S67-1: Epoxy-Polyamide (Non-Skid)
- A.3 System No. 73-12: Epoxy/Urethane
- A.4 System No. 281-1: High Build Polyamide-Epoxy Flooring
- A.5 System No. 221/281: Functional Flooring (Non-Slip)

K. POROUS MASONRY - EXTERIOR/INTERIOR EXPOSURE

- A.1 System No. 52-2: Modified Epoxy-Sand Texture
- A.2 System No. 6-2: Acrylic Emulsion, Low Sheen
- A.3 System No. 66-15: Epoxy-Polyamide (Interior)
- A.4 System No. 104-6: High Solids Epoxy (Interior Only)
- A.5 System No. 113-1: Acrylic Epoxy Semi-Gloss (Interior Only)

- A.6 System No. 156-1: Modified Acrylic Elastomer
- L. GYPSUM WALLBOARD
 - A.1 System No. 111-5: Acrylic Epoxy
 - A.2 System No. 66-22: Hi-Build Epoxoline
 - A.3 System No. 6-1: Acrylic Emulsion, Low Sheen
- M. WOOD EXTERIOR/INTERIOR EXPOSURE
 - A.1 System No. 23-4: Alkyd Semi-Gloss
 - A.2 System No. 6-5: Acrylic Latex
- N. PVC PIPE EXTERIOR/INTERIOR EXPOSURE
 - A.1 System No. 66-23: Epoxy-Polyamide
- O. INSULATED PIPE-INTERIOR EXPOSURE
 - A.1 System No. 6-1: Acrylic Emulsion, Low Sheen
- P. HIGH HEAT SURFACES-FERROUS METAL
 - A.1 System No. 39-2: Silicone Aluminum (1200deg F Maximum)
 - A.2 System No. 39-4: Silicone Aluminum (600deg F Maximum)
- Q. SURFACES EXPOSED TO H₂S/H₂SO₄ (SEVERE EXPOSURE/IMMERSION)
 - A.1 System No. 120-1: Vinester
- R. EXTERIOR OF PRESTRESSED CONCRETE TANKS
 - A. System 156-1: New Tanks
 - B. System 156-2: System 156-2 Existing Tanks (Previously Painted)
- S. SECONDARY CONTAINMENT AREAS
 - A. System No. 64-4: Epoxy Polyamide
 - B. System No. 61-1: Amine Epoxy
 - C. System No. 262-1: Flexible Polyurethane
- T. CLEAR WATER REPELLENT FOR CONCRETE, MASONRY AND BRICK
 - A. Silane Sealer (Min. 20% Solids)
- U. MANHOLES, WET WELLS & LIFT STATIONS
 - A. System No. 120-1: Vinester
 - B. System No. 100-1: Crystalline Waterproofing
- V. CANAL PIPE CROSSINGS
 - A. System No. 90-97: Zinc/Epoxy/Urethane

- B. System No. 135-2: High Build/High Gloss Urethane
- C. Ductile Iron Pipe Above Grade: Series 66 High Build Epoxy

END OF SECTION

Bid Attachment 3
PLAN SET / DRAWINGS

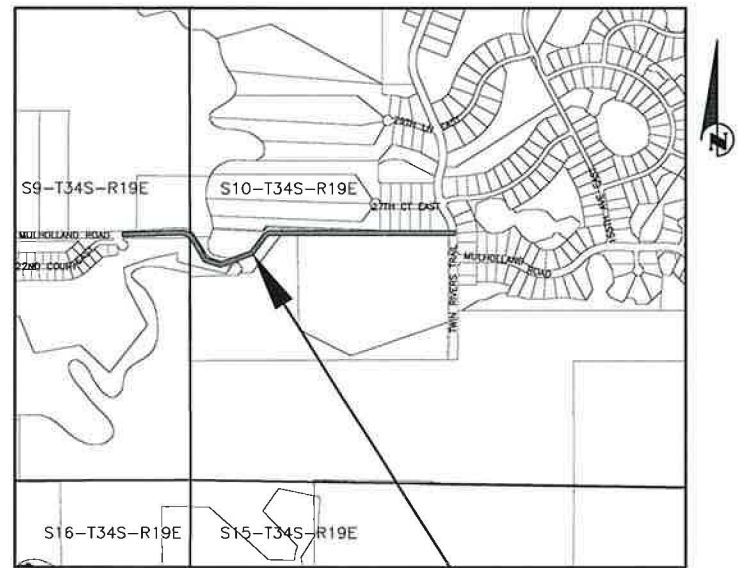


MANATEE COUNTY, FLORIDA MULHOLLAND ROAD WATER MAIN 6046270

February 2018

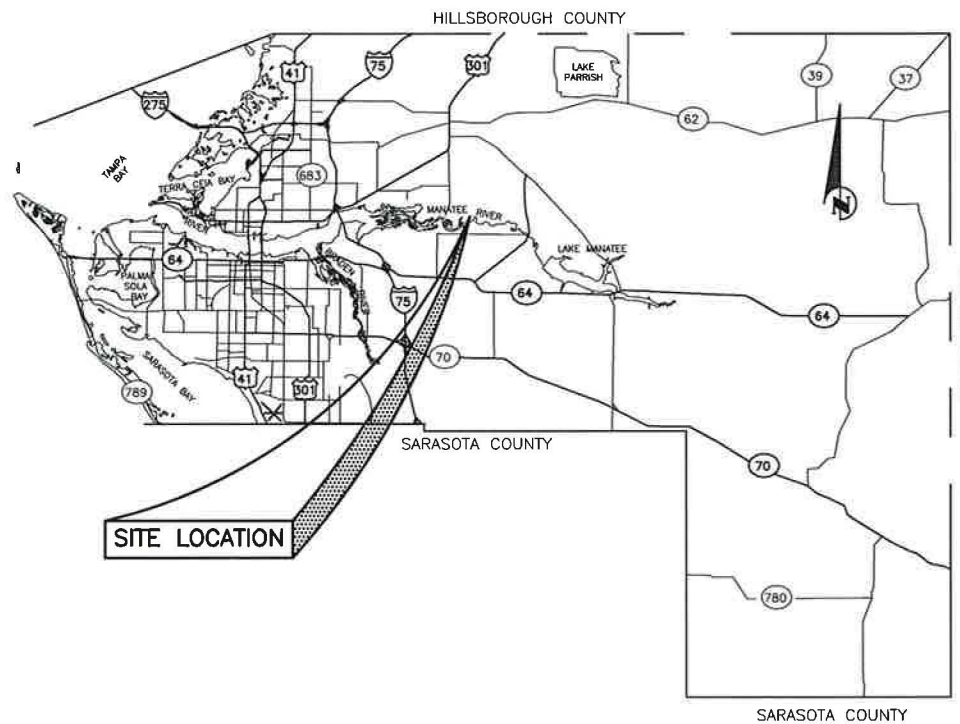
MULHOLLAND ROAD
WATER MAIN
COVER SHEET

BID SET



VICINITY MAP
N.T.S.

PROJECT SITE

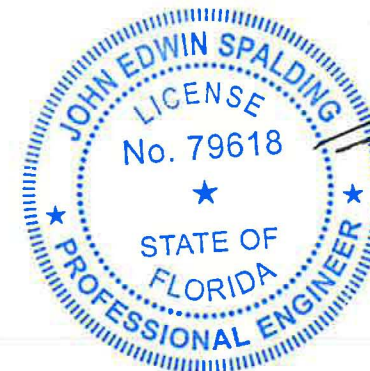


SITE LOCATION

NO.	INDEX OF SHEETS
1	COVER SHEET
2	GENERAL NOTES & LEGEND
3	KEY SHEET AND MOT
4-13	PLAN & PROFILE
14	CROSS SECTIONS
15-17	DETAILS
18	EROSION CONTROL

PROJECT DESCRIPTION

INSTALL 1696 LF OF 10-INCH DIP WATER MAIN
INSTALL 1870 LF OF 10-INCH PVC WATER MAIN
INSTALL 10 LF OF 8-INCH PVC WATER MAIN
INSTALL 290 LF OF 12-INCH IN 20-INCH CASING HDD WATER MAIN



John E. Spalding
2/5/2018



Know what's below
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STANTEC CONSULTING SERVICES INC.
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FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT # 177310615
SURVEY # 000
SEC./TWN./RGE 9&10/34S/19E
SCALE

BY	DATE
SURVEYED GFY	11/06/15
DESIGNED JES	02/05/18
DRAWN SRP	02/05/18
CHECKED SCM	02/05/18

JOHN E. SPALDING
FLORIDA P.E. # 79618

Signature & Date

SHEET 1

I:\Projects\2018\6046270\Drawings\02\177310615\02\177310615\02\177310615\02\177310615.dwg, 11 x 17 Cover, 2/7/2018 3:53 PM Paphom, Scott, 11 x A0S1 full bleed B (17.00 x 11.00 inches)

GENERAL

- 1. ALL CONSTRUCTION ACTIVITIES SHALL BE COORDINATED WITH THE PROJECT MANAGEMENT DIVISION...
2. ALL CONSTRUCTION ON THIS PROJECT SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF MANATEE COUNTY UTILITY AND TRANSPORTATION STANDARDS...
3. VERTICAL CONTROL FOR THIS PROJECT WAS ESTABLISHED BY A MINIMUM OF TWO REFERENCE BENCHMARKS...
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL CONDITIONS AND REQUIREMENTS OF ALL PERMITS...
5. THE INFORMATION PROVIDED IN THESE PLANS IS SOLELY TO ASSIST THE CONTRACTOR IN ASSESSING THE NATURE AND EXTENT OF THE CONDITIONS WHICH MAY BE ENCOUNTERED...
6. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS ON THE PLANS AND REVIEW ALL FIELD CONDITIONS THAT MAY AFFECT CONSTRUCTION...
7. AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT SUNSHINE STATE ONE CALL OF FLORIDA...
8. NO WORK, EXCEPT FOR EMERGENCY TYPE, SHALL BE PERFORMED AFTER 7:00 PM AND BEFORE 7:00 AM.

SAFETY

- 9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE FLORIDA TRENCH SAFETY ACT, 90-96, LAWS OF FLORIDA EFFECTIVE OCTOBER 1, 1990...
10. THE CONTRACTOR SHALL USE SHEET PILING, SHEETING, BRACING, ETC., AS REQUIRED IN ALL EXCAVATION AREAS AND CONFORM TO ALL OSHA REQUIREMENTS.
11. THE CONTRACTOR SHALL USE ALL NECESSARY SAFETY PRECAUTIONS TO AVOID CONTACT WITH OVERHEAD AND UNDERGROUND UTILITIES, POWER LINES, ETC.
12. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY, THIS EXCLUSION DOES NOT ALLEVIATE THE CONTRACTOR FOR PROVIDING A CONTINUOUS SAFE WORKSPACE.

ENVIRONMENTAL

- 13. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ALL SEDIMENT AND EROSION CONTROL (SEC) DEVICES (E.G., BARRIERS, SEDIMENT TRAPS/BASINS, VEGETATIVE BUFFERS, ETC.) AS SPECIFIED IN THE FINAL APPROVED PLANS FOR THE PROJECT.
14. WHEN A BENTONITE SPILL OR FRACK-OUT OCCURS OR THERE IS A LOSS OF RETURN INDICATING EXCESSIVE SEEPAGE OR LOSS OF DRILLING FLUID, DRILLING MUST BE STOPPED UNTIL THE LOCATION OF THE SPILL IS IDENTIFIED...
15. ONCE LOCATED, THE BENTONITE SPILL MUST BE ISOLATED AND SEEPAGE INTO ANY NEARBY WATER BODIES WILL BE BLOCKED...
16. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY STORM WATER, EROSION, AND SEDIMENTATION CONTROL MEASURES...
17. STOCKPILES SHALL BE PROTECTED AT ALL TIMES BY ON-SITE DRAINAGE CONTROLS WHICH PREVENT EROSION OF THE STOCKPILED MATERIAL...
18. STORM WATER INLETS IN THE VICINITY OF THE PROJECT SHALL BE PROTECTED BY SEDIMENT TRAPS...
19. SEDIMENT BASINS AND TRAPS, PERIMETER BERMS, SEDIMENT BARRIERS, VEGETATIVE BUFFERS, AND OTHER MEASURES INTENDED TO TRAP SEDIMENT...
20. ALL SWALES, DITCHES, AND CHANNELS LEADING FROM THE SITE SHALL BE PROTECTED FROM SILTATION AND EROSION...
21. SOIL DISPLACED BY CONSTRUCTION SHALL BE REMOVED. EROSION CONTROL SHALL BE IMPLEMENTED IN AREAS WHICH ARE CONSIDERED ENVIRONMENTALLY SENSITIVE...
22. ALL EROSION AND POLLUTION CONTROL DEVICES SHALL BE CHECKED REGULARLY, ESPECIALLY AFTER EACH RAINFALL...
23. THE CONTRACTOR SHALL NOT ENTER UPON OR IN ANY WAY ALTER WETLAND AREAS THAT MAY BE ON OR NEAR THE CONSTRUCTION SITE...
24. FOR MORE INFORMATION, SEE THE EROSION CONTROL DETAIL SHEET INCLUDED IN THE PLANS.

RIGHT-OF-WAY

- 25. ALL CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO WITHIN THE MANATEE COUNTY/FDOT RIGHT-OF-WAY AND/OR EASEMENTS SHOWN ON THE DRAWINGS.
26. THE CONTRACTOR SHALL EMPLOY A LAND SURVEYOR REGISTERED IN THE STATE OF FLORIDA TO REFERENCE AND RESTORE PROPERTY CORNER MONUMENTS, PINS, AND LANDMARKS THAT MAY BE DISTURBED BY CONSTRUCTION...
27. THE CONTRACTOR, PRIOR TO CONSTRUCTION AND RESTRICTING ANY TRAFFIC, MUST OBTAIN A RIGHTS-OF-WAY USE PERMIT AND A TRAFFIC CONTROL PLAN...
28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ALL DAMAGED STORM WATER STRUCTURES, PIPING, ENTRANCE PIPE, AND HEADWALLS WHETHER SHOWN ON THE PLANS OR NOT.

- 29. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH IN THE FIELD THE RIGHT-OF-WAY LINES, BASE LINES, BENCH MARKS (ELEV.), CENTER LINES, AND STATIONING AS REQUIRED TO CONSTRUCT THIS PROJECT.
30. THE CONTRACTOR SHALL COORDINATE THE CUTTING OF DRIVEWAYS WITH THE PROPERTY OWNER PRIOR TO CUT. ALL DRIVEWAYS WILL BE IN PASSABLE CONDITION AT THE END OF THE WORK DAY AND FULLY RESTORED PER SECTION 02575.
31. A RIGHT OF ENTRY AGREEMENT SHALL BE OBTAINED BY THE PROJECT MANAGER FROM THE PROPERTY OWNER BEFORE ANY DRIVEWAY CONSTRUCTION WORK IS DONE OUTSIDE OF THE RIGHT-OF-WAY OR EASEMENT.

UTILITIES

- 32. LOCATIONS, ELEVATIONS, AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES ARE SHOWN TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS...
33. THE CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURES, WATER AND SEWER LINES, STORM DRAINS, UTILITIES, DRIVEWAYS, SIDEWALKS, SIGNS, MAIL BOXES, FENCES, TREES, LANDSCAPING, AND ANY OTHER IMPROVEMENT OR FACILITY IN THE CONSTRUCTION AREA...
34. THE CONTRACTOR SHALL USE APPROPRIATE TECHNIQUES, AS APPROVED, RECOMMENDED OR OFFERED BY FLORIDA POWER AND LIGHT TO PREVENT UNDERMINING OF POWER POLES...
35. ANY TEMPORARY SHUTDOWNS FOR MODIFICATIONS OF EXISTING UTILITY SYSTEMS THAT MUST REMAIN IN SERVICE DURING CONSTRUCTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE COORDINATED WITH AND APPROVED BY THE MANATEE COUNTY UTILITY OPERATIONS DEPARTMENT...
36. DIMENSIONS SHOWN TO THE PROPOSED WATER MAIN ARE MEASURED TO THE CENTER OF THE PIPE...
37. UNLESS CALLED OUT TO REMAIN ON THE PLANS, EXISTING HYDRANTS ATTACHED TO ABANDONED WATER MAIN ARE TO BE REMOVED.

RESTORATION

- 38. ALL RESTORATION WORK PERFORMED THROUGHOUT THE PROJECT SHALL CONFORM TO EXISTING LINES AND GRADES UNLESS SHOWN OTHERWISE.
39. ALL DISTURBED GRASSED AREAS SHALL BE SODDED OR SEEDED UNLESS OTHERWISE INDICATED...
40. ALL CONCRETE THRUST BLOCKS INSTALLED FOR TESTING PURPOSES AND NOT REQUIRED FOR THE OPERATION OF THE PIPELINE SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR...
41. ASPHALT DRIVES THAT ARE CUT SHALL BE RESTORED PER SECTION 02513.

CONSTRUCTION

- 42. CONCRETE DRIVEWAYS OR SIDEWALKS THAT ARE CUT SHALL BE RESTORED TO MATCH EXISTING ACCORDING TO THE CURRENT EDITIONS OF THE F.D.O.T. SPECIFICATIONS FOR ROAD AND BRIDGE DESIGN...
43. WHENEVER A PERMANENT ROADWAY SURFACE IS NOT PLACED IMMEDIATELY AFTER BACKFILLING AND COMPACTION OF THE NEWLY INSTALLED PIPE LINE...
44. RESTORATION OF CURBS, DRIVEWAYS, SIDEWALKS, AND PLACEMENT OF SOD SHALL BE COMPLETED WITHIN FORTY-FIVE CALENDAR DAYS...
45. THE EXHAUST SYSTEM OF ALL GASOLINE AND DIESEL ENGINES SHALL BE EQUIPPED WITH MUFFLERS...
46. NO MATERIAL SHALL BE STOCKPILED IN ROADWAYS. ALL DIRT AND DEBRIS SHALL BE REMOVED FROM THE JOB SITE DAILY...
47. THE CONTRACTOR IS TO CONTROL ALL FUGITIVE DUST ORIGINATING ON THIS PROJECT...
48. INGRESS AND EGRESS TO ALL THE PROPERTIES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED AT ALL TIMES.
49. PRIOR APPROVAL WILL BE REQUIRED FOR REMOVAL OF ANY TREE WITHIN THE CONSTRUCTION AREA.
50. THE CONTRACTOR SHALL PROVIDE ALL DEWATERING EQUIPMENT NECESSARY TO KEEP ALL EXCAVATIONS DRY...
51. ALL PIPING AND FITTINGS USED ON THIS PROJECT SHALL BE AS NOTED ON THE PLANS AND IN THE CONTRACT DOCUMENT AND SHALL BE INSTALLED TO THE LINES AND GRADES SHOWN ON THE PLANS AND PROFILES.
52. ALL PIPE SHALL BE COLOR CODED TO CONFORM TO MANATEE COUNTY STANDARDS.
53. ALL PIPE AND FITTINGS SHALL BE INSTALLED AS RECOMMENDED BY THE MANUFACTURER AND ALL PIPE JOINTS SHALL BE RESTRAINED WHERE REQUIRED.
54. ALL FITTINGS FOR PRESSURE CLASS-RATED PIPE SHALL BE RESTRAINED DUCTILE IRON, RESTRAINED LENGTHS OF PIPE SHALL ADHERE TO THE REQUIREMENTS AS SHOWN ON THE DETAIL SHEETS.
55. WHERE IT IS NECESSARY TO DEFLECT PIPE EITHER HORIZONTALLY OR VERTICALLY, PIPE DEFLECTION SHALL NOT EXCEED 75% OF THE MANUFACTURER'S MAXIMUM ALLOWABLE RECOMMENDED DEFLECTION.
56. ALL PIPE LENGTHS ARE PLUS OR MINUS AND MAY BE ADJUSTED IN THE FIELD AS REQUIRED...
57. ALL ROCKS OR STONES LARGER THAN SIX INCH DIAMETER SHALL BE REMOVED FROM THE BACKFILL MATERIAL...
58. ONLY MANATEE COUNTY UTILITY OPERATIONS STAFF ARE AUTHORIZED TO OPERATE VALVES ON COUNTY OWNED AND MAINTAINED UTILITY SYSTEMS.
59. ALL PENETRATION OF EXISTING STRUCTURES SHALL BE BY THE MECHANICAL ROTARY CORE BORING METHOD.
60. ALL CONCRETE PENETRATED OR DISTURBED SHALL BE COATED WITH TWO COATS OF EPOXY.
61. THE CONTRACTOR, PRIOR TO ANY TEMPORARY WATER SHUT-OFFS DURING WATER MAIN TIE-IN, ETC., SHALL NOTIFY THE AFFECTED RESIDENTS BY POSTING INFORMATIONAL SIGNS IN THE NEIGHBORHOOD AT LEAST TWO DAYS (48 HRS) PRIOR TO THE SHUT-OFF...

EXTENSIVE USE OF THE MEDIA AND SHALL HAVE PRIOR CONTACT WITH HOMEOWNER'S ASSOCIATIONS. WRITTEN NOTIFICATIONS SHALL ALSO BE FAXED TO THE TAMPA TRIBUNE, BRADENTON HERALD, SARASOTA HERALD TRIBUNE, WBRO RADIO, EMERGENCY COMMUNITY CENTERS, INSPECTIONS, WATER TREATMENT PLANT, WATER MANAGER, HELPLINE, CUSTOMER SERVICE, AND THE MANATEE COUNTY UTILITY OPERATIONS DEPARTMENT.

- 62. ALL NEW PIPE LINES SHALL BE PIG CLEANED (4" AND LARGER), FLUSHED, PRESSURE TESTED, DISINFECTED, AND CERTIFIED PRIOR TO TIE-INS TO EXISTING FACILITIES...
63. ALL TEST POINT PIPING SHALL BE CUT LOOSE FROM THE CORPORATION STOP AND COMPLETELY REMOVED AND DISPOSED OF BY THE CONTRACTOR PRIOR TO FINAL ACCEPTANCE...
64. ALL EXISTING MAINS THAT ARE BEING REPLACED SHALL BE ABANDONED IN PLACE UPON ACCEPTANCE...
65. WATER MAINS CROSSING OVER OR UNDER SANITARY SEWERS, FORCE MAINS, AND RECLAIMED WATER LINES SHALL BE LAID PER CURRENT EDITION OF "10 STATE STANDARDS" AND MANATEE COUNTY UTILITY STANDARDS...
66. FIELD CONDITIONS MAY NECESSITATE MINOR ALIGNMENT AND GRADE DEVIATION OF THE PROPOSED UTILITIES...
67. CONTRACTOR SHALL PROVIDE RECORD DRAWINGS IN ACCORDANCE WITH SECTION 1.14 IN THE CURRENT MANATEE COUNTY UTILITY STANDARDS...

CONTACTS

Table with columns for various utility and engineering contacts including Manatee County Public Works Dept, Florida Power & Light Distribution, Southwest Florida Water Management District, Manatee County Public Work Dept, TECO/Peoples Gas Co., Florida Power & Light Transmission, BrightHouse Networks, Department of Environmental Protection, Manatee County Health Dept, and Tom Larkin.

LEGEND

Legend table defining symbols for existing and proposed features. Includes categories like BENCH MARK, IRON PIPE, HUB, ELEVATION, GUY WIRE, POWER POLE, MAIL BOX, SIGN, REFLECTOR, GAS MARKER, BACKFLOW PREVENTER, BLOW OFF VALVE, FIRE HYDRANT, WATER VALVE, AIR RELEASE VALVE, UNCONFIRMED WATER SERVICE, CONFIRMED WATER SERVICE, SANITARY SEWER MANHOLE, SOIL BORING LOCATION, TELEPHONE SERVICE BOX, FLOW DIRECTION, GRATE INLET, MITERED END SECTION, SOFT DIG (VWH). Also includes a table for ABBREVIATIONS (R/W, CONC, ASPH, HDD, HDPE, DIP, VWH, SB, RWM) and PROPOSED (WATER MAIN IN CASING, WATER MAIN (OPEN CUT), FIRE HYDRANT, VALVE, REDUCER, TEE, HORIZONTAL BEND, CAP, AIR RELEASE VALVE, BARBED WIRE FENCE, PAVEMENT RESTORATION, SHELL DRIVEWAY, CONCRETE DRIVEWAY/SIDEWALK).

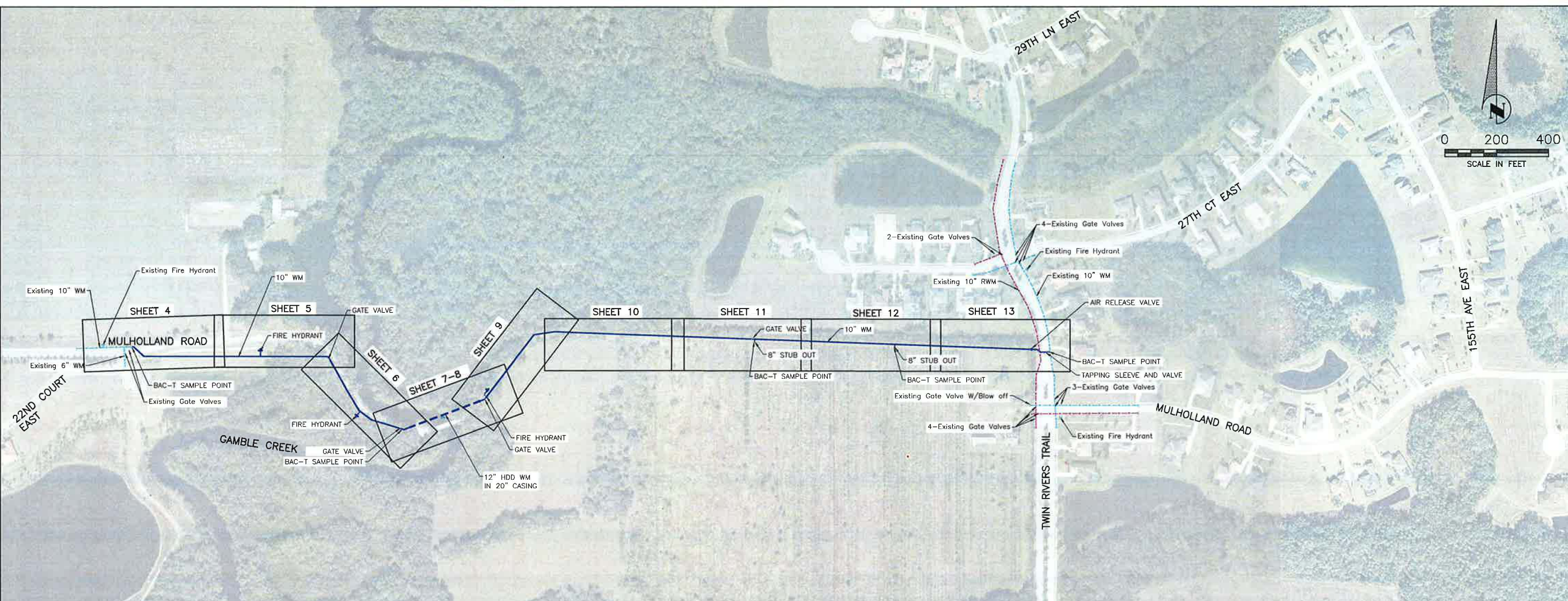
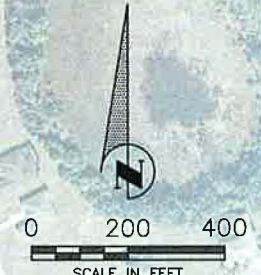
Professional Engineer Seal for Edwin Spalding, License No. 79618, State of Florida. Includes a signature line for JOHN E. SPALDING and a stamp for Stantec Bid Set dated 2/5/2019.

Manatee County Florida logo and address: 1022 26th Avenue East Bradenton, FL 34208.

MULHOLLAND ROAD WATER MAIN GENERAL NOTES & LEGEND

Revision table with columns for NO, REVISION DESCRIPTION, DATE, and BY. Includes project information: PROJECT # 177310615, SURVEY # 000, SEC./TWN./RGE 9&10/34S/19E, SCALE, SURVEYED GFY 11/06/15, DESIGNED JES 02/05/18, DRAWN SRP 02/05/18, CHECKED SCM 02/05/18, and SIGNATURE & DATE SHEET 2.

Vertical text on the left margin: I:\Users\j333-F01\Work\177310615\Design\Drawing\Utility\177310615.dwg (177310615.dwg) - 2/7/2018 9:51 AM Popham, Scott, T.J., ANS Full Sheet E (17.00 x 11.00 inches)



**MULHOLLAND ROAD
WATER MAIN
KEY SHEET AND MOT**

MAINTENANCE OF TRAFFIC (MOT) - GENERAL

1. TRAFFIC CONTROL MEASURES SHALL BE IN ACCORDANCE WITH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2009 EDITION, PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.
2. MEASURES SPECIFIED HERE SHALL REPRESENT THE MINIMUM REQUIRED MOT MEASURES. ANY ADDITIONAL MOT MEASURES NECESSARY TO ENSURE THE SAFETY OF ROAD USERS AND WORKS THROUGHOUT CONSTRUCTION SHALL BE PROVIDED BY THE CONTRACTOR.
3. MEASUREMENT AND PAYMENT FOR TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH SECTION 01150.
4. FOUR (STREET) WORK SIGNS (MUTCD SIGN DESIGNATION W20-1) ARE TO BE PLACED IN ADVANCE OF THE WORK AND SHALL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE WORK. SIGNS SHALL BE PROVIDED ON MULHOLLAND ROAD (ONE SIGN), 22ND COURT EAST (ONE SIGN), AND TWIN RIVERS TRAIL.

