

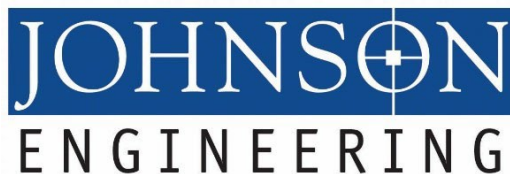
TECHNICAL SPECIFICATIONS

RSW TRANSMISSION LINE - BEN HILL/TREELINE



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JUNE 2022
JULY 2022 – ADDENDUM #1

LEE COUNTY UTILITIES

RSW TRANSMISSION LINE – BEN HILL/TREELINE

TECHNICAL SPECIFICATIONS

REFERENCE DOCUMENTS

The Contractor shall complete all work in conformance with the Lee County Utilities Design Manual, latest revision, and as provided herein these technical specifications. The latest version of the Design Manual is available at the Lee County website: <http://www.leegov.com/utilities/designmanual>

Contractor shall complete all applicable work in conformance with the latest version of the FDOT indices: <http://www.fdot.gov/design/standardplans/current/default.shtm>

All utility related materials shall comply with Lee County Utility's Approved Materials List: <http://www.leegov.com/utilities/design-manual/approved-materials>

**LEE COUNTY UTILITIES
WATER AND WASTEWATER TECHNICAL SPECIFICATIONS**

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SECTION 01 11 00
SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Work
- B. Constraints
- C. Work by Others
- D. CONTRACTOR's Use of Site
- E. Work Sequence
- F. Owner Occupancy

1.2 DESCRIPTION OF WORK

- A. General: The Work to be done under this Contract consists of the construction of approximately 5 miles of 24" potable water main to serve as a transmission main for Lee County Utilities. This work includes Contractor obtaining railway crossing insurance and inspection, installation of the following PVC C900 DR18 water mains: 10 LF of 8" and 50 LF of 12"; 21,400 LF of 24" DIP Pressure Class 250 water main installed via open cut method; and 1,220 LF 30" of HDPE DR9 (DIPS) via 2 HDD and 1 HDD under railway crossing. This project also includes installation of 23 gate valves (various sizes); 7 ARV's, 4 water main connections (various sizes), 2 aerial crossings, 1 fire hydrant assembly, 6 temporary blow-off assemblies and 20 bollards. Roadway restoration, and silt fencing are also to be provided as shown and specified in Contract Documents entitled *RSW Transmission Line - Ben Hill/Treeline*.

As a courtesy, the following hyperlink to a YouTube video shows the proposed route of the water main as of December 2020.

<https://youtu.be/LFBqR0ktnTE>.

This video is not to be used as a pre-construction video nor shall it be used as verification of existing conditions. The intention is only to provide the prospective bidders an overview of the route.

B. The Work includes:

1. Furnishing of all labor, material, superintendence, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, services and other means of construction necessary or proper for performing and completing the Work.
2. Sole responsibility for adequacy of plant and equipment.
3. Maintaining the Work area and site in a clean and acceptable manner.
4. Maintaining existing facilities in service at all times except where specifically provided for otherwise herein.
5. Protection of finished and unfinished Work.
6. Repair and restoration of Work damaged during construction.
7. Furnishing as necessary proper equipment and machinery, of a sufficient capacity, to facilitate the Work and to handle all emergencies normally encountered in Work of this character.
8. Furnishing, installing, and protecting all necessary guides, rails, bearing plates, anchor and attachment bolts, and all other appurtenances needed for the installation of the devices included in the equipment specified. Make anchor bolts of appropriate size, strength and material for the purpose intended. Furnish substantial templates and shop drawings for installation.

C. Implied and Normally Required Work: It is the intent of these Specifications to provide the OWNER with complete operable systems, subsystems and other items of Work. Any part or item of Work which is reasonably implied or normally required to make each installation satisfactorily and completely operable is deemed to be included in the Work and the Contract Amount. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of these Specifications are included in the Work and the Contract Amount even though these appurtenances may not be specifically called for in these Specifications.

D. Quality of Work: Regard the apparent silence of the Contract Documents as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished as meaning that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Interpretation of these specifications will be made upon this basis.

1.3 CONSTRAINTS

- A. The Contract Documents are intended to allow the CONTRACTOR flexibility in construction of the Work however, the following constraints apply:

The CONTRACTOR shall construct the project in Phases as shown on the Drawings. Phase 1 needs to be constructed West to East. A Phase is considered completed once a partial clearance through Florida Department of Health is Accepted and a Preliminary Walk through is performed by LCU and Engineer. A 30 day overlap of Phases is the maximum amount of time allowed.

1.4 WORK BY OTHERS

- A. Work on the Project, which may take place concurrently with this CONTRACT and which is excluded from this CONTRACT, is as follows:

1. Throughout the Project, Gopher Tortoise permitting, and relocation will need to be coordinated. The Contractor must notify the COUNTY and ENGINEER Ninety (90) days prior to moving on to the next Phase.

1.5 CONTRACTOR'S USE OF SITE

- A. In addition to the requirements of the General Conditions, limit use of site and premises for work and storage to allow for the following:

1. Coordination of the Work under this CONTRACT with the work of the other contractors where Work under this CONTRACT encroaches on the Work of other contractors.
2. OWNER occupancy and access to operate existing facilities.
3. Coordination of site use with ENGINEER.
4. Responsibility for protection and safekeeping of products under this CONTRACT.
5. Providing additional off site storage at no additional cost to OWNER as needed.

1.6 WORK SEQUENCE

- A. Construct Work in stages to accommodate OWNER's use of premises during construction period and in accordance with the limitations on the sequence of construction specified. Coordinate construction schedules and operations with ENGINEER.
- B. Coordinate Work of all subcontractors.

1.7 OWNER OCCUPANCY

- A. OWNER will occupy premises during entire period of construction in order to maintain normal operations. Cooperate with OWNER's representative in all construction operations to minimize conflict, and to facilitate OWNER usage.
- B. Conduct operations so as to inconvenience the general public in the least.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

- A. Starting Work: Start Work on the date stated in the Notice to Proceed and execute with such progress as may be required to prevent delay to other contractors or to the general completion of the project. Execute Work at such items and in or on such parts of the project, and with such forces, material and equipment, as to complete the Work in the time established by the Contract. At all times, schedule and direct the Work so that it provides an orderly progression to completion within the specified time for completion.

END OF SECTION

SECTION 01 22 13

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Explanation and Definitions
- B. Measurement
- C. Payment
- D. Schedule of Values

1.2 EXPLANATION AND DEFINITIONS

- A. The following explanation of the Measurement and Payment for the bid form items is made for information and guidance. The omission of reference to any item in this description shall not, however, alter the intent of the bid form or relieve the CONTRACTOR of the necessity of furnishing such as a part of the Contract.

1.3 MEASUREMENT

- A. The quantities set forth in the bid form are approximate and are given to establish a uniform basis for the comparison of bids. The OWNER reserves the right to increase or decrease the quantity of any class or portion of the work during the progress of construction in accord with the terms of the Contract.

1.4 PAYMENT

- A. Payment shall be made for the items listed on the Bid Form on the basis of the work actually performed and completed, such work including but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, clean up, restoration of disturbed areas, and all other appurtenances to complete the construction and installation of the work as shown on the drawings and described in the specifications.
- B. Unit prices are used as a means of computing the final figures for bid and Contract purposes, for periodic payments for work performed, for determining value of additions or deletions and wherever else reasonable.

1.5 SCHEDULE OF VALUES

- A. Approval of Schedule: Submit for approval a preliminary schedule of values, in duplicate, for all of the Work. Prepare preliminary schedule in accordance with the General Conditions. Submit preliminary schedule of values within 10 calendar days after the Effective Date of the Agreement. Submit final schedule of values in accordance with the General Conditions.
- B. Format: Utilize a format similar to the Table of Contents of the Project Specifications. Identify each line item with number and title of the major specification. Identify site mobilization, bonds and insurance. Include within each line item, a direct proportional amount of CONTRACTOR's overhead profit.
- C. Revisions: With each Application for Payment, revise schedule to list approved Change Orders.

PART 2 EXECUTION

2.1 MEASUREMENT AND PAYMENT

- A. Payment shall be made on the basis of work actually performed completing each item in the Bid, such work including, but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, cleanup, and all other appurtenances to complete the construction and installation of the work to the configuration and extent as shown on the drawings and described in the specifications. Payment for each item includes compensation for cleanup and restorations. Cleanup and surface restorations (including pavement replacement) will be considered as ten percent (10%) of each pay item and complete payment will not be made until cleanup, restorations and as-builts are completed.

GENERAL

- 1. Mobilization: Payment for mobilization will be made at the Contract lump sum price for the contractor's cost for mobilization, demolition, survey, insurance, audio-video tape of existing conditions, preparing a field office, identifying and securing a staging area and other applicable administrative charges as outlined in the Contract Documents and specified herein.
- 2. Performance and Payment Bond Premiums and Insurance: Performance and Payment Bond Premiums and Insurance lump sum price shall be divided equally over the number of pay request anticipated from the Notice to Proceed. No additional payments shall be made due to time extension.
- 3. Maintenance of Traffic: Payment for maintenance of traffic will be made for at the Contract lump sum price and includes the furnishing and installation of

labor, equipment and materials to provide temporarily traffic control, temporary surfaces and pavements, preparation of maintenance of traffic plans, and other such cost that may be necessary to properly maintain traffic throughout the entire construction site including provisions for emergency vehicles. This item includes the traffic control devices, flag men to direct traffic and the preparation and submittal of the Maintenance of Traffic plan to LCDOT for approval. All maintenance of traffic shall be in accordance with the approved Lee County Right of Way permit and in accordance with applicable FDOT/LCDOT standard Indexes. It also includes road/lane closures of local streets with minimal delay to traffic. All emergency services shall be notified well in advance of road closures.

4. Preconstruction Audio/Video Recording: Measurement and payment for pre-construction audio/video recording shall be made at the contract Lump Sum price. The work includes that necessary to document existing conditions on public and private property. The Contractor may be required to restore private properties to conditions better than existing, at no additional cost to the County, if the Contractor fails to sufficiently document existing conditions. The preconstruction video is only good for up to 6 months. Please phase the video properly to meet this requirement.

5. Record Drawings: The cost for preparation of the record drawings survey and construction layout shall be made at the Contract lump sum price. This item includes material, labor, and certification to prepare the "Record Drawing", field verification of existing underground facilities, construction stakeout of the proposed pipe and to survey the new pipe after it has been installed. Prior to acceptance of the project by the Board of County Commissioners, the Contractor shall submit two prints, and one set of computer disk copies of AutoCAD formatted drawings marked as "Drawings of Record" which include the original design and all deviations that occurred during construction in accordance with Lee County regulations. The record drawings shall include vertical and horizontal alignment of all water mains, valves, tees, bends, reducers, air release valves and other pertinent structures. Pipe runs in excess of 500 feet without fittings shall include vertical alignment and grade information. Record drawings shall be certified by a Professional Land surveyor licensed in the State of Florida. All elevation to be based on NAVD '88 vertical datum and all horizontal coordinates in Florida West State Plane coordinates.

6. Railroad Crossing Inspection and Insurance: The cost for providing Railroad Crossing inspection and insurance pursuant to the Seminole Gulf Railway, LP License Agreement for Underground Potable Water Main Pipe Installation and Occupation Briarcliff Canal, Fort Myers, Florida ("SGLR License Agreement") shall be made at the contract Lump Sum price for items a. – c. below. The SLGR License Agreement includes Exhibit "C" Release and Indemnification which is to be reviewed and executed by the Contractor. The Contractor will be

responsible to abide by the terms as outlined in the SLGR License Agreement and Exhibit C Release and Indemnification included with these Bid Documents. This includes Contractor agreeing to obtain the insurance specified and maintain similar insurance for at least two years following completion of the construction or maintenance of the Utility. A breakdown of these items is provided in a.-c. below:

- a. Seminole Gulf Railway Inspection Fees: Payment for Seminole Gulf Railway Inspection Fees is based on a two-day minimum with normal working hours between 8:00 am – 4:00 pm. All work associated with this bid item shall be accomplished in Item 10. Additional days, if needed, will be reimbursable at \$1,720 per day. The Contractor shall provide Seminole Gulf Railway invoices as back-up for payment. The Contractor is responsible for coordinating with Seminole Gulf Railway to schedule construction activities and inspections. No mark-up for this bid item is allowed.
 - b. Seminole Gulf Railway Inspection Fees (overtime): Payment for Seminole Gulf Railway Inspection Fees (overtime) is for inspection costs outside of normal working hours (8:00 am – 4:00 pm). All work associated with this bid item shall be accomplished in Item 10. The Contractor shall provide Seminole Gulf Railway invoices as back-up for payment. The Contractor is responsible for coordinating with Seminole Gulf Railway to schedule construction activities and inspections. No mark-up for this bid item is allowed.
 - c. Seminole Gulf Railway Insurance: Payment of the lump sum price for furnishing Seminole Gulf Railway insurance is based on the cost to obtain and maintain the insurance requirements described in the Seminole Gulf Railway Insurance and Right-Of-Way Requirements form incorporated into this section. The insurance duration shall be for the amount of time required by Seminole Gulf Railway. Additionally, the Contractor will be required to prepare Seminole Gulf Railway Exhibit C – Release and Indemnification form incorporated into this section. No mark-up for this bid item is allowed.
7. Gopher Tortoise Relocation: Payment for furnishing and providing gopher tortoise relocation will be made at the Contract unit price per lump sum. This item includes coordinating with Johnson Engineering, Inc. for the permitting and relocation of all gopher tortoises found within the project corridor. Per State requirements, a pre-construction survey must be conducted within 90 days of commencement of construction by Johnson Engineering. Based on the survey results, a permit will need to be obtained by Johnson Engineering to remove gopher tortoises. Contractor will need to assist with the removal of the tortoises utilizing a small tire backhoe and operator for approximately 2 days. Johnson Engineering will take possession of the gopher tortoise(s) and coordinate transfer to the relocation site.

WATER SYSTEM

8. Furnish and Install Water Main Pipelines: Payment for furnishing and installing water main pipelines (Items a. and b.) will be made at the Contract unit price per lineal foot for the pipe in place. This item includes all necessary fittings, connections to existing mains, labor, equipment and materials for the furnishing and laying of the pipe, steel casing, signs, maintenance of traffic, dewatering, compaction, pipe bedding, backfilling, sheeting, restrained joint piping, mylar detectable tape, clamps, harnessing, plugs and caps, adapters, excavation of all material encountered including rock, backfill, replacement of grass, sod, clearing and grubbing, pavement, driveways, sidewalks, mailboxes, culverts, storm sewers, and other surface materials not specifically designated in the Bid, clean-up, sterilization, and tests. Measurement of the pipe shall be to the nearest foot along the centerline including the lengths of manholes, valves, and fittings. Lineal footage measurement shall be horizontal. Cuts shall be measured from existing grade to the invert elevation of the sewer. Contractor is required to hydroseed along flat areas, water and maintain until growth is established. Repair eroded areas as needed. Sod along slopes, pin if needed, and water until established. This item also includes all roadway restoration, pavement removal, repair per the included Details. All required silt fence, turbidity barriers, erosion protection, de-chlorination, and flushing are included. The pipeline must be pigged/swabbed prior to the full bore flush. Contractor to test section by test section as show in the Drawings.
9. Furnish and Install Horizontal Directional Drills: Payment for furnishing and installing horizontal directional drills (Items a. and b.) will be made the Contract lump sum price for each directional drill acceptably installed. This item includes all labor and equipment for installation of the horizontal directional drills with tracer and tracer wire boxes made in accordance with the details shown in the Drawings and Lee County Standards. This item also includes all excavation, including rock, backfilling, compaction, dewatering, fittings, thrust restraint devices, bedding material, erosion and sedimentation control and finished grading. The Drawings show a suggested path for the drill, that includes an entry angle, exit angle with a radius shown for each drill. The Contractor may deviate from these criteria but will only be paid a lump sum price regardless of length. The Contractor will be responsible for providing necessary fittings, appurtenances, and materials. Contractor shall provide imported backfill, if needed. Any deviations will need to be reviewed and approved by LCU and Engineer.
10. Furnish and Install Horizontal Directional Drill under Railway Crossing (30" WM – HDPE DR9 (DIPS): STA 138+25 To STA 150+45): Payment for furnishing and installing horizontal directional drill under railway crossing will be made the Contract lump sum price. This item includes all labor and equipment for installation of the horizontal directional drill with tracer and

tracer wire boxes made in accordance with the details shown in the Drawings, Lee County Standards and comply with Chapter 1, Part 5 – Pipelines of the American Railway Engineering Association Manual for Railway Engineering. This item also includes all excavation, including rock, backfilling, compaction, dewatering, fittings, thrust restraint devices, bedding material, erosion and sedimentation control and finished grading. **Contractor is responsible to notify Lee County, Engineer and Seminole Gulf Railway at least fourteen (14) days in advance of any work performed within the railway utility. Furthermore, a pressure test of the directional drill under the railway will need to be performed immediately after installation since there is a short time period allowed to work within the railway right of way.** The Drawings show a path for the drill, that includes an entry angle, exit angle with a radius shown for each drill. The Contractor may deviate from these criteria but will only be paid a lump sum price regardless of length. The Contractor will be responsible for providing necessary fittings, appurtenances, and materials. Contractor shall provide imported backfill, if needed. Any deviations will need to be reviewed and approved by LCU and Engineer. This item also includes (2) signs properly mounted and set per MUTCD with (1) set on each side of the railroad tracks.

11. Furnish and Install Gate Valves: Payment for furnishing and installing gate valves (various sizes) will be made at the appropriate Contract unit price per each gate valve acceptably installed. This item includes the gate valve, valve stem, ID Tags, valve box, and all necessary labor, all necessary restoration to equal or better conditions, materials, and equipment for installation, including valve stem and valve box extensions, joints, and concrete pads. This item also includes the installation of base material below the valve in accordance with the detail shown in the Drawings.
12. Furnish and Install Air Release Valves: Payment for furnishing and installing automatic air release valves will be made at the appropriate Contract unit price per each unit acceptably installed. This item includes all necessary labor, materials and equipment for installation, including the tapping saddle, corporation stop, polytubing, brass elbows, brass piping, ball valve, schedule 80 PVC pipe, air release valve fixture, vented pedestal housing with stainless steel post, an odor control bio-filter and bedding stone in accordance with the details shown in the project Drawings. When ordered in writing by the Engineer, payment will be made for additional automatic air release valve assemblies installed in the work due to field conditions. All automatic air release valves installed in the work not shown on the Drawings and not ordered by the Engineer in writing will not be measured for payment.
13. Furnish and Install Water Main Interconnections: Payment for furnishing and installing water main interconnections (various sizes) will be made at the Contract price for each interconnection acceptably installed. This item includes all labor, equipment and materials to install all necessary pipe,

fittings, connections, tapping sleeve and valve with valve box, field measurements, protection of existing facilities, excavation, pipe bedding, dewatering, compaction, surface restoration, testing, cleanup and all other work for a complete installation.

14. Furnish and Install Aerial Crossings: Payment for furnishing and installing aerial crossings (Items a. and b.) will be made at the unit lump sum price per each crossing acceptably installed. This item includes all necessary labor, materials, and equipment for furnishing and installing aerial crossings in accordance with the project Drawings and Lee County Standards. All fan guards, piles, pile caps, foundation straps, and restraints are included in this item. The price of pipe should be included in Item 8. The price for air release valves should be included in Item 12.
15. Fire Hydrant Assembly: Payment for the furnishing and installing fire hydrant assembly will be made at the Contract unit price for each fire hydrant assembly acceptably installed. This item includes the tee installed on the utility main, all necessary fittings, joint restraint from the valve to the tee and necessary piping from the tee to the hydrant location with the installation of barrel section to meet finished grade. All piping shall be six-inch (6") ductile iron pipe from the tee to hydrant. The CONTRACTOR shall be responsible to set the hydrant to grade in accordance with the detail shown on the Plans.
16. Temporary Blow-Off Assembly: Payment for furnishing and installing temporary blow-offs will be made at the appropriate Contract unit price per blow-off acceptably installed. This item includes the reinforced concrete thrust collar, piping, making pipe connections, valves, meter box, tie rods, and all other work for a complete installation. All permanent blow-offs shall conform to the details shown on the Drawings and Lee County Standards.
17. Bollards: Payment for furnishing and installing bollards will be made at the appropriate Contract price per each. This item shall include excavating footer, furnishing, installing, and painting bollard, furnishing and installing concrete. The price shall also include furnishing and installing an expansion joint, if set adjacent to concrete pavement, and foundation stone. All bollards shall conform to the details shown on the Drawings and/or Lee County Standards.

RESTORATION

18. Permanent Fence Relocation (1,225 LF of chain link and 6,860 LF of hog wire): Payment for permanent fence relocation will be made at the Contract price per lineal foot. This item includes all labor, equipment, and materials to provide permanent fence relocation in accordance with the project Drawings and Lee County Standards. The existing fence appears to be in good enough shape to be reused while maintaining security.

19. Temporary Fence Relocation (1,225 LF of chain link): Payment for temporary fence relocation will be made at the Contract price per lineal foot. This item includes all labor, equipment, and materials to provide temporary fence relocation in accordance with the project Drawings and Lee County Standards. The existing fence appears to be in good enough shape to be reused while maintaining security.

END OF SECTION

SECTION 01 31 13
PROJECT COORDINATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Work Progress
- B. Private Land
- C. Work Locations
- D. Open Excavations
- E. Test Pits
- F. Maintenance of Traffic
- G. Maintenance of Flow

1.2 WORK PROGRESS

- A. Furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will allow the completion of the work within the time stipulated in the Bid of these Specifications. If at any time such personnel appears to the ENGINEER to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the CONTRACTOR to increase the efficiency, change the character or increase the personnel and equipment, and the CONTRACTOR shall conform to such order. Failure of the ENGINEER to give such order shall in no way relieve the CONTRACTOR of his obligations to secure the quality of the work and rate of progress.

1.3 PRIVATE LAND

- A. Do not enter or occupy private land outside of easements, except by permission of OWNER. Construction operations shall be conducted in accordance with Section 01 57 00.

1.4 WORK LOCATIONS

- A. Structures and pipelines shall be located substantially as indicated on the Drawings, but the ENGINEER reserves the right to make such modifications in locations as may be found desirable to avoid interference noted on the Drawings, such notation is for

the CONTRACTOR's convenience and does not relieve him from laying and jointing different or additional items where required.

1.5 OPEN EXCAVATIONS

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The CONTRACTOR shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by the public and workmen.

1.6 TEST PITS

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

1.7 MAINTENANCE OF TRAFFIC

- A. Maintenance of traffic shall be in accordance with Sections 01 55 26 and 33 05 02.
- B. All projects and work on highways, roads, and streets, shall have a traffic control plan, (TCP), as required by Florida Statute and Federal regulations. All work shall be executed under the established plan and Department approved procedures. The TCP is the result of considerations and investigations made in the development of a comprehensive plan for accommodating vehicular and pedestrian traffic through the construction zone.
- C. The complexity of the TCP varies with the complexity of the traffic problems associated with a project. Many situations can be covered adequately with reference to specific sections from the Manual on Uniform Traffic Control Devices (MUTCD), the Traffic Control Devices Handbook (TCDH), or Roadway and Traffic Design Standard Series 600.

1.8 MAINTENANCE OF FLOW

- A. Provide for the flow of sewers, drains, courses interrupted during the progress of the work, and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the ENGINEER well in advance of the interruption of any flow.

PART 2 PRODUCTS

2.1 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. All newly constructed work shall be carefully protected from damage in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions damaged shall be reconstructed by the CONTRACTOR at his own expense.
- B. All structures shall be protected in a manner approved by the ENGINEER. Should any of the floors or other parts of the structures become heaved, cracked or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the CONTRACTOR at his own expense and to the satisfaction of the ENGINEER. Special attention is directed to substructure bracing requirements, described in Section 31 40 00. If, in the final inspection of the work, any defects, faults or omissions are found, the CONTRACTOR shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. The CONTRACTOR shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the contract.
- C. Take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the OWNER.

PART 3 EXECUTION

3.1 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. Sequence and schedule work in a manner to preclude delays and conflicts between the work of various trades and contractors. Each trade shall keep informed as to the work of other trades on the project and shall execute their work in a manner that will not interfere with the work of other trades.

3.2 DIAGRAMMATIC NATURE OF DRAWINGS

- A. Where layout is diagrammatic, such as pipelines, conduits, ductwork, etc., it shall be followed as closely as other work will permit. Changes from diagrams shall be made as required to conform to the construction requirements.
- B. Before running lines, carefully verify locations, depths and sizes and confirm that lines can be run as contemplated without interfering with other construction. Any deviation shall be referred to the ENGINEER for approval before lines are run. Minor changes in location of the equipment, fixtures, piping, etc., from those shown on the Drawings, shall be made without extra charge if so directed by the ENGINEER before installation.

- C. Determine the locations and sizes of equipment, fixtures, conduit, ducts, openings, etc., in order that there will be no interference in the installation of the work or delay in the progress of other work. In the event that interferences develop, the ENGINEER's decision regarding relocation of work will be final.
- D. Any changes made necessary through failure to make proper arrangements to avoid interference shall not be considered as extras. Cooperate with those performing other work in preparation of interference drawings, to the extent that the location of piping, ductwork, etc., with respect to the installations of other trades shall be mutually agreed upon by those performing the work.

3.3 PROVISIONS FOR LATER INSTALLATION

- A. Where any work cannot be installed as the construction is progressing, provide for boxes, sleeves, inserts, fixtures or devices as necessary to permit installation of the omitted work during later phases of construction. Arrange for chases, holes, and other openings in the masonry, concrete or other work and provide for subsequent closure after placing equipment. Arrangement for and closure of openings shall be subject to the approval of the ENGINEER and all costs therefor shall be included in the contract price for the work.

3.4 COORDINATION

- A. The CONTRACTOR shall be fully responsible for the coordination of his work and the work of his employees, subcontractors, and suppliers with the OWNER, and regulatory agencies, and assure compliance with schedules.

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination
- B. Preconstruction Conference
- C. Progress Meetings

1.2 COORDINATION

- A. General: Coordinate scheduling, submittals, and Contract work to assure efficient and orderly sequence of installation of interdependent construction elements.

1.3 PRECONSTRUCTION CONFERENCE

- A. General: Prior to commencement of the Work, in accordance with the General Conditions, the OWNER will conduct a preconstruction conference to be held at a predetermined time and place.
- B. Delineation of Responsibilities: The purpose of the conference is to designate responsible personnel, to establish a working relationship among the parties and to identify the responsibilities of the OWNER, plant personnel and the CONTRACTOR/VENDOR. Matters requiring coordination will be discussed and procedures for handling such matters, established. The agenda will include:
 - 1. Submittal procedures
 - 2. Partial Payment procedures
 - 3. Maintenance of Records
 - 4. Schedules, sequences and maintenance of facility operations
 - 5. Safety and First Aid responsibilities
 - 6. Change Orders and Field Directive Changes
 - 7. Use of site
 - 8. Housekeeping
 - 9. Equipment delivery
- C. Attendees: The preconstruction conference is to be attended by the representatives of the CONTRACTOR/VENDOR, the OWNER and plant personnel that will be associated with the project. Representatives of regulatory agencies, subcontractors, and principal suppliers may also attend when appropriate.