MULHOLLAND ROAD CROSSING (SHEET 4):

1. ONE LANE MUST REMAIN OPEN AT ALL TIMES.
2. TRAFFIC CONTROL FOR LANE CLOSURE SHALL BE IN ACCORDANCE WITH TYPICAL APPLICATION 11: LANE CLOSURE ON A TWO-LANE ROAD WITH LOW TRAFFIC VOLUMES IN THE MUTCD. ALL FLASHING WARNING LIGHTS INDICATED AS 'OPTIONAL' SHALL BE PROVIDED. OPTIONAL TEMPORARY PAVEMENT MARKINGS AND ADVISORY SPEED PLAQUES ARE NOT REQUIRED.
3. TRAFFIC CONTROL MEASURES SHALL BE IN PLACE NO SOONER THAN 48 HOURS IN ADVANCE OF PAVEMENT DISTURBANCE AND SHALL BE REMOVED IMMEDIATELY UPON COMPLETION OF PAVEMENT RESTORATION.
4. PAVEMENT RESTORATION MUST BE COMPLETED WITHIN SEVEN DAYS OF INITIAL DISTURBANCE.

MULHOLLAND ROAD STREET CLOSURE (SHEETS 5-7)

1. MULHOLLAND SHALL BE CLOSED TO ALL TRAFFIC DURING WATER MAIN CONSTRUCTION WITHIN THE LIMITS OF PAVEMENT.
2. THE FOLLOWING TRAFFIC CONTROL MEASURES SHALL BE PROVIDED:
 - a. PROVIDE TWO TYPE 3 BARRICADES IN ADVANCE OF THE ROAD CLOSURE. EACH BARRICADE SHALL BE FITTED WITH A TYPE B FLASHING WARNING LIGHT AND A 'ROAD CLOSED' SIGN (MUTCD SIGN DESIGNATION R11-2).
 - b. PROVIDE ONE 'UTILITY WORK AHEAD' SIGN (MUTCD SIGN DESIGNATION W21-7) 500 FEET IN ADVANCE OF THE BARRICADES.
 - c. PROVIDE ONE 'ROAD (STREET) CLOSED (WITH DISTANCE)' SIGN (MUTCD SIGN DESIGNATION W20-3) 1,000 FEET IN ADVANCE OF THE BARRICADES.
3. TRAFFIC CONTROL MEASURES FOR THE STREET CLOSURE SHALL BE IN PLACE NO SOONER THAN 48 HOURS IN ADVANCE OF PAVEMENT DISTURBANCE AND SHALL BE REMOVED IMMEDIATELY UPON COMPLETION OF PAVEMENT RESTORATION.
4. PAVEMENT RESTORATION MUST BE COMPLETED WITHIN 30 DAYS OF INITIAL DISTURBANCE.

TWIN RIVERS TRAIL STREET CLOSURE AND DETOUR (SHEET 13)

1. TWIN RIVERS TRAIL SHALL BE CLOSED TO ALL TRAFFIC DURING CONSTRUCTION OF WATER MAIN ACROSS THE ROADWAY.
2. STREET CLOSURE AND DETOUR SHALL BE IN ACCORDANCE WITH TYPICAL APPLICATION 20: DETOUR FOR A CLOSED STREET IN THE MUTCD.
3. THE DETOUR FOR TRAFFIC ON TWIN RIVERS TRAIL SHALL FOLLOW 27TH COURT EAST, 155TH AVENUE EAST, AND MULHOLLAND ROAD.
4. TYPE 3 BARRICADES SHALL BE PROVIDED AT:
 - a. TWIN RIVERS TRAIL IN ADVANCE OF THE ROAD CLOSURE (FOUR BARRIERS).
 - b. INTERSECTION OF TWIN RIVERS TRAIL AND 27TH COURT EAST (TWO BARRIERS).
 - c. INTERSECTION OF TWIN RIVERS TRAIL AND MULHOLLAND ROAD (TWO BARRIERS).
5. SIGNS SHALL BE PROVIDED AT THE FOLLOWING LOCATIONS:
 - a. ON TWIN RIVERS TRAIL.
 - b. THE INTERSECTION OF TWIN RIVERS TRAIL AND 27TH COURT EAST.
 - c. THE INTERSECTION OF 27TH COURT EAST AND 155TH AVENUE EAST.
 - d. THE INTERSECTION OF 155TH AVENUE EAST AND MULHOLLAND ROAD.
 - e. THE INTERSECTION OF MULHOLLAND ROAD AND TWIN RIVERS TRAIL.
6. TRAFFIC CONTROL MEASURES FOR THE STREET CLOSURE SHALL BE IN PLACE NO SOONER THAN 48 HOURS IN ADVANCE OF PAVEMENT DISTURBANCE AND SHALL BE REMOVED IMMEDIATELY UPON COMPLETION OF PAVEMENT RESTORATION.
7. PAVEMENT RESTORATION MUST BE COMPLETED WITHIN SEVEN DAYS OF INITIAL DISTURBANCE.

CONTROL						
POINT	STATION	OFFSET	NORTHING	EASTING	ELEV	DESCRIPTION
GPS1	11+80.43	47.23' RT	1164030.14	525136.88	12.92'	SET IRC 1/2" GFY
GPS2	33+44.47	2.81' LT	1164046.38	527415.92	3.63'	SET IRC 1/2" GFY
GPS3	36+96.08	12.87' LT	1164055.21	527767.57	6.87'	SET IRC 1/2" GFY
GPS4	50+08.44	29.74' RT	1164008.06	529079.77	15.07'	SET IRC 1/2" GFY
GPS5	50+22.83	261.06' RT	1163776.69	529093.36	15.13'	FPKD LB6982
GPS6	15+81.38	16.79' LT	1164075.89	525985.46	6.04'	SET IRC 1/2" GFY
2000	18+93.76	0.54' LT	1164062.00	526293.94	3.84'	SET IRC 1/2" GFY
2002	22+32.36	7.24' RT	1163763.42	526461.23	4.56'	SET IRC 1/2" GFY
2003	24+40.13	14.98' RT	1163695.67	526657.80	6.14'	SET IRC 1/2" GFY
2005	26+71.48	2.57' RT	1163765.95	526880.38	3.71'	SET IRC 1/2" GFY
2006	28+85.09	167.92' RT	1163834.81	527143.88	3.19'	SET IRC 1/2" GFY
2007	41+81.88	3.47' RT	1164037.19	528253.31	10.70'	SET IRC 1/2" GFY
2010	47+95.99	22.75' RT	1164015.79	528867.35	13.28'	SET IRC 1/2" GFY
A13	45+33.67	14.52' RT	1164024.92	528605.05	12.55'	SET IRC 1/2" GFY
A14	46+30.10	17.55' RT	1164021.56	528701.48	12.61'	SET IRC 1/2" GFY



John Edwin Spalding
2/5/2018

BID SET

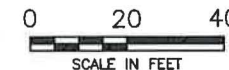


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5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL. 941.365.8500 - FAX 941.366.1822
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	REVISION DESCRIPTION	DATE	BY

PROJECT #	177310615	
SURVEY #	000	
SEC./TWN./RGE	9&10/34S/19E	
SCALE	1"=150'	
	BY	DATE
SURVEYED	GFY	11/06/15
DESIGNED	JES	02/05/18
DRAWN	SRP	02/05/18
CHECKED	SCM	02/05/18
JOHN E. SPALDING		
FLORIDA P.E. # 79618		
Signature & Date		
SHEET 3		

I:\Users\paula\Documents\177310615\Drawings\WaterMain\001\001.dwg, 2/17/2018 4:01 PM, P:\paula, Scale: 1:1, ANSI full bleed B (17.00 x 11.00 inches)

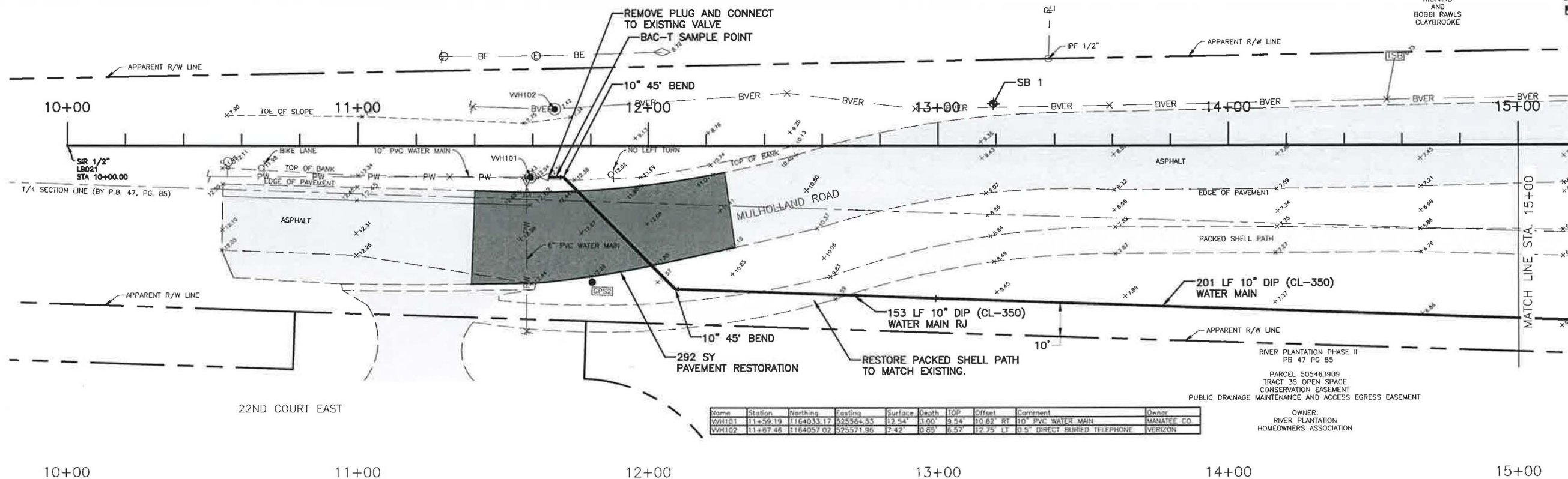


NOTES:

1. CLEAR AND GRUB AS REQUIRED FOR CONSTRUCTION OF WATER MAIN. THE CLEARED AREA SHALL NOT EXCEED 20' IN WIDTH.
2. SOD ALL CLEARED AND GRUBBED AREAS.

PARCEL
500221509
O.R. 2373
PG. 1118
OWNER:
WAYNE UNDERHILL AS TRUSTEE
OF RAWLS MORTGAGE TRUST

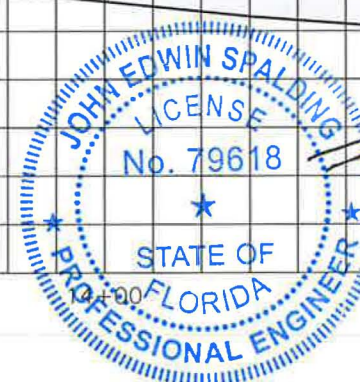
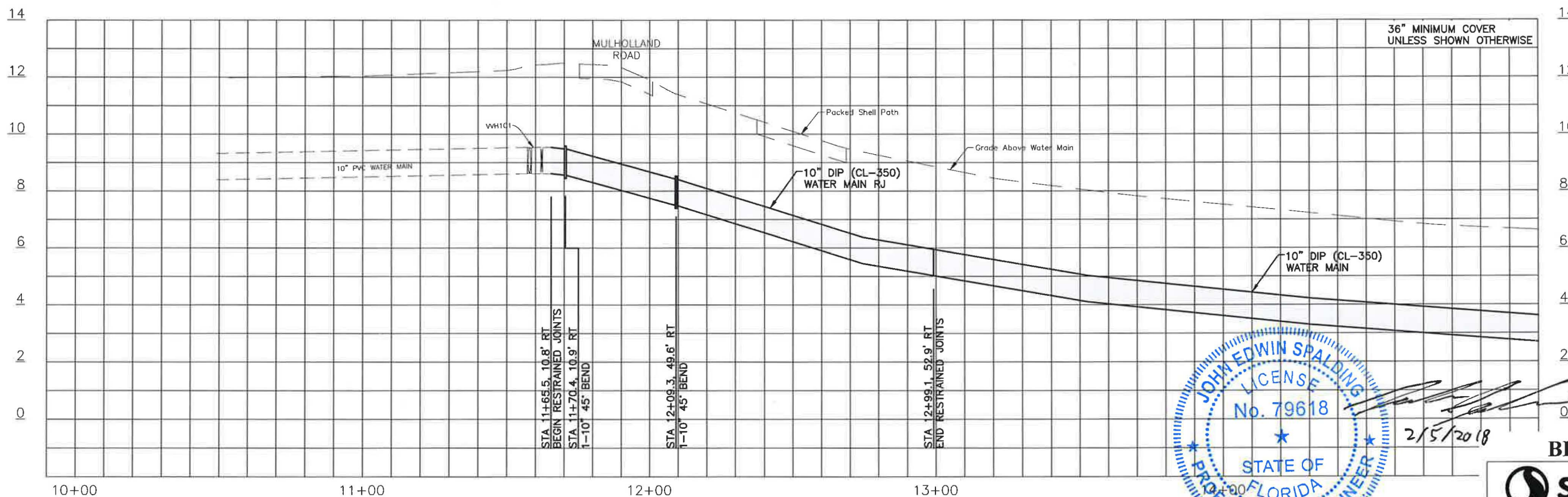
PARCEL
510220009
O.R. 1994
PG. 2871
OWNER:
RICHARD
AND
BOBBI RAWLS
CLAYBROOKE



Name	Station	Northing	Easting	Surface	Depth	TOP	Offset	Comment	Owner
WH101	11+59.19	1164033.17	525564.53	12.54'	3.00'	9.54'	10.82'	RT 10" PVC WATER MAIN	MANATEE CO.
WH102	11+67.46	1164057.02	525571.96	7.42'	0.85'	6.57'	12.75'	LT 0.5" DIRECT BURIED TELEPHONE	VERIZON

RIVER PLANTATION PHASE II
PB 47 PG 85
PARCEL 505463909
TRACT 35 OPEN SPACE
CONSERVATION EASEMENT
PUBLIC DRAINAGE MAINTENANCE AND ACCESS EGRESS EASEMENT
OWNER:
RIVER PLANTATION
HOMEOWNERS ASSOCIATION

**MULHOLLAND ROAD
WATER MAIN
PLAN & PROFILE STA. 10+00 TO 15+00**



[Signature]
2/5/2018

BID SET



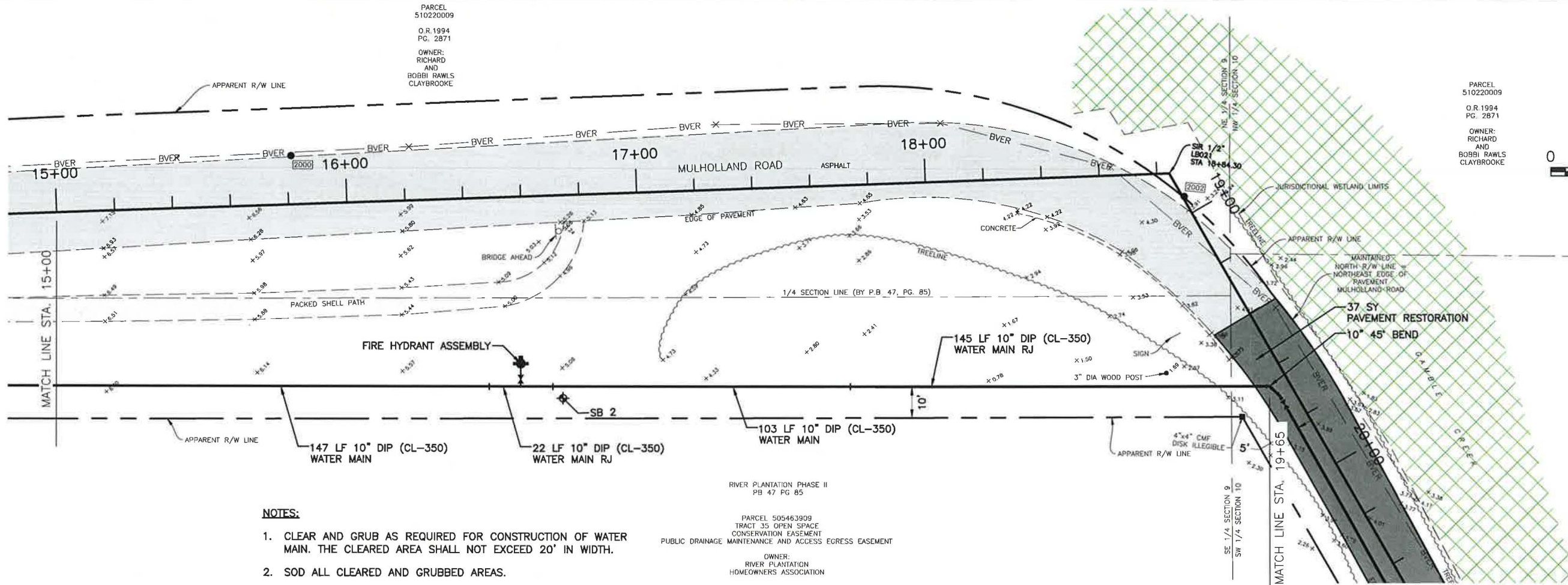
NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	1"=20'
BY	DATE
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18
JOHN E. SPALDING	
FLORIDA P.E. # 79618	
Signature & Date	
SHEET 4	

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PARCEL
510220009
O.R. 1994
PG. 2871
OWNER:
RICHARD
AND
BOBBI RAWLS
CLAYBROOKE

PARCEL
510220009
O.R. 1994
PG. 2871
OWNER:
RICHARD
AND
BOBBI RAWLS
CLAYBROOKE



NOTES:

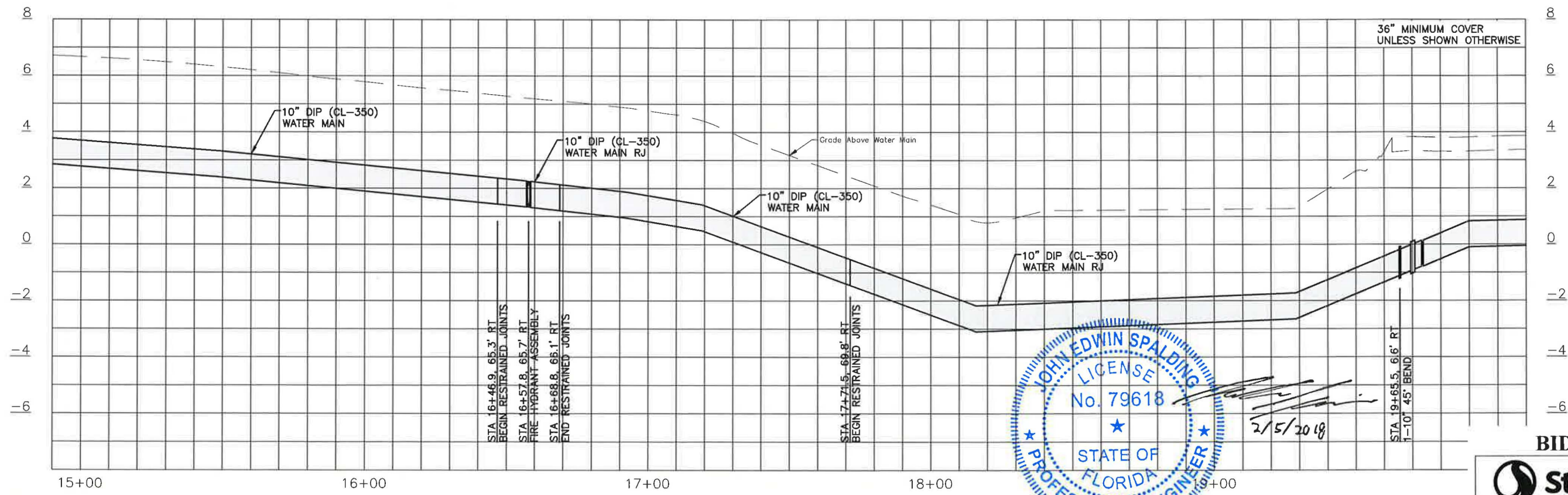
1. CLEAR AND GRUB AS REQUIRED FOR CONSTRUCTION OF WATER MAIN. THE CLEARED AREA SHALL NOT EXCEED 20' IN WIDTH.
2. SOD ALL CLEARED AND GRUBBED AREAS.

RIVER PLANTATION PHASE II
PB 47 PG 85

PARCEL 505463909
TRACT 35 OPEN SPACE
CONSERVATION EASEMENT
PUBLIC DRAINAGE MAINTENANCE AND ACCESS EGRESS EASEMENT

OWNER:
RIVER PLANTATION
HOMEOWNERS ASSOCIATION

15+00 16+00 17+00 18+00 19+00



JOHN EDWIN SPALDING
LICENSE
No. 79618
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

2/5/2018

BID SET

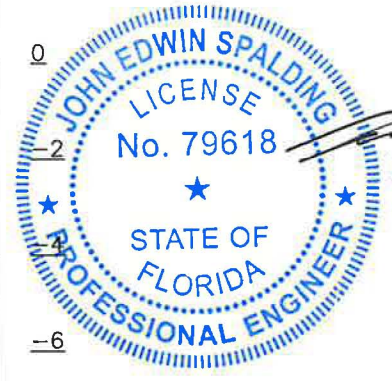
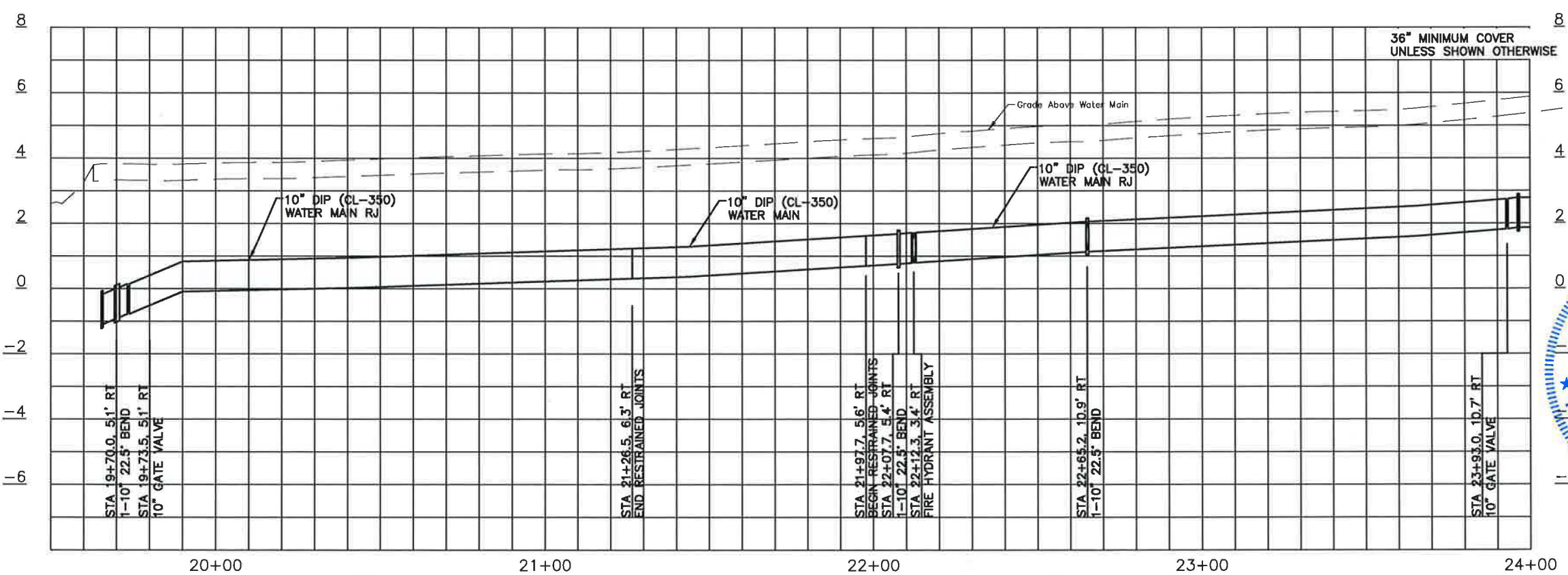
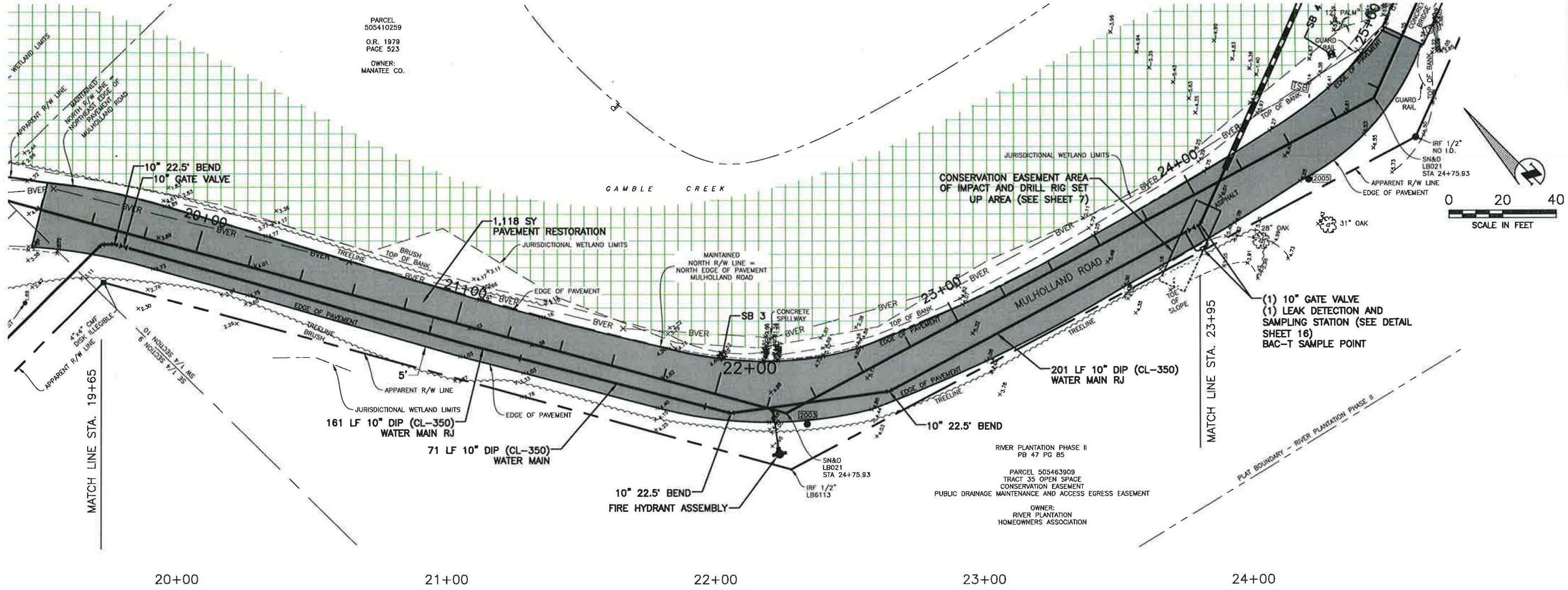


STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL. 941.365.5500 - FAX. 941.366.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	DATE	BY	REVISION DESCRIPTION
PROJECT #	177310615		
SURVEY #	000		
SEC./TWN./RGE	9&10/34S/19E		
SCALE	1"=20'		
SURVEYED	GFY	DATE	11/06/15
DESIGNED	JES	DATE	02/05/18
DRAWN	SRP	DATE	02/05/18
CHECKED	SCM	DATE	02/05/18
JOHN E. SPALDING			
FLORIDA P.E. # 79618			
Signature & Date			
SHEET 5			



MULHOLLAND ROAD
WATER MAIN
PLAN & PROFILE STA. 19+65 TO 23+95



John E. Spalding
2/5/2018

BID SET



STANTEC CONSULTING SERVICES INC.
6172 STATION WAY, SARASOTA, FLORIDA 34233
TEL. 941.365.5500 - FAX. 941.366.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	DATE	BY	REVISION DESCRIPTION

PROJECT #	177310815
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	1"=20'
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18

JOHN E. SPALDING
FLORIDA P.E. # 79618

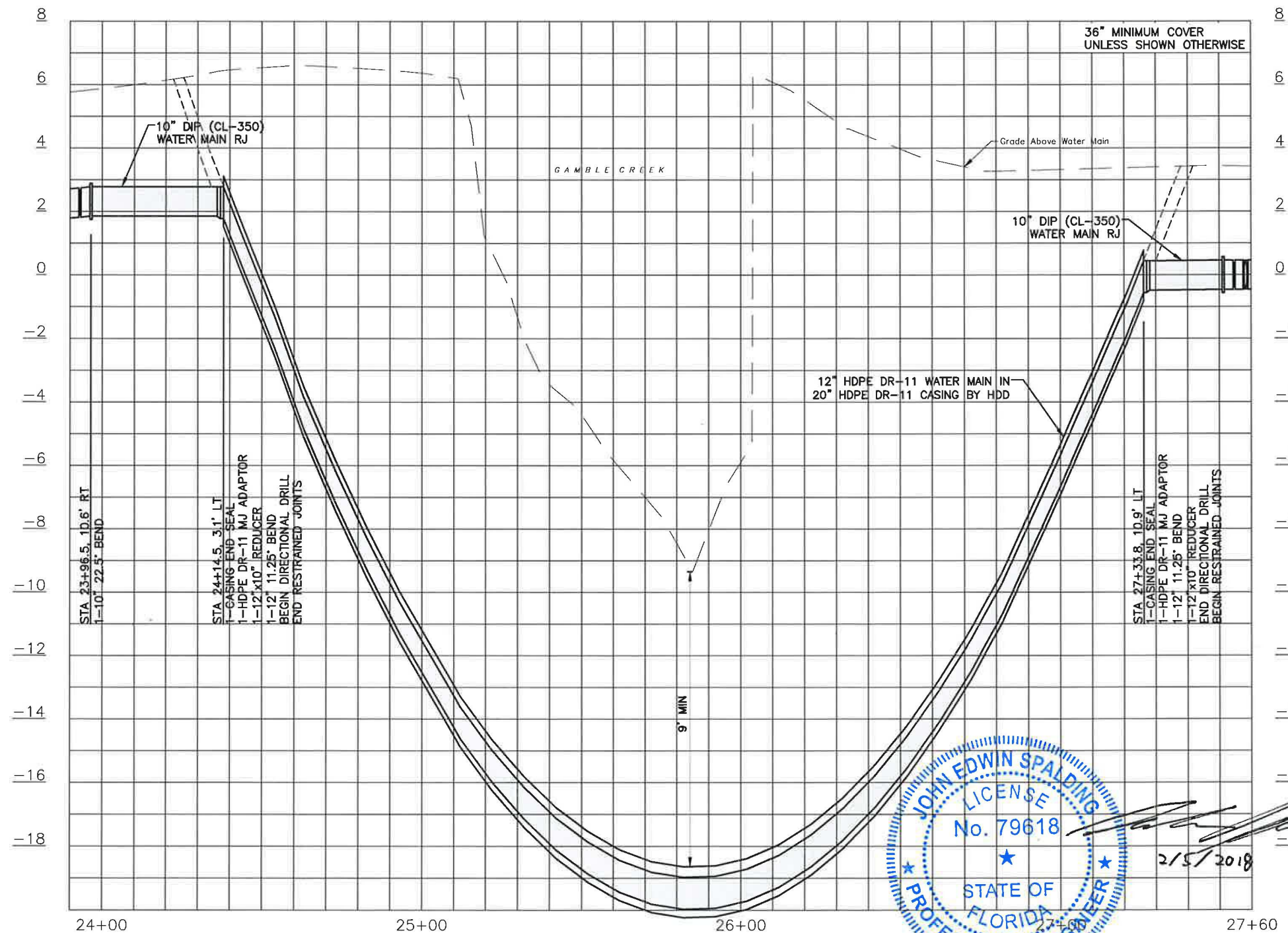
Signature & Date
SHEET 6

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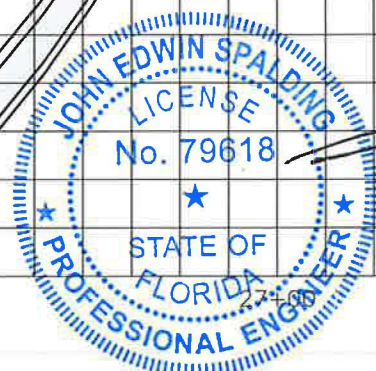
**MULHOLLAND ROAD
WATER MAIN
PROFILE STA. 23+95 TO 27+40**

FOR PLAN SEE SHEET 7



NOTES:

1. A PNEUMATIC LEAK TEST SHALL BE PERFORMED ON THE CASING. THE TEST SHALL BE PERFORMED AFTER ALL HDPE CASING PIPE HAS BEEN FUSED AND PRIOR TO INSTALLATION. THE TEST SHALL CONSIST OF MAINTAINING A PRESSURE OF 10 PSI FOR A PERIOD OF 15 MINUTES WITH NO LOSS IN PRESSURE.
2. WATER MAIN SHALL BE INSTALLED IN CASING AFTER CASING HAS BEEN FULLY PULLED INTO THE HDD BOREHOLE; PULLBACK OF THE CASING SHALL NOT BE PERFORMED WITH THE WATER MAIN INSTALLED WITHIN THE CASING.