- D. Chair and Minutes: The preconstruction conference will be chaired by the Owner who will also arrange for the keeping and distribution of minutes to all attendees.

1.4 PROGRESS MEETINGS

- A. Meeting Frequency and Format: Schedule progress meetings on at least a basis or more frequently as warranted by the complexity of the Project, to review the Work, discuss changes in schedules, maintain coordination and resolve potential problems. Invite OWNER, ENGINEER and all SUBCONTRACTOR/VENDORS. Suppliers may be invited as appropriate. Minutes of the meeting will be maintained by CONTRACTOR/VENDOR and reviewed by ENGINEER prior to distribution by the CONTRACTOR/VENDOR. Distribute reviewed minutes to attendees within 7 calendar days after each meeting.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 32 17
PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Scheduling Responsibilities
- B. Submittals
- C. Network Requirement
- D. Cost Loading
- E. Progress of the Work
- F. Schedule Updates

1.2 SCHEDULING RESPONSIBILITIES

- A. Format: Use the Critical Path Method to schedule and monitor job progress. Provide all information concerning sequencing logic and duration of all activities as well as the initial CPM logic network diagram and tabulated report data.
- B. Initial Submittal: Within 30 days after the Notice to Proceed, submit the initial logic network diagram to the ENGINEER for review. Within 60 days submit final network diagram.
- C. Updates: On a monthly basis, furnish to the ENGINEER updated information on logic, percent complete, actual start and finish date and direction changes. Distribute copies at Progress Meetings.
- D. Adherence: Schedule and direct forces in a manner that will allow for completion of the Work within the Contract time specified.
- E. Accuracy: Provide initial schedule and subsequent update information to reflect the best efforts of the CONTRACTOR and all subcontractors as to how they envision the Work to be accomplished. Similarly, all progress information must be an accurate representation of the CONTRACTOR's and subcontractor's actual performance. Complete Work under this Contract in accordance with the established CPM schedule.

- F. Cost of Revisions: At no additional cost to the OWNER, revise schedule when in the judgement of the ENGINEER, it does not accurately reflect the actual prosecution of the Work.

1.3 SUBMITTALS

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

- B. CPM Schedule:

1. Within 30 days after the date stated in the Notice to Proceed, submit to the ENGINEER prints of a proposed CPM network diagram and tabular reports for the first 90 days of the Work. Draw initial logic diagram as described herein and submit on sheets 24 inches by 36 inches. Include both procurement and construction activities. Schedule a review meeting with the ENGINEER and the OWNER (or OWNER's Consultants) within 2 weeks of its submission. Revise and resubmit the 90 day schedule until it is acceptable to the ENGINEER.
2. Within 60 Days after the Notice to Proceed, submit to the ENGINEER 3 sets of the proposed CPM logic diagram and tabular reports for the entire Contract duration. Include both procurement and construction activities. Sort these tabular reports by total float and activity number. Provide a predecessor/successor report, resource loading report, and project calendar. Draw logic diagram as described.
3. Schedule review meeting with the ENGINEER and the OWNER within 2 weeks of its submission. If a review of the submitted CPM Schedule indicates a work plan which will not complete the Work within the time requirements stated in the Contract, reallocate resources, revise the CPM Schedule and resubmit it until it is acceptable. Failure by the CONTRACTOR to submit an acceptable schedule may, at the OWNER's sole discretion, be cause for the withholding of any partial payment otherwise due under the Contract.
4. Review of the Schedule by the ENGINEER will not constitute ENGINEER's representation that the Work can be completed as shown on the Schedule.

- C. Submittals Schedule: In addition to the above scheduling requirements, submit a complete and detailed listing of anticipated submittals during the course of the Contract. Coordinate these submittals with those of subcontractors and suppliers. Identify each submittal by Contract drawing number and Specification section number. Show the anticipated submission due date for each submittal along with the date on which its return is required. For planning purposes, average turn-around time for shop drawings will be 14 Calendar Days after receipt. Longer durations for review may be required and will not be considered a basis for a claim for additional time or compensation. For submittals on the critical path, at the time of submission mark transmittal in red with the words "Critical Path".

1. Submit Submittal schedule within 10 Days from the Notice to Proceed. Revise as required and incorporate the dates and review durations into the CPM Schedule.

1.4 NETWORK REQUIREMENTS

- A. Diagram: Show in the network diagram the order and interdependence of activities and the sequence in which the Work is to be accomplished. The purpose of the network analysis diagram is to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of succeeding activities. Follow a time scaled precedence format. Time scale the detailed network diagram showing a continuous flow from left to right.
- B. Develop the schedule activities into two major groups; procurement activities; and construction activities:
 1. Include the following procurement activities as a minimum:
 - a. Permits
 - b. Easements
 - c. Submittal items
 - d. Approval of submittal items
 - e. Fabrication and delivery of submittal items.

Tie each of the above procurement items logically to the correct construction activity in the overall CPM construction schedule.
 2. Under construction activities section utilize physical work activities to describe how the job will be constructed.
- C. Activity Durations: Break the work into activities with durations of 1 to 20 Days each, except for non-construction activities, such as procurement of materials and delivery of equipment, and other activities which may require longer durations. To the extent feasible, group activities related to a specific physical area of the project on the network for ease of understanding and simplification. The ENGINEER and OWNER will review the selection and number of activities.
 1. For each activity on the network indicate the following:
 - a. A single duration, no longer than 20 Days (i.e., the single best estimate of the expected elapsed time considering the scope of work involved in the activity) expressed in Days. Include normal holidays and weather delay. Show critical path for the schedule.
 - b. Assign an activity I.D. number to each activity. The I.D. number will be numeric with a maximum of 5 digits.

- c. Include a brief description of the activity. If this description is not definitive, a separate listing of each activity and a descriptive narrative may be required.
 - d. Cost load each activity, except for procurement activities, to indicate the total estimated costs of the activity. No activity shall exceed \$60,000 except for equipment items. Assign material costs to delivery activities.
 - e. Load each activity with the estimated work hours to be expended on each activity.
- D. Incomplete Schedule: Failure to include on the network any element of work required for the performance of this Contract does not excuse the CONTRACTOR from completing all Work required within the applicable completion time, notwithstanding the network review by the ENGINEER or the OWNER and OWNER's Authorized Representative.

1.5 COST LOADING

- A. Schedule of Values: Allocate a dollar value to each activity on the construction schedule as specified. Include in dollar value the cost of labor, equipment, and material, and a pro rata contribution to overhead and profit. The sum of the activities cost shall be equal to the total contract price. In submitting cost data the CONTRACTOR certifies that it is not unbalanced and that the value assigned to each activity represents the CONTRACTOR's estimate of the actual costs of performing that activity.
- B. Documentation: If, in the opinion of the ENGINEER, the cost data does not meet the requirements for a balanced Contract Price breakdown, present documentation to the ENGINEER substantiating any cost allocation. If an activity on the construction schedule has been assigned a disproportionate allocation of direct costs, overhead and profit the cost allocations will be considered unbalanced.

1.6 PROGRESS OF THE WORK

- A. Delays to Critical Path: Whenever it becomes apparent from the current monthly CPM Schedule update that delays to the critical path have resulted and these delays are through no fault of the OWNER, and hence, that the Contract completion date will not be met, or when so directed by the OWNER, take one or more of the following actions to improve the Completion Date at no additional cost to the OWNER.
1. Increase construction labor in such quantities and crafts as will substantially eliminate the backlog of Work.
 2. Increase the number of working hours per shift, shifts per day, or days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.

3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities, and comply with the revised schedule.
4. Submit to the ENGINEER, the OWNER or OWNER's Authorized Representatives for review, a written statement of the steps proposed to be taken to remove or arrest the delay to the schedule. Failure to submit a written statement of the steps to be taken or failure to take such steps as required by the Contract, may result in the OWNER directing the level of effort in labor (trades), equipment, and work schedule (overtime, weekend and holiday work, etc.) to be employed by the CONTRACTOR in order to remove or arrest the delay to the critical path in the accepted schedule. Promptly provide such level of effort at no additional cost to the OWNER. In addition, should schedule delays persist, the CONTRACTOR's surety will be asked to attend meetings at which schedule is updated.
5. If the requirements of this provision are not complied with, the OWNER at the OWNER's sole discretion, will withhold, partially or in total, payments otherwise due for work performed under this Contract. Any withholding of monies is not a penalty for noncompliance, but is an assurance to the OWNER that funds will be available to implement these requirements should the CONTRACTOR fail to do so.

1.7 SCHEDULE UPDATES

- A. Monthly Meetings: If determined by the OWNER, a monthly Schedule Update Meeting will be held 1 week prior to the progress meeting at the construction site to review and update the CPM Schedule. The Schedule Update Meeting will be chaired by the ENGINEER and attended by the OWNER and the CONTRACTOR. Actual progress of the previous month will be recorded and future activities will be reviewed. The duration of activities and their logical connections may be revised as needed. Decisions made at these meetings and agreed to by all parties are binding with the exception that no contract completion dates will be modified without formal written requests and acceptance as specified herein. In the event a monthly Schedule Update Meeting is not required by the ENGINEER, the CONTRACTOR shall submit the update information to the OWNER and the update worksheets provided with each previous update. In either case the CONTRACTOR must provide the following information for each update at a minimum:
 1. Actual start and finished dates for all completed activities.
 2. Actual start dates for all started but uncompleted activities including remaining durations.
- B. Withholding of Payments: Failure to provide specified updated information or failure to attend progress meetings may result in the withholding of progress payments.

- C. Time Extensions: If the OWNER or ENGINEER finds that the CONTRACTOR is entitled to any extension of the Contract completion date under the provisions of the Contract, the OWNER's determination as to the total number of Days extension will be based upon the current accepted and updated CPM Schedule and on all data relevant to the extension. Such data shall be included in the next monthly updating of the schedule. Actual delays in activities which, according to the CPM Schedule, do not affect any contract completion date shown by the critical path in the network, do not have any effect on the Contract completion date or dates and therefore, will not be the basis for a change in Contract completion time.
- D. Schedule Adjustments: From time to time it may be necessary for the Contract schedule and completion time to be adjusted by the OWNER to reflect the effects of job conditions, acts or omissions of other contractors not directly associated with this Contract, weather, technical difficulties, strikes, unavoidable delays on the part of the OWNER or OWNER's representatives, and other unforeseeable conditions. Under such conditions, the OWNER will direct the CONTRACTOR to reschedule the Work to reflect the changed conditions and will grant, in writing, schedule extensions affecting the Contract completion time. No additional compensation will be made to the CONTRACTOR for such schedule adjustments.
- E. Acceleration Costs: Additional compensation will be made to the CONTRACTOR in the event the OWNER requires the project completion prior to the completion date shown on the CONTRACTOR's accepted schedule. The OWNER, therefore, has the right to accelerate the schedule and the CONTRACTOR will be compensated for such acceleration as long as such acceleration is not required through fault of the CONTRACTOR. Available total float in the CPM Schedule may be used by the OWNER and OWNER's representatives as well as by the CONTRACTOR.
- F. Float: Without obligation to extend the overall completion date or any intermediate completion dates set out in the CPM network, the OWNER may initiate changes to the Contract Work that absorb float time only. OWNER-initiated changes that affect the critical path on the CPM network shall be the sole grounds for extending (or shortening) said completion dates. CONTRACTOR initiated changes that encroach on the float time identified in the CPM network may be accomplished with the OWNER's concurrence. Such changes, however, shall give way to OWNER-initiated changes competing for the same float time.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Requirements
- B. Submittal Procedures
- C. Specific Submittal Requirements
- D. Action on Submittals
- E. Repetitive Review

1.2 DESCRIPTION OF REQUIREMENTS

- A. This section specifies procedural requirements for Shop Drawings, product data, samples, and other miscellaneous Work-related submittals.
- B. Procedures concerning items such as listing of manufacturers, suppliers, subcontractors, construction progress schedule, schedule of Shop Drawing submissions, bonds, payment applications, insurance certificates, and schedule of values are specified elsewhere.
- C. Work-Related Submittals:
 - 1. Substitution or "Or Equal" Items:
 - a. Includes material or equipment CONTRACTOR requests ENGINEER to accept, after Bids are received, as substitute for items specified or described in Specifications by using name of a proprietary item or name of particular supplier.
 - 2. Shop Drawings:
 - a. Includes technical data and drawings specially prepared for this Project, including fabrication and installation drawings, diagrams, actual performance curves, data sheets, schedules, templates, patterns, reports, instructions, design mix formulas, measurements, and similar information not in standard printed form.

- b. Standard information prepared without specific reference to the Project is not considered a Shop Drawing.
- 3. Product Data:
 - a. Includes standard printed information on manufactured products, and systems that has not been specially prepared for this Project, including manufacturer's product specifications and installation instructions, catalog cuts, standard wiring diagrams, printed performance curves, mill reports, and standard color charts.
- 4. Samples:
 - a. Includes both fabricated and manufactured physical examples of materials, products, and units of work, partial cuts of manufactured or fabricated work, swatches showing color, texture, and pattern, and units of work to be used for independent inspection and testing.
 - b. Mock-ups are special forms of samples which are too large or otherwise inconvenient for handling in manner specified for transmittal of sample submittals.
- 5. Working Drawings:
 - a. When used in the Contract Documents, the term "working drawings" shall be considered to mean the CONTRACTOR'S plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities control systems, forming and falsework for underpinning; temporary by-pass pumping and for such other work as may be required for construction but does not become an integral part of the project.
 - b. Copies of working drawings shall be submitted to the ENGINEER at least fourteen (14) calendar days (unless otherwise specified by the ENGINEER) in advance of the required work.
 - c. Working drawings shall be signed by a registered Professional Engineer currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use.
- 6. Miscellaneous Submittals:
 - a. Work-related submittals that do not fit in the previous categories, such as guarantees, warranties, certifications, experience records, maintenance agreements, Operating and Maintenance Manuals, workmanship bonds,

survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, and similar information, devices, and materials applicable to the Work.