2/5/2018

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
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BY	DATE
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18

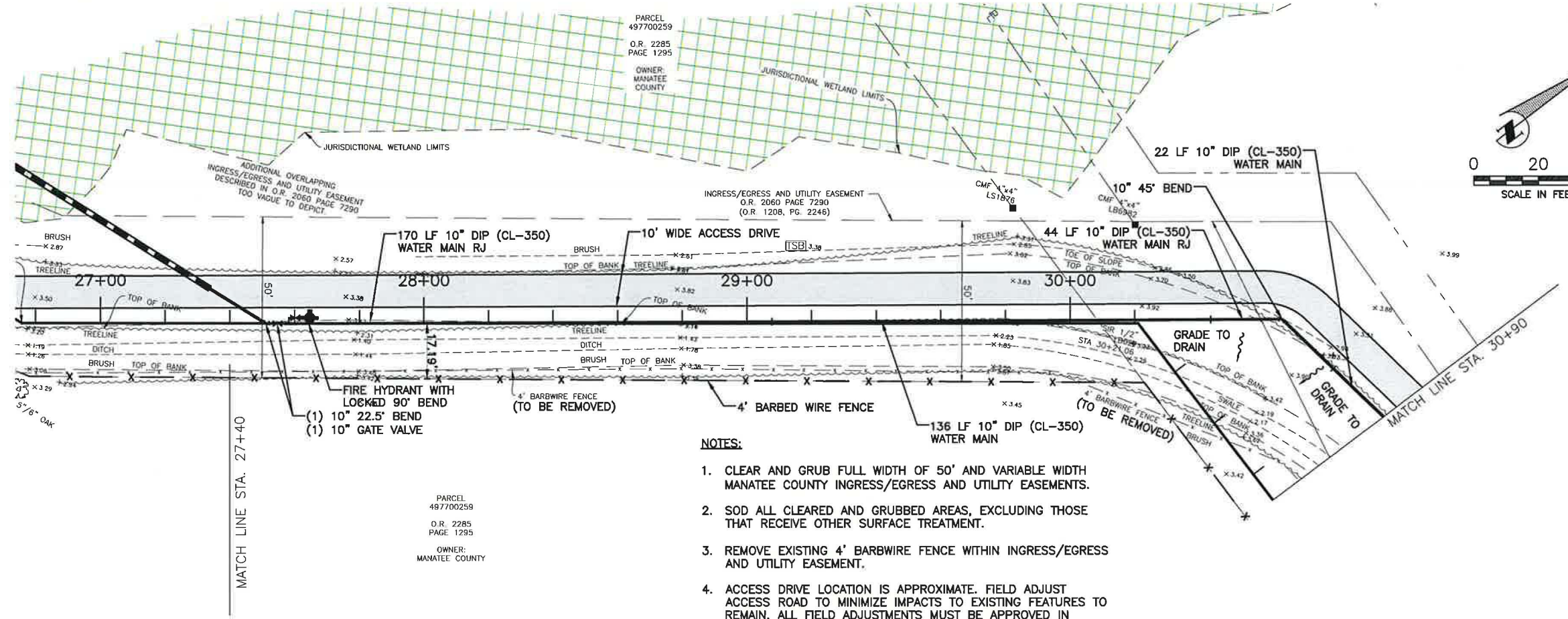
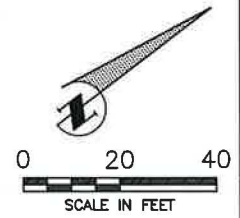
BID SET



STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL. 941.366.5500 - FAX. 941.366.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

JOHN E. SPALDING
FLORIDA P.E. # 79618

Signature & Date
SHEET 8



NOTES:

1. CLEAR AND GRUB FULL WIDTH OF 50' AND VARIABLE WIDTH MANATEE COUNTY INGRESS/EGRESS AND UTILITY EASEMENTS.
2. SOD ALL CLEARED AND GRUBBED AREAS, EXCLUDING THOSE THAT RECEIVE OTHER SURFACE TREATMENT.
3. REMOVE EXISTING 4' BARBED WIRE FENCE WITHIN INGRESS/EGRESS AND UTILITY EASEMENT.
4. ACCESS DRIVE LOCATION IS APPROXIMATE. FIELD ADJUST ACCESS ROAD TO MINIMIZE IMPACTS TO EXISTING FEATURES TO REMAIN. ALL FIELD ADJUSTMENTS MUST BE APPROVED IN ADVANCE BY THE COUNTY.

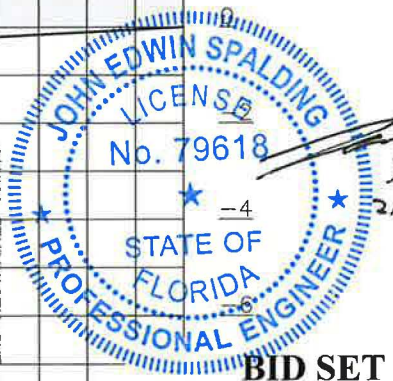
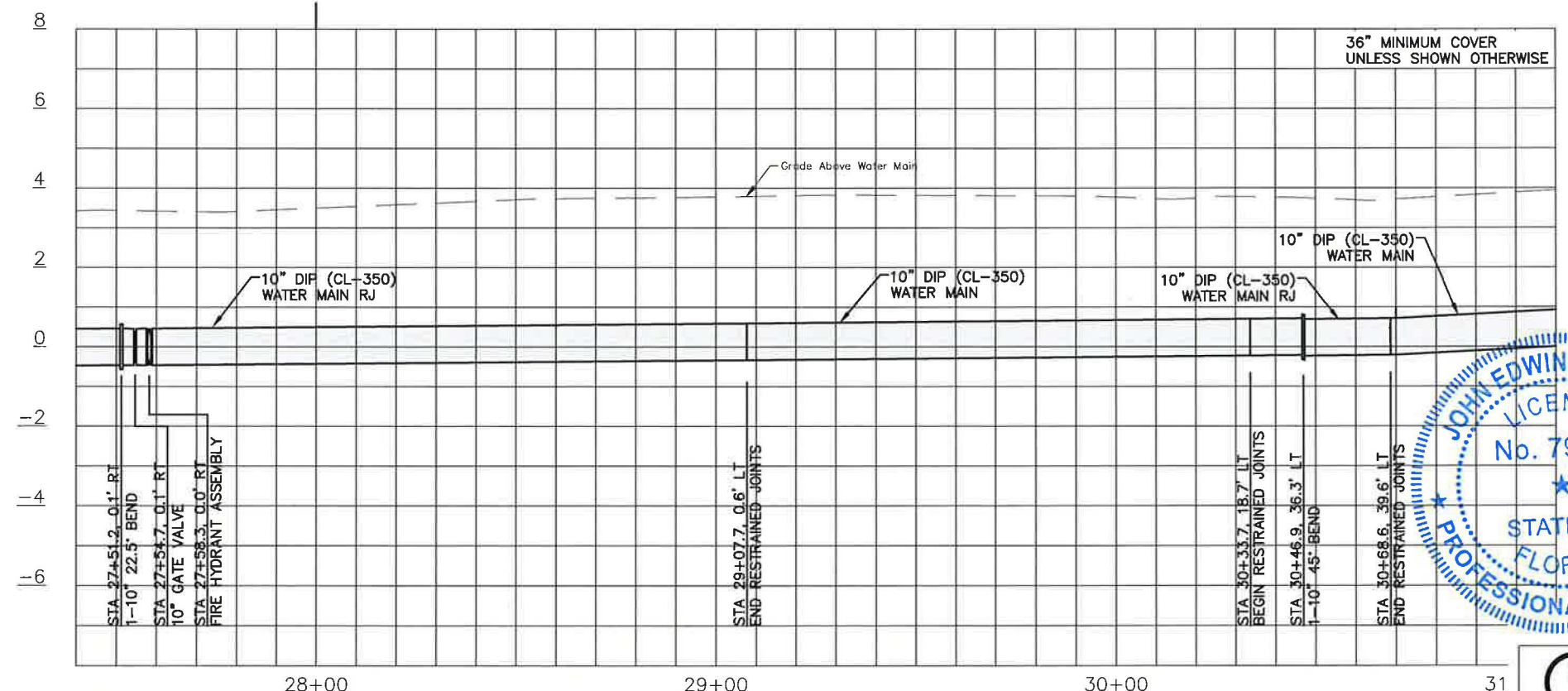
27+00

28+00

29+00

30+00

35+00



BID SET

NO.	REVISION DESCRIPTION	BY	DATE

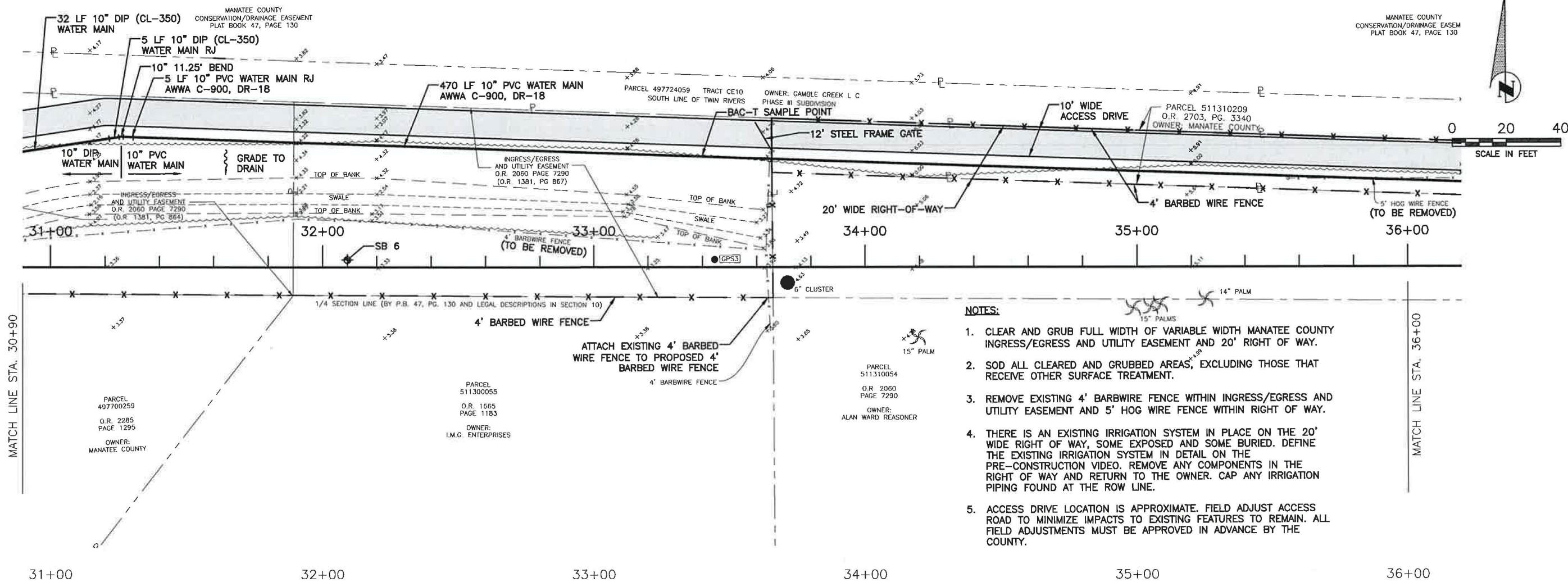
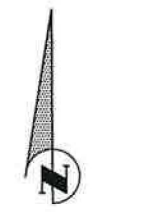
PROJECT #	177310615
SURVEY	000
SCALE	1"=20'
BY	DATE
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18

JOHN E. SPALDING
FLORIDA P.E. # 79618



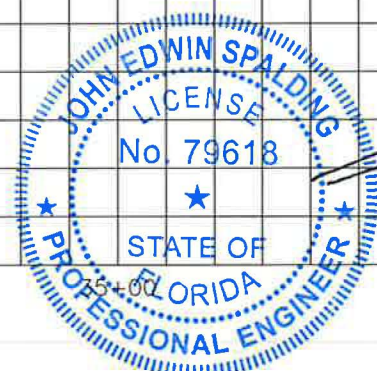
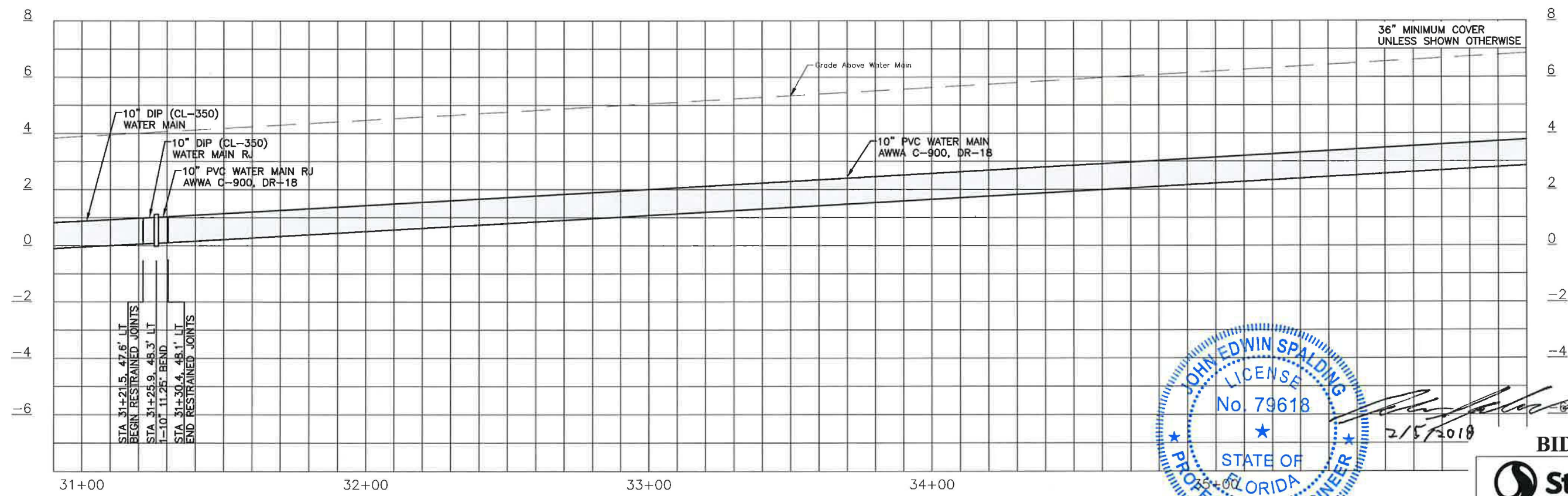
STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL 941.566.5500 - FAX 941.566.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

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- NOTES:**
1. CLEAR AND GRUB FULL WIDTH OF VARIABLE WIDTH MANATEE COUNTY INGRESS/EGRESS AND UTILITY EASEMENT AND 20' RIGHT OF WAY.
 2. SOD ALL CLEARED AND GRUBBED AREAS, EXCLUDING THOSE THAT RECEIVE OTHER SURFACE TREATMENT.
 3. REMOVE EXISTING 4' BARBWIRE FENCE WITHIN INGRESS/EGRESS AND UTILITY EASEMENT AND 5' HOG WIRE FENCE WITHIN RIGHT OF WAY.
 4. THERE IS AN EXISTING IRRIGATION SYSTEM IN PLACE ON THE 20' WIDE RIGHT OF WAY, SOME EXPOSED AND SOME BURIED. DEFINE THE EXISTING IRRIGATION SYSTEM IN DETAIL ON THE PRE-CONSTRUCTION VIDEO. REMOVE ANY COMPONENTS IN THE RIGHT OF WAY AND RETURN TO THE OWNER. CAP ANY IRRIGATION PIPING FOUND AT THE ROW LINE.
 5. ACCESS DRIVE LOCATION IS APPROXIMATE. FIELD ADJUST ACCESS ROAD TO MINIMIZE IMPACTS TO EXISTING FEATURES TO REMAIN. ALL FIELD ADJUSTMENTS MUST BE APPROVED IN ADVANCE BY THE COUNTY.

**MULHOLLAND ROAD
WATER MAIN
PLAN & PROFILE STA. 30+90 TO 36+00**



[Signature]
2/5/2018

BID SET

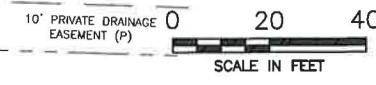
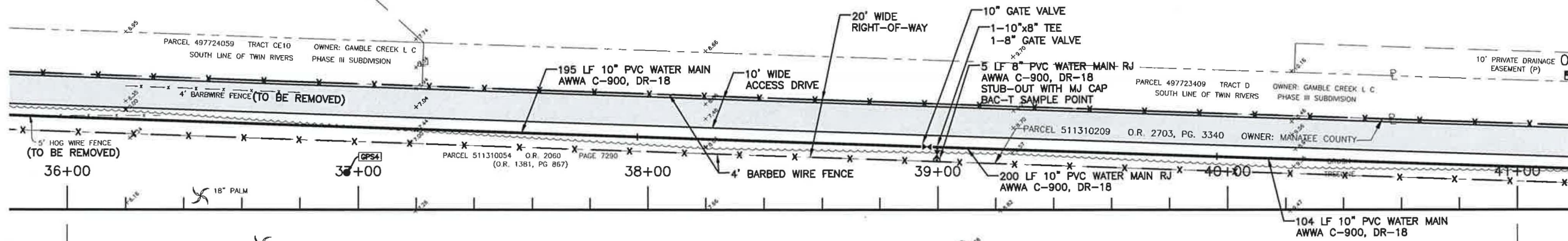


STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL. 941.365.5500 - FAX 941.365.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	1"=20'
BY DATE	
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18
JOHN E. SPALDING	
FLORIDA P.E. # 79618	
Signature & Date	

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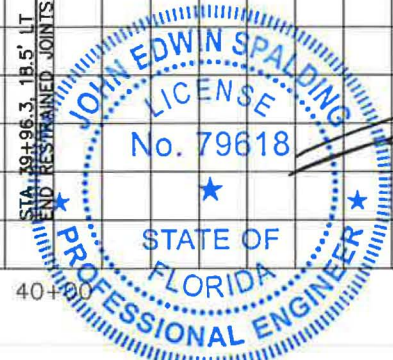
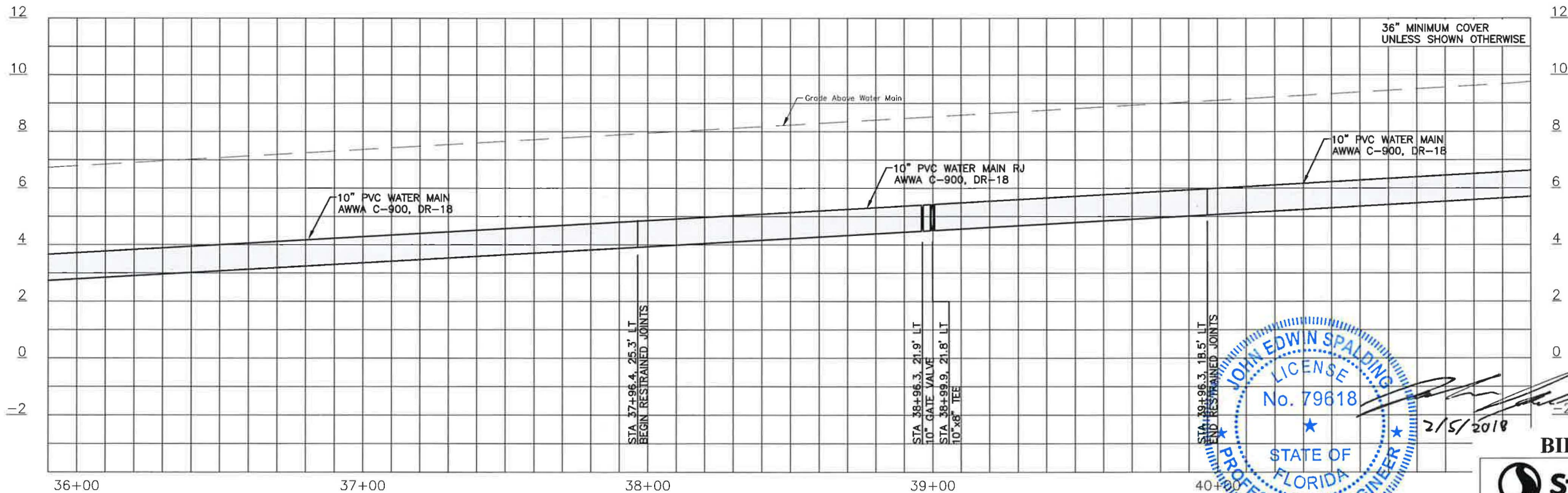
NOTES:

1. CLEAR AND GRUB FULL WIDTH OF 20' RIGHT OF WAY.
2. SOD ALL CLEARED AND GRUBBED AREAS, EXCLUDING THOSE THAT RECEIVE OTHER SURFACE TREATMENT.
3. REMOVE EXISTING 4' BARBWIRE FENCE AND 5' HOG WIRE FENCE WITHIN RIGHT OF WAY.
4. THERE IS AN EXISTING IRRIGATION SYSTEM IN PLACE ON THE 20' WIDE RIGHT OF WAY, SOME EXPOSED AND SOME BURIED. DEFINE THE EXISTING IRRIGATION SYSTEM IN DETAIL ON THE PRE-CONSTRUCTION VIDEO. REMOVE ANY COMPONENTS IN THE RIGHT OF WAY AND RETURN TO THE OWNER. CAP ANY IRRIGATION PIPING FOUND AT THE ROW LINE.
5. ACCESS DRIVE LOCATION IS APPROXIMATE. FIELD ADJUST ACCESS ROAD TO MINIMIZE IMPACTS TO EXISTING FEATURES TO REMAIN. ALL FIELD ADJUSTMENTS MUST BE APPROVED IN ADVANCE BY THE COUNTY.

MATCH LINE STA. 36+00

MATCH LINE STA. 41+00

36+00 37+00 38+00 39+00 40+00 41+00



[Signature]
2/5/2018

BID SET

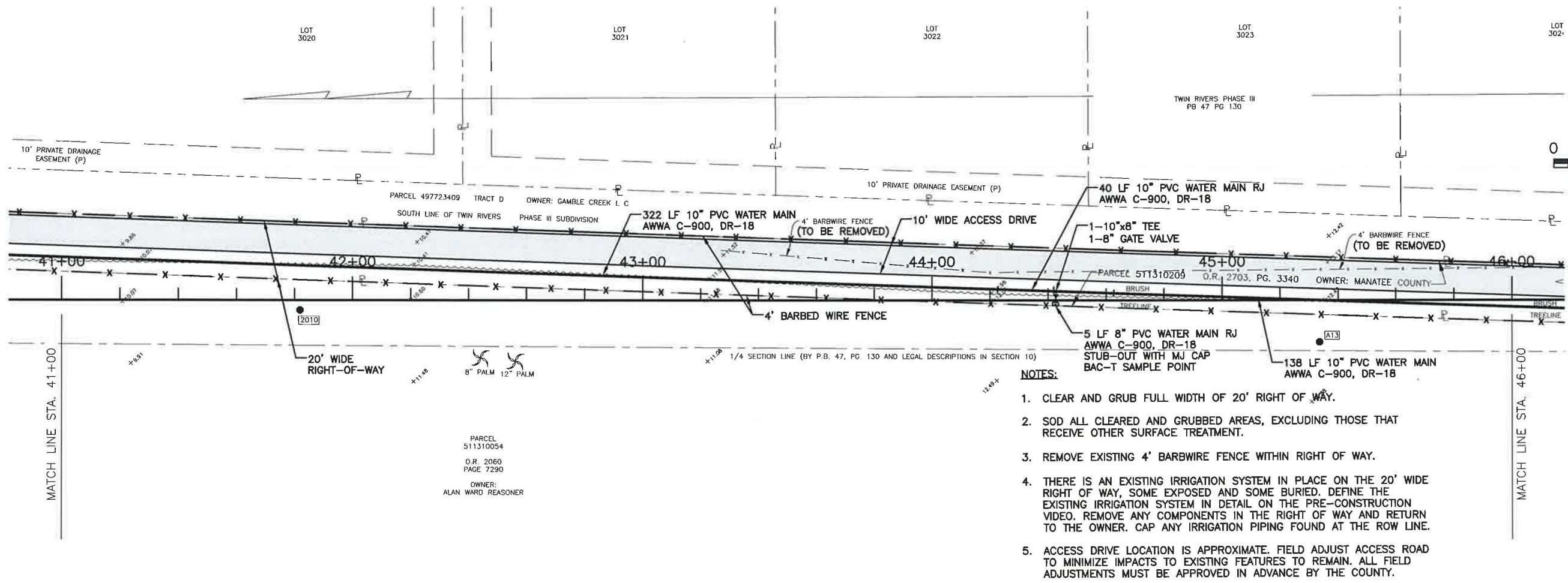
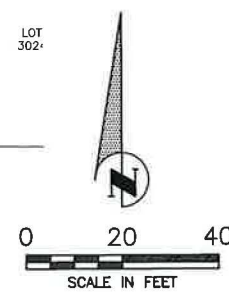


STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL 941.365.5500 - FAX 941.365.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

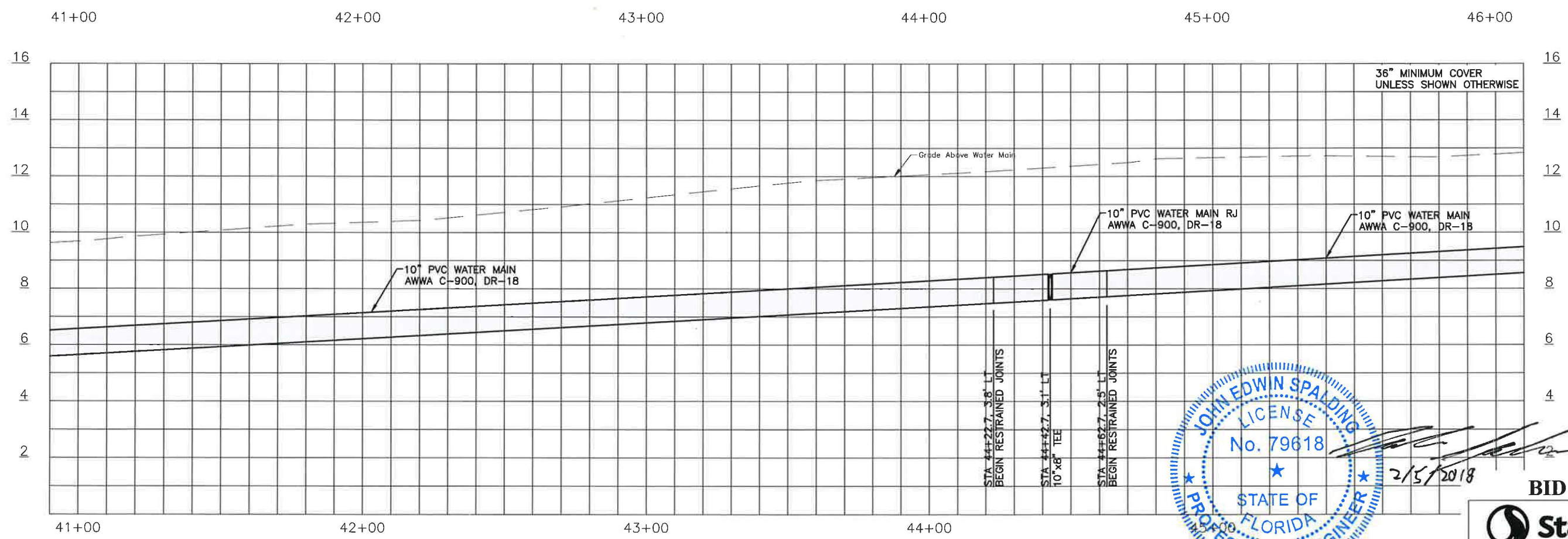
NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	1"=20'
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18
JOHN E. SPALDING	
FLORIDA P.E. # 79618	
Signature & Date	

SHEET 11



- NOTES:**
1. CLEAR AND GRUB FULL WIDTH OF 20' RIGHT OF WAY.
 2. SOD ALL CLEARED AND GRUBBED AREAS, EXCLUDING THOSE THAT RECEIVE OTHER SURFACE TREATMENT.
 3. REMOVE EXISTING 4' BARBWIRE FENCE WITHIN RIGHT OF WAY.
 4. THERE IS AN EXISTING IRRIGATION SYSTEM IN PLACE ON THE 20' WIDE RIGHT OF WAY, SOME EXPOSED AND SOME BURIED. DEFINE THE EXISTING IRRIGATION SYSTEM IN DETAIL ON THE PRE-CONSTRUCTION VIDEO. REMOVE ANY COMPONENTS IN THE RIGHT OF WAY AND RETURN TO THE OWNER. CAP ANY IRRIGATION PIPING FOUND AT THE ROW LINE.
 5. ACCESS DRIVE LOCATION IS APPROXIMATE. FIELD ADJUST ACCESS ROAD TO MINIMIZE IMPACTS TO EXISTING FEATURES TO REMAIN. ALL FIELD ADJUSTMENTS MUST BE APPROVED IN ADVANCE BY THE COUNTY.



[Signature]
2/5/2018

BID SET



STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL. 941.365.5500 - FAX. 941.366.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	REVISION DESCRIPTION	BY	DATE

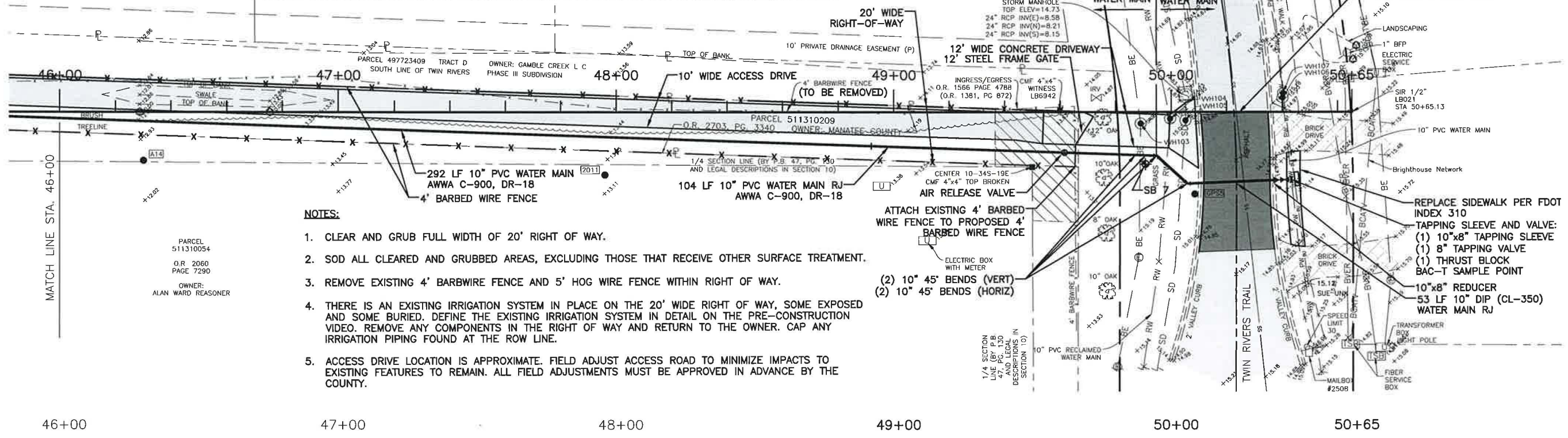
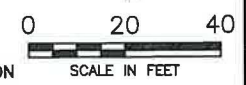
PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	1"=20'
BY	DATE
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18
JOHN E. SPALDING	
FLORIDA P.E. # 79618	
Signature & Date	

**MULHOLLAND ROAD
WATER MAIN
PLAN & PROFILE STA. 41+00 TO 46+00**

**MULHOLLAND ROAD
WATER MAIN
PLAN & PROFILE STA. 46+00 TO 51+00**

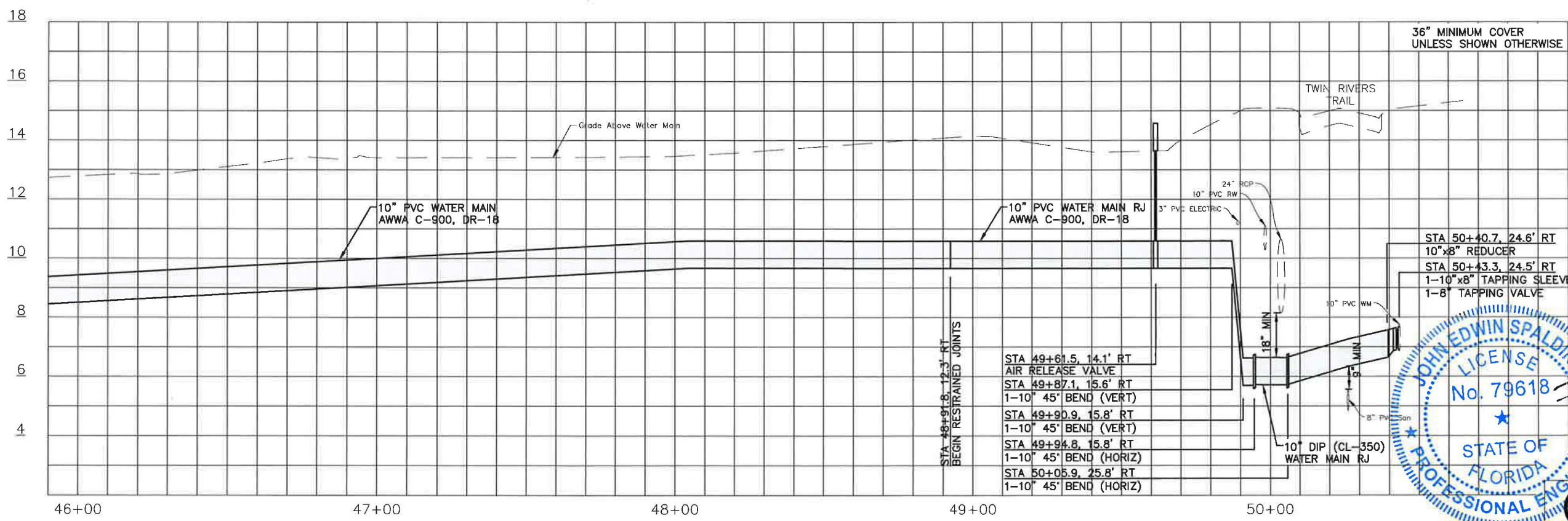
LOT 3024 LOT 3025 LOT 3026

Name	Station	Northing	Easting	Surface	Depth	TOP	Offset	Comment	Owner
WH103	49+88.99	1164033.72	529060.41	14.88'	3.61'	11.27'	4.14' RT	3" PVC ELECTRIC (GREY)	PEACE RIVER
WH104	49+99.60	1164035.45	529071.03	15.22'	4.11'	11.11'	2.39' RT	10" PVC RECLAIMED WATER MAIN	MANATEE CO
WH105	50+05.08	1164034.79	529076.50	15.30'	4.65'	10.65'	3.02' RT	24" RCP STORM	N/A
WH106	50+40.09	1164042.88	529111.54	15.03'	7.26'	7.77'	5.20' LT	WATER MAIN (SIZE/MATERIAL NFV)	MANATEE CO
WH107	50+40.29	1164044.47	529111.75	15.18'	2.98'	12.20'	6.78' LT	0.5" PVC UNKNOWN (x2) (GREY)	UNKNOWN



NOTES:

1. CLEAR AND GRUB FULL WIDTH OF 20' RIGHT OF WAY.
2. SOD ALL CLEARED AND GRUBBED AREAS, EXCLUDING THOSE THAT RECEIVE OTHER SURFACE TREATMENT.
3. REMOVE EXISTING 4' BARBWIRE FENCE AND 5' HOG WIRE FENCE WITHIN RIGHT OF WAY.
4. THERE IS AN EXISTING IRRIGATION SYSTEM IN PLACE ON THE 20' WIDE RIGHT OF WAY, SOME EXPOSED AND SOME BURIED. DEFINE THE EXISTING IRRIGATION SYSTEM IN DETAIL ON THE PRE-CONSTRUCTION VIDEO. REMOVE ANY COMPONENTS IN THE RIGHT OF WAY AND RETURN TO THE OWNER. CAP ANY IRRIGATION PIPING FOUND AT THE ROW LINE.
5. ACCESS DRIVE LOCATION IS APPROXIMATE. FIELD ADJUST ACCESS ROAD TO MINIMIZE IMPACTS TO EXISTING FEATURES TO REMAIN. ALL FIELD ADJUSTMENTS MUST BE APPROVED IN ADVANCE BY THE COUNTY.



JOHN EDWIN SPALDING
LICENSE
No. 79618
STATE OF FLORIDA
PROFESSIONAL ENGINEER

5/5/2018

BID SET



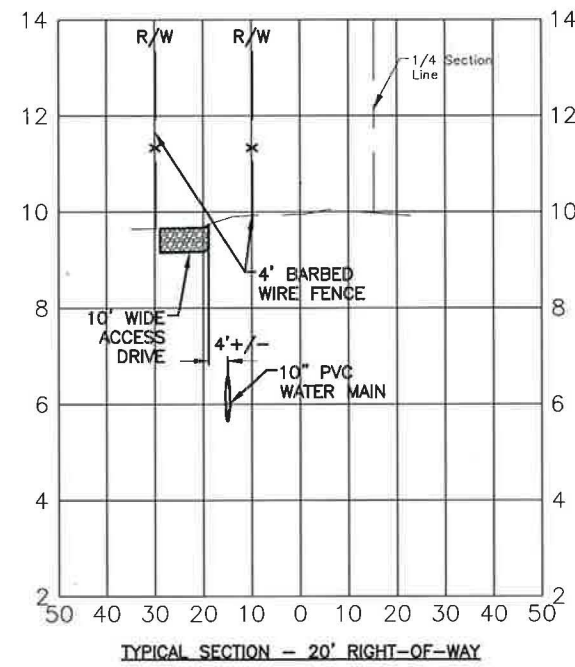
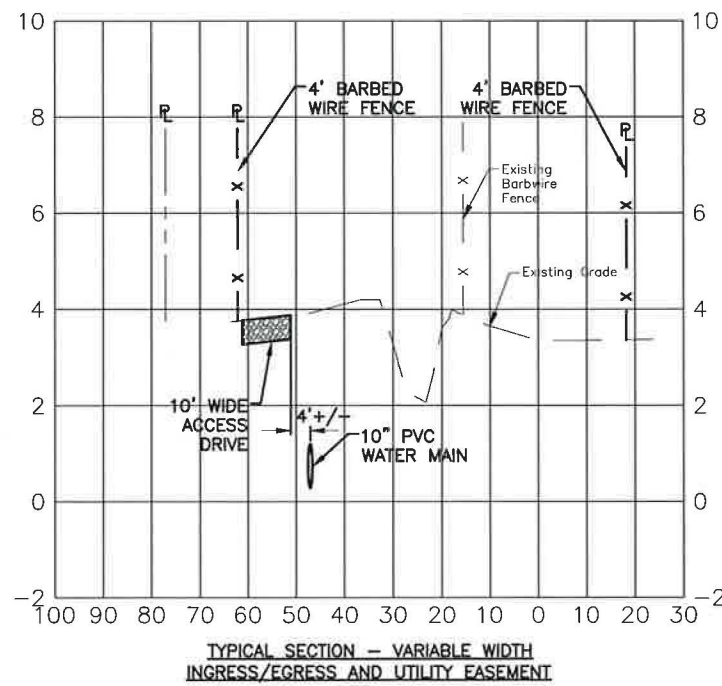
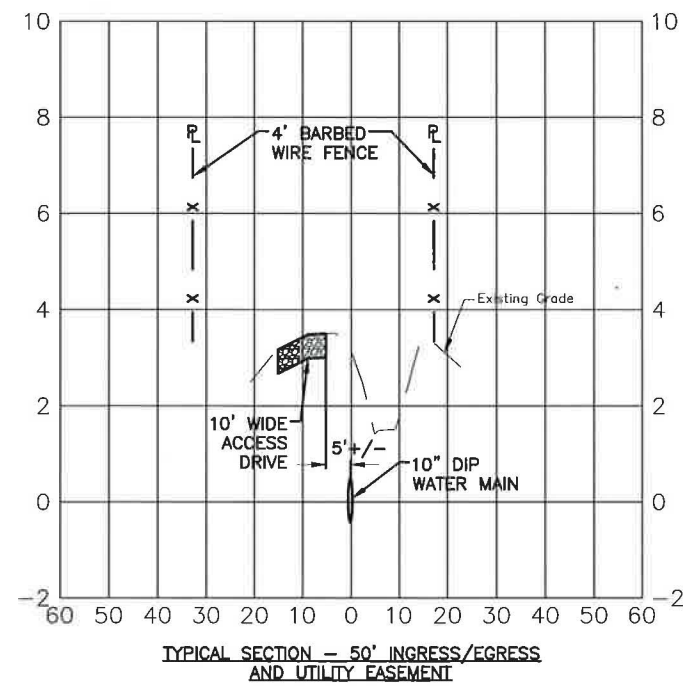
STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL: 941.365.5500 - FAX: 941.365.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	1"=20'
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18
JOHN E. SPALDING	
FLORIDA P.E. # 79618	
Signature & Date	
SHEET 13	

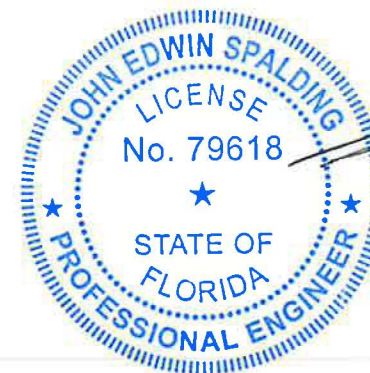


**MULHOLLAND ROAD
WATER MAIN
CROSS SECTIONS**



NOTES:

1. ACCESS DRIVE LOCATION IS APPROXIMATE. FIELD ADJUST ACCESS ROAD TO MINIMIZE IMPACTS TO EXISTING FEATURES TO REMAIN. ALL FIELD ADJUSTMENTS MUST BE APPROVED IN ADVANCE BY THE COUNTY.
2. FOR WORK WITHIN THE 20' RIGHT-OF-WAY, THE LIMITS OF DISTURBANCE SHALL BE THE LIMITS OF RIGHT-OF-WAY.



John E. Spalding
2/5/2018

BID SET



STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL: 941.365.5500 - FAX: 941.365.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	1"=20'
BY	DATE
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18

JOHN E. SPALDING
FLORIDA P.E. # 79618

Signature & Date
SHEET 14

U:\081233-01\Work\proj\2017\Drawings\177310615\Design\Utility\Sheet\10615cu-014.dwg, 14, 2/1/2018 9:47 AM Pophom, Scott, L.L., ANSI full bleed B (17.00 x 11.00 inches)

REV. BY	DATE
CLB/BR	11/10
DATE OF APPROVAL	MAY 10, 2011

MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
MAY 10, 2011
DATE OF APPROVAL

NOTES:

- FOR SANITARY FORCE MAIN USE PLUG VALVE.
- FOR POTABLE AND RECLAIMED WATER USE GATE VALVE OR BUTTERFLY VALVE.

PIPE DIAMETER "D" IN INCHES	MIN. RADIUS FOR PE PIPE IN FEET	
	MIN. RADIUS "R" FOR DR-11	MIN. RADIUS "R" FOR DR-9
4	1.5	1.1
6	2.2	1.6
8	3.0	2.1
10	4.0	2.8
12	5.0	3.5
14	6.0	4.2
16	7.0	5.0
18	8.0	5.8
20	9.0	6.6
24	11.0	8.0
30	14.0	10.0
36	18.0	13.0

NOTES:

- ALL POLYETHYLENE PIPING SHALL MEET MANATEE COUNTY STANDARDS AND SPECIFICATIONS. DR-11, CLASS 180 OR GREATER PRESSURE CLASS SHALL BE USED FOR POTABLE, RECLAIMED WATER OR SANITARY FORCE MAINS. DR-9 MAY BE REQUIRED BASED ON THE ENGINEER'S CALCULATIONS. SEE NOTE #2.
- THE ENGINEER SHALL SUBMIT CALCULATIONS FOR THE MAXIMUM PULLING LENGTH, TOTAL PULL FORCE AND THE ALLOWABLE TENSILE LOAD, IN ACCORDANCE WITH AWWA M58 & ASTM F1984. DESIGN SHALL ALSO BE IN ACCORDANCE WITH ASTM F1982.
- THE PIPE STRING SHALL BE ATTACHED TO THE BACKREAMER THROUGH A "WEAK-LINK" DEVICE TO ENSURE THAT THE PULLING FORCE DOES NOT EXCEED THE PIPE'S ALLOWABLE TENSILE LOAD RATING.
- TWO #10 GAUGE EXTRA HIGH STRENGTH COPPER CLAD STEEL TRACER WIRE SHALL BE PULLED AND SECURED TO THE PIPE FOR PIPELINES THAT ARE INSTALLED BY TRENCHLESS HORIZONTAL DIRECTIONAL DRILLING METHOD. IN TRENCHLESS/NON-DIRECTIONAL BORE APPLICATIONS, A #10 GAUGE SOLID INSULATED COPPER WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRES SHALL HAVE A MINIMUM 30-MILS OF POLYETHYLENE INSULATION. SEE SPEC SECTION 02819.
- COLOR CODED BLUE FOR POTABLE WATER MAINS.
- COLOR CODED PURPLE (PANTONE 522 C) FOR RECLAIMED WATER MAINS.
- COLOR CODED GREEN FOR SANITARY FORCE MAINS.
- PIPE DEPTHS MAY NEED TO BE DEEPER TO AVOID FRACKOUTS.

MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
MAY 10, 2011
DATE OF APPROVAL

HDPE PIPE TO PVC PIPE / SPIGOT TO BELL CONNECTION

HDPE PIPE TO MJ FITTING TRANSITION

HDPE PIPE TO PVC PIPE SPIGOT TO SPIGOT CONNECTION

NOTES:

- ONE #10 GAUGE EXTRA HIGH STRENGTH COPPER CLAD STEEL TRACER WIRE SHALL BE PULLED AND SECURED TO THE PIPE FOR PIPELINES THAT ARE INSTALLED BY TRENCHLESS HORIZONTAL DIRECTIONAL DRILLING METHOD. IN NON-DIRECTIONAL BORE (TRENCHES AND BORE & JACK) APPLICATIONS, A #10 GAUGE SOLID INSULATED COPPER WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRES SHALL HAVE A MINIMUM 30-MILS OF POLYETHYLENE INSULATION.

REV. BY	DATE
CLB/BR	11/10
DATE OF APPROVAL	MAY 10, 2011

PIPE SIZE (N.)	THRUST BLOCK DIMENSIONS B ft. x d inches					
	90° BEND	45° BEND	22.5° BEND	11.25° BEND	DEAD END	45° WYE
4	1.5	3 1/2	1.1	3 1/2	0.8	3 1/2
6	2.2	5 1/2	1.6	3 1/2	1.2	3 1/2
8	2.9	7	2.1	5	1.5	3 1/2
10	3.5	8 1/2	2.6	6 1/2	1.9	4 1/2
12	4.2	10	3.1	7 1/2	2.2	5 1/2
14	4.9	11 1/2	3.6	8 1/2	2.6	6 1/2
16	5.5	13 1/2	4.1	9 1/2	2.9	7
18	6.2	15	4.6	11	3.3	8
20	6.9	16 1/2	5.0	12	3.6	8 1/2
24	8.2	19 1/2	6.0	14 1/2	4.3	10 1/2
30	10.1	24 1/2	7.5	18	5.3	12 1/2
36	12.1	29	8.9	21 1/2	6.4	15 1/2

REINFORCEMENT MAT SCHEDULE

FOR DIM. "B" BETWEEN 5.75' & 12.5' USE #4 @ 8" EACH WAY
FOR DIM. "B" LESS THAN 5.75' USE #3 @ 8" EACH WAY

NOTES:

- ALL THRUST BLOCKS SHALL BE CAST IN PLACE. FITTINGS ADJACENT TO THRUST BLOCKS SHALL BE WRAPPED IN POLYETHYLENE.
- THIS TABLE IS BASED ON WATER PRESSURE=180 PSI WITH AN ALLOWABLE SOIL BEARING PRESSURE=2000 PSF. CONCRETE STRENGTH & #3000 FIBER REINFORCING IS REQUIRED FOR THRUST BLOCKS. THRUST BLOCK SHALL BE CAST AGAINST FIRM UNDISTURBED SOIL.
- FOR LARGER "B" DIMENSIONS IT IS NECESSARY TO CHECK THAT PIPE IS SUFFICIENTLY DEEP TO ALLOW 15" MIN. SOIL COVER OVER TOP EDGE OF THRUST BLOCK.
- RESTRAINED JOINTS MAY BE USED IN LIEU OF THRUST BLOCKS TO SAVE SPACE. THRUST BLOCKS SHALL BE USED IN SITUATIONS WHERE THRUST BLOCKS AND RESTRAINED JOINTS ARE BOTH REQUIRED.

REV. BY	DATE
CLB/BR	11/10
DATE OF APPROVAL	MAY 10, 2011

REQUIRED LENGTH OF RESTRAINED JOINT PIPE FOR DR-18 PVC PIPE

MAIN PIPE SIZE	HORIZ. BENDS			TEES								REDUCERS								PLUGS & VALVES	
	90°	45°	22.5°	SIZE LENGTH								SIZE LENGTH									
24	90	39	18	K24	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	214
20	78	32	16	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	184	
16	66	27	13	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	151	
12	52	22	10	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	118	
10	44	18	8	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	100	
8	37	15	7	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	83	
6	29	12	6	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	63	
4	21	8	4	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	45	

NOTES:

- RESTRAIN 11.25° BENDS 50% OF LENGTH FOR 22.5° BENDS.
- ALL VALVES AND FITTINGS SHALL BE RESTRAINED TO THE CONNECTING SECTIONS OF PIPE.
- ALL ISOLATION VALVES MUST BE PROPERLY ANCHORED OR RESTRAINED TO RESIST A 180 PSI TEST PRESSURE IN EITHER DIRECTION.
- PIPE SIZES ARE GIVEN IN INCHES.
- RESTRAINED PIPE LENGTHS ARE GIVEN IN FEET.
- LENGTHS SHOWN ARE FOR A TEST PRESSURE OF 180 PSI.
- THE RESTRAINED LENGTHS SHOWN IN THESE TABLES ARE BASED ON SOIL CLASSIFICATION SP WITH AWWA TYPE 3 TRENCH CONDITIONS, 180 PSI TEST PRESSURE, 3 FEET OF COVER AND 1.5 FACTOR OF SAFETY. ACTUAL BURY CONDITIONS MUST BE DETERMINED BY THE ENGINEER OF RECORD AND THE RESTRAINED LENGTHS MODIFIED ACCORDINGLY.
- RESTRAINED LENGTHS TO BE APPLIED TO PIPELINES PER DETAIL RESTRAINED LENGTHS FOR PIPE.

REV. BY	DATE
CLB/BR	11/10
DATE OF APPROVAL	MAY 10, 2011

REQUIRED LENGTH OF RESTRAINED JOINT PIPE FOR DIP (POLY-WAPPED)

MAIN PIPE SIZE	HORIZ. BENDS			TEES								REDUCERS								PLUGS & VALVES	
	90°	45°	22.5°	SIZE LENGTH								SIZE LENGTH									
36	142	59	28	K36	K30	K24	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	453
30	124	51	25	K30	K24	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	391
24	106	44	21	K24	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	327
20	92	38	18	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	280
18	77	32	15	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	231
12	61	25	12	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	181
10	52	22	10	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	153
8	44	18	8	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	128
6	34	14	7	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	98
4	24	10	5	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	69

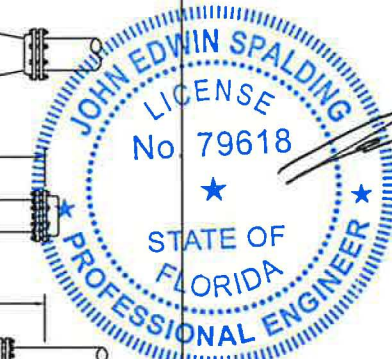
REQUIRED LENGTH OF RESTRAINED JOINT PIPE FOR DIP (NON-WAPPED)

MAIN PIPE SIZE	HORIZ. BENDS			TEES								REDUCERS								PLUGS & VALVES	
	90°	45°	22.5°	SIZE LENGTH								SIZE LENGTH									
36	100	42	20	K36	K30	K24	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	188
30	88	37	18	K30	K24	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	162
24	75	31	15	K24	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	135
20	65	27	13	K20	K18	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	116
16	54	22	11	K16	K14	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	96
12	43	18	8	K12	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	75
10	37	15	7	K10	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	63
8	30	13	6	K8	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	53
6	24	10	5	K6	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	41
4	17	7	3	K4	K2	K1	K3/4	K3/8	K1/2	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	K1/8	K1/4	29

NOTE:
SEE RESTRAINED LENGTHS FOR PVC PIPE DETAIL FOR NOTES 1 THROUGH 8 THAT ARE ALSO APPLICABLE TO RESTRAINED LENGTHS FOR DIP.

REV. BY	DATE
CLB/BR	11/10
DATE OF APPROVAL	MAY 10, 2011

REV. BY	DATE
CLB/BR	11/10
DATE OF APPROVAL	MAY 10, 2011



BID SET

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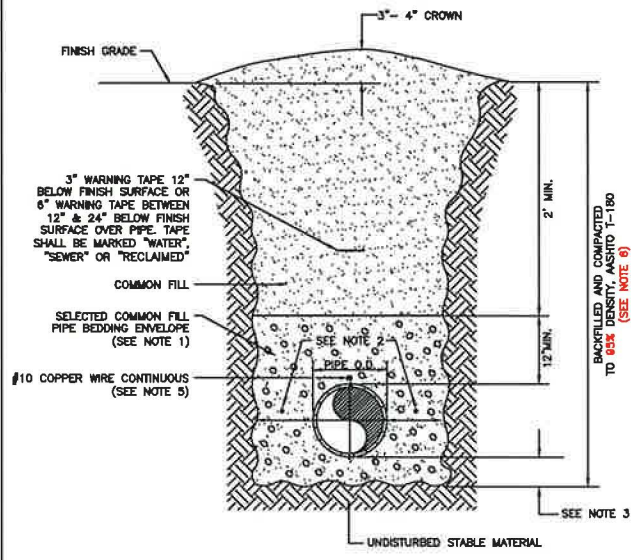
NO.	
REVISION DESCRIPTION	
BY	
DATE	
PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
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BY	DATE
JOHN E. SPALDING	
FLORIDA P.E. # 79618	
Signature & Date	
SHEET 15	

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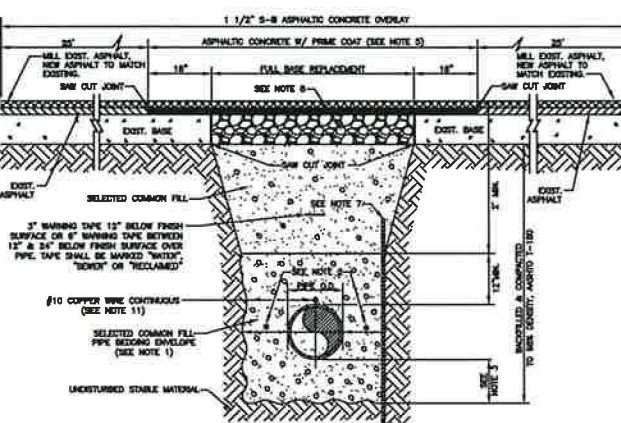
MULHOLLAND ROAD
WATER MAIN
DETAILS

- NOTES:
1. USE OF TYPE A-2 AND A-3 PIPE BEDDING TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
 2. PROVIDE ADEQUATE CLEARANCE TO PLACE AND COMPACT STAGE 1 BEDDING MATERIAL IN TRENCH AREA BELOW PIPE SPRINGLINE. PIPE EMBEDMENT MUST BE COMPACTED OUT TO THE TRENCH WALL OR 2.5 TIMES THE PIPE OD, WHICHEVER IS LESS.
 3. TYPICALLY 4" TO 6".
 4. PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
 5. TRACER WIRE NOT REQUIRED FOR GRAVITY SEWERS.
 6. COMPACT TO 98% DENSITY, AASHTO T-180, FOR PIPE INSTALLED WITHIN 5 FEET OF EDGE OF PAVEMENT.