1.3 SUBMITTAL PROCEDURES

A. Scheduling:

1. Submit for approval, a preliminary schedule of shop drawings and samples submittals, in duplicate, and in accordance with the General Conditions.
2. Prepare and transmit each submittal to ENGINEER sufficiently in advance of scheduled performance of related work and other applicable activities.

B. Coordination:

1. Coordinate preparation and processing of submittals with performance of work. Coordinate each submittal with other submittals and related activities such as substitution requests, testing, purchasing, fabrication, delivery, and similar activities that require sequential activity.
2. Coordinate submission of different units of interrelated work so that one submittal will not be delayed by ENGINEER's need to review a related submittal. ENGINEER may withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

C. Submittal Preparation:

1. Stamp and sign each submittal certifying to review of submittal, verification of products, field measurement, field construction criteria, coordination of information within submittal with requirements of the Work and the Contract Documents, coordination with all trades, and verification that product will fit in space provided.
2. Transmittal Form: In the transmittal form forwarding each specific submittal to the ENGINEER include the following information as a minimum.
 - a. Date of submittal and dates of previous submittals containing the same material.
 - b. Project title and number.
 - c. Submittal and transmittal number.
 - d. Contract identification.

- e. Names of:
 - (1) Contractor
 - (2) Supplier
 - (3) Manufacturer
- f. Identification of equipment and material with equipment identification numbers, model numbers, and Specification section number.
- g. Variations from Contract Documents and any limitations which may impact the Work.
- h. Drawing sheet and detail number as appropriate.

D. Resubmittal Preparation:

- 1. Comply with the requirements described in Submittal Preparation. In addition:
 - a. Identify on transmittal form that submittal is a resubmission.
 - b. Make any corrections or changes in submittals required by ENGINEER's notations on returned submittal.
 - c. Respond to ENGINEER's notations:
 - (1) On the transmittal or on a separate page attached to CONTRACTOR's resubmission transmittal, answer or acknowledge in writing all notations or questions indicated by ENGINEER on ENGINEER's transmittal form returning review submission to CONTRACTOR.
 - (2) Identify each response by question or notation number established by ENGINEER.
 - (3) If CONTRACTOR does not respond to each notation or question, resubmission will be returned without action by ENGINEER until CONTRACTOR provides a written response to all ENGINEER's notations or questions.
 - d. CONTRACTOR initiated revisions or variations:
 - (1) On transmittal form identify variations or revisions from previously reviewed submittal, other than those called for by ENGINEER.
 - (2) ENGINEER's responsibility for variations or revisions is established in the General Conditions.

1.4 SPECIFIC SUBMITTAL REQUIREMENTS

- A. Specific submittals required for individual elements of work are specified in the individual Specification sections. Except as otherwise indicated in Specification sections, comply with requirements specified herein for each indicated type of submittal.
- B. Requests for Substitution or "Or Equal"
 - 1. Collect data for items to be submitted for review as substitution into one submittal for each item of material or equipment in accordance with the General Conditions.
 - 2. Submit with other scheduled submittals for the material or equipment allowing time for ENGINEER to evaluate the additional information required to be submitted.
 - 3. If CONTRACTOR requests to substitute for material or equipment specified but not identified in Specifications as requiring submittals, schedule substitution submittal request in Submittal schedule and submit as scheduled.
- C. Shop Drawings:
 - 1. Check all drawings, data and samples before submitting to the ENGINEER for review. Each and every copy of the drawings and data shall bear CONTRACTOR's stamp showing that they have been so checked. Shop drawings submitted to the ENGINEER without the CONTRACTOR's stamp will be returned to the CONTRACTOR for conformance with this requirement. All shop drawings shall be submitted through the CONTRACTOR, including those from any subcontractors.
 - 2. Submit newly prepared information, with graphic information at accurate scale. Indicate name of manufacturer or supplier (firm name). Show dimensions and clearly note which are based on field measurement; identify materials and products which are included in the Work; identify revisions. Indicate compliance with standards and notation of coordination requirements with other work. Highlight, encircle or otherwise indicate variations from Contract Documents or previous submittals.
 - 3. Include on each drawing or page:
 - a. Submittal date and revision dates.
 - b. Project name, division number and descriptions.
 - c. Detailed specifications section number and page number.

- d. Identification of equipment, product or material.
 - e. Name of CONTRACTOR and Subcontractor.
 - f. Name of Supplier and Manufacturer.
 - g. Relation to adjacent structure or material.
 - h. Field dimensions, clearly identified.
 - i. Standards or Industry Specification references.
 - j. Identification of deviations from the Contract Documents.
 - k. CONTRACTOR's stamp, initialed or signed, dated and certifying to review of submittal, certification of field measurements and compliance with Contract.
 - l. Physical location and location relative to other connected or attached material at which the equipment or materials are to be installed.
- 4. Provide 8-inch by 3-inch blank space for CONTRACTOR and ENGINEER stamps.
 - 5. Submittals:
 - a. Submit 3 hard copies plus 1 PDF.
 - 6. Distribution:
 - a. Do not proceed with installation of materials, products or systems until copy of applicable product data showing only approved information is in possession of installer.
 - b. Maintain one set of product data (for each submittal) at Project site.
 - c. Mark 5 additional copies with the date of approval and forward to the ENGINEER for use in field and for OWNER's records.
- D. Product Data:
- 1. Preparation:
 - a. Collect required data into single submittal for each element of work or system. Where product data has been printed to include information on several similar products, some of which are not required for use on

Project or are not included in submittal, mark copies to clearly show such information is not applicable.

- b. Where product data must be specially prepared for required products, materials or systems, because standard printed data are not suitable for use, submit data as a Shop Drawing and not as product data.

2. Submittals:

- a. Submittal is for information and record, and to determine that products, materials, and systems comply with Contract Documents. Submittal is final when returned by ENGINEER marked "Approved" or "Approved as Noted".
- b. Submit 3 copies.

3. Distribution:

- a. Do not proceed with installation of materials, products or systems until copy of applicable product data showing only approval information is in possession of installer.
- b. Maintain one set of product data (for each submittal) at Project site, available for reference by ENGINEER and others.
- c. Mark 5 additional copies with the date of approval and forward to the ENGINEER for use in field and for OWNER records.

E. Samples:

1. Preparation:

- a. Where possible, provide samples that are physically identical with proposed materials or products to be incorporated into the Work. Where variations in color, pattern or texture are inherent in material or product represented by sample, submit multiple units (not less than 3 units) showing approximate limits of variations.
- b. Provide full set of optional samples where ENGINEER's selection required. Prepare samples to match ENGINEER's selection where so indicated.
- c. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with standards.

- d. Submit samples for ENGINEER's visual review of general generic kind, color, pattern, texture, and for final check of coordination of these characteristics with other related elements of work.
2. Submittals:
- a. At CONTRACTOR's option, and depending upon nature of anticipated response from ENGINEER, initial submittal of samples may be either preliminary or final submittal.
 - b. A preliminary submittal, consisting of a single set of samples, is required where specifications indicate ENGINEER's selection of color, pattern, texture or similar characteristics from manufacturer's range of standard choices is necessary. Preliminary submittals will be reviewed and returned with ENGINEER's "Action" marking.
 - c. Final Submittals: Submit 3 sets of samples in final submittal, 1 set will be returned.
3. Distribution:
- a. Maintain returned final set of samples at Project site, in suitable condition and available for quality control comparisons throughout course of performing work.
 - b. Returned samples intended or permitted to be incorporated in the Work are indicated in Specification sections, and shall be in undamaged condition at time of use.
- F. Mock-Ups:
- 1. Mock-ups and similar samples specified in Specification sections are recognized as special type of samples. Comply with samples submittal requirements to greatest extent possible. Process transmittal forms to provide record of activity.
- G. Miscellaneous Submittals:
- 1. Inspection and Test Reports:
 - a. Classify each inspection and test report as being either "Shop Drawings" or "product data", depending on whether report is specially prepared for Project or standard publication of workmanship control testing at point of production. Process inspection and test reports accordingly.
 - 2. Guarantees, Warranties, Maintenance Agreements, and Workmanship Bonds:

- a. Refer to Specification sections for specific requirements. Submittal is final when returned by ENGINEER marked "Approved" or "Approved as Noted".
 - b. In addition to copies desired for CONTRACTOR's use, furnish 2 executed copies. Provide 2 additional copies where required for maintenance data.
3. Survey Data:
- a. Refer to Specification sections for specific requirements on property surveys, building or structure condition surveys, field measurements, quantitative records of actual Work, damage surveys, photographs, and similar data required by Specification sections. Copies will not be returned.
 - (1) Survey Copies: Furnish 2 copies. Provide 10 copies of final property survey (if any).
 - (2) Condition Surveys: Furnish 2 copies.
4. Certifications:
- a. Refer to Specification sections for specific requirement on submittal of certifications. Submit 7 copies. Certifications are submitted for review of conformance with specified requirements and information. Submittal is final when returned by ENGINEER marked "Approved".
5. Closeout Submittals:
- a. Refer to Specification Section 01 77 00 for specific requirements on submittal of closeout information, materials, tools, and similar items.
 - (1) Record Documents: Section 01 77 00.
 - (2) Materials and Tools: Spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.
 - (3) Operating and maintenance data.
- H. Operation and Maintenance Manuals:
- 1. Submit Operation and Maintenance Manuals in accordance with Section 01 78 23.
- I. General Distribution:

1. Unless required elsewhere, provide distribution of submittals to subcontractors, suppliers, governing authorities, and others as necessary for proper performance of work.

1.5 ACTION ON SUBMITTALS

A. ENGINEER's Action:

1. General:

- a. Except for submittals for record and similar purposes, where action and return on submittals are required or requested, ENGINEER will review each submittal, mark with appropriate action, and return. Where submittal must be held for coordination, ENGINEER will also advise CONTRACTOR without delay.
- b. ENGINEER will stamp each submittal with uniform, self-explanatory action stamp, appropriately marked with submittal action.

B. Action Stamp:

1. Approved:

- a. Final Unrestricted Release: Where submittals are marked "Approved", Work covered by submittal may proceed PROVIDED IT COMPLIES WITH CONTRACT DOCUMENTS. Acceptance of Work will depend upon that compliance.

2. Approved As Noted:

- a. When submittals are marked "Approved as Noted", Work covered by submittal may proceed PROVIDED IT COMPLIES WITH BOTH ENGINEER'S NOTATIONS OR CORRECTIONS ON SUBMITTAL AND WITH Contract Documents. Acceptance of Work will depend on that compliance. Re-submittal is not required.

3. Comments Attached - Confirm or Resubmit:

- a. When submittals are marked "Examined and Returned for Correction", do not proceed with Work covered by submittal. Do not permit Work covered by submittal to be used at Project site or elsewhere where Work is in progress.
- b. Revise submittal or prepare new submittal in accordance with ENGINEER's notations in accordance with Paragraph 1.3D of this section. Resubmit submittal without delay. Repeat if necessary to obtain different action marking.

1.6 RE-SUBMITTAL REVIEW

- A. Cost of Subsequent Reviews: Shop Drawings and Operation and Maintenance Manuals submitted for each item will be reviewed no more than twice at the OWNER's expense. All subsequent reviews will be performed at times convenient to the ENGINEER and at the CONTRACTOR's expense based on the ENGINEER's then prevailing rates including all direct and indirect costs and fees. Reimburse the OWNER for all such fees invoiced to the OWNER by the ENGINEER.
- B. Time Extension: Any need for more than one resubmission, or any other delay in ENGINEER's review of submittals, will not entitle CONTRACTOR to extension of the Contract Time.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 01 38 50

COLOR AUDIO-VIDEO CONSTRUCTION RECORD

PART 1 - GENERAL

1.01 SCOPE

- A. Prior to the commencement of any work, including Contractor mobilization, the Contractor shall have a continuous color digital audio-video recording taken of the interior and exterior areas of any areas of the existing wastewater treatment facilities that are likely to be impacted by construction activities . The audio-video record is to serve as a record of preconstruction conditions. The recording shall be suitable for viewing on standard laptop and/or desk top computers used by the Engineer, Owner, and Project Representative. Two copies of the recording shall be kept at the temporary construction office, one with the Project Representative and one with the Contractor until completion of the work at which time at least one copy shall be turned over to the Owner.

1.02 CONSTRUCTION SCHEDULE

- A. Digital recordings shall not be made more than 30 days prior to construction in any area. No construction shall begin prior to review and approval of the digital recordings, covering the construction area, by the Engineer. The Engineer shall have the authority to reject all or any portion of the digital recording not conforming to the specifications and order that it be redone at no additional charge. The Contractor shall reschedule unacceptable coverage within five (5) days after being notified. The Engineer shall designate those areas, if any, to be omitted from or added to the audio-video coverage. All master digital copies and written records shall be well maintained without any damage and shall become the property of the Owner.

1.03 PROFESSIONAL VIDEOGRAPHERS

- A. The Contractor shall engage the services of a professional videographer. The color audio- video digital recordings shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business of pre-construction color audio-video digital documentation. The videographer shall furnish to the Engineer a list of all equipment to be used for the audio-video recording, i.e., manufacturer's name, model number, technical specifications and other pertinent information. Additional information to be furnished by the videographer shall include the names and addresses of two (2) references that the videographer has performed color audio-videotaping for on projects of a similar nature, including one (1) within the last twelve (12) months.