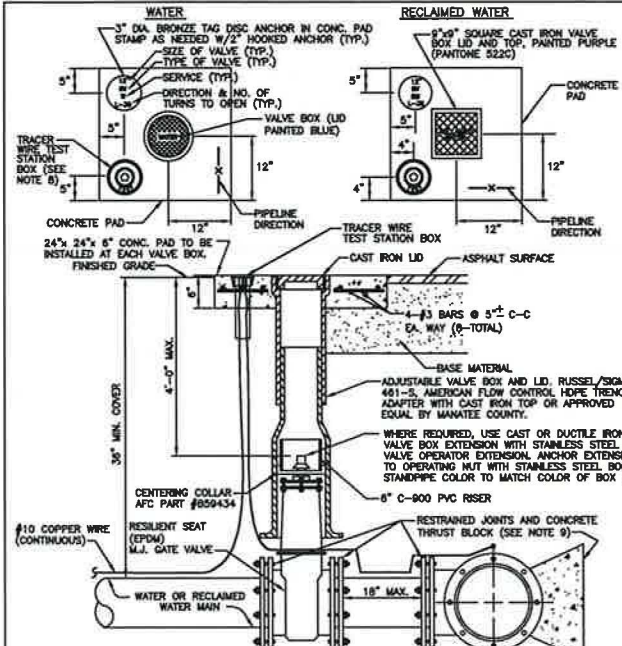


MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
TRENCH WITH UNIMPROVED SURFACE TYPE A-1 PIPE BEDDING
UG-11
MAY 10, 2011
DATE OF APPROVAL
PAGE 111

- NOTES:
1. USE OF TYPE A-2 AND A-3 PIPE BEDDING TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
 2. PROVIDE ADEQUATE CLEARANCE TO PLACE AND COMPACT STAGE 1 BEDDING MATERIAL IN TRENCH AREA BELOW PIPE SPRINGLINE. PIPE EMBEDMENT MUST BE COMPACTED OUT TO THE TRENCH WALL OR 2.5 TIMES THE PIPE OD, WHICHEVER IS LESS.
 3. TYPICALLY 4" TO 6".
 4. PIPE INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
 5. ASPHALTIC CONCRETE STRUCTURE COURSE WITH PRIME COAT SHALL BE THE SAME DEPTH AND TYPE AS EXISTING OR A MINIMUM OF 1 1/4 INCH, WHICHEVER IS GREATER.
 6. MILL 25' BACK FROM TRENCH SAW CUT. ADJUST MILLING PER INDIVIDUAL SITE TO NOT IMPACT BASE BUTT JOINT TO EXIST ASPHALT. FINAL OVERLAY LIMITS ARE FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT. FINAL OVERLAY TO MATCH EXISTING WITH NO DISCREETABLE "DUMPS" AT JOINT. MILLING LIMITS THAT IMPACT INTERSECTION SHALL BE ADDRESSED ON A CASE BY CASE BASIS AND APPROVED BY MANATEE COUNTY.
 7. SHEETING ORDERED LEFT IN PLACE TO BE CUT OFF 24" BELOW FINISHED GRADE OR 12" BELOW SUBGRADE.
 8. BASE SHALL BE 8" MINIMUM THICKNESS CRUSHED CONCRETE.
 9. TEMPORARY PATCHES WILL BE INSTALLED TO PROVIDE A SMOOTH ALL WEATHER SURFACE AT ALL TIMES. PERMANENT REPLACEMENT TO BE MADE AS SOON AS POSSIBLE.
 10. RESTORE SIGNAGE & MARKING WITH THERMOPLASTIC PER FOOT STANDARDS, LATEST EDITION.
 11. TRACER WIRE NOT REQUIRED FOR GRAVITY SEWERS.
 12. NOTES 5. THRU 10. ARE MINIMUM REQUIREMENTS FOR A TRENCH IN A ROAD. REFER TO LATEST EDITION OF MANATEE COUNTY HIGHWAY AND TRAFFIC STANDARDS FOR ADDITIONAL REQUIREMENTS.

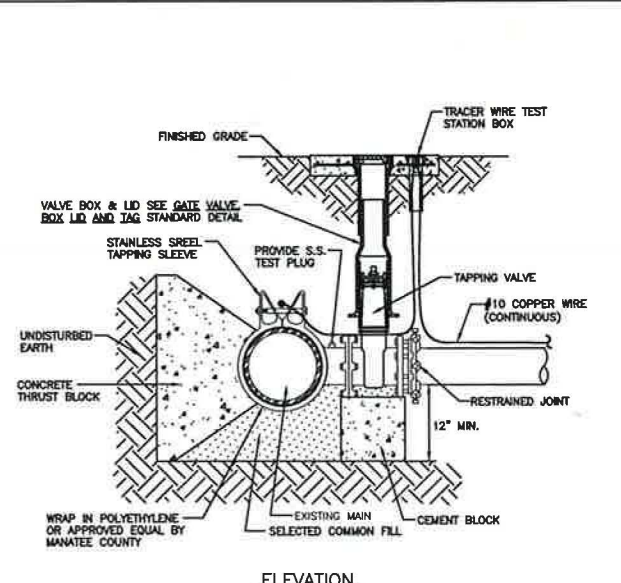


MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
TRENCH WITH ASPHALT PAVEMENT SURFACE TYPE A-1 PIPE BEDDING
UG-12
MAY 10, 2011
DATE OF APPROVAL
PAGE 112



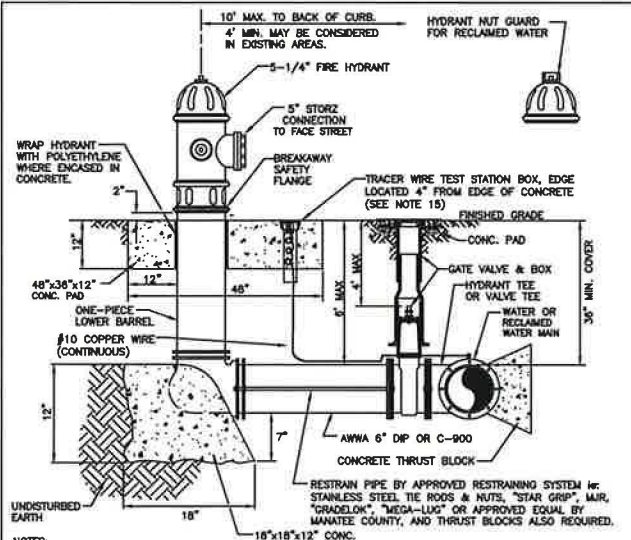
- NOTES:
1. "W" OR "RW" TO BE IMPRESSED INTO THE NEWLY-POURED CONCRETE CURB, ALONG WITH DISTANCE IN FEET TO THE VALVE. IF NO CURB, INSTALL A BLUE DISC WITH "W" OR PURPLE DISC WITH "RW" AND A 1" GALVANIZED STEEL SCREW IN THE EDGE OF PAVEMENT WITH THE FOOTAGE FROM THE DISC TO THE VALVE.
 2. ALL EXISTING AND PROPOSED VALVE BOXES SHALL BE ADJUSTED TO FINISHED GRADES AS DETERMINED IN THE FIELD.
 3. WATER VALVES SHALL NOT BE PLACED IN HANDICAPPED RAMP.
 4. PRECAST CONCRETE PADS & THRUST BLOCKS SHALL NOT BE USED.
 5. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1/4".
 6. FOR VALVES 18" AND LARGER, USE BUTTERFLY VALVES.
 7. PIPELINE DIRECTION TO BE IMPRESSED INTO NEWLY-POURED CONCRETE PAD.
 8. TRACER WIRE TEST STATION BOX IS NOT REQUIRED IN VALVE BOX PAD IF THE GATE VALVE IS LOCATED WITHIN 200 FEET OF A WATER SERVICE, BLOW-OFF, BACKFLOW PREVENTER OR FIRE HYDRANT THAT HAS A TRACER WIRE BOX.
 9. WHERE THRUST BLOCK NOT USED, RESTRAINED JOINTS MUST THEN EXTEND FROM THE FULL LENGTH SPECIFIED FOR "TEES".
 10. BINGHAM & TAYLOR P200W FOR NORMAL YARD SERVICE, WHERE VALVE WILL BE IN STREET OR PARKING UNDER VEHICLE TRAFFIC, USE P250ND CENTERED IN SEPARATE CONCRETE PAD SIMILAR TO STANDARD VALVE BOX PAD.

MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
GATE VALVE, BOX, LID AND TAG
UW-2
MAY 10, 2011
DATE OF APPROVAL
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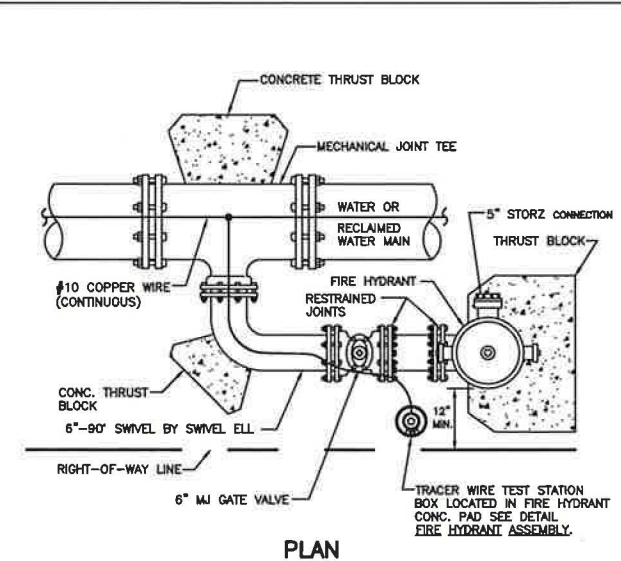
- NOTES:
1. PRIOR TO TAPPING, CONTRACTOR TO DEMONSTRATE 60 MINUTE HYDROSTATIC TEST OF THE TAPPING SLEEVE AND VALVE WITH NO LOSS OF 180 PSI PRESSURE FOR WATER AND RECLAIMED WATER OR 150 PSI FOR FORCE MAIN.
 2. ALL FITTINGS TO BE WRAPPED WITH 20 MIL VULQUEEN AT THRUST BLOCK.
 3. ALL TAPS ON CONCRETE WATER MAINS AND LARGER THAN 12" ARE TO BE MADE BY A MANATEE COUNTY APPROVED TAPPING COMPANY. ALL MATERIALS TO BE SUPPLIED BY THE CONTRACTOR.
 4. ALL TAPS MUST BE OF A SMALLER SIZE THAN THE MAIN BEING TAPPED & PLACED NO CLOSER THAN 30" OR A DISTANCE EQUAL TO (1) MAIN PIPE DIAMETER PLUS (2) TAP PIPE DIAMETERS (WHICHEVER IS GREATER) FROM A JOINT OR FITTING.
 5. CONTRACTOR TO SUPPLY A DRY HOLE FOR TAPPING CREW TO WORK IN AND A BACK-HOE TO LOWER TAPPING MACHINE INTO THE HOLE.
 6. WHERE THRUST BLOCK NOT USED, RESTRAINED JOINTS MUST THEN EXTEND FROM TEE FULL LENGTH SPECIFIED FOR "TEES".
 7. TRACER WIRE TEST STATION BOX IS REQUIRED AT CONNECTIONS TO EXISTING MAINS.

MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
TAPPING SLEEVE AND VALVE
UW-4
MAY 10, 2011
DATE OF APPROVAL
PAGE 122



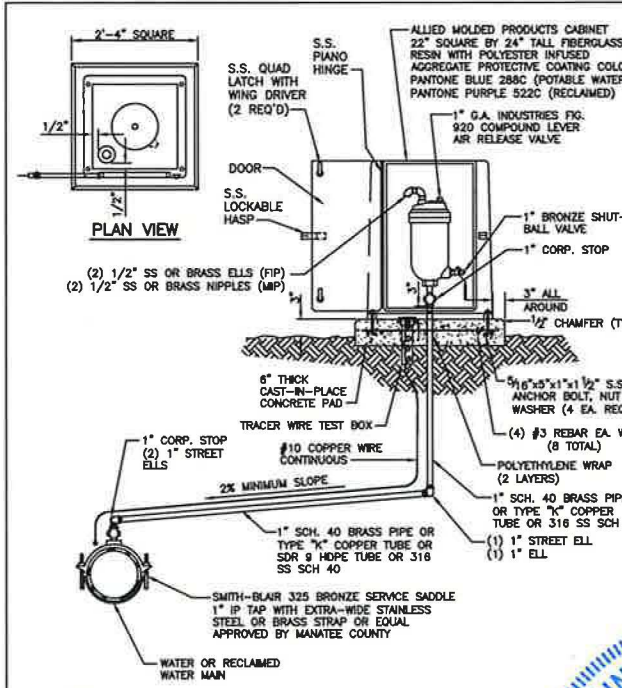
- NOTES:
1. WEEDHOLES SHALL BE EXCLUDED FROM THE FIRE HYDRANT.
 2. FIRE HYDRANTS SHALL BE A MINIMUM OF 6" OFF EDGE OF PAVEMENT AND 10' MAX FROM BACK OF CURB. WHERE POSSIBLE AND WHERE SIDEWALK IS TO BE INSTALLED, FIRE HYDRANT SHALL BE LOCATED BETWEEN SIDEWALK AND RIGHT-OF-WAY LINE.
 3. HYDRANTS SHALL BE FLOWN BONDED EPOXY COATED SAFETY YELLOW FOR WATER AND PURPLE (PANTONE 522C) FOR RECLAIMED WATER. HYDRANT SHALL BE DUCTILE IRON CONSTRUCTION.
 4. FIRE HYDRANTS SHALL BE PLACED SO THAT STORM WATER FLOWS AWAY FROM THE HYDRANT.
 5. FIRE HYDRANTS SHALL BE CONSTRUCTED WITH "GROUND LINE" SET TO FINISHED GRADES AS ESTABLISHED IN THE FIELD. NORMAL BURY IS 3 FEET OF COVER FOR ALL WATER LINES.
 6. FIRE HYDRANTS MAY BE CONSTRUCTED WITH "GRADELOK" OFFSET FITTING.
 7. RAISED REFLECTIVE PAVEMENT MARKER (BLUE) FOR POTABLE WATER (PURPLE) FOR RECLAIMED WATER SHALL BE INSTALLED AT CENTERLINE OF PAVEMENT ADJACENT TO EACH HYDRANT.
 8. PRECAST CONCRETE THRUST BLOCKS & PADS SHALL NOT BE USED.
 9. ALL EXPOSED EDGES OF CONCRETE SHALL HAVE 1/2" CHAMFER.
 10. FIRE HYDRANT VALVE SHALL BE FASTENED DIRECTLY TO TEE.
 11. N-LINE VALVES SHOULD BE LOCATED AT HYDRANT TEES.
 12. HYDRANTS SHALL BE LOCATED ON SAME SIDE OF ROAD AS WATER MAIN UNLESS OTHERWISE APPROVED.
 13. THERE MUST BE A CLEARANCE OF 7 1/2 FEET FROM FRONT AND BOTH SIDES, AND FOUR FEET TO THE REAR OF THE HYDRANT, TO ABOVE GRADE OBSTRUCTIONS INCLUDING POSTS, FENCES, TREES, ETC., PER THE FLORIDA FIRE PREVENTION CODE.
 14. SEE STANDARD DETAIL GATE VALVE BOX LID AND TAG.
 15. SHOULD THE FIRE HYDRANT'S CONCRETE PAD OVERLAP THE SIDEWALK, THE TRACER WIRE TEST STATION BOX SHALL NOT BE LOCATED WITHIN THE SIDEWALK.

MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
FIRE HYDRANT ASSEMBLY
UW-5
MAY 10, 2011
DATE OF APPROVAL
PAGE 123



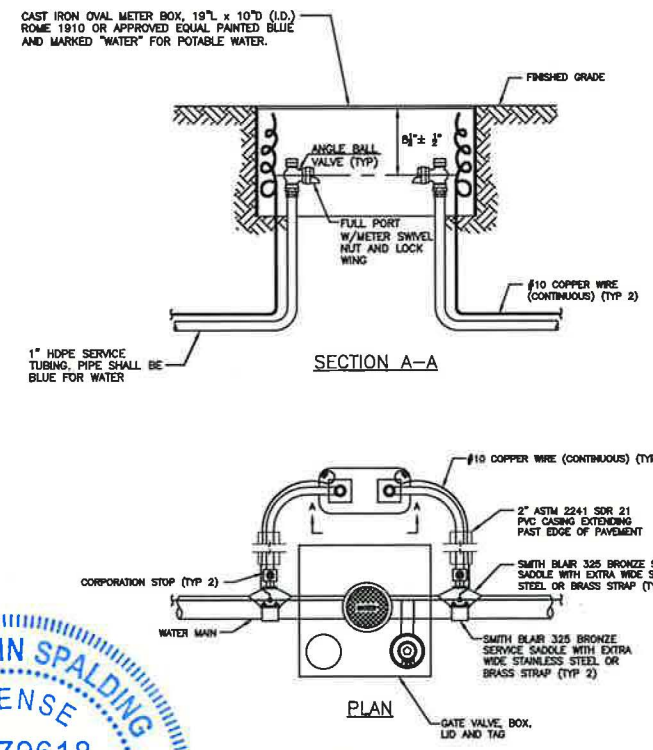
- NOTE:
1. THIS DETAIL FOR USE ONLY WHEN THE WATER MAIN IS LOCATED TOO CLOSE TO THE RIGHT-OF-WAY LINE TO USE THE FIRE HYDRANT ASSEMBLY DETAIL.
 2. SEE STANDARD DETAIL GATE VALVE, BOX, LID AND TAG.

MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
FIRE HYDRANT WITH LOCKED 90° BEND
UW-6
MAY 10, 2011
DATE OF APPROVAL
PAGE 124

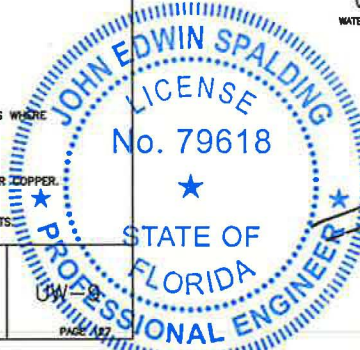


- NOTES:
1. AIR RELEASE VALVES TO BE INSTALLED AT HIGH POINTS ALONG WATER MAINS WHERE SPECIFICALLY INDICATED ON THE PLAN.
 2. AIR VENT ORIFICE TO BE SIZED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION FOR WATER MAIN SIZE.
 3. ALL INCIDENTAL FITTINGS AND HARDWARE TO BE STAINLESS STEEL, BRASS OR COPPER.
 4. ALL PIPE THREADS TO BE SEALED AIR TIGHT.
 5. VENT PIPE TO BE LAID ACCURATELY ON SLOPE, WITHOUT HIGH OR LOW POINTS.

MANATEE COUNTY
PUBLIC WORKS DEPARTMENT
ABOVE-GROUND AIR RELEASE VALVE ASSY. FOR 12-INCH AND SMALLER WATER MAINS
UW-7
MAY 10, 2011
DATE OF APPROVAL
PAGE 127



LEAK DETECTION AND SAMPLING STATION
PLAN
GATE VALVE, BOX, LID AND TAG



2/15/2018

Stantec
STANTEC CONSULTING SERVICES INC.
5172 STATION WAY, SARASOTA, FLORIDA 34233
TEL 941.365.5500 - FAX 941.368.1922
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310615
SURVEY #	000
SEC./TWN./RGE	9&10/34S/19E
SCALE	N.T.S.
SURVEYED	GFY 11/06/15
DESIGNED	JES 02/05/18
DRAWN	SRP 02/05/18
CHECKED	SCM 02/05/18
JOHN E. SPALDING FLORIDA P.E. # 79618	
Signature & Date	
SHEET 16	

Bid Attachment 4

MULLHOLLAND ROAD PRESERVE RESTORATION PLAN

Mulholland Road Water Main Manatee County Project No. 6046270 Preserve Restoration Plan

1. INTRODUCTION

The Mulholland Road Water Main extension project will connect water main lines from the end of Mulholland Road to Twin Rivers Trail to the east ($\pm 4,000'$). In an effort to reduce impacts to Manatee County natural resources (including wetlands, flowing waterways, and wildlife), the County has decided to install the pipe under Gamble Creek using horizontal directional drilling (HDD).

To perform the HDD, machinery will need to be set up in an adjacent portion of a regulated preserve within River Plantation (see attached **Impact and Restoration Map**). The native habitat surrounding the area of impact is dominated by a canopy of cabbage palms (*Sabal palmetto*) with an understory of saw palmetto (*Serenoa repens*). Approximately 0.01 acres will need to be cleared for machinery set up, but as depicted in the photo below, long term impacts from the limited clearing are anticipated to be minimal due to the apparent historic disturbance at the selected impact site.



Impact area



2. GOALS

The primary goal of this Restoration Plan is to effectively replace the ecological value lost by the HDD impacts to the Preserve Area.

3. RESPONSIBLE ENTITY

Manatee County will be responsible for the implementation of this Plan.

4. ACREAGE OF IMPACTS

Approximately 0.01 acres of the preserve are estimated to be impacted. The proposed restoration is to occur within this 0.01 acre footprint.

5. RESTORATION ACTIVITIES

Prior to clearing efforts, the boundary of the impact area within the Preserve will be staked and a tree survey and habitat assessment will be conducted within the area to be cleared. Canopy species and diameter at breast height (DBH) of all impacted trees will be recorded. Within 30 days of construction completion the following restoration activities will commence:

- Soil will be regraded to match adjacent elevations and leveled.
- Plant 2x the number of impacted trees, respective to individual species.
- Plant saw palmettos on 3' centers within the impacted area.
- Size of the installed plants shall be a minimum of 1 gallon pots, and must be Florida #1 grade as described in the Grades and Standards for Nursery Plants. Plants shall be installed during the rainy season to increase survivorship.
- Manatee County environmental staff will be notified that the restoration activities have been completed following plant installation.

6. MAINTENANCE

Treatment of nuisance/exotic (N/E) vegetation within the impacted area shall be conducted quarterly for the first year, semi-annually during the second year, and annually during year three. Supplemental vegetative maintenance activities will be performed at any time that coverage by N/E species is observed to be >5%. Species identified as Category I or II in the most current Florida Exotic Pest Plant Council (FLEPPC) list will be targeted.

Herbicide applications will be performed and supervised by a professional licensed by the Florida Department of Agriculture and Consumer Services (FDACS) for the commercial application of pesticides with certification of Natural Areas Weed Management. Herbicide applications will be made pursuant to label rates and instructions.

7. MONITORING

The Restoration Area shall be monitored annually during the growing season (April-November). Annual reports will be submitted to County staff for three years following the completion of the restoration activities.

A qualified environmental scientist will review 100% of the Restoration Area and estimate the percent cover of undesirable and desirable vegetation, and will document such cover photographically at selected sites. The scientist will recommend remedial actions in addition to the maintenance plan described herein if any of the thresholds are exceeded.



Stantec Consulting Services Inc.

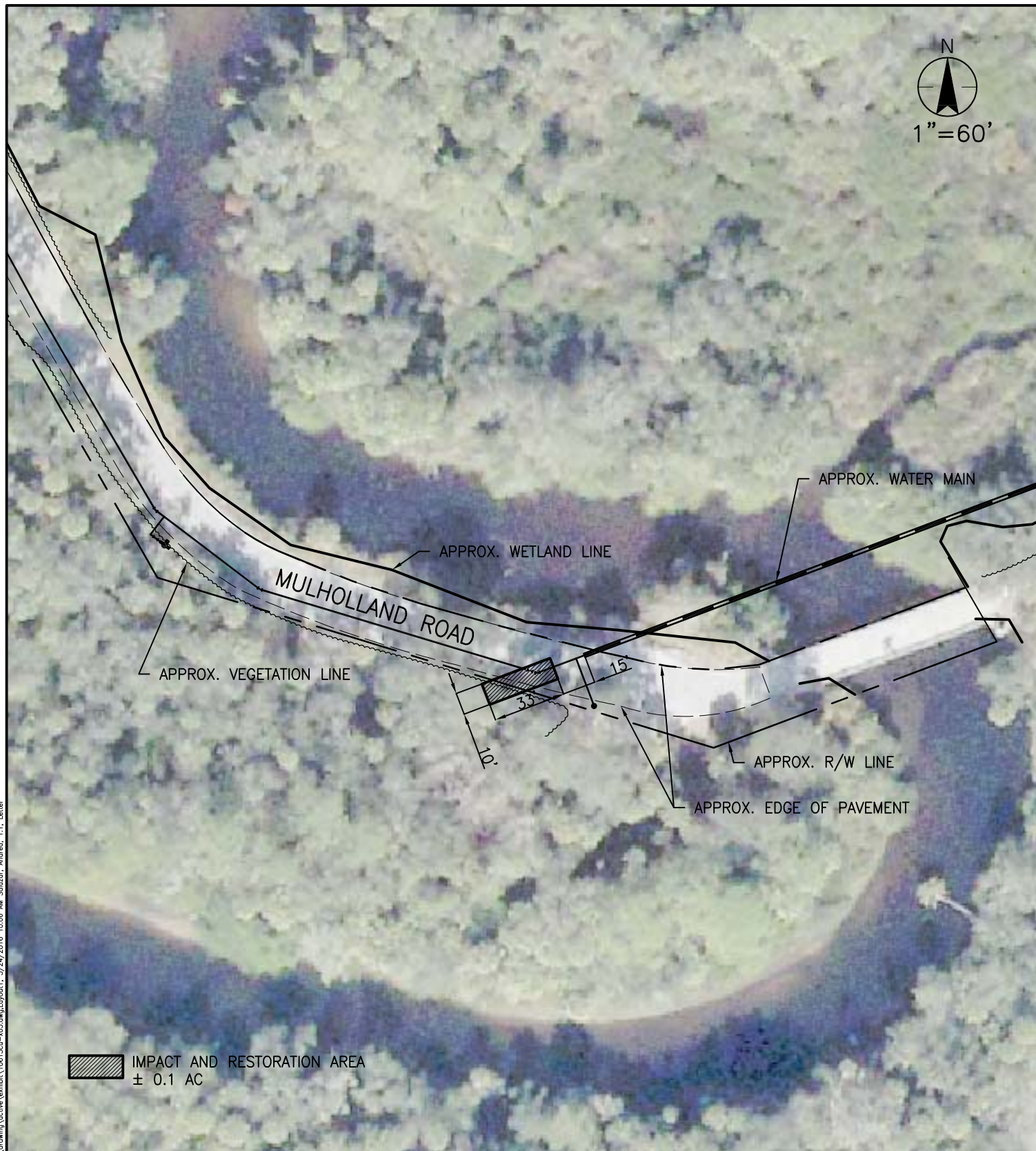
6900 Professional Parkway East, Sarasota FL 34240-8414

The first annual report shall restate the Restoration Plan goals and a summary of vegetative maintenance activities conducted during the previous monitoring term.

8. SUCCESS CRITERIA

At the end of the required minimum three year monitoring period, the restoration activities may be deemed successful and monitoring may cease when:

- Coverage by N/E species is $\leq 5\%$.
- Coverage by desirable species is $\geq 80\%$.



 IMPACT AND RESTORATION AREA
± 0.1 AC

PROJECT: MULHOLLAND ROAD WATERMAIN – IMPACT AND RESTORATION AREA

CLIENT: MANATEE COUNTY, FL



Stantec

6900 Professional Parkway East, Sarasota, FL 34240-8414
Phone 941-907-6900 • Fax 941-907-6910
Certificate of Authorization #27013 • www.stantec.com

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay. The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

SCALE:	1"=60'	DATE:	03/22/2016
SEC:	9&10	TWP:	34S
		RGE:	19E
PROJECT NO.	177310615	INDEX NO:	10615cu-X03
DRWN BY/EMP NO.	AS/102871	SHEET NO:	1 OF 1

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Bid Attachment 5

FDEP PERMITS



Florida Department of Environmental Protection

Southwest District Office
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

Notification of Acceptance of Use of a General Permit

PERMITTEE:

Sia Mollanazar, Deputy Director -
Engineering
Manatee County Utilities
1022 26th Avenue East
Bradenton, FL 34208
sia.mollanazar@mymanatee.org

Permit Number: 133068-1170-DSGP/02

Issue Date: May 27, 2016

Expiration Date: May 26, 2021

County: Manatee

Project Name: Mulholland Road Water
Main

Water Supplier: Manatee County Utilities

PWS ID: 641-1132

Dear Mr. Mollanazar:

On May 25, 2016, the Florida Department of Environmental Protection received a "*Notice of Intent to Use the General Permit for Construction of Water Main Extensions for PWSs*" [DEP Form No. 62-555.900(7)], under the provisions of Rule 62-4.530 and Chapter 62-555, Florida Administrative Code (F.A.C.). The proposed project includes the construction of a new ten and twelve-inch diameter water mains along Mulholland Road.

Based upon the submitted Notice and accompanying documentation, this correspondence is being sent to advise that the Department does not object to the use of such general permit at this time. Please be advised that the permittee is required to abide by Rule 62-555.405, F.A.C., all applicable rules in Chapters 62-4, 62-550, 62-555, F.A.C., and the General Conditions for All General Drinking Water Permits (found in 62-4.540, F.A.C.).

The permittee shall comply with all sampling requirements specific to this project. These requirements are attached for review and implementation.

Pursuant to Rule 62-555.345, F.A.C., the permittee shall submit a certification of construction completion [DEP Form No. 62-555.900(9)] to the Department and obtain approval, or clearance, from the Department before placing any water main extension constructed under this general permit into operation for any purpose other than disinfection or testing for leaks.

Within 30 days after the sale or legal transfer of ownership of the permitted project that has not been cleared for service in total by the Department, both the permittee and the proposed permittee shall sign and submit an application for transfer of the permit using Form 62-555.900(8), F.A.C., with the appropriate fee. The permitted construction is not authorized past the 30-day period unless the permit has been transferred.

Permittee:
Sia Mollanazar - Deputy Director - Engineering
Page 2

DEP File No.:
133068-1170-DSGP/02

This permit will expire five years from the date of issuance. If the project has been started and not completed by that time, a new permit must be obtained before the expiration date in order to continue work on the project, per Rule 62-4.030, F.A.C.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION



for _____
Pamala Vazquez
Program Administrator
Permitting & Waste Cleanup Program
Southwest District

Enclosures: Clearance Requirements/Utilities Separation Requirements

cc: Robert J. Halbach, P.E., Stantec Consulting Services Inc., bob.halbach@stantec.com
Kenneth Labarr, Manatee County Public Works Dept., kenneth.labarr@mymanatee.org
Jim Stockwell, P.E., Manatee County Public Works Dept., jim.stockwell@mymanatee.org

A Civil Penalty May Be Incurred
if this project is placed into operation before obtaining a clearance from this office.

Requirements for clearance upon completion of projects are as follows:

1) Clearance Form

Submission of a fully completed Department of Environmental Protection (DEP) Form 62-555.900(9) *Certification of Construction Completion and Request for Clearance to Place Permitted PWS Components into Operation.*

2) Record Drawings, if deviations were made

Submission of the portion of record drawings showing deviations from the DEP construction permit, including preliminary design report or drawings and specifications, if there are any deviations from said permit (Note that it is necessary to submit a copy of only the portion of record drawings showing deviations and not a complete set of record drawings.).

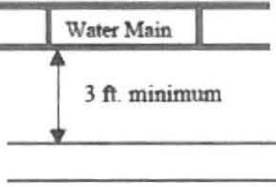
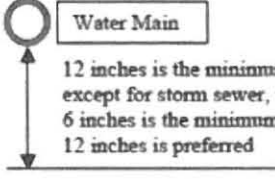
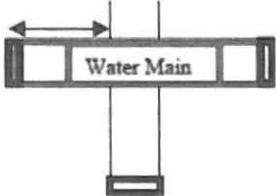
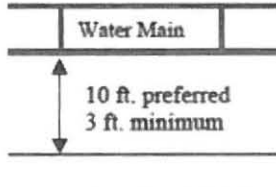
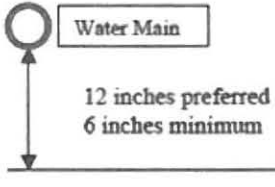
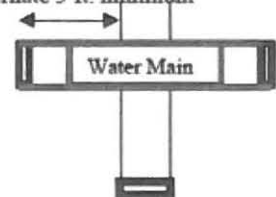
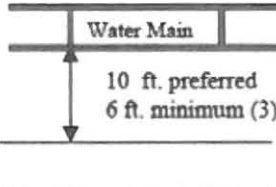
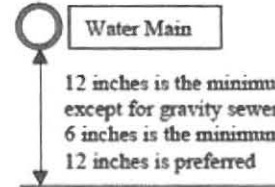
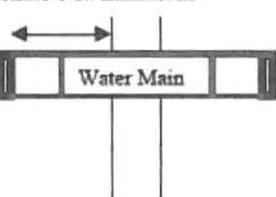
3) Bacteriological Results

Copies of satisfactory bacteriological analysis (a.k.a. Main Clearance), taken within sixty (60) days of completion of construction, from locations within the distribution system or water main extension to be cleared, in accordance with Rules 62-555.315(6), 62-555.340, and 62-555.330, F.A.C. and American Water Works Association (AWWA) Standard C 651-92, as follows:

- Connection to an existing system
- The end point of the proposed addition
- Any water lines branching off a main extension
- Every 1,200 feet on straight runs of pipe

Each location shall be sampled on two consecutive days, at least 6 hours apart, with sample points and chlorine residual readings clearly indicated on the report. A sketch or description of all bacteriological sampling locations must also be provided.

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH F.A.C. RULE 62-555.314

Other Pipe	Horizontal Separation	Crossings (1)	Joint Spacing @ Crossings (Full Joint Centered)
Storm Sewer, Stormwater Force Main, Reclaimed Water (2)	 <p align="center">3 ft. minimum</p>	 <p align="center">12 inches is the minimum, except for storm sewer, then 6 inches is the minimum and 12 inches is preferred</p>	<p align="center">Alternate 3 ft. minimum</p> 
Vacuum Sanitary Sewer	 <p align="center">10 ft. preferred 3 ft. minimum</p>	 <p align="center">12 inches preferred 6 inches minimum</p>	<p align="center">Alternate 3 ft. minimum</p> 
Gravity or Pressure Sanitary Sewer, Sanitary Sewer Force Main, Reclaimed Water (4)	 <p align="center">10 ft. preferred 6 ft. minimum (3)</p>	 <p align="center">12 inches is the minimum, except for gravity sewer, then 6 inches is the minimum and 12 inches is preferred</p>	<p align="center">Alternate 6 ft. minimum</p> 
On-Site Sewage Treatment & Disposal System	<p align="center">10 ft. minimum</p>	<p align="center">---</p>	<p align="center">---</p>

- (1) Water main should cross above other pipe. When water main must be below other pipe, the minimum separation is 12 inches.
- (2) Reclaimed water regulated under Part III of Chapter 62-610, F.A.C.
- (3) 3 ft. for gravity sanitary sewer where the bottom of the water main is laid at least 6 inches above the top of the gravity sanitary sewer.
- (4) Reclaimed water not regulated under Part III of Chapter 62-610, F.A.C.

Disclaimer – This document is provided for your convenience only. Please refer to F.A.C. Rule 62-555.314 for additional construction requirements.



Florida Department of Environmental Protection

Southwest District Office, Suite 101
13051 North Telecom Parkway
Temple Terrace, FL 33637-0926

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

June 29, 2017

Manatee County
c/o Sia Mollanazar, Deputy Director – Engineer Services
1022 26th Ave East
Bradenton, FL 34208
Sia.mollanazar@mymanatee.org

File No. 41-0344704-001-EG, Manatee County

Dear Mr. Mollanazar:

On May 25, 2016, we received your notice of intent to use a General Permit (GP), pursuant to Rule 62-330.453, Florida Administrative Code (F.A.C.) to install approximately 3900 linear feet of 10-12-inch water main using open trench and Horizontal Direction Drilling (HDD) crossing Gamble Creek, a Class III Florida Waterbody. The project is located along Mulholland Road, east of 22nd Court East, and west of Twin Rivers Trail, in Parrish, Sections 9 and 10, Township 34 South, Range 19 East, Manatee County.

Please note, separate authorization may be required from SWFMWD or Manatee County for any temporary impacts which may occur to a conservation easement due to drill rig placement as noted on Sheet 7 of the project drawings.

Your intent to use a general permit has been reviewed by Department staff for three types of authorizations: (1) regulatory authorization, (2) proprietary authorization (related to state-owned submerged lands), and (3) federal authorization. The authority for review and the outcomes of the reviews are listed below. Please read each section carefully.

Your project qualifies for all three authorizations. However, this letter does not relieve you from the responsibility of obtaining other federal, state, or local authorizations that may be required for the activity.

If you change the project from what you submitted, the authorization(s) granted may no longer be valid at the time of commencement of the project. Please contact us prior to beginning your project if you wish to make any changes.

1. Regulatory Review – Approved

Based on the forms, drawings, and documents submitted with your notice, it appears that the project meets the requirements for the General Permit under Rule 62-330.453, F.A.C. Any activities performed under a general permit are subject to general conditions required in Rule 62-330.405, F.A.C. (attached), and the specific conditions of Rule 62-330.453, F.A.C. (attached). Any deviations from these conditions may subject the permittee to enforcement action and possible penalties.

Please be advised that the construction phase of the GP must be completed within five years from the date the notice to use the GP was received by the Department. If you wish to continue this GP beyond the expiration date, you must notify the Department at least 30 days before its expiration.

Authority for review- Part IV of Chapter 373, F.S., Title 62, F.A.C. and in accordance with the operating agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C.

2. Proprietary Review – Approved

The Department acts as staff to the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees) and issues certain authorizations for the use of sovereign submerged lands. The Department has the authority to review activities on sovereign submerged lands under Chapters 253 and 258 of the Florida Statutes, and Chapters 18-20 and 18-21 of the Florida Administrative Code.

The activity appears to be located on sovereign submerged lands owned by the Board of Trustees. As staff to the Board of Trustees, the Department has reviewed the activity described above, and has determined that the activity qualifies for an exception under Rule 18-21.005(1)(a)1 and Section 253.77 of the Florida Statutes to construct and use the activity on the specified sovereign submerged lands, as long as the work performed is located within the boundaries as described herein and is consistent with the terms and conditions herein.

3. Federal Review - SPGP Not Required

Your proposed activity as outlined in your application and attached drawings has been reviewed for compliance with the State Programmatic General Permit V and it has been determined to not be within the jurisdiction of the Corps. No further permitting for these activities is required by the Corps.

Authority for review - an agreement with the USACOE entitled “Coordination Agreement Between the U. S. Army Corps of Engineers (Jacksonville District) and the Florida Department of Environmental Protection, or Duly Authorized Designee, State Programmatic General Permit”, Section 10 of the Rivers and Harbor Act of 1899, and Section 404 of the Clean Water Act.

Additional Information

Please retain this general permit. The activities may be inspected by authorized state personnel in the future to ensure compliance with appropriate statutes and administrative codes. If the activities are not in compliance, you may be subject to penalties under Chapter 373, F.S., and Chapter 18-14, F.A.C.

NOTICE OF RIGHTS

This action is final and effective on the date filed with the Clerk of the Department unless a petition for an administrative hearing is timely filed under Sections 120.569 and 120.57, F.S., before the deadline for filing a petition. On the filing of a timely and sufficient petition, this action will not be final and effective until further order of the Department. Because the administrative hearing process is designed to formulate final agency action, the hearing process may result in a modification of the agency action or even denial of the application.

Petition for Administrative Hearing

A person whose substantial interests are affected by the Department's action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. Pursuant to Rule 28-106.201, F.A.C., a petition for an administrative hearing must contain the following information:

- (a) The name and address of each agency affected and each agency's file or identification number, if known;
- (b) The name, address, any email address, any facsimile number, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests are or will be affected by the agency determination;
- (c) A statement of when and how the petitioner received notice of the agency decision;
- (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;
- (e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action;
- (f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and
- (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received by the Clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000. Also, a copy of the petition shall be mailed to the applicant at the address indicated above at the time of filing.

Time Period for Filing a Petition

In accordance with Rule 62-110.106(3), F.A.C., petitions for an administrative hearing by the applicant must be filed within 21 days of receipt of this written notice. Petitions filed by any persons other than the applicant, and other than those entitled to written notice under Section 120.60(3), F.S., must be filed within 21 days of publication of the notice or within 21 days of receipt of the written notice, whichever occurs first. Under Section 120.60(3), F.S., however, any person who has asked the Department for notice of agency action may file a petition within 21 days of receipt of such notice, regardless of the date of publication. The failure to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

Extension of Time

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the Department's action may also request an extension of time to file a petition for an administrative hearing. The Department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, before the applicable deadline for filing a petition for an administrative hearing. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

Mediation

Mediation is not available in this proceeding.

FLAWAC Review

The applicant, or any party within the meaning of Section 373.114(1)(a) or 373.4275, F.S., may also seek appellate review of this order before the Land and Water Adjudicatory Commission under Section 373.114(1) or 373.4275, F.S. Requests for review before the Land and Water Adjudicatory Commission must be filed with the Secretary of the Commission and served on the Department within 20 days from the date when this order is filed with the Clerk of the Department.

Judicial Review

Once this decision becomes final, any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General

Counsel, 3900 Commonwealth Boulevard, M.S. 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this action is filed with the Clerk of the Department.

Thank you for applying to the Submerged Lands and Environmental Resource Permit Program. If you have any questions regarding this matter, please contact Anthony Pidala at the letterhead address or via email at anthony.pidala@dep.state.fl.us or by phone at 813-470-5777.

Executed in Hillsborough County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Sincerely,



Anthony Pidala
Environmental Specialist III
Permitting and Waste Cleanup Program
Southwest District

Enclosures:
Ch. 62-330.453, F.A.C.
General Conditions for All General Permits, Ch. 62-330.405, F.A.C.

Attachment:
Project Drawings


cc: Robert Halbach, PE, Stantec; bob.halbach@stantec.com

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this determination, including all copies, was mailed before the close of business on June 29, 2017, to the above listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to 120.52(7),
Florida Statutes, with the designated Department Clerk,
receipt of which is hereby acknowledged.

Clerk  Date June 29, 2017

62-330.453 General Permit for Installation, Maintenance, Repair, and Removal of Utility Lines.

(1) A general permit is granted for the installation, maintenance, repair, and removal of underground utility lines, cable, conduit, or pipeline transmitting electricity, communication signals, potable water, raw water, reclaimed water, domestic wastewater, propane gas or natural gas.

(2) For the purposes of this general permit:

(a) “Directional drilling” means the linear or curvilinear, excavation of a tunnel or conduit, in any direction, through the use of drilling equipment that can change direction during excavation; this also includes borehole reaming and pulling following primary drilling.

(b) “Jack-and-bore” means the linear, primarily lateral excavation of a tunnel, typically between excavated subgrade pits, through use of drilling equipment and encasement which is advanced under mechanical force, and includes similar methods commonly termed as “microtunneling.”

(c) “Frac-out” means any release of drilling fluid or slurry which results in above-grade discharge of drilling fluid or slurry or significant loss of such fluid or slurry into the surrounding parent material.

(3) This general permit is limited as follows:

(a) No work occurs within Outstanding Florida Waters, Aquatic Preserves, or Class I waters;

(b) The installation of conduit or pipeline to drain wetlands or other surface waters is not authorized;

(c) Prior to work, existing pipelines shall be evacuated of substances which, if released, could result in a violation of state water quality standards;

(d) The maximum width of the disturbed corridor in wetlands shall not exceed 30 feet;

(e) The total area of forested wetland disturbance shall not exceed 0.5 acre per ten miles of cable, conduit, or pipeline;

(f) Minor above-grade improvements may be constructed in uplands under this general permit, but shall be limited to vents, valves, meter assemblies, relays, junction boxes, pads or

similar structures that are directly connected to the utility line, do not create discharges, and which cumulatively comprise no more than 100 square feet of impervious surfaces per mile of utility line;

(g) Installation, maintenance, repair, and removal activities performed via trenching or methods other than directional drilling or jack-and-bore, are subject to the following special conditions:

1. The maximum width of the excavated trench shall not exceed eight feet, with temporary spoil storage banks not to exceed ten feet in width;

2. For a trench with a top width greater than three feet in herbaceous wetlands, the upper layer of the soil horizon shall initially be scraped and segregated into a spoil bank that is separated from the spoil bank resulting from the excavation of the trench for the utility line. The upper layer of the soil horizon shall be replaced as the last step of restored grades to facilitate natural revegetation;

3. Trenching in surface waters shall be limited to wetlands, artificial waters, and residential canal systems;

4. Temporary spoil banks shall contain breaches that prevent impoundment or restriction of surface water flows.

(h) Installation, maintenance, repair, and removal conducted using directional drilling or jack-and-bore methods are subject to the following special conditions:

1. The maximum outside diameter of the cable, conduit or pipeline, including encasement, shall not exceed 24 inches;

2. A minimum of depth of cover, equal to the greater of either five feet, or five times the maximum encased diameter of the utility line to be installed, shall be maintained between the top of the utility line and casing and the soil surface or submerged bottom of any wetland or waterbody being crossed.

3. All work areas associated with directional drilling or jack-and-bore activities, including entrance and exit pits, drill rigs, tanks, pumps, drilling fluid mixing and settling pits, dewatering systems and staging areas for pipe, cables, and drill string, shall be located within uplands.

4. The use of drilling fluids shall not cause or contribute to a violation of state ground water quality criteria or standards, as defined in Chapter 62-520, F.A.C.

5. The permittee shall, at least 48 hours prior to commencement of any directional drilling or jack-and-bore activities, submit to the agency the name, as registered with the Florida Department of State, and all-hours telephone contact information of all contractors responsible for drilling and for containment and cleanup in the event of a drilling fluid frac-out or spill.

6. Contractor shall, at all times during directional drilling activities, maintain appropriate equipment and materials in a readily-accessible location and condition, to effectively contain and clean up a drilling fluid frac-out or spill.

7. The permittee or the permittee's contractor shall, at all times during directional drilling activities, ensure that appropriately-trained personnel monitor downhole equipment position, drilling fluid circulation and pressures, and actively monitor the entire utility line route for surface frac-out of drilling fluids.

8. Drilling activities shall be discontinued and the drilling fluid or slurry shall be contained using appropriate methods as soon as possible, in the event of a drilling fluid frac-out or spill. Removal of drilling fluid or slurry from wetlands and other surface waters shall be initiated and completed in the most expeditious manner practicable. Removed drilling fluid shall be contained

or disposed of in an appropriate upland location. Any frac-out or spill of drilling fluid into wetlands or other surface waters shall be reported to Agency staff within 24 hours following detection of the spill or frac-out.

Rulemaking Authority 373.026(7), 373.043, 373.118(1), 373.406(5), 373.4131, 373.414(9), 373.418, 403.805(1) FS. Law Implemented 373.118(1), 373.406(5), 373.413, 373.4131, 373.414(9), 373.416, 373.418, 403.814(1) FS. History–New 10-3-95, Formerly 62-341.453, Amended 10-1-13.

62-330.405 General Conditions for All General Permits

The following general permit conditions are binding upon the permittee and are enforceable under Chapter 373, F.S. These conditions do not apply to the general permit in Section 403.814(12), F.S.

(1) The general permit is valid only for the specific activity indicated. Any deviation from the specified activity and the conditions for undertaking that activity shall constitute a violation of the permit and may subject the permittee to enforcement action and revocation of the permit under Chapter 373, F.S.

(2) This general permit does not eliminate the necessity to obtain any required federal, state, local and special district authorizations prior to the start of any construction, alteration, operation, maintenance, removal or abandonment authorized by this permit.

(3) This general permit does not convey to the permittee or create in the permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the permittee, or convey any rights or privileges other than those specified in the general permit.

(4) The general permit does not relieve the permittee from liability and penalties when the permitted activity causes harm or injury to: human health or welfare; animal, plant or aquatic life; or property. It does not allow the permittee to cause pollution that violates state water quality standards.

(5) Section 253.77, F.S., provides that a person may not commence any excavation, construction, or other activity involving the use of state-owned or other lands of the state, the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund without obtaining the required consent, lease, easement, or other form of authorization authorizing the proposed use. Therefore, the permittee is responsible for obtaining any necessary authorizations from the Board of Trustees prior to commencing activity on state-owned lands.

(6) The authorization to conduct activities under a general permit may be modified, suspended or revoked in accordance with Chapter 120, F.S., and Section 373.429, F.S.

(7) This permit shall not be transferred to a third party except pursuant to Rule 62-330.340, F.A.C. The permittee transferring the general permit shall remain liable for any corrective actions that may be required as a result of any permit violations prior to sale, conveyance, or other transfer of ownership or control of the permitted project, activity, or the real property at which the permitted project or activity is located.

(8) Upon reasonable notice to the permittee, Agency staff with proper identification shall have permission to enter, inspect, sample and test the permitted system to ensure conformity with the plans and specifications approved by the permit.

(9) The permittee shall maintain any permitted project or activity in accordance with the

plans submitted to the Agency and authorized in this general permit.

(10) A permittee's right to conduct a specific activity under this general permit is authorized for a duration of five years.

(11) Activities shall be conducted in a manner that does not cause or contribute to violations of state water quality standards. Performance-based erosion and sediment control best management practices shall be implemented and maintained immediately prior to, during, and after construction as needed to stabilize all disturbed areas, including other measures specified in the permit to prevent adverse impacts to the water resources and adjacent lands. Erosion and sediment control measures shall be installed and maintained in accordance with the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual (Florida Department of Environmental Protection and Florida Department of Transportation June 2007)*, available at www.dep.state.fl.us/water/wetlands/docs/erp/FLerosionSedimentManual_6_07.pdf, and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008)*, available at www.dep.state.fl.us/water/nonpoint/docs/erosion/erosion-inspectors-manual.pdf.

(12) Unless otherwise specified in the general permit, temporary vehicular access within wetlands during construction shall be performed using vehicles generating minimum ground pressure to minimize rutting and other environmental impacts. Within forested wetlands, the permittee shall choose alignments that minimize the destruction of mature wetland trees to the greatest extent practicable. When needed to prevent rutting or soil compaction, access vehicles shall be operated on wooden, composite, metal, or other non-earthen construction mats. In all cases, access in wetlands shall comply with the following:

- (a) Access within forested wetlands shall not include the cutting or clearing of any native wetland tree having a diameter 4 inches or greater at breast height;
- (b) The maximum width of the construction access area shall be limited to 15 feet;
- (c) All mats shall be removed within 72 hours after the work commences; and
- (d) Areas disturbed for access shall be restored to natural grades immediately after the maintenance or repair is completed.

(13) Barges or other work vessels used to conduct in-water activities shall be operated in a manner that prevents unauthorized dredging, water quality violations, and damage to submerged aquatic communities.

(14) The construction, alteration, or use of the authorized project shall not adversely impede navigation or create a navigational hazard in the water body.

(15) Except where specifically authorized in a general permit, activities must not:

- (a) Impound or obstruct existing water flow, cause adverse impacts to existing surface water storage and conveyance capabilities, or otherwise cause adverse water quantity or flooding impacts to receiving water and adjacent lands;
- (b) Cause an adverse impact to the maintenance of surface or ground water levels or surface water flows established pursuant to Section 373.042, F.S., or a Works of the District established pursuant to Section 373.086, F.S.; or

(16) If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoes, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, work involving subsurface disturbance in the immediate vicinity of such

discoveries shall cease. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section, at (850) 245-6333 or (800) 847-7278, as well as the appropriate permitting agency office. Such subsurface work shall not resume without verbal or written authorization from the Division of Historical Resources. If unmarked human remains are encountered, all work shall stop immediately and notification shall be provided in accordance with Section 872.05, F.S.

(17) The activity must be capable, based on generally accepted engineering and scientific principles, of being performed and of functioning as proposed, and must comply with any applicable District special basin and geographic area criteria.

(18) The permittee shall comply with the following when performing work within waters accessible to federally- or state-listed aquatic species, such as manatees, marine turtles, smalltooth sawfish, and Gulf sturgeon:

(a) All vessels associated with the project shall operate at “Idle Speed/No Wake” at all times while in the work area and where the draft of the vessels provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

(b) All deployed siltation or turbidity barriers shall be properly secured, monitored, and maintained to prevent entanglement or entrapment of listed species.

(c) All in-water activities, including vessel operation, must be shutdown if a listed species comes within 50 feet of the work area. Activities shall not resume until the animal(s) has moved beyond a 50-foot radius of the in-water work, or until 30 minutes elapses since the last sighting within 50 feet. Animals must not be herded away or harassed into leaving. All on-site project personnel are responsible for observing water-related activities for the presence of listed species.

(d) Any listed species that is killed or injured by work associated with activities performed shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1(888)404-3922 and ImperiledSpecies@myFWC.com.

(e) Whenever there is a spill or frac-out of drilling fluid into waters accessible to the above species during a directional drilling operation, the FWC shall be notified at imperiledspecies@myfwc.com with details of the event within 24 hours following detection of the spill or frac-out.

(19) The permittee shall hold and save the Agency harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any activity authorized by the general permit.

(20) The permittee shall immediately notify the Agency in writing of any submitted information that is discovered to be inaccurate.

Rulemaking Authority 373.026(7), 373.043, 373.118(1), 373.406(5), 373.4131, 373.414(9), 373.4145, 373.418, 403.805(1) FS. Law Implemented 373.044, 373.118(1), 373.129, 373.136, 373.406(5), 373.413, 373.4131, 373.414(9), 373.4145, 373.416, 373.422, 373.423, 373.429, 403.814(1) FS. History—New 10-3-95, Amended 10-1-07, Formerly 62-341.215, Amended 10-1-13.



FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MAY 25 2016

SOUTHWEST DISTRICT
TEMPLE TERRACE

MANATEE COUNTY, FLORIDA
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES



1022 20th Avenue East
Bradenton, FL 34208

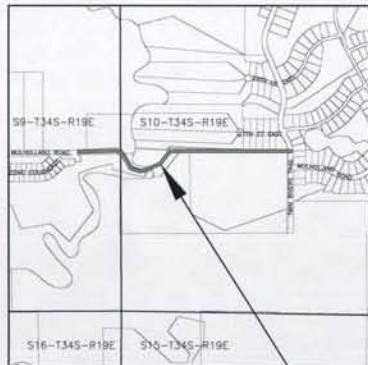
MANATEE COUNTY, FLORIDA MULHOLLAND ROAD WATER MAIN 6046270

May 2016

MULHOLLAND ROAD
WATER MAIN
COVER SHEET

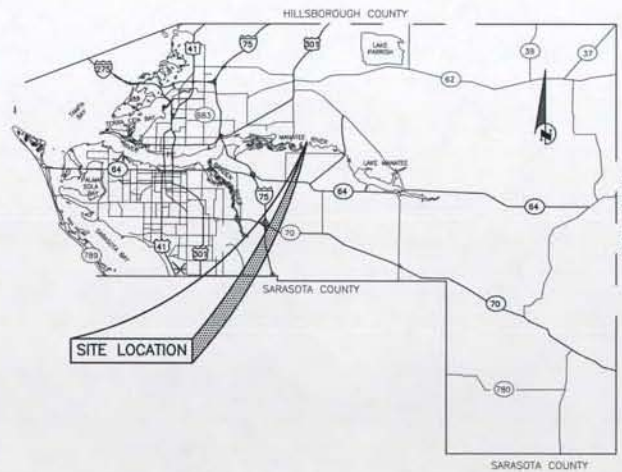
PERMIT PLANS

NO.	INDEX OF SHEETS
1	COVER SHEET
2	GENERAL NOTES & LEGEND
3	KEY SHEET
4-13	PLAN & PROFILE
14-15	DETAILS
16	EROSION CONTROL



VICINITY MAP
N.T.S.