PART 2 - PRODUCT

2.01 GENERAL

- A. The total audio-video digital recording system and the procedures employed in its use shall be such as to produce a finished product that will fulfill the technical requirements of the project. The video portion of the recording shall produce bright, sharp, and clear pictures with accurate colors and shall be free from distortion or any other form of picture imperfection. All video recordings shall, by electronic means, display on the screen the day, the time, the month, and the year of the recording. This date and time information must be continuously and simultaneously generated with the actual recording. The audio portion of the recording shall produce the commentary of the camera operator with proper volume, clarity, and be free from distortion.

2.02 EQUIPMENT

- A. Audio/Video Recorder: Digital voice and video recorder, MPEG-4 recording technology for TV quality video recording, built-in microphone for high quality voice and sound recording, 3.15 Mega Pixel CDD Sensor with up to 640 x 480 video resolution, 4X digital zoom, 16 MB internal memory, SD/MMC compatible, compatible with software needed and cabling provided to interface with a Windows 10 based computer for creating high quality digital file records.
- B. Video Storage Devices: Used to create and store digital video, audio and multimedia files. Stores up to 4.7 GB or more than two hours of MPEG-2 Video, compatible for playback with most Windows 10 based computers. The storage devices shall be new and shall not have been used for any previous recording.

PART 3 - EXECUTION

3.01 COVERAGE

- A. The recordings shall contain coverage of all surface features located within the construction areas and shall include but not be limited to: all roadways, pavements, detention ponds, ditches, walls, piping, equipment, curbs, driveways, sidewalks, culverts, headwalls, retaining walls, buildings, landscaping, trees, shrubbery, fences, and electrical power poles and equipment. Of particular concern shall be the existence of any faults, fractures, or defects.
- B. Recording coverage shall be grouped by structure providing both exterior and interior coverage for all areas that will be affected by the work. The outside areas of the work for the general area grounds shall be covered in grid format to cover the property for the construction areas that will be affected by the work. Coverage shall include all surface conditions located within the zone of influence of construction supported by appropriate audio description.

3.02 AUDIO CONTENT

- A. Accompanying the video recording shall be a corresponding and simultaneously recorded audio recording. This audio recording, exclusively containing the commentary of the camera operator, shall assist in viewer orientation and in any needed identification, differentiation, clarification, or objective description of the features being shown in the video portion of the recording including the location relative to construction activities planned. The audio recording shall be free from any conversations between the camera operator and any other production technicians. Panning, zoom-in and zoom-out rates shall be sufficiently controlled to maintain a clear view of all subjects.

3.03 VIDEO LOGS

- A. Video Logs: Each video recording digital file shall have a log of that video recording's contents and what the recording file is stored on. The log shall describe the various segments of coverage contained on that video recording in terms of the location within the plant, extent of coverage, beginning and end points, directions of coverage, and date.

3.04 TIME OF EXECUTION

- A. Visibility: All recording shall be performed during times of good visibility. No recording shall be done during periods of significant precipitation, mist, or fog. The recording shall only be done when sufficient sunlight is present for outdoor recordings to properly illuminate the subject, and to produce bright, sharp video recordings of those subjects. For indoor recordings, the Contractor shall provide adequate lighting to produce bright, sharp video recordings. No recording shall be performed when more than 10% of the area to be recorded contains debris or obstructions unless otherwise authorized by the Engineer.

3.05 CONTINUITY OF COVERAGE

- A. In order to increase the continuity of the coverage, the coverage shall consist of a single, continuous, unedited recording which begins at one end of a particular construction area and proceeds uninterrupted to the other end of that area. Coverage shall reflect an organized, interrelated sequence of recordings from one construction area to another. Coverage shall be obtained by walking or by other conveyance approved by the Engineer.

3.06 COVERAGE RATES

- A. The rate of travel during a particular segment of coverage shall be related to the amount of the surface features within a construction area being recorded. For interior and exterior of existing structures, average rate of travel shall not exceed thirty feet per minute from approximately 10 feet from subject. For open areas within the existing plant, average rate of travel shall not exceed forty-eight feet per minute. For

open areas within the new property area, average rate of travel shall not exceed sixty feet per minute

3.07 CAMERA OPERATION

- A. Camera Stability: Camera shall be firmly held such that movement of the camera during the recording process does not cause an unsteady picture.
- B. Camera Control: Camera pan, tilt, zoom-in, and zoom-out rates shall be sufficiently controlled such that recorded objects will be clearly viewed during video playback. In addition, all other camera and recording system controls such as lens focus and aperture, video level, pedestal, chroma, white balance, and electrical focus shall be properly controlled or adjusted to maximize picture quality.
- C. Viewer Orientation Techniques: The audio and video portions of the recording shall maintain viewer orientation. To this end overall establishing views and visual displays of all visible building distinguishing characteristics shall be incorporated at the beginning of each recording. The narrator shall regularly call out changes in direction, viewing angle, focus zoom, and distinguishing subjects as the video recording progresses.
- D. Operator Experience: The operator in charge must have had previous experience with audio-video documenting preconstruction work. Any apprentice operator(s) must be continuously supervised by an experienced operator.

3.08 VIDEO VIEWING

- A. The video recordings shall be suitable for playing video and audible recordings on standard computer desktop or laptop computers.

END OF SECTION

SECTION 01 42 00

REFERENCE STANDARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Abbreviations and Symbols
- B. Reference Standards
- C. Definitions

1.2 RELATED SECTIONS

- A. Information provided in this section is used where applicable in individual Specification Sections, Divisions 2 through 16.

1.3 REFERENCE ABBREVIATIONS

- A. Reference to a technical society, trade association or standards setting organization, may be made in the Specifications by abbreviations in accordance with the following list:

AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
ADC	Air Diffusion Council
AFBMA	Anti-friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHA	Association of Home Appliance Manufacturers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	American Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineers

ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders' Hardware Manufacturers Association
BIA	Brick Institute of American
CABO	Council of American Building Officials
CAGI	Compressed Air and Gas Institute
CISPI	Cast Iron Soil Pipe Institute
CMAA	Crane Manufacturers Association of America
CRD	U.S. Corps of Engineers Specifications
CRSI	Concrete Reinforcing Steel Institute
CTI	Cooling Tower Institute
DHI	Door and Hardware Institute
DOH	Department of Health
DOT	Department of Transportation
Fed. Spec.	Federal Specifications
FGMA	Flat Glass Marketing Association
FM	Factory Mutual
HMI	Hoist Manufacturing Institute
HPMA	See HPVA
HPVA	Hardwood Plywood Veneer Association
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IFI	Industrial Fasteners Institute
MIL	Military Specifications
MSS	Manufacturer's Standardization Society
NAAMM	National Association of Architectural Metal Manufacturers
NACM	National Association of Chain Manufacturers
NBS	National Bureau of Standards, See NIST
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NETA	National Electrical Testing Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NFPA	National Fluid Power Association
NIST	National Institute of Standards and Technology
NLMA	National Lumber Manufacturers Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Act
PCI	Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
SAE	Society of Automotive Engineers
SCPRF	Structural Clay Products Research Foundation
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPI	Society of the Plastics Industry

SSPC	Steel Structures Painting Council
STI	Steel Tank Institute
TCA	Tile Council of American
TIMA	Thermal Insulation Manufacturers' Association
UL	Underwriters' Laboratories, Inc.
USBR	U. S. Bureau of Reclamation
USBS	U. S. Bureau of Standards, See NIST

1.4 REFERENCE STANDARDS

- A. Latest Edition: Construe references to furnishing materials or testing, which conform to the standards of a particular technical society, organization, or body, to mean the latest standard, code, or specification of that body, adopted and published as of the date of bidding this Contract. Standards referred to herein are made a part of these Specifications to the extent which is indicated or intended.
- B. Precedence: The duties and responsibilities of the OWNER, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees are set forth in the Contract Documents and are not changed or altered by any provision of any referenced standard specifications, manuals or code, whether such standard manual or code is or is not specifically incorporated by reference in the Contract Documents. Any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority, to undertake responsibility contrary to the powers of the ENGINEER as set forth in the Contract Documents cannot be assigned to the ENGINEER or any of the ENGINEER's consultants, agents or employees.

1.5 DEFINITIONS

- A. In these Contract Documents the words furnish, install and provide are defined as follows:
 - 1. Furnish (Materials): to supply and deliver to the project ready for installation and in operable condition.
 - 2. Install (services or labor): to place in final position, complete, anchored, connected in operable condition.
 - 3. Provide: to furnish and install complete. Includes the supply of specified services. When neither furnish, install or provide is stated, provided is implied.

1.6 LCU APPROVED MATERIALS LIST

- A. The CONTRACTOR shall refer to the most recent Approved Materials List, as of the date of the advertisement for these contract documents.
- B. The Approved Materials List located on LCU website constitutes a part of these contract documents.

1.7 LCU STANDARD DETAILS

- A. The CONSTRUCTOR shall refer to the most recent LCU Standard Details, as of the date of the advertisement for these contract documents.
- B. The Standard Details located on LCU website constitutes a part of these contract documents.

1.8 LCU DESIGN MANUAL

- A. The CONSTRUCTOR shall refer to the most recent LCU Design Manual, as of the date of the advertisement for these contract documents.
- B. The Design Manual located on LCU website constitutes a part of these contract documents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 42 13

ABBREVIATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Abbreviations
- B. Standards for Abbreviations

1.2 RELATED SECTIONS

- A. Abbreviations provided in this section are used where applicable in individual Specification Sections, Divisions 2 through 16.

1.3 ABBREVIATIONS

- A. Abbreviations which may be used in Divisions 1 through 16 for units of measure are as follows:

alternating current.....	ac	cubic	cu
American wire gauge	AWG	cubic centimeter(s).....	cc
ampere(s)	amp	cubic feet per day	cfd
ampere-hour(s)	AH	cubic feet per hour	cfh
annual.....	ann	cubic feet per minute	cfm
Ampere Interrupting Capacity.....	AIC	cubic feet per minute, standard conditions	scfm
atmosphere(s)	atm	cubic feet per second	cfs
average	avg	cubic foot (feet)	cu ft
biochemical oxygen demand	BOD	cubic inch(es)	cu in
Board Foot.....	FBM	cubic yard(s)	cu yd
brake horsepower	bhp	decibels.....	dB
Brinell Hardness	BH	decibels (A scale).....	dBa
British thermal unit(s).....	Btu	degree(s).....	deg
calorie (s).....	cal	dewpoint temperature	dpt
carbonaceous biochemical oxygen demand	CBOD	diameter	dia
Celsius (centigrade).....	C	direct current	dc
Center to Center	C to C	dissolved oxygen.....	DO
centimeter(s).....	cm	dissolved solids.....	DS
chemical oxygen demand	COD	dry-bulb temperature.....	dbt
coefficient, valve flow.....	C _v	efficiency	eff
		elevation.....	el

entering water temperature.....ewt
 entering air temperature eat
 equivalent direct radiation.....edr

 face area fa
 face to face f to f
 Fahrenheit F
 feet per day..... fpd
 feet per hour fph
 feet per minute..... fpm
 feet per second fps
 foot (feet)..... ft
 foot-candle..... fc
 foot-pound ft-lb
 foot-pounds per minute ft-lb/min
 foot-pounds per secondft-lb/sec
 formazin turbidity unit(s) FTU
 frequency..... freq

 gallon(s)..... gal
 gallons per day gpd
 gallons per day per
 cubic foot gpd/cu ft
 gallons per day per
 square foot..... gpd/sq ft
 gallons per hour gph
 gallons per minute gpm
 gallons per second gps
 gas chromatography and
 mass spectrometry GC-MS
 gauge ga
 grain(s) gr
 gram(s) g
 grams per cubic centimetergm/cc

 Heat Transfer Coefficient.....U
 height..... hgt
 Hertz..... Hz
 horsepower..... hp
 horsepower-hour hp-hr
 hour(s) hr
 humidity, relative..... rh
 hydrogen ion concentrationpH

 inch(es)..... in
 inches per secondips
 inside diameterID

Jackson turbidity unit(s) JTU

 kelvin..... K
 kiloamperes..... kA
 kilogram(s) kg
 kilometer(s) km
 kilovar (kilovolt-amperes
 reactive) kvar
 kilovolt(s)..... kV
 kilovolt-ampere(s)..... kVA
 kilowatt(s).....kW
 kilowatt-hour(s)kWh

 linear foot (feet)..... lin ft
 liter(s)..... L

 megavolt-ampere(s) MVA
 meter(s).....m
 micrograms per liter ug/L
 miles per hourmph
 milliamperes(s) mA
 milligram(s) mg
 milligrams per liter mg/L
 milliliter(s)..... mL
 millimeter(s) mm
 million gallons MG
 million gallons per day..... mgd
 millisecond(s) ms
 millivolt(s) mV
 minute(s)..... min

 mixed liquor suspended
 solids..... MLSS

 nephelometric turbidity
 unit NTU
 net positive suction head.....NPSH
 noise criteria..... nc
 noise reduction coefficient..... NRC
 number.....no

 ounce(s)..... oz
 outside airoa
 outside diameter OD

 parts per billion..... ppb
 parts per million..... ppm
 percent..... pct

phase (electrical) ph
 pound(s) lb
 pounds per cubic foot pcf
 pounds per cubic foot
 per hour pcf/hr
 pounds per day lbs/day
 pounds per day per
 cubic foot lbs/day/cu ft
 pounds per day per
 square foot lbs/day/sq ft
 pounds per square foot psf
 pounds per square foot
 per hour psf/hr
 pounds per square inch psi
 pounds per square inch
 absolute psia
 pounds per square inch
 gauge psig
 power factor PF
 pressure drop or
 difference dp
 pressure, dynamic
 (velocity) vp
 pressure, vapor vap pr

 quart(s) qt

 Rankine R
 relative humidity rh
 resistance res
 return air ra
 revolution(s) rev
 revolutions per minute rpm
 revolutions per second rps
 root mean squared rms

 safety factor sf
 second(s) sec
 shading coefficient SC
 sludge density index SDI

 Sound Transmission
 Coefficient STC
 specific gravity sp gr
 specific volume Sp Vol
 sp ht at constant pressure Cp
 square sq
 square centimeter(s) sq cm

square foot (feet) sq ft
 square inch (es) sq in
 square meter(s) sq m
 square yard(s) sq yd
 standard std
 static pressure st pr
 supply air sa
 suspended solids SS

 temperature temp
 temperature difference TD
 temperature entering TE
 temperature leaving TL
 thousand Btu per hour Mbh
 thousand circular mils kcmil
 thousand cubic feet Mcf
 threshold limit value TLV
 tons of refrigeration tons
 torque TRQ
 total dissolved solids TDS
 total dynamic head TDH
 total kjeldahl nitrogen TKN
 total oxygen demand TOD
 total pressure TP
 total solids TS
 total suspended solids TSS
 total volatile solids TVS

 vacuum vac
 viscosity visc
 volatile organic chemical VOC
 volatile solids VS
 volatile suspended solids VSS
 volt(s) V
 volts-ampere(s) VA
 volume vol

 watt(s) W
 watthour(s) Wh
 watt-hour demand WHD
 watt-hour demand meter WHDM
 week(s) wk
 weight wt
 wet-bulb WB
 wet bulb temperature WBT

 yard(s) yd
 year(s) yr

1.4 STANDARD FOR ABBREVIATIONS

- A. Use ASME Y1.1-1989, "Abbreviations for use on Drawings and in Text" for abbreviations for units of measure not included in Paragraph 1.3.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 43 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. Inspection Services
- C. Inspection of Materials
- D. Quality Control
- E. Costs of Inspection
- F. Acceptance Tests
- G. Failure to Comply with Contract

1.2 RELATED SECTIONS

- A. Section 01 33 00 - Submittals: Specific Submittal Requirements

1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Certificate Submittals: Furnish the ENGINEER authoritative evidence in the form of Certificates of Manufacture that the materials and equipment to be used in the Work have been manufactured and tested in conformity with the Contract Documents. Include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

1.4 INSPECTION SERVICES

- A. OWNER's Access: At all times during the progress of the Work and until the date of final completion, afford the OWNER and ENGINEER every reasonable, safe, and proper facility for inspecting the Work at the site. The observation and inspection of any work will not relieve the CONTRACTOR of any obligations to perform proper and satisfactory work as specified. Replace work rejected due to faulty design, inferior, or defective materials, poor workmanship, improper installation, excessive wear, or nonconformity with the requirements of the Contract Documents, with satisfactory

work at no additional cost to the OWNER. Replace as directed, finished or unfinished work found not to be in strict accordance with the Contract, even though such work may have been previously approved and payment made therefor.

- B. Rejection: The OWNER and the OWNER's Authorized Representatives have the right to reject materials and workmanship which are defective or require correction. Promptly remove rejected work and materials from the site.
- C. Inferior Work Discoveries: Failure or neglect on the part of the OWNER or the OWNER's Authorized Representatives to condemn or reject bad or inferior work or materials does not imply an acceptance of such work or materials. Neither is it to be construed as barring the OWNER or the OWNER's Authorized Representatives at any subsequent time from recovering damages or a sum of money needed to build anew all portions of the Work in which inferior work or improper materials were used.
- D. Removal for Examination: Should it be considered necessary or advisable by the OWNER or the OWNER's Authorized Representatives, at any time before final acceptance of the Work, to make examinations of portions of the Work already completed, by removing or tearing out such portions, promptly furnish all necessary facilities, labor, and material, to make such an examination. If such Work is found to be defective in any respect, defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the Work will be considered a change in the Work to be paid for in accordance with applicable provisions of the Contract.
- E. Operation Responsibility: Assume full responsibility for the proper operation of equipment during tests and instruction periods. Make no claim for damage which may occur to equipment prior to the time when the OWNER accepts the Work.
- F. Rejection Prior to Warranty Expiration: If at anytime prior to the expiration of any applicable warranties or guarantees, equipment is rejected by the OWNER, repay to the OWNER all sums of money received for the rejected equipment on progress certificates or otherwise on account of the Contract lump sum prices, and upon the receipt of the sum of money, OWNER will execute and deliver a bill of sale of all its rights, title, and interest in and to the rejected equipment. Do not remove the equipment from the premises of the OWNER until the OWNER obtains from other sources, equipment to take the place of that rejected. The OWNER hereby agrees to obtain other equipment within a reasonable time and the CONTRACTOR agrees that the OWNER may use the equipment furnished by the CONTRACTOR without rental or other charge until the other new equipment is obtained.

1.5 INSPECTION OF MATERIALS

- A. Premanufacture Notification: Give notice in writing to the ENGINEER sufficiently in advance of the commencement of manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. When required, notice to include a request for inspection, the date of commencement, and

the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, ENGINEER will arrange to have a representative present at such times during the manufacture or testing as may be necessary to inspect the materials, or will notify CONTRACTOR that the inspection will be made at a point other than the point of manufacture or testing, or that the inspection will be waived. Comply with these provisions before shipping any materials. Such inspection will not constitute a release from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

- B. Testing Standards: Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized, applicable test codes except as may otherwise be stated herein.

1.6 QUALITY CONTROL

A. Testing

1. Field and Laboratory

- a. Provide personnel to assist the ENGINEER in performing the following periodic observation and associated services.
 - (1) Soils: Observe and test excavations, placement and compaction of soils. Determine suitability of excavated material. Observe subgrade soils and foundations.
 - (2) Concrete: Observe forms and reinforcement; observe concrete placement; witness air entrainment tests, facilitate concrete cylinder preparation and assist with other tests performed by ENGINEER.
 - (3) Masonry: Sample and test mortar, bricks, blocks and grout; inspect brick and block samples and sample panels; inspect placement of reinforcement and grouting.
- b. When specified in the Contract Documents, provide an independent laboratory testing facility to perform required testing. Qualify the laboratory as having performed previous satisfactory work. Prior to use, submit to the ENGINEER for approval.
- c. Cooperate with the ENGINEER and laboratory testing representatives. Provide at least 24 hours notice prior to when specified testing is required. Provide labor and materials, and necessary facilities at the site as required by the ENGINEER and the testing laboratory.
- d. Provide an independent testing agency, a member of the National Electrical Testing Association, to perform inspections and tests specified in Division 16 of these Specifications.

2. Equipment: Coordinate and demonstrate test procedures as specified in the Contract Documents or as otherwise required during the formal tests.
3. Pipeline and Other Testing: Conform to test procedures and requirements specified in the appropriate Specification Section.

B. Reports

1. Certified Test Reports: Where transcripts or certified test reports are required by the Contract Documents, meet the following requirements:
 - a. Before delivery of materials or equipment submit and obtain approval of the ENGINEER for all required transcripts, certified test reports, certified copies of the reports of all tests required in referenced specifications or specified in the Contract Documents. Perform all testing in an approved independent laboratory or the manufacturer's laboratory. Submit for approval reports of shop equipment tests within thirty days of testing. Transcripts or test reports are to be accompanied by a notarized certificate in the form of a letter from the manufacturer or supplier certifying that tested material or equipment meets the specified requirements and the same type, quality, manufacture and make as specified. The certificate shall be signed by an officer of the manufacturer or the manufacturer's plant manager.
2. Certificate of Compliance: At the option of the ENGINEER, or where not otherwise specified, submit for approval a notarized Certificate of Compliance. The Certificates may be in the form of a letter stating the following:
 - a. Manufacturer has performed all required tests
 - b. Materials to be supplied meet all test requirements
 - c. Tests were performed not more than one year prior to submittal of the certificate
 - d. Materials and equipment subjected to the tests are of the same quality, manufacture and make as those specified
 - e. Identification of the materials

1.7 COSTS OF INSPECTION

- A. OWNER's Obligation: Initial inspection and testing of materials furnished under this Contract will be performed by the OWNER or his authorized Representatives or inspection bureaus without cost to the CONTRACTOR, unless otherwise expressly specified. If subsequent testing is necessary due to failure of the initial tests or

because of rejection for noncompliance, reimburse the OWNER for expenditures incurred in making such tests.

- B. CONTRACTOR's Obligation: Include in the Contract Price, the cost of all shop and field tests of equipment and other tests specifically called for in the Contract Documents.
- C. Reimbursements to OWNER:
 - 1. Materials and equipment submitted by the CONTRACTOR as the equivalent to those specifically named in the Contract may be tested by the OWNER for compliance. Reimburse the OWNER for expenditures incurred in making such tests on materials and equipment which are rejected for noncompliance.
 - 2. Reimburse OWNER for the costs of any jobsite inspection between the hours of 7:00 p.m. and 6:00 a.m.
 - 3. Reimburse OWNER for all costs associated with Witness Tests which exceed 5 Calendar Days per kind of equipment.

1.8 ACCEPTANCE TESTS

- A. Preliminary Field Tests: As soon as conditions permit, furnish all labor and materials and services to perform preliminary field tests of all equipment provided under this Contract. If the preliminary field tests disclose that any equipment furnished and installed under this Contract does not meet the requirements of the Contract Documents, make all changes, adjustments and replacements required prior to the acceptance tests.
- B. Final Field Tests: Upon completion of the Work and prior to final payment, subject all equipment, piping and appliances installed under this Contract to specified acceptance tests to demonstrate compliance with the Contract Documents.
 - 1. Furnish all labor, fuel, energy, water and other materials, equipment, instruments and services necessary for all acceptance tests.
 - 2. Conduct field tests in the presence of the ENGINEER. Perform the field tests to demonstrate that under all conditions of operation each equipment item:
 - a. Has not been damaged by transportation or installation
 - b. Has been properly installed
 - c. Has been properly lubricated
 - d. Has no electrical or mechanical defects
 - e. Is in proper alignment
 - f. Has been properly connected
 - g. Is free of overheating of any parts
 - h. Is free of all objectionable vibration

- i. Is free of overloading of any parts
 - j. Operates as intended
- 3. Operate work or portions of work for a minimum of 100 hours or 14 days continuous service, whichever comes first. For those items of equipment which would normally operate on wastewater or sludge, plant effluent may be used if available when authorized by ENGINEER. If water can not properly exercise equipment, conduct 100-hour test after plant startup. Conduct test on those systems which require load produced by weather (heating or cooling) exercise only when weather will produce proper load.
- C. Failure of Tests: If the acceptance tests reveal defects in material or equipment, or if the material or equipment in any way fails to comply with the requirements of the Contract Documents, then promptly correct such deficiencies. Failure or refusal to correct the deficiencies, or if the improved materials or equipment, when tested again, fail to meet the guarantees or specified requirements, the OWNER, notwithstanding its partial payment for work and materials or equipment, may reject said materials or equipment and may order the CONTRACTOR to remove the defective work from the site at no addition to the Contract Price, and replace it with material or equipment which meets the Contract Documents.

1.9 FAILURE TO COMPLY WITH CONTRACT

- A. Unacceptable Materials: If it is ascertained by testing or inspection that the material or equipment does not comply with the Contract, do not deliver said material or equipment, or if delivered remove it promptly from the site or from the Work and replace it with acceptable material without additional cost to the OWNER. Fulfill all obligations under the terms and conditions of the Contract even though the OWNER or the OWNER's Authorized Representatives fail to ascertain noncompliance or notify the CONTRACTOR of noncompliance.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 55 26

TRAFFIC REGULATION

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. General Requirements
- B. Traffic Control

1.2 RELATED SECTIONS

- A. Section 33 05 02 – Roadway Crossings by Open Cut

1.3 GENERAL REQUIREMENTS

- A. All projects and work on highways, roads, and streets, shall have a traffic control plan (TCP), as required by Florida Statute and Federal regulations. All work shall be executed under the established plan and Department approved procedures. The TCP is the result of considerations and investigations made in the development of a comprehensive plan for accommodating vehicular and pedestrian traffic through the construction zone.
- B. The complexity of the TCP varies with the complexity of the traffic problems associated with a project. Many situations can be covered adequately with reference to specific sections from the Manual on Uniform Traffic Control Devices (MUTCD), the Traffic Control Devices Handbook (TCDH), or Roadway and Traffic Design Standard Series 600.
- C. The CONTRACTOR shall be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the CONTRACTOR and which interfere with the driving or walking public.
- D. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.
- E. The requirements specified herein are in addition to the plan for Maintenance of Traffic as specified in Section 33 05 02.
- F. Before starting work, the CONTRACTOR shall submit to the Lee County Department of Transportation, with copy to the ENGINEER, a detailed schedule of his operations a minimum of fourteen (14) days prior to beginning work for approval. This shall include, but not be limited to, type and extent of temporary paving, and drawings and

lists describing materials and traffic control methods to be used. Approval shall not relieve the CONTRACTOR of his obligation to provide a safe and proper crossing.

1.4 TRAFFIC CONTROL

- A. The necessary precautions shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, marking, barricades, channelization, and hand signaling devices. The CONTRACTOR shall be responsible for installation and maintenance of all devices and requirements for the duration of the Construction period.
- B. The CONTRACTOR shall provide at least 72 hours notification to the State, County, or municipal Department of Transportation of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval of such closings can be obtained at least 48 hours in advanced. At no time will more than one (1) lane of roadway be closed to vehicles and pedestrians. With any such closings adequate provision shall be made for the safe expeditious movement of each.
- C. The CONTRACTOR shall also be responsible for notifying Police, Fire, and other Emergency Departments whenever construction is within roadways and of the alternate routes. Monthly status reports shall be provided to these Departments, as a minimum.
- D. The CONTRACTOR shall be responsible for removal, relocation, or replacement of any traffic control device in the construction area which exists as part of the normal pre-construction traffic control scheme. Any such actions shall be performed by the CONTRACTOR under the supervision, and in accordance with the Specifications, of the Owner, unless otherwise specified.
- E. The CONTRACTOR shall immediately notify the Owner of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the project.
- F. The CONTRACTOR shall be responsible for notifying all residents of any road construction and limited access at least 72 hours in advance.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 01 57 00

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Temporary Utilities
- C. Temporary Construction
- D. Barricades and Enclosures
- E. Fences
- F. Security
- G. Temporary Controls
- H. Traffic Regulation
- I. Field Offices and Sheds

1.2 GENERAL REQUIREMENTS

- A. Plant and Facilities: Furnish, install, maintain and remove all false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the Work and which are not herein described or specified in detail. The CONTRACTOR shall accept responsibility for the safety and efficiency of such works and for any damage that may result from their failure or from their improper construction, maintenance or operation.
- B. First Aid: Maintain a readily accessible, completely equipped first aid kit at each location where work is in progress.
- C. Safety Responsibility: Accept sole responsibility for safety and security at the site. Indemnify and hold harmless the OWNER and the OWNER's Authorized Representatives, including the ENGINEER, for any safety violation, or noncompliance with governing bodies and their regulations, and for accidents, deaths, injuries, or damage at the site during occupancy or partial occupancy of the site by CONTRACTOR's forces while performing any part of the Work.

- D. Hazard Communication: Furnish two copies of the CONTRACTOR's Hazard Communication Program required under OSHA regulations before beginning on site activities. Furnish two copies of amendments to Hazard Communications Program as they are prepared.

1.3 TEMPORARY UTILITIES

- A. Water: Provide all necessary and required water without additional cost, unless otherwise specified. If necessary, provide and lay water lines to the place of use; secure all necessary permits; pay for all taps to water mains and hydrants and for all water used at the established rates.
- B. Light and Power: Provide without additional cost to the OWNER temporary lighting and power facilities required for the proper construction and inspection of the Work. If, in the ENGINEER's opinion, these facilities are inadequate, do NOT proceed with any portion of the Work affected thereby. Maintain temporary lighting and power until the Work is accepted.
- C. Heat: Provide temporary heat, whenever required, for work being performed during cold weather to prevent freezing of concrete, water pipes, and other damage to the Work or existing facilities.
- D. Sanitary Facilities: Provide sufficient sanitary facilities for construction personnel. Prohibit and prevent nuisances on the site of the Work or on adjoining property. Discharge any employee who violates this rule. Abide by all environmental regulations or laws applicable to the Work.
- E. Connections to Existing Utilities:
 - 1. Unless otherwise specified or indicated, make all necessary connections to existing facilities including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electricity. In each case, obtain permission from the OWNER or the owning utility prior to undertaking connections. Protect facilities against deleterious substances and damage.
 - 2. Thoroughly plan in advance all connections to existing facilities. Have on hand at the time of undertaking the connections, all material, labor and required equipment. Proceed continuously to complete connections in minimum time. Arrange for the operation of valves or other appurtenances on existing utilities, under the direct supervision of the owning utility.

1.4 TEMPORARY CONSTRUCTION

- A. Bridges: Design and place suitable temporary bridges where necessary for the maintenance of vehicular and pedestrian traffic. Assume responsibility for the sufficiency and safety of all such temporary work or bridges and for any damage which may result from their failure or their improper construction, maintenance, or

operation. Indemnify and save harmless the OWNER and the OWNER's representatives from all claims, suits or actions, and damages or costs of every description arising by reason of failure to comply with the above provisions.

1.5 BARRICADES AND ENCLOSURES

- A. Protection of Workmen and Public: Effect and maintain at all times during the prosecution of the Work, barriers and lights necessary for the protection of Workmen and the Public. Provide suitable barricades, lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the Work causes obstructions to normal traffic, excavation sites, or constitutes in any way a hazard to the public.
- B. Barricades and Lights:
 - 1. Protect all streets, roads, highways, excavations and other public thoroughfares which are closed to traffic; use effective barricades which display acceptable warning signs. Locate barricades at the nearest public highway or street on each side of the blocked section.
 - 2. Statutory Requirements: Install and maintain all barricades, signs, lights, and other protective devices within highway rights-of-way in strict conformity with applicable statutory requirements by the authority having jurisdiction.

1.6 FENCES

- A. Existing Fences: Obtain written permission from the OWNER prior to relocating or dismantling fences which interfere with construction operations. Reach agreements with the fence owner as to the period the fence may be left relocated or dismantled. Install adequate gates where fencing must be maintained. Keep gates closed and locked at all times when not in use.
- B. Restoration: Restore all fences to their original or better condition and to their original location on completion of the Work.

1.7 SECURITY

- A. Preservation of Property:
 - 1. Preserve from damage, all property along the line of the Work, in the vicinity of or in any way affected by the Work, the removal or destruction of which is not called for by the Drawings. Preserve from damage, public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, and public streets. Note: Normal wear and tear of streets resulting from legitimate use by the CONTRACTOR are not considered as damage. Whenever damages occur to such property, immediately restore to its original condition. Costs for such repairs are incidental to the Contract.

2. In case of failure on the part of the CONTRACTOR to restore property or make good on damage or injury, the OWNER may, upon 24 hours written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any moneys due or which may become due the CONTRACTOR under this Contract. If removal, repair or replacement of public or private property is made necessary by alteration of grade or alignment authorized by the OWNER and not contemplated by the Contract Documents, the CONTRACTOR will be compensated, in accordance with the General Conditions, provided that such property has not been damaged through fault of the CONTRACTOR or the CONTRACTOR's employees.

B. Public Utility Installations and Structures:

1. Public utility installations and structures include all poles, tracks, pipes, wires, conduits, vaults, manholes, and other appurtenances and facilities, whether owned or controlled by public bodies or privately-owned individuals, firms or corporations, used to serve the public with transportation, gas, electricity, telephone, storm and sanitary sewers, water, or other public or private utility services. Facilities appurtenant to public or private property which may be affected by the Work are deemed included hereunder.
2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. Existing public utility installations and structures are indicated on the Drawings only to the extent such information was made available to, or found by, the ENGINEER in preparing the Drawings. These data are not guaranteed for completeness or accuracy, and the CONTRACTOR is responsible for making necessary investigations to become fully informed as to the character, condition, and extent of all public utility installations and structures that may be encountered and that may affect the construction operations.
3. Contact utility locating service sufficiently in advance of the start of construction to avoid damage to the utilities and delays to the completion date.
4. Remove, replace, relocate, repair, rebuild, and secure any public utility installations and structures damaged as a direct or indirect result of the Work under this Contract. Costs for such work are incidental to the Contract. Be responsible and liable for any consequential damages done to or suffered by any public utility installations or structures. Assume and accept responsibility for any injury, damage, or loss which may result from or be consequent to interference with, or interruption or discontinuance of, any public utility service.
5. Repair or replace any water, electric, sewer, gas, irrigation, or other service connection damaged during the Work with no addition to the Contract price.

6. At all times in performance of the Work, employ proven methods and exercise reasonable care and skill to avoid unnecessary delay, injury, damage, or destruction to public utility installations and structures. Avoid unnecessary interference with, or interruption of, public utility services. Cooperate fully with the owners thereof to that end.
 7. Give written notice to the owners of all public utility installations and structures affected by proposed construction operations, sufficiently in advance of breaking ground in any area or on any unit of the Work, to obtain their permission before disrupting the lines and to allow them to take measures necessary to protect their interests. Advise the Chiefs of Police, Fire and Rescue Services of any excavation in public streets or the temporary shut-off of any water main. Provide at least 24 hours notice to all affected property owners whenever service connections are taken out of service.
- C. Work on Private Property: Work on this project will require operations on private property, rights of way or easements. The OWNER has secured the appropriate easements or rights of entry from the affected property owners. Comply with all easement or rights of entry provisions including the following:
- Relocate fences as shown in the Drawings.
 - Maintain site security at all times.
 - Restore back to original condition or better.
- Conduct operations along rights-of-way and easements through private property to avoid damage to the property and to minimize interference with its ordinary use. Upon completion of the Work through such property, restore the surface and all fences or other structures disturbed by the construction as nearly as possible to the preconstruction conditions. Do not remove any material from private property without the consent of the property owner or responsible party in charge of such property. Save the OWNER harmless from any claim or damage arising out of or in connection with the performance of work across and through private property.
- D. Miscellaneous Structures: Assume and accept responsibility for all injuries or damage to culverts, building foundations and walls, retaining walls, or other structures of any kind met with during the prosecution of the Work. Assume and accept liability for damages to public or private property resulting therefrom. Adequately protect against freezing all pipes carrying liquid.
- E. Protection of Trees and Lawn Areas:
1. Protect with boxes, trees and shrubs, except those ordered to be removed. Do not place excavated material so as to cause injury to such trees or shrubs. Replace trees or shrubs destroyed by accident or negligence of the

CONTRACTOR or CONTRACTOR's employees with new stock of similar size and age, at the proper season, at no additional cost to the OWNER.

2. Leave lawn areas in as good condition as before the start of the Work. Restore areas where sod has been removed by seeding or sodding.

1.8 TEMPORARY CONTROLS

A. During Construction:

1. Keep the site of the Work and adjacent premises free from construction materials, debris, and rubbish. Remove this material from any portion of the site if such material, debris, or rubbish constitutes a nuisance or is objectionable.
2. Remove from the site all surplus materials and temporary structures when they are no longer needed.
3. Neatly stack construction materials such as concrete forms and scaffolding when not in use. Promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.
4. Properly store volatile wastes in covered metal containers and remove from the site daily.
5. Do not bury or burn on the site or dispose of into storm drains, sanitary sewers, streams, or waterways, any waste material. Remove all wastes from the site and dispose of in a manner complying with applicable ordinances and laws.

B. Smoke Prevention:

1. Strictly observe all air pollution control regulations.
2. Open fires will be allowed only if permitted under current ordinances.

C. Noises:

1. Maintain acceptable noise levels in the vicinity of the Work. Limit noise production to acceptable levels by using special mufflers, barriers, enclosures, equipment positioning, and other approved methods.
2. Supply written notification to the OWNER sufficiently in advance of the start of any work which violates this provision. Proceed only when all applicable authorizations and variances have been obtained in writing.

D. Hours of Operation:

1. Refer to the supplemental conditions section for hours of operation.
2. Do not carry out nonemergency work, including equipment moves, on Sundays without prior written authorization by the OWNER. No work shall be performed on holidays or weekends unless otherwise specified or approved.

E. Dust Control:

1. Take measures to prevent unnecessary dust. Keep earth surfaces exposed to dusting moist with water or a chemical dust suppressant. Cover materials in piles or while in transit to prevent blowing or spreading dust.
2. Adequately protect buildings or operating facilities which may be affected adversely by dust. Protect machinery, motors, instrument panels, or similar equipment by suitable dust screens. Include proper ventilation with dust screens.

F. Temporary Drainage Provisions:

1. Provide for the drainage of stormwater and any water applied or discharged on the site in performance of the Work. Provide adequate drainage facilities to prevent damage to the Work, the site, and adjacent property.
2. Supplement existing drainage channels and conduits as necessary to carry all increased runoff from construction operations. Construct dikes as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect the OWNER's facilities and the Work, and to direct water to drainage channels or conduits. Provide ponding as necessary to prevent downstream flooding.
3. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

- G. Pollution: Prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. Do not permit sanitary wastes to enter any drain or watercourse other than sanitary sewers. Do not permit sediment, debris, or other substances to enter sanitary sewers. Take reasonable measures to prevent such materials from entering any drain or watercourse.

1.9 TRAFFIC REGULATION

- A. Parking: Provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the

Contract, to avoid any need for parking personal vehicles where they may interfere with public traffic or construction activities

- B. Access: Conduct Work to interfere as little as possible with public travel, whether vehicular or pedestrian. Provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when the CONTRACTOR has obtained permission from the owner or tenant of private property, or from the authority having jurisdiction over the public property involved, to obstruct traffic at the designated point.

1.10 FIELD OFFICES AND SHEDS

- A. CONTRACTOR's Office: Erect, furnish, and maintain a field office with a telephone. Have an authorized agent present at this office at all times while the Work is in progress. Keep readily accessible copies of the Contract Documents, required record documents, and the latest approved shop drawings at this field office.
- B. Material Sheds and Temporary Structures: Provide material sheds and other temporary structures of sturdy construction and neat appearance.
- C. Location: Coordinate location of field offices, material sheds and temporary structures with ENGINEER and OWNER.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01 61 00

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description
- B. Substitutions
- C. Manufacturer's Written Instructions
- D. Transportation and Handling
- E. Storage, Protection and Maintenance
- F. Manufacturer's Field Quality Control Services
- G. Post Startup Services
- H. Special Tools and Lubricating Equipment
- I. Lubrication

1.2 DESCRIPTION

- A. Proposed Manufacturers List: Within 15 calendar days of the date of the Notice to Proceed, submit to the ENGINEER a list of the names of proposed manufacturers, materialmen, suppliers and subcontractors, obtain approval of this list by OWNER prior to submission of any working drawings. Upon request submit evidence to ENGINEER that each proposed manufacturer has manufactured a similar product to the one specified and that it has previously been used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.
- B. Furnish and install Material and Equipment which meets the following:
 - 1. Conforms to applicable specifications and standards.
 - 2. Complies with size, make, type, and quality specified or as specifically approved, in writing, by ENGINEER.
 - 3. Will fit into the space provided with sufficient room for operation and maintenance access and for properly connecting piping, ducts and services, as applicable. Make the clear spaces that will be available for operation and

maintenance access and connections equal to or greater than those shown and meeting all the manufacturers' requirements. Make all provisions for installing equipment furnished at no increase in Contract Price.

4. Manufactured and fabricated in accordance with the following:
 - a. Design, fabricate, and assemble in accordance with best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Provide two or more items of same kind identical, by same manufacturer.
 - d. Provide materials and equipment suitable for service conditions.
 - e. Adhere to equipment capabilities, sizes, and dimensions shown or specified unless variations are specifically approved, in writing, in accordance with the Contract Documents.
 - f. Adapt equipment to best economy in power consumption and maintenance. Proportion parts and components for stresses that may occur during continuous or intermittent operation, and for any additional stresses that may occur during fabrication or installation.
 - g. Working parts are readily accessible for inspection and repair, easily duplicated and replaced.
5. Use material or equipment only for the purpose for which it is designed or specified.

1.3 SUBSTITUTIONS

A. Substitutions:

1. CONTRACTOR's requests for changes in equipment and materials from those required by the Contract Documents are considered requests for substitutions and are subject to CONTRACTOR's representations and review provisions of the Contract Documents when one of following conditions are satisfied:
 - a. Where request is directly related to an "or equal" clause or other language of same effect in Specifications.
 - b. Where required equipment or material cannot be provided within Contract Time, but not as result of CONTRACTOR's failure to pursue Work promptly or to coordinate various activities properly.

- c. Where required equipment or material cannot be provided in manner compatible with other materials of Work, or cannot be properly coordinated therewith.
- 2. CONTRACTOR'S Options:
 - a. Where more than one choice is available as options for CONTRACTOR's selection of equipment or material, select option compatible with other equipment and materials already selected (which may have been from among options for other equipment and materials).
 - b. Where compliance with specified standard, code or regulation is required, select from among products which comply with requirements of those standards, codes, and regulations.
 - c. "Or Equal": For equipment or materials specified by naming one or more equipment manufacturer and "or equal", submit request for substitution for any equipment or manufacturer not specifically named.
- B. Conditions Which are Not Substitution:
 - 1. Requirements for substitutions do not apply to CONTRACTOR options on materials and equipment provided for in the Specifications.
 - 2. Revisions to Contract Documents, where requested by OWNER or ENGINEER, are "changes" not "substitutions".
 - 3. CONTRACTOR's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute substitutions and do not constitute basis for a Change Order, except as provided for in Contract Documents.

1.4 MANUFACTURER'S WRITTEN INSTRUCTIONS

- A. Instruction Distribution: When the Contract Documents require that installation, storage, maintenance and handling of equipment and materials comply with manufacturer's written instruction's, obtain and distribute printed copies of such instructions to parties involved in installation, including six copies to ENGINEER.
 - 1. Maintain one set of complete instructions at jobsite during storage and installation, and until completion of work.
- B. Manufacturer's Requirements: Store, maintain, handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's written instructions and in conformity with Specifications.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult ENGINEER for further instructions.
 2. Do not proceed with work without written instructions.
- C. Performance Procedures: Perform work in accordance with manufacturer's written instructions. Do not omit preparatory steps or installation procedures, unless specifically modified or exempted by Contract Documents.

1.5 TRANSPORTATION AND HANDLING

- A. Coordination with Schedule: Arrange deliveries of materials and equipment in accordance with Construction Progress Schedules. Coordinate to avoid conflict with work and conditions at site.
1. Deliver materials and equipment in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 2. Protect bright machined surfaces, such as shafts and valve faces, with a heavy coat of grease prior to shipment.
 3. Immediately upon delivery, inspect shipments to determine compliance with requirements of Contract Documents and approved submittals and that material and equipment are protected and undamaged.
- B. Handling: Provide equipment and personnel to handle material and equipment by methods recommended by manufacturer to prevent soiling or damage to materials and equipment or packaging.

1.6 STORAGE, PROTECTION, AND MAINTENANCE

- A. On-site storage areas and buildings:
1. Conform storage buildings to requirements of Section 01 57 00.
 2. Coordinate location of storage areas with ENGINEER and OWNER.
 3. Arrange on site storage areas for proper protection and segregation of stored materials and equipment with proper drainage. Provide for safe travel around storage areas and safe access to stored materials and equipment.
 4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
 5. Store materials such as pipe, reinforcing and structural steel, and equipment on pallets, blocks or racks, off ground.

6. PVC Pipe may be damaged by prolonged exposure to direct sunlight and the CONTRACTOR shall take necessary precautions during storage and installation to avoid this damage. Pipe shall be stored under cover and installed with sufficient backfill to shield it from the sun.
 7. Store fabricated materials and equipment above ground, on blocking or skids, to prevent soiling or staining. Cover materials and equipment which are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- B. Interior Storage:
1. Store materials and equipment in accordance with manufacturer's instructions, with seals and labels intact and legible.
 2. Store materials and equipment, subject to damage by elements, in weathertight enclosures.
 3. Maintain temperature and humidity within ranges required by manufacturer's instructions.
- C. Accessible Storage: Arrange storage in a manner to provide easy access for inspection and inventory. Make periodic inspections of stored materials or equipment to assure that materials or equipment are maintained under specified conditions and free from damage or deterioration.
1. Perform maintenance on stored materials or equipment in accordance with manufacturer's instructions, in presence of OWNER or ENGINEER.
 2. Submit a report of completed maintenance to ENGINEER with each Application for Payment.
 3. Failure to perform maintenance, to notify ENGINEER of intent to perform maintenance or to submit maintenance report may result in rejection of material or equipment.
- D. OWNER's Responsibility: OWNER assumes no responsibility for materials or equipment stored in buildings or on-site. CONTRACTOR assumes full responsibility for damage due to storage of materials or equipment.
- E. CONTRACTOR's Responsibility: CONTRACTOR assumes full responsibility for protection of completed construction. Repair and restore damage to completed Work equal to its original condition.
- F. Special Equipment: Use only rubber-tired wheelbarrows, buggies, trucks, or dollies to wheel loads over finished floors, regardless if the floor has been protected or not.

This applies to finished floors and to exposed concrete floors as well as those covered with composition tile or other applied surfacing.

- G. Surface Damage: Where structural concrete is also the finished surface, take care to avoid marking or damaging surface.

1.7 MANUFACTURER'S FIELD QUALITY CONTROL SERVICES

A. General:

1. Provide manufacturer's field services in accordance with this subsection for those tasks specified in other sections.
2. Include and pay all costs for suppliers' and manufacturers' services, including, but not limited to, those specified.

- ### B. Installation Instruction: Provide instruction by competent and experienced technical representatives of equipment manufacturers or system suppliers as necessary to resolve assembly or installation procedures which are attributable to, or associated with, the equipment furnished.

C. Installation Inspection, Adjustments and Startup Participation:

1. Provide competent and experienced technical representatives of equipment manufacturers or system suppliers to inspect the completed installation as follows.
 - a. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.
 - b. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
 - c. Verify that wiring and support components for equipment are complete.
 - d. Verify that equipment or system is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.
 - e. Verify that nothing in the installation voids any warranty.
2. Provide manufacturer's representatives to perform initial equipment and system adjustment and calibration conforming to the manufacturer's recommendations and instructions, approved shop drawings and the Contract Documents.

3. Obtain ENGINEER's approval before start-up of equipment. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
4. Furnish ENGINEER with three copies of the following. When training is specified, furnish the copies at least 24 hours prior to training.
 - a. "Certificate of Installation, Inspection and Start-up Services" by manufacturers' representatives for each piece of equipment and each system specified, certifying:
 - (1) That equipment is installed in accordance with the manufacturers' recommendations, approved shop drawings and the Contract Documents.
 - (2) That nothing in the installation voids any warranty.
 - (3) That equipment has been operated in the presence of the manufacturer's representative.
 - (4) That equipment, as installed, is ready to be operated by others.
 - b. Detailed report by manufacturers' representatives, for review by ENGINEER of the installation, inspection and start-up services performed, including:
 - (1) Description of calibration and adjustments if made; if not in Operation and Maintenance Manuals, attach copy.
 - (2) Description of any parts replaced and why replaced.
 - (3) Type, brand name, and quantity of lubrication used, if any.
 - (4) General condition of equipment.
 - (5) Description of problems encountered, and corrective action taken.
 - (6) Any special instructions left with CONTRACTOR or ENGINEER.
- D. Field Test Participation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to participate in field testing of the equipment specified in Section 01 43 00.
- E. Trouble-Free Operation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to place the equipment in trouble-free operation after completion of start-up and field tests.

1.8 POST START-UP SERVICES

- A. General: Provide Post Start-up Services in accordance with this subsection for equipment specified in other sections.
- B. Site Visit: Provide the services of an authorized service representative for each equipment manufacturer or system supplier to make a final site visit after the equipment or system has been in operation for at least 6 months, but no longer than 11 months. Furnish assistance to OWNER's operating personnel in making adjustments and calibrations required to determine that the equipment and system is operating in conformance with design, manufacturer's, and specification requirements. Instruct the personnel in a review of proper operation and maintenance procedures.
- C. Certificate: Furnish "Certificate of Post Start-up Services" cosigned by ENGINEER and the manufacturer's representative, certifying that this service has been performed. Use form provided in this section, and furnish OWNER with three copies.

1.9 SPECIAL TOOLS AND LUBRICATING EQUIPMENT

- A. General: Furnish, per manufacturer's recommendations, special tools required for checking, testing, parts replacement, and maintenance. (Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics.)
- B. Time of Delivery: Deliver special tools and lubricating equipment to OWNER when unit is placed into operation and after operating personnel have been properly instructed in operation, repair, and maintenance of equipment.
- C. Quality: Provide tools and lubricating equipment of a quality meeting equipment manufacturer's requirements.

1.10 LUBRICATION

- A. General: Where lubrication is required for proper operation of equipment, incorporate in the equipment the necessary and proper provisions in accordance with manufacturer's requirements. Where possible, make lubrication automated and positive.
- B. Oil Reservoirs: Where oil is used, supply reservoir of sufficient capacity to lubricate unit for a 24-hour period.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Scheduling of Shutdown

1.2 RELATED SECTIONS

- A. Section 32 10 01 – Pavement Repair and Restoration

1.3 GENERAL REQUIREMENTS

- A. CONTRACTOR shall be responsible for all cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.
- B. Coordination: Perform all cutting, fitting or patching of the Work that may be required to make the several parts thereof join in accordance with the Contract Documents. Perform restoration with competent workmen skilled in the trade.
- C. Improperly Timed Work: Perform all cutting and patching required to install improperly timed work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.
- D. Limitations: Except when the cutting or removal of existing construction is specified or indicated, do not undertake any cutting or demolition which may affect the structural stability of the Work or existing facilities without the ENGINEER's concurrence.

1.4 SUBMITTALS

- A. Submit a written request to the ENGINEER well in advance of executing any cutting or alteration which affects:
 - 1. Work of the OWNER or any separate contractor.
 - 2. Structural value or integrity of any element of the project or work.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.

- B. Request shall include:
 - 1. Identification of the work.
 - 2. Description of affected work.
 - 3. The necessity for cutting, alteration or excavation.
 - 4. Effect on work of OWNER or any separate contract, or on structural or weatherproof integrity of work.
 - 5. Description of proposed work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 - 6. Alternatives to cutting and patching.
 - 7. Cost proposal, when applicable.
 - 8. Written permission of any separate contractor whose work will be affected.

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

1.5 SCHEDULING OF SHUTDOWN

- A. Connections to Existing Facilities: If any connections, replacement, or other work requiring the shutdown of an existing facility is necessary, schedule such work at times when the impact on the OWNER's normal operation is minimal. Overtime, night and weekend work without additional compensation from the OWNER, may be required to make these connections, especially if the connections are made at times other than those specified.

- B. Request for Shutdowns: Submit a written request for each shutdown to the OWNER and the ENGINEER sufficiently in advance of any required shutdown.

PART 2 PRODUCTS

2.1 MATERIALS

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

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of projects, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of the work.
- C. Report unsatisfactory or questionable conditions to the ENGINEER in writing; do not proceed with work until the ENGINEER has provided further instructions.

3.2 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity or affected portion of work.
- B. Provide devices and methods to protect other portions of project from damage.
- C. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work, and maintain excavations free from water.
- D. Material Removal: Cut and remove all materials to the extent shown or as required to complete the Work. Remove materials in a careful manner with no damage to adjacent facilities. Remove materials which are not salvageable from the site.

3.3 PERFORMANCE

- A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- C. Employ original installer or fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant elements.
 - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- E. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.
- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish entire unit.

3.4 PAVEMENT RESTORATION

- A. Restore all pavement or roadway surfaces in accordance with Section 32 10 01 – Pavement Repair and Restoration.
- B. The restoration of existing street paving, including underdrains, if any are encountered, where damaged, shall be restored by the CONTRACTOR and shall be replaced or rebuilt using the same type of construction as was in the original. The CONTRACTOR shall be responsible for restoring all such work, including subgrade, base courses, curb and gutter or other appurtenances where present. The CONTRACTOR shall obtain and pay for at his own expense such local or other governmental permits as may be necessary for the opening of streets and shall satisfy himself as to any requirements other than those herein set forth which may affect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- C. This section does not describe the construction of new road surfaces or the complete resurfacing of existing pavements.
- D. In all cases, the CONTRACTOR will be required to maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract for a period of 12 months after the acceptance of the Contract, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.
- E. The CONTRACTOR shall do all the final resurfacing or repaving of streets or roads, over the excavations that he has made and he shall be responsible for relaying paving surfaces of roads that have failed or been damaged, at any time before the termination of the maintenance period on account of work done by him and he shall resurface or repave over any tunnel jacking, or boring excavation that shall settle or break the surface, shall be repaved to the satisfaction of the OWNER and at the CONTRACTOR's sole expense. Backfilling of trenches and the preparation of subgrades shall conform to the requirements of excavation and backfilling of pipeline trenches.
- F. Where pipeline construction crosses paved streets, the CONTRACTOR may elect, at no additional cost to the OWNER, to place the pipe by the jacking or boring or tunneling method in lieu of cutting and patching of the paved surfaces.

END OF SECTION