PROJECT SITE



SITE LOCATION

PROJECT DESCRIPTION

INSTALL 1670 LF OF 10-INCH DIP WATER MAIN
INSTALL 1895 LF OF 10-INCH PVC WATER MAIN
INSTALL 290 LF OF 12-INCH IN 20-INCH CASING HDD WATER MAIN

NO.	REVISION	DESCRIPTION	DATE

PROJECT #	177310615	DATE	
SURVEY #	000	DESIGNED	11/06/15
SEC./TWP./RGE	9&10/34S/19E	CHECKED	05/27/16



Know what's below
Call before you dig

ROBERT J. RALBACH
FLORIDA P.E. #140139



STANTEC CONSULTING SERVICES INC.
812 STATION HWY. SARASOTA, FLORIDA 34235
TEL. 941.365.5500 - FAX. 941.365.1822
FLORIDA CERTIFICATE NO. 27103 - WWW.STANTEC.COM

SHEET 1

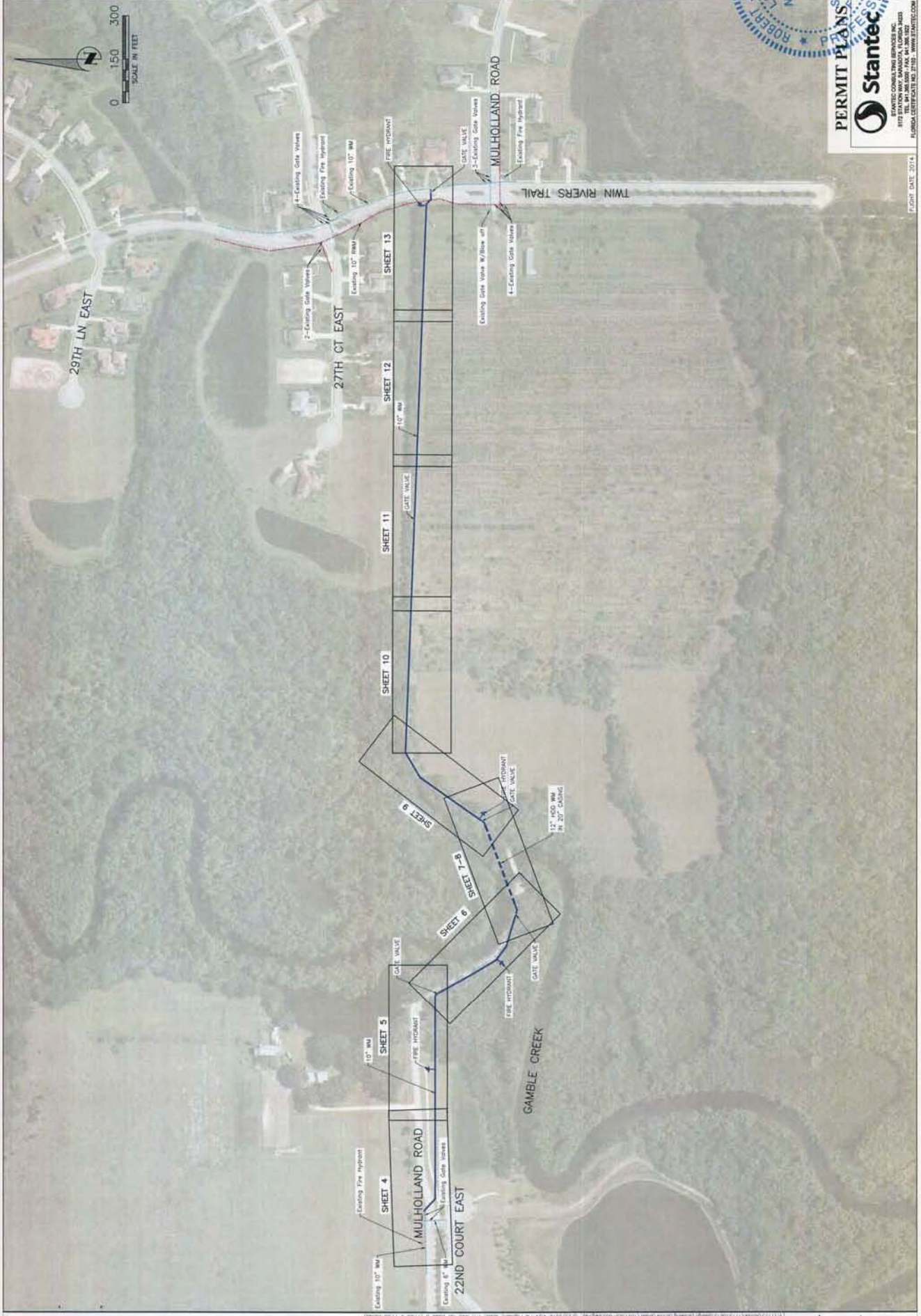
MULHOLLAND ROAD WATER MAIN KEY SHEET

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177310815
SURVEY #	000
DATE	08/10/2016
DESIGNED BY	W. B. [unreadable]
CHECKED BY	D.M. [unreadable]
DATE	08/22/16
PROJECT LOCATION	MULHOLLAND ROAD
PROJECT NUMBER	16
PROJECT NAME	MULHOLLAND ROAD WATER MAIN
PROJECT NO.	16
PROJECT DATE	08/10/2016
PROJECT TIME	10:00 AM
PROJECT PLACE	BR/10/26/16
PROJECT TYPE	000
PROJECT NO.	177310815
PROJECT DATE	08/10/2016
PROJECT TIME	10:00 AM
PROJECT PLACE	BR/10/26/16
PROJECT TYPE	000

PERMIT PLANS
Stantec
 STANTEC CONSULTING SERVICES INC.
 8175 TEL. 813.363.8300 FAX 813.363.8303
 FLORIDA CERTIFICATE NO. 79187 WWW.STANTEC.COM

ROBERT J. HANCOCK
 P.E.
 Signature & Date



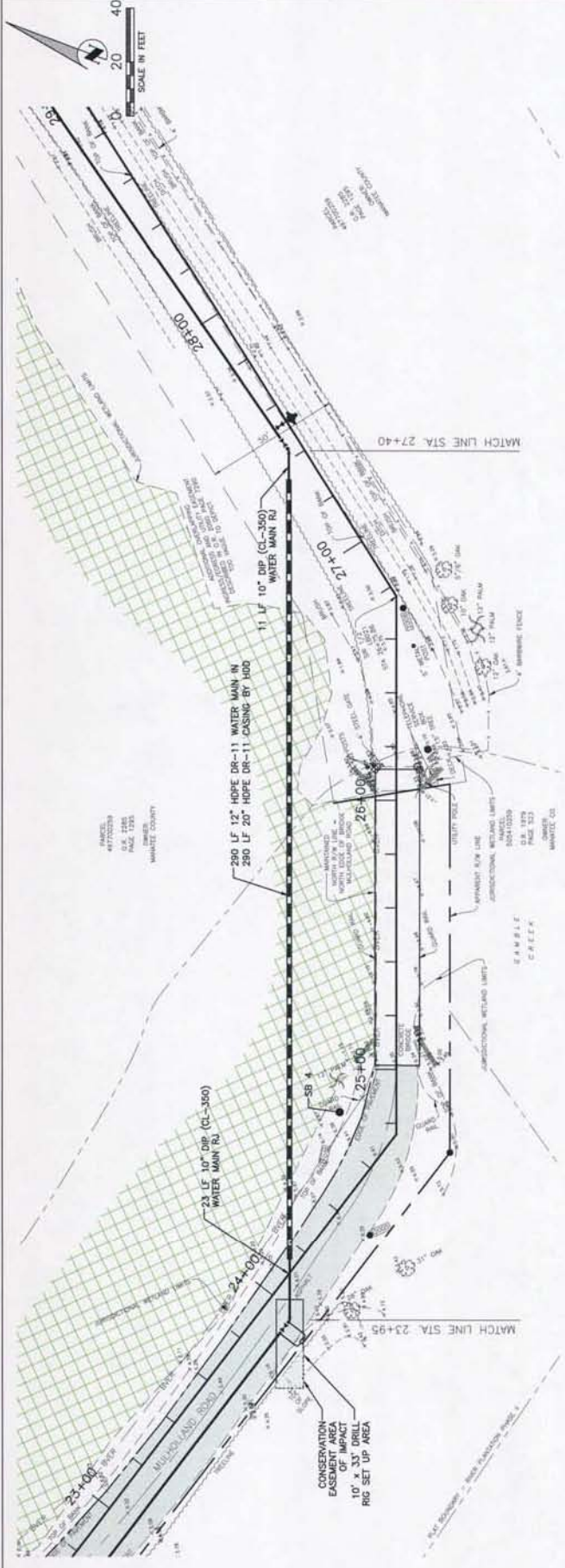


MULHOLLAND ROAD
WATER MAIN
PLAN STA. 23+95 TO 27+40

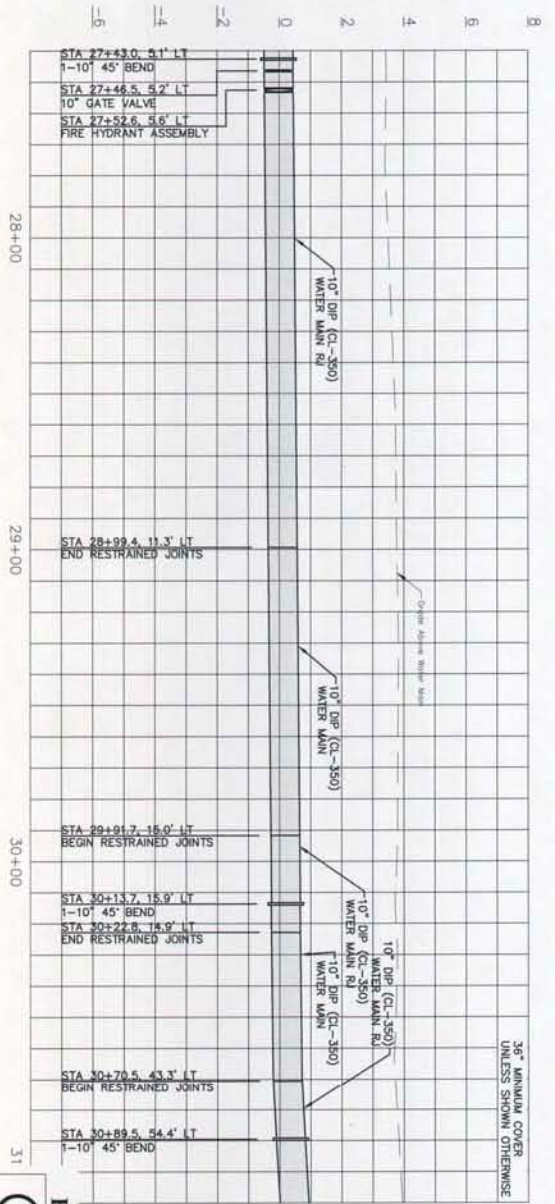
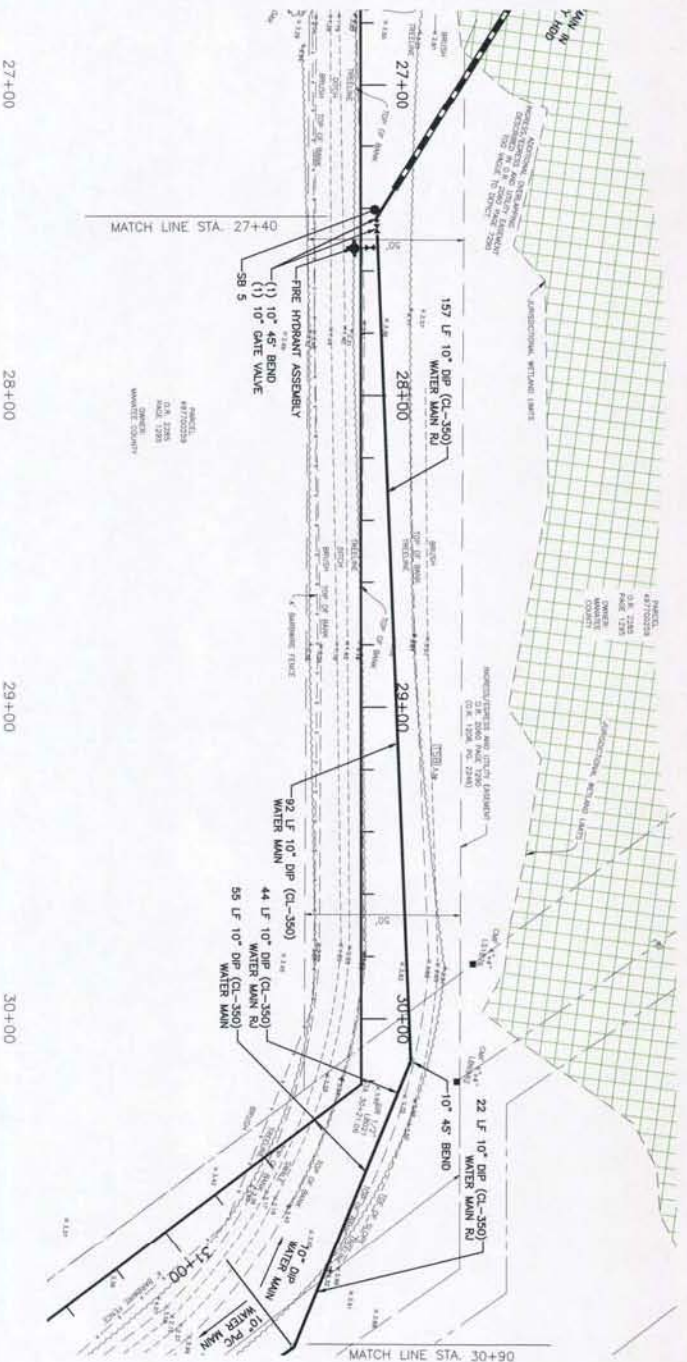
NO.	REVISION DESCRIPTION	BY	DATE

PROJECT #	177210815
SURVEY #	000
SEC./TWP./RANGE	08/10/24S/71E
DATE	11-2017
DESIGNED BY	ST/07/09/15
DRAWN BY	ST/07/09/15
CHECKED BY	ST/07/09/15
APPROVED BY	ST/07/09/15
DATE	11-2017
PROJECT	177210815
SURVEY	000
SEC./TWP./RANGE	08/10/24S/71E
DATE	11-2017
DESIGNED BY	ST/07/09/15
DRAWN BY	ST/07/09/15
CHECKED BY	ST/07/09/15
APPROVED BY	ST/07/09/15
DATE	11-2017

PERMIT PLANS
STATE OF FLORIDA
Professional Engineer
No. 12345
ROBERT J. QUINN
FLORIDA P.E. # 30789
SHEET 7



FOR PROFILE SEE SHEET 8



27+00

28+00

29+00

30+00

31+00

35+00



MULHOLLAND ROAD WATER MAIN PLAN & PROFILE STA. 27+40 TO 30+90



PERMIT PLANS
 PROJECT # 172310615
 SHEET # 002
 DATE 1-2-2016

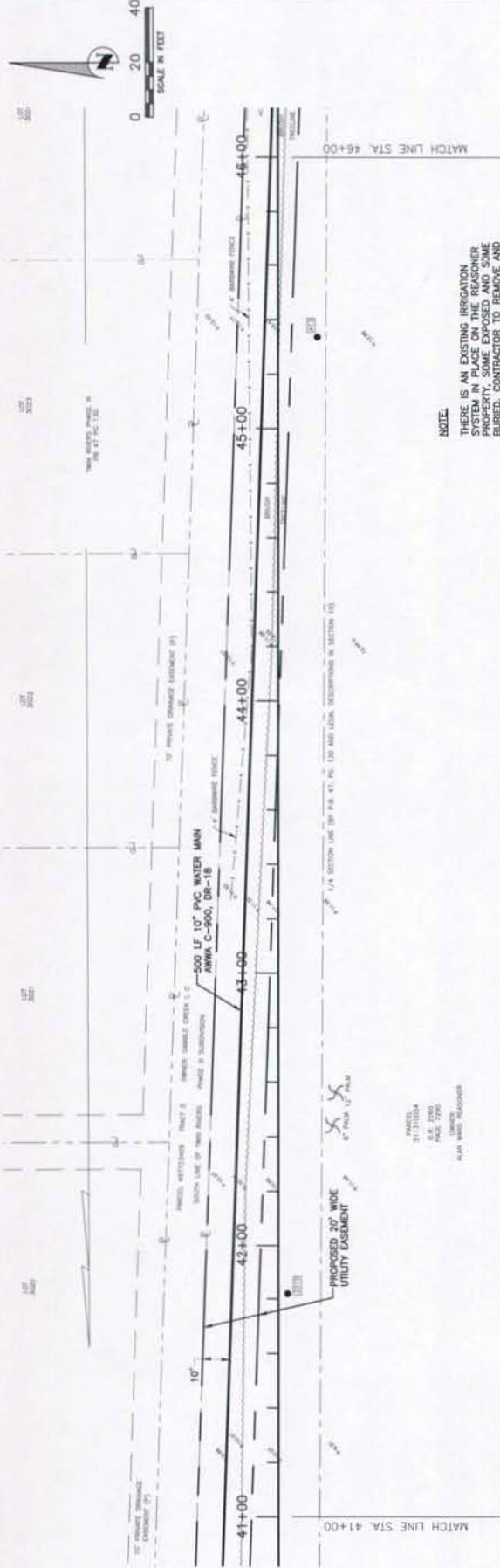
NO.	REVISION DESCRIPTION	BY	DATE

ROBERT J. ROBERTS
 PROFESSIONAL ENGINEER
 No. 10000
 State of Connecticut
 Date: 08/13/13
 Project: Mulholland Rd Water Main
 Drawing No: 172310615
 Sheet: 002 of 16
 Date: 1/2/16

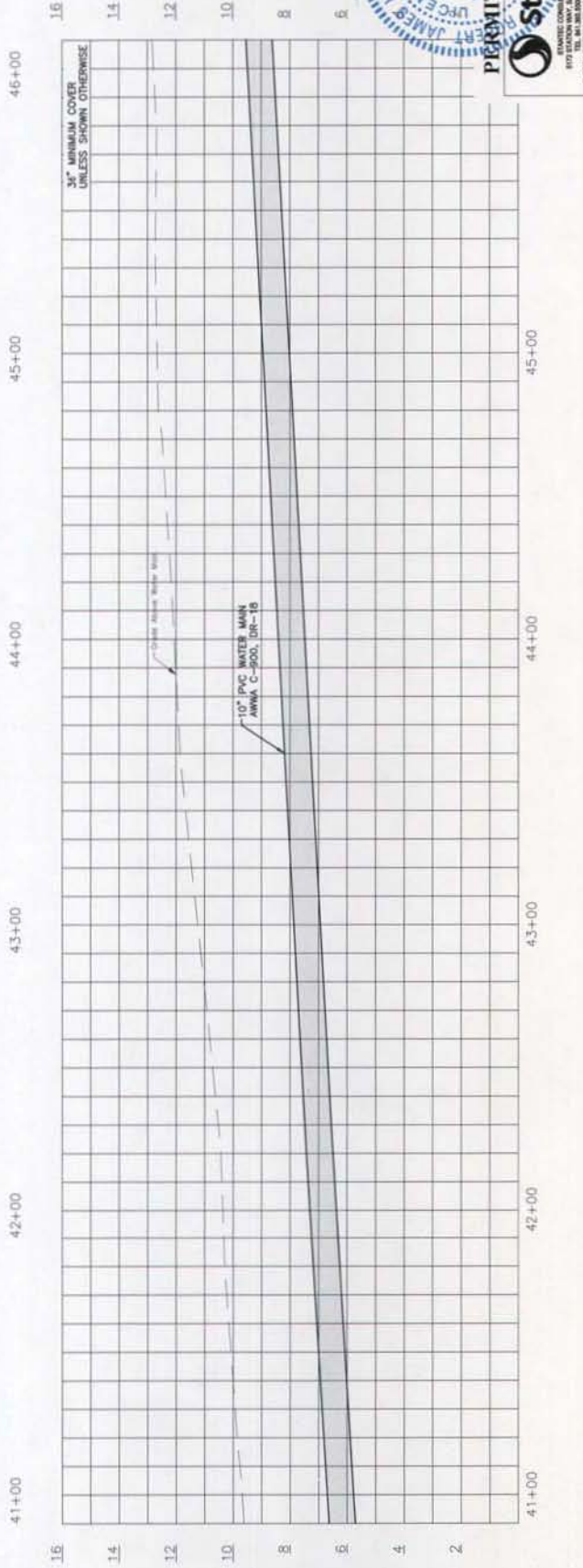


MULHOLLAND ROAD
 WATER MAIN
 PLAN & PROFILE STA. 41+00 TO 46+00

PROJECT #	177310815
SURVEY #	500
SEC./TWP./RGE	8N10/24S/19E
SCALE	1"=20'
DATE	
REVISION DESCRIPTION	
BY	
DATE	



NOTE:
 THERE IS AN EXISTING IRRIGATION SYSTEM IN PLACE UNDER THE ROAD. CONTRACTOR TO REMOVE AND BURIED. CONTRACTOR TO REMOVE AND REPLACE ANY PORTION DISTURBED BY CONSTRUCTION. DEFINE THE EXISTING PRE-CONSTRUCTION PERMITS ON THE PRE-CONSTRUCTION VIDEO.



Stantec
 PERMIT PLANS
 JAMES HARBACH
 LICENSE NO. 40139
 STATE OF FLORIDA
 PROFESSIONAL ENGINEER

Bid Attachment 6

GEOTECHNICAL REPORT MULLHOLLAND ROAD

**SUBSURFACE SOIL EXPLORATION AND
GEOTECHNICAL ENGINEERING EVALUATION
PROPOSED WATER MAIN
AT MULLHOLLAND ROAD,
PARRISH,
MANATEE COUNTY, FLORIDA**



Ardaman & Associates, Inc.

OFFICES

FLORIDA

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- Fort Myers**, 9970 Bavaria Road, Fort Myers, Florida 33913, Phone (239) 768-6600
- Miami**, 2608 W. 84th Street, Hialeah, Florida, 33016, Phone (305) 825-2683
- Port St. Lucie**, 460 NW Concourse Place, Unit #1, Port St. Lucie, Florida 34986-2248, Phone (772) 878-0072
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- Tallahassee**, 3175 West Tharpe Street, Tallahassee, Florida 32303, Phone (850) 576-6131
- Tampa**, 3925 Coconut Palm Drive, Suite 115, Tampa, Florida 33619, Phone (813) 620-3389
- West Palm Beach**, 2511 Westgate Avenue, Suite 10, West Palm Beach, Florida 33409, Phone (561) 687-8200

LOUISIANA

- Alexandria**, 3609 MacLee Drive, Alexandria, Louisiana 71302, Phone (318) 443-2888
- Baton Rouge**, 316 Highlandia Drive, Baton Rouge, Louisiana 70810, Phone (225) 752-4790
- Monroe**, 1122 Hayes Street, Monroe, Louisiana 71292, Phone (318) 387-4103
- New Orleans**, 1305 Distributors Row, Suite 1, Jefferson, Louisiana 70123, Phone (504) 835-2593
- Shreveport**, 7222 Greenwood Road, Shreveport, Louisiana 71119, Phone (318) 636-3723

MEMBERS:

A.S.F.E.

**American Concrete Institute
American Society for Testing and Materials
Florida Institute of Consulting Engineers**



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

January 27, 2016
File No. 15-7347

TO: Stantec
5172 Station Way
Sarasota, FL 34233-3221

Attention: Robert Halbach, P.E.

SUBJECT: Subsurface Soil Exploration and Geotechnical Engineering Evaluation
Proposed Water Main at Mullholland Road,
Parrish, Manatee County, Florida

Dear Robert:

As requested and authorized by you, we have completed a subsurface soil exploration and geotechnical engineering evaluation for the subject project. We understand that the project will include construction of approximately 3,900 lineal feet of new water main, extending from the east end of Mullholland Road, across Gamble Creek to Twin Rivers Trail. We understand that the pipes will be installed primarily by cut-and-cover methods, but at least the creek crossing will be installed by directional drill methods.

The scope of our work included providing geotechnical engineering recommendations for trench stability, pipe bedding, use of excavated soils, the need for dewatering, thrust resistance, and backfill and compaction requirements. The boring data at the directional drilling locations has been provided for informational purposes only (for use by others in design), because this type of construction is somewhat proprietary in nature. In addition, we have provided an estimate of the normal seasonal high groundwater level at the boring locations.

SITE LOCATION AND PROPOSED CONSTRUCTION

The proposed water main project is located in Sections 9 and 10 of Township 34 South, Range 19 East. The proposed alignment is located to the south of the City of Parrish, in Manatee County Florida.

The proposed water main alignment begins near the east end of Mullholland Road and can be inferred from the test boring locations shown on the attached Figure 1. The proposed route crosses Gamble Creek and continues to the east to Twin Rivers Trail, where it is to connect to another existing water main.

REVIEW OF SOIL SURVEY MAPS

Based on USDA Natural Resources Conservation Service (NRCS) "Web Soil Survey," various soil types are mapped within the pipeline alignment. The soils map for the general area of the subject project is included in Appendix I of this report. The map indicates several soil types along

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the pipeline alignment including Map Unit 11 (Cassia fine sand), Map Unit 24 (Felda-Wabasso association, frequently flooded), Map Unit 48 (Wabasso fine sand) and Map Unit 20 (EauGallie fine sand).

The mapped locations of the individual soil units and selected characteristics of each, according to the NRCS, are summarized in Appendix I of this report. The characteristics listed are the general ratings for corrosion of concrete, general ratings for corrosion of steel, and suitability for shallow excavations, as reported by the NRCS. These ratings represent the “dominant condition” for the soil map unit and are not site specific.

FIELD EXPLORATION PROGRAM

Standard Penetration Test (SPT) and Auger Borings

The proposed field exploration program included conducting a total of nine Standard Penetration Test (SPT) borings at relatively evenly spaced intervals along the proposed pipe route. Due to locked gates and other factors, however, we were not able to obtain access to a portion of the proposed route. The most easterly boring (No. 7) was therefore moved to within the right-of-way of Twin Rivers Trail and no borings were performed between boring Nos. 6 and 7, resulting in a total of seven borings.

As described above, the field exploration program consisted of performing seven SPT borings along the proposed pipeline alignment, at the approximate locations shown on the attached Figure 1. The SPT borings were drilled to a depth of 20 or 40 feet below the existing ground surface using the methodology outlined in ASTM D1586. A summary of this boring procedure is included in Appendix II. Split-spoon soil samples recovered during performance of the borings were visually classified in the field and representative portions of the soil samples were transported to our laboratory for further visual classification and laboratory testing.

Where encountered, the groundwater level at each of the boring locations was measured during drilling. After completion, the 20-foot deep borings were backfilled with soil cuttings and the 40-foot deep borings were sealed with cement grout (placed by tremie method).

Test Locations

The proposed water main alignment was provided by Stantec in the form of an aerial photograph with alignment superimposed. The approximate locations of the borings are schematically illustrated on Figure 1. The locations of the borings were determined in the field by visual reference to available site landmarks. The locations should be considered accurate only to the degree implied by the method used.

LABORATORY TESTING PROGRAM

Representative soil samples obtained during our field sampling operation were packaged and transferred to our laboratory for further visual examination and classification. Laboratory testing was performed on selected samples as deemed necessary to aid in soil classification and to further define the engineering properties of the soils. The laboratory tests included determining the fines (silt and clay) content and natural moisture (water) content of selected samples. The



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test results are presented on the graphic soil profiles on Figure 2, at the depths from which the samples were recovered.

The soil descriptions shown on the soil profiles are based on the laboratory test results and a visual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2487 or D-2488).

GENERAL SUBSURFACE CONDITIONS

General Soil Profile

The results of the field exploration and laboratory testing programs are graphically summarized on the soil boring profiles presented on Figure 2. The stratification depicted on the boring profiles represents our interpretation of the field boring logs and the results of laboratory examinations of the recovered samples. The stratification lines represent the approximate boundary between soil types. The actual transitions may be more gradual than implied.

The borings encountered a general soil profile consisting primarily of strata of loose to dense fine sand (SP), fine sand with silt (SP-SM) and silty fine sand (SM) from the ground surface to a depth of approximately 12 to 17 feet. The deeper soils were more clayey, and generally consisted of very loose to medium dense clayey fine sand (SC), although dense to very dense strata were encountered at and below a depth of 20 feet at boring Nos. 1 and 5, and a stratum of very stiff sandy clay was encountered at a depth of 15 feet at boring No. 6.

Although highly organic soils or "muck" were not encountered at the boring locations, they may be present at other locations, particularly in the lower lying areas near Gamble Creek.

Although no rock was encountered, a stratum of very dense clayey fine sand with gravel was encountered at a depth of 25 feet at boring No. 5. This may indicate the presence of relatively thin layers of rock or of somewhat cemented soils that may be difficult to excavate with conventional excavators.

The above soil profile descriptions are outlined in general terms only. Please refer to Figure 2 for soil profile details at each boring location.

Groundwater Level

The groundwater level in the boreholes was measured during drilling. As shown on Figure 2, the groundwater level was encountered at depths of approximately 4½ to 8 feet below the ground surface. Fluctuations in groundwater levels should be anticipated throughout the year, primarily due to seasonal variations in rainfall and other factors that may vary from the time the borings were conducted.

The normal seasonal high groundwater level each year typically occurs in August through September, which is the period near the end of the rainy season during a year of normal (average) rainfall patterns. The seasonal high groundwater level is affected by a number of factors, such as the drainage characteristics of the soils, the land surface elevation, relief points (such as lakes, rivers, swamp areas, etc.), and distance to relief points.

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January 27, 2016

We estimate that the normal seasonal high groundwater level probably occurs within a depth of 2 feet or less below the ground surface at each boring location. The water table elevations associated with a flood or greater than normal rainfall may be higher than the normal seasonal high groundwater levels, however.

ENGINEERING EVALUATION AND RECOMMENDATIONS

General

The results of this exploration indicate that the existing soils as encountered in the borings are suitable for supporting the proposed pipelines and associated structures.

The following are our recommendations for overall site preparation and foundation support which we feel are best suited for the proposed pipelines and associated structures relative to the soil conditions encountered in the borings shown on Figures 1 and 2. The recommendations are made as a guide for the design engineer, parts of which should be incorporated into the project's specifications.

Pipelines and Associated Structures

Excavation

Based on the conditions encountered during the field exploration, we anticipate that the majority of the soils can be excavated with standard earth moving equipment (i.e., front-end loaders and backhoes). A possible exception to this may be the very dense clayey fine sand with gravel that was encountered at a depth of approximately 25 feet at boring No. 5. The clayey fine sands (SC) and sandy clays (CL) may also be somewhat difficult to excavate, due to their cohesive nature.

The soils below the bottom of the excavations should not be disturbed by the excavation process. If soils become disturbed and difficult to compact, they should be overexcavated below the pipeline and other structures to a depth necessary to remove all disturbed soils. Overexcavated areas should be replaced with compacted backfill meeting the "Backfill Requirements" presented in a foregoing section of this report.

Excavations should be safely braced or sloped to prevent injury to personnel or damage to equipment. Temporary safe slopes should be cut at a minimum 1.5 Horizontal (H) to 1 Vertical (V) in accordance with OSHA, 29 CFR Part 1926 Subpart P. Flatter slopes should be used if deemed necessary based on actual conditions encountered. Surcharge loads should be kept at least 5 feet from excavations. Spoil banks adjacent to excavations should be sloped no steeper than 2.0H to 1.0V. Provisions for maintaining workers' safety within and adjacent to excavations is the sole responsibility of the Contractor.

Dewatering

The control of the groundwater may be required to achieve the necessary depths of excavation and subsequent construction, backfilling and compaction requirements presented in the following sections. The actual method(s) of dewatering should be determined by the Contractor. However, regardless of the method(s) used, we suggest drawing down the water table sufficiently (i.e., 2 to



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3 feet) below the bottom of the excavation(s) to preclude "pumping" and/or minimize compaction-related problems with the foundation soils. We recommend that the dewatering be installed and used to lower groundwater levels prior to excavating the trenches.

Pipeline Bedding

Pipe bedding material should be compacted as necessary to achieve a density equivalent to 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557), to a minimum depth of 6 inches below the bottom of the pipe. (Compact deeper if recommended by the pipe manufacturer.)

It should be noted that, depending upon the pipe depth, that the trench bottom may be within silty or clayey soil layers (SM, SC or CL) which may be difficult to compact. These soils are not freely draining and may retain moisture for long periods of time that is well in excess of the optimum for compaction. If this is the case, these soils may need to be undercut and replaced with more readily compacted clean fine sands, such as fine sand (SP) to fine sand with silt (SP-SM).

We recommend that the bedding for the pipe be preshaped by means of a template prior to placement of the structure to ensure that the upward reaction on the bottom of the pipe will be well distributed over the width of the bedding contact. Based on the cost involved with pre-shaping the bedding material and the construction time requirements, an alternative procedure may be to utilize a level bed for the pipe and require a higher pipe strength class which will adequately carry the load on a lower class of bedding. It would be prudent to perform an economic analysis of the two alternatives, or specify both design conditions within the contract documents and allow the Contractor to decide the most efficient method.

If level bedding is utilized, it will be necessary to place and compact the haunching backfill (backfill between the bedding and the springline of the pipe) to the springline of the pipe. This material should be placed in simultaneous layers on each side of the pipe and must be compacted in such a manner as to ensure an intimate contact with the sides of the pipe. Do not use blocking to raise the pipe to grade.

The final backfill above the haunching or springline of the pipe must extend all the way to the trench walls and should be placed in level lifts not exceeding 12 inches. Each lift should be compacted to at least 95 percent of the maximum dry density, as determined by the Modified Proctor (ASTM D-1557). Care should be taken not to damage the pipe or defect it by compacting directly above the pipe where there is insufficient cover material present. Minimum cover criteria should be in accordance with the pipe manufacturer's recommendations.

Where the utility line will traverse roadways and/or other permanent structures such as sidewalks, all backfill should be compacted to 95 percent of maximum dry density, as determined by the Modified Proctor (ASTM D-1557), from the top of the pipe to the ground surface.



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A geotechnical engineer or a designated representative from Ardaman & Associates, Inc. should observe and test all prepared and compacted areas to verify that all bedding, haunching and final backfill are prepared and compacted in accordance with the aforementioned specifications

Backfill Requirements

As a general guide to aid the Contractor, we recommend using trench backfill with up to 12 percent by dry weight of material passing the U.S. Standard No. 200 sieve size. Soils with more than 12 percent passing the No. 200 sieve will be more difficult to compact due to their inherent nature to retain soil moisture. Based on the soil samples obtained during our subsurface investigation, the on-site fine sand (SP) and fine sand with silt (SP-SM) soils without roots and/or organic matter appear suitable for use as structural backfill for the pipe. However, material removed from below the groundwater table will be wet and will require time to dry sufficiently.

Resistance to Horizontal Forces on Pipeline Structures

Horizontal forces which act on structures such as thrust blocks or anchor blocks can be resisted to some extent by the earth pressures that develop in contact with the buried vertical face (buried vertical face is perpendicular and in front of the applied horizontal load) of the block structures and by shearing resistance mobilized along the base of the block structures and soil subgrade interface.

Allowable earth pressure resistance may be determined using an equivalent fluid density of 110 pounds per cubic foot (pcf) for moist soil and 70 pcf for submerged soils below the water table*. The passive earth pressures are developed from ground surface** to the bottom of the block structure.

*Equivalent fluid density (moist soil) = $K_p \gamma_m / S.F. = 110 \text{ pcf}$
 Equivalent fluid density (submerged soil) = $K_p (\gamma_s - \gamma_w) / S.F. = 70 \text{ pcf}$

Where:

K_p = effective coefficient of passive earth pressure = 3.0
 S.F. = safety factor = (values given below)
 γ_m = unit weight of moist soil = 110 pcf
 γ_s = unit weight of saturated soils = 120 pcf
 γ_w = unit weight of water = 62.4 pcf

**Assuming there is no excavation in the vicinity of the block structure that would reduce the available passive pressure.



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The values presented above presume that the block structures are surrounded by well compacted sand backfill extending at least 5 feet horizontally beyond the vertical buried face. In addition, it is presumed that the block structures can withstand horizontal movements on the order of one-quarter (1/4) to three-eighths (3/8) inch before mobilizing full passive resistance. The factors of safety assumed in the above recommendations are 2.5 for passive pressure with submerged conditions, and 3.0 for passive pressure without submerged conditions.

The sliding shearing resistance mobilized along the base of the block structure may be determined by the following formula:

$$\text{Allowable Shearing Resisting Force, } P = V \tan(2/3\phi)/S.F.$$

Where:

- P = Shearing Resistance Force (pounds)
- V = Net Vertical Force (total weight of block and soil overlying the structure minus uplift forces including buoyancy forces) (pounds)
- ϕ = Angle of Internal Friction of Soil = 30 degrees
- S.F. = Safety Factor = 1.5

The vertical earth pressures developed by the overburden weight of soil can be calculated using the following unit weights:

- Compacted moist soil = 110 pcf
- Saturated soil = 120 pcf

Vertical pressure distributions in accordance with the above do not take into account vertical forces from construction equipment, wheel loads or other surcharge loads.

Foundation Support and Estimated Settlements

The permanent structures such as anchor blocks, thrust blocks, air release valves, blow offs, etc., bearing at least 18 inches below adjacent grade and at least 18 inches wide can be designed for the following maximum vertical bearing capacities:

- 1,500 psf on undisturbed natural granular soils.
- 2,000 psf on compacted natural or backfilled subgrade; this value assumes compaction of 95 percent of the Modified Proctor maximum density (ASTM D-1557, AASHTO T-180) to a depth of 1 foot below the structure.

Pipe settlement during and after construction should be negligible (less than 1/2 inch) provided the bedding and backfilling criteria in the above sections are satisfied. The volume of soil displaced by the pipe, compared to the weight of the pipe when full, will result in little if any net increase in bearing stress to the subsurface soils.



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Uplift Resistance

Permanent structures submerged below the groundwater table will be subjected to uplift forces caused by buoyancy. The components resisting this buoyancy include: 1) the total weight of the pipe or structure divided by an appropriate factor of safety; 2) the buoyant weight of soil overlying the pipe or structure; and 3) the shearing forces that act on shear planes that radiate vertically upward from the perimeter of the pipe or the edges of the structure to the ground surface. The allowable unit shearing resistance may be determined by the following formula:

Allowable Unit Shearing Resistance, $F = K_o \gamma_m h (2/3 \tan \phi) / S.F.$ (above groundwater table)

Allowable Unit Shearing Resistance, $F = K_o [\gamma_m h_w + \gamma_b (h - h_w)] (2/3 \tan \phi) / S.F.$ (below groundwater table)

Where:

F = unit shearing resistance (psf)
 K_o = coefficient of earth pressure at rest = 0.5
 γ_m = unit weight of moist soil = 110 pcf
 γ_b = buoyant unit weight of soil = 58 pcf
 h = vertical depth (feet) below grade at which shearing resistance is determined
 h_w = vertical depth (feet) below grade to groundwater table
 ϕ = angle of internal friction of the soil = 30 degrees
 S.F. = safety factor = 2

The values given for the above parameters assume that the permanent structures are covered by clean, well compacted granular backfill that extends horizontally at least 2 feet beyond the structures.

Earth Pressure on Shoring and Bracing

If temporary shoring and bracing is required for any excavations, the system should be designed to resist lateral earth pressure. The design earth pressure will be a function of the flexibility of the shoring and bracing system. For a flexible system restrained laterally by braces placed as the excavation proceeds, the design earth pressure for shoring and bracing can be computed using a uniform earth pressure distribution with depth. It is recommended that soils be dewatered around the excavations. For such dewatered excavations, we recommended using the following uniform pressure distribution over the full braced height as follows:

Uniform Soil Pressure Distribution, $p = 0.65 K_a \gamma_s H$

where:

p = uniform pressure distribution for design of braced excavation
 K_a = coefficient of active earth pressure = 0.33
 γ_s = unit weight of saturated soils = 120 pcf
 H = depth of excavation



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An appropriate factor of safety should be applied for the design of the braced excavations.

Lateral pressure distributions determined in accordance with the above do not take hydrostatic pressures or surcharge loads into account. To the extent that such pressures and forces may act on the walls, they should be included in the design.

Construction equipment and excavated fill should be kept a minimum distance of 5 feet from the edge of the braced or shored excavation. Backfill material placed adjacent to (maintaining a minimum 5-foot horizontal clearance) the braced or shored excavation should have a minimum slope of 2.0H:1.0V or flatter if required by site specific conditions and/or to meet OSHA requirements.

Means and methods of excavation and bracing should be the responsibility of the Contractor; however, excavation and/or bracing should at a minimum adhere to the requirements of the Occupational Safety Health Administration (OSHA).

Lateral Earth Pressures

Lateral loads acting on the embedded structure will include at-rest earth pressures as well as hydrostatic pressures and surcharge loads. The lateral earth pressure will be a function of both the depth below ground surface and the soil unit weight (submerged or moist) plus hydrostatic pressure (if applicable). The following equations can be used to determine the lateral at-rest earth pressure:

$$\sigma_h = K_o \gamma_m h \text{ (above groundwater table)}$$

$$\sigma_h = K_o [\gamma_m h_w + \gamma_b (h - h_w)] \text{ (below groundwater table)}$$

Where:

- σ_h = lateral earth pressure (psf)
- K_o = coefficient of at rest earth pressure (0.5) (this value assumes that the backfill is lightly compacted yet not overcompacted)
- γ_m = moist unit weight of soil = 110 pcf for compacted moist soil above the water table.
- γ_b = buoyant unit weight of soil = 58 pcf for compacted saturated soil below the water table.
- h = vertical depth (feet) below grade at which lateral earth pressure is determined.
- h_w = vertical depth (feet) below grade to groundwater table

For design, an appropriate factor of safety should be applied to the lateral earth pressure calculated using the above equation. Lateral pressure distributions determined in accordance with the above do not include hydrostatic pressures or surcharge loads. Where applicable, they should be incorporated in the design.



Pipeline Directional Drill Locations

We understand that directionally drilled pipe installation may be used at some locations, particularly at the crossing of Gamble Creek. The SPT borings were conducted at accessible locations to provide soil stratigraphy data for information purposes only, for use by the directional drill design engineer. Further subsurface exploration may be necessary after final pipe invert elevations are determined.

QUALITY CONTROL

We recommend establishing a comprehensive quality control program to verify that all excavation, bedding, and backfilling is conducted in accordance with the appropriate plans and specifications. Materials testing and inspection services should be provided by Ardaman & Associates, Inc. In-situ density tests should be conducted during bedding and backfilling activities to verify that the required densities are achieved. Backfill for the proposed pipeline should be tested at a minimum frequency of one in-place density test for each lift for each 200 lineal feet of pipe. Additional tests should be performed beneath foundations and in backfill for other associated structures. In-situ density values should be compared to laboratory Proctor moisture-density results for each of the different natural and fill soils encountered.

CLOSURE

The analyses and recommendations submitted herein are based on the data obtained from the soil borings presented on Figures 1 and 2. This report does not reflect any variations which may occur adjacent to or between the borings. The nature and extent of the variations between the borings may not become evident until during construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations presented in this report after performing on-site observations during the construction period and noting the characteristics of the variations.

This study is based on a relatively shallow exploration and is not intended to be an evaluation for sinkhole potential. This study does not include an evaluation of the environmental (ecological or hazardous/toxic material related) condition of the site and subsurface.

This report has been prepared for the exclusive use of Stantec in accordance with generally accepted geotechnical engineering practices. In the event any changes occur in the design, nature, or location of the proposed improvements, we should review the applicability of conclusions and recommendations in this report. We recommend a general review of final design and specifications by our office to verify that earthwork and foundation recommendations are properly interpreted and implemented in the design specifications. Ardaman and Associates should attend the pre-bid and preconstruction meetings to verify that the bidders/contractor understand the recommendations contained in this report.



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We are pleased to be of assistance to you on this phase of the project. When we may be of further service to you or should you have any questions, please contact us.

Very truly yours,

ARDAMAN & ASSOCIATES, INC.
Certificate of Authorization No. 5950

Jerry H. Kuehn, P.E.
Senior Project Engineer
Fl. License No. 35557

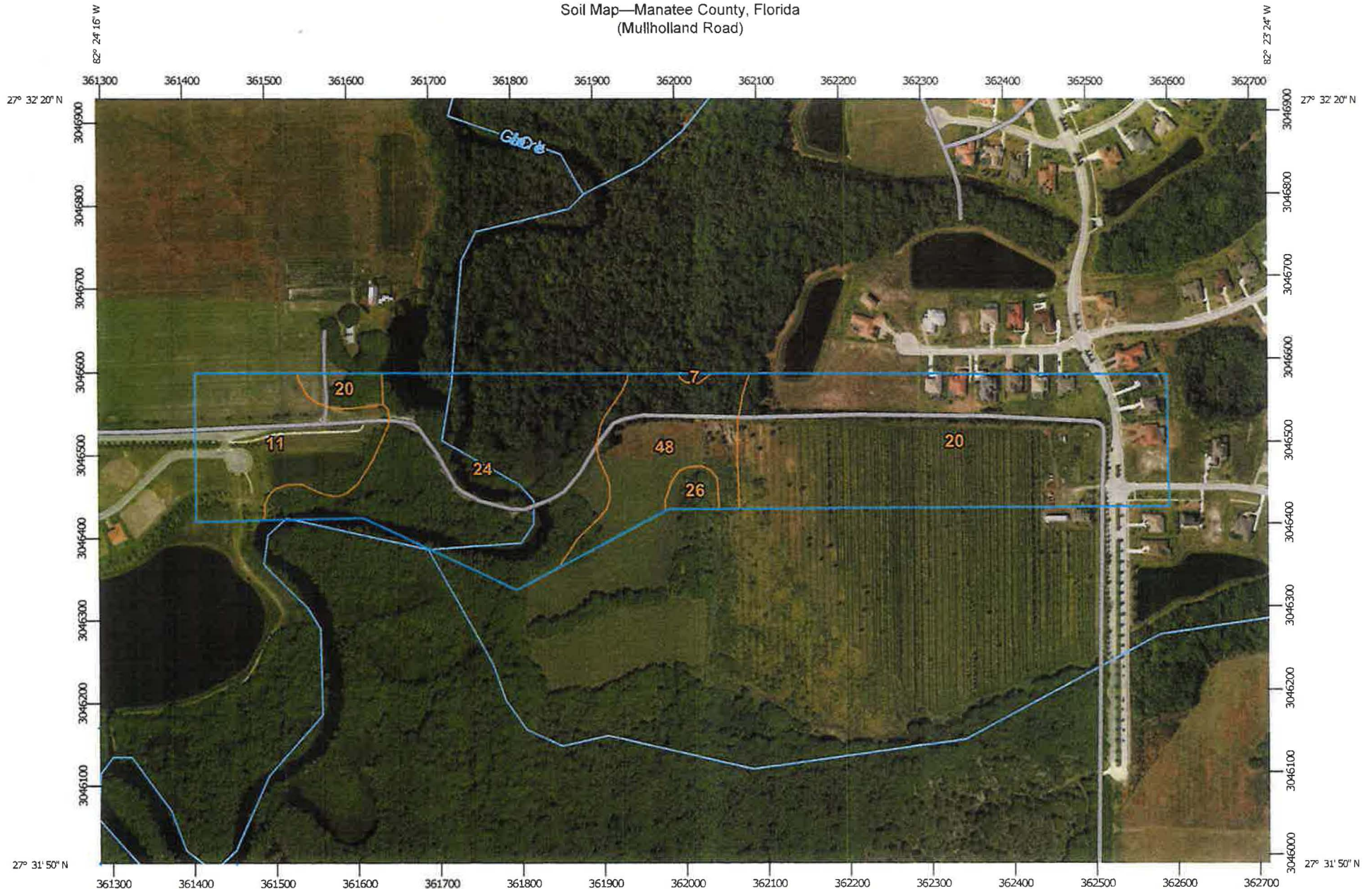
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APPENDIX I
SOIL MAP AND DATA
FROM
N.R.C.S. SOIL SURVEY

Soil Map—Manatee County, Florida
(Mullholland Road)



Map Scale: 1:6,530 if printed on A landscape (11" x 8.5") sheet.

Meters

0 50 100 200 300

Feet


0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Manatee County, Florida
(Mullholland Road)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp


 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Manatee County, Florida
Survey Area Data: Version 12, Nov 19, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 14, 2011—Mar 20, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Manatee County, Florida (FL081)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7	Canova, Anclote, and Okeelanta soils	0.1	0.2%
11	Cassia fine sand	7.6	14.3%
20	EauGallie fine sand, 0 to 2 percent slopes	21.9	41.0%
24	Felda-Wabasso association, frequently flooded	16.6	31.1%
26	Floridana-Immokalee-Okeelanta association	0.7	1.3%
48	Wabasso fine sand	6.5	12.1%
Totals for Area of Interest		53.4	100.0%

Corrosion of Steel

Corrosion of Steel— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
7	Canova, Anclote, and Okeelanta soils	High	0.1	0.2%
11	Cassia fine sand	High	7.2	13.5%
20	EauGallie fine sand, 0 to 2 percent slopes	High	22.3	42.0%
24	Felda-Wabasso association, frequently flooded	High	16.5	31.1%
26	Floridana-Immokalee-Okeelanta association	High	0.6	1.2%
48	Wabasso fine sand	High	6.3	12.0%
Totals for Area of Interest			53.0	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Corrosion of Concrete

Corrosion of Concrete— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
7	Canova, Anclote, and Okeelanta soils	Moderate	0.1	0.2%
11	Cassia fine sand	High	7.2	13.5%
20	EauGallie fine sand, 0 to 2 percent slopes	High	22.3	42.0%
24	Felda-Wabasso association, frequently flooded	High	16.5	31.1%
26	Floridana-Immokalee-Okeelanta association	Moderate	0.6	1.2%
48	Wabasso fine sand	High	6.3	12.0%
Totals for Area of Interest			53.0	100.0%

Description

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Shallow Excavations

Shallow Excavations— Summary by Map Unit — Manatee County, Florida (FL081)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
7	Canova, Anclote, and Okeelanta soils	Very limited	0.1	0.2%
11	Cassia fine sand	Very limited	7.2	13.5%
20	EauGallie fine sand, 0 to 2 percent slopes	Very limited	22.3	42.0%
24	Felda-Wabasso association, frequently flooded	Very limited	16.5	31.1%
26	Floridana-Immokalee-Okeelanta association	Very limited	0.6	1.2%
48	Wabasso fine sand	Very limited	6.3	12.0%
Totals for Area of Interest			53.0	100.0%

Shallow Excavations— Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Very limited	53.0	100.0%
Totals for Area of Interest	53.0	100.0%

Description

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX II

SOIL BORING, SAMPLING & TEST METHODS

SOIL BORING, SAMPLING AND TESTING METHODS

Standard Penetration Test

The Standard Penetration Test (SPT) is a widely accepted method of in situ testing of foundation soils (ASTM D-1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load. The following tables relate N-values to a qualitative description of soil density and, for cohesive soils, an approximate unconfined compressive strength (Qu):

Cohesionless Soils:	<u>N-Value</u>	<u>Description</u>	
	0 to 4	Very loose	
	4 to 10	Loose	
	10 to 30	Medium dense	
	30 to 50	Dense	
	Above 50	Very dense	

Cohesive Soils:	<u>N-Value</u>	<u>Description</u>	<u>Qu (ton/ft²)</u>
	0 to 2	Very soft	Below 1/4
	2 to 4	Soft	1/4 to 1/2
	4 to 8	Medium stiff	1/2 to 1
	8 to 15	Stiff	1 to 2
	15 to 30	Very stiff	2 to 4
	Above 30	Hard	Above 4

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or prevent the loss of circulating fluid.

Representative split-spoon samples from each sampling interval and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. Samples not used in testing are stored for at least six months prior to being discarded. After completion of a test boring, the hole is kept open until a steady-state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

A hammer with an automatic drop release (auto-hammer) is sometimes used in place of the safety hammer. The auto-hammer has been calibrated to relate its blow counts to equivalent safety hammer N-values.

Laboratory Test Methods

Soil samples returned to our laboratory are examined by a geotechnical engineer or geotechnician to obtain more accurate descriptions of the soil strata. Laboratory testing is performed on selected samples as deemed necessary to aid in soil classification and to further define engineering properties of the soils. The test results are presented on the soil boring logs at the depths at which the respective sample was recovered, except that grain size distributions or selected other test results may be presented on separate tables, figures or plates as described in this report. The soil descriptions shown on the logs are based upon a visual-manual classification procedure in general accordance with the Unified Soil Classification System (ASTM D-2488-84) and standard practice. Following is a list of abbreviations which may be used on the boring logs or elsewhere in this report.

- 200 - Fines Content (percent passing the No. 200 sieve); ASTM D-1140
- DD - Dry Density of Undisturbed Sample; ASTM D-2937
- Gs - Specific Gravity of Soil; ASTM D-854
- k - Hydraulic Conductivity (Coefficient of Permeability)
- LL - Liquid Limit; ASTM D-423
- OC - Organic Content; ASTM D-2974
- pH - pH of Soil; ASTM D-2976
- PI - Plasticity Index (LL-PL); ASTM D-424
- PL - Plastic Limit; ASTM D-424
- Qp - Unconfined Compressive Strength by Pocket Penetrometer;
- Qu - Unconfined Compressive Strength; ASTM D-2166 (soil), D-2938 (rock)
- SL - Shrinkage Limit; ASTM D-427
- USCS - Unified Soil Classification System; ASTM D-2487, D-2488
- w - Water (Moisture) Content; ASTM D-2216

Soil Classifications

The soil descriptions presented on the soil boring logs are based upon the Unified Soil Classification System (USCS), which is the generally accepted method (ASTM D-2487 and D-2488) for classifying soils for engineering purposes. The following modifiers are the most commonly used in the descriptions.

For Sands:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with silt or with clay	5% to 12% fines
	silty or clayey	12% to 50% fines
	with gravel or with shell	15% to 50% gravel or shell
For Silts or Clays:	<u>Modifier</u>	<u>Fines, Sand or Gravel Content*</u>
	with sand	15% to 30% sand and gravel; and % sand > % gravel
	sandy	30% to 50% sand and gravel; and % sand > % gravel
	with gravel	15% to 30% sand and gravel; and % sand < % gravel
	gravelly	30% to 50% sand and gravel; and % sand < % gravel

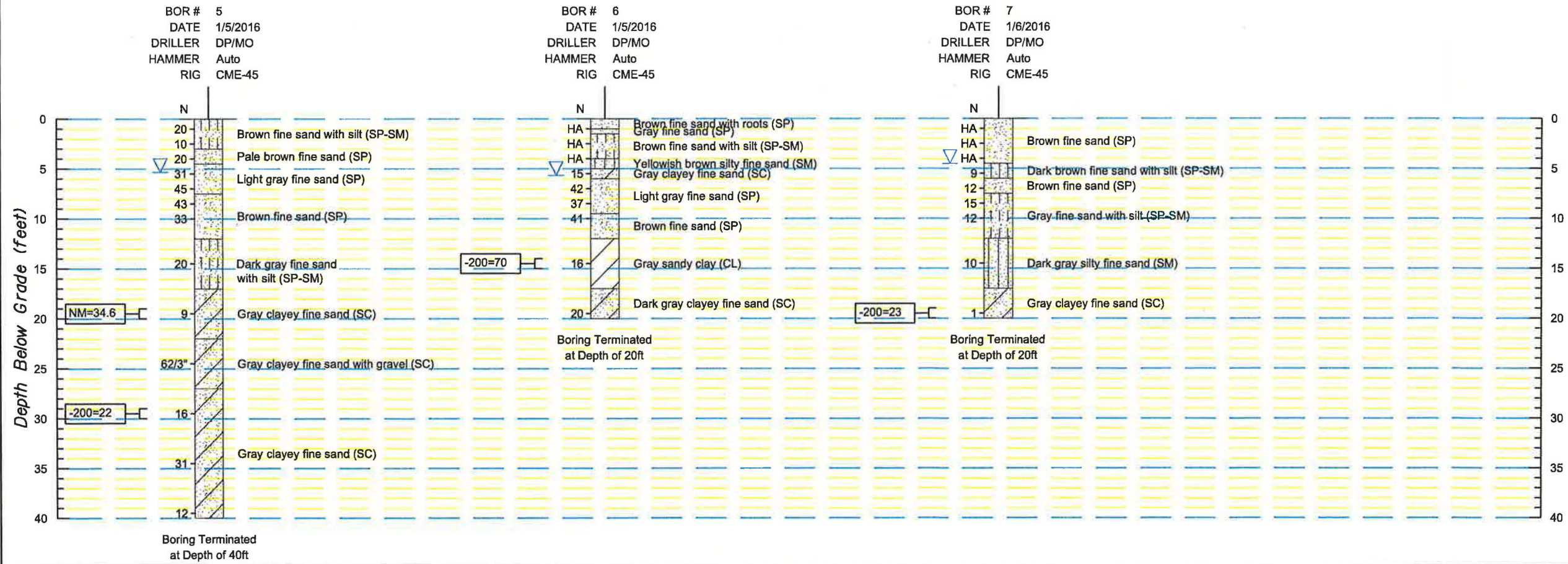
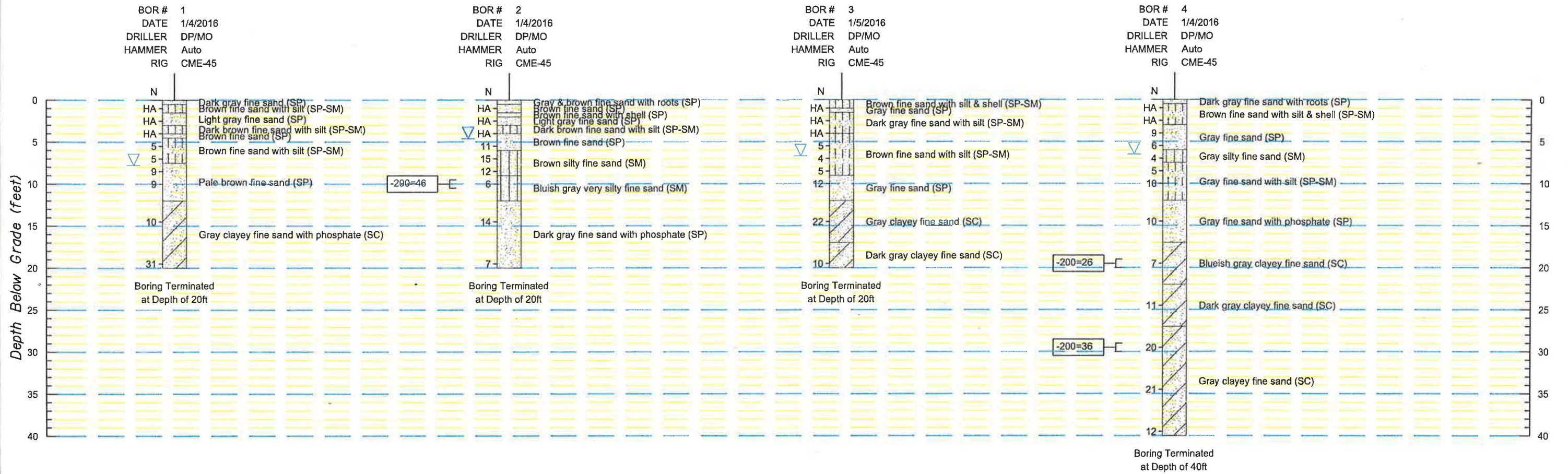
* may be determined by laboratory testing or estimated by visual/manual procedures. Fines content is the combined silt and clay content, or the percent passing the No. 200 sieve.

The USCS also uses a set of Group Symbols, which may also be listed on the soil boring logs. The following is a summary of these.

<u>Group Symbol</u>	<u>General Group Name*</u>	<u>Group Symbol</u>	<u>General Group Name*</u>
GW	Well-graded gravel	SW	Well-graded sand
GP	Poorly graded gravel	SP	Poorly graded sand
GW-GM	Well-graded gravel with silt	SW-SM	Well-graded sand with silt
GW-GC	Well-graded gravel with clay	SW-SC	Well-graded sand with clay
GP-GM	Poorly graded gravel with silt	SP-SM	Poorly graded sand with silt
GP-GC	Poorly graded gravel with clay	SP-SC	Poorly graded sand with clay
GM	Silty gravel	SM	Silty sand
GC	Clayey gravel	SC	Clayey sand
GC-GM	Silty, clayey gravel	SC-SM	Silty, clayey sand
CL	Lean clay	ML	Silt
CL-ML	Silty clay	MH	Elastic silt
CH	Fat clay	OL or OH	Organic silt or organic clay

* Group names may also include other modifiers, per standard or local practice.

Other soil classification standards may be used, depending on the project requirements. The AASHTO classification system is commonly used for highway design purposes and the USDA soil textural classifications are commonly used for septic (on-site sewage disposal) system design purposes.



LEGEND

▽ GROUNDWATER LEVEL MEASURED ON DATE DRILLED

N SPT N-VALUE IN BLOWS PER FOOT (UNLESS OTHERWISE NOTED)

SPT N VALUES CONVERTED TO EQUIVALENT SAFETY HAMMER

NM NATURAL MOISTURE CONTENT

-200 FINES PASSING THE NO. 200 SIEVE (%)

HA HAND AUGER

GNM GROUND WATER NOT MEASURED

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FOOT)
VERY LOOSE	LESS THAN 4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	GREATER THAN 50

SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FOOT)
VERY SOFT	LESS THAN 4
SOFT	2-4
FIRM	4-8
STIFF	8-15
VERY STIFF	15-30
HARD	GREATER THAN 30

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

Soil Boring Logs
Water Main
Mullholland Road, Parrish
Manatee County, Florida

DRAWN BY: KGS CHECKED BY: DATE: 1/14/16
FILE NO. 15-7347 APPROVED BY: FIGURE: 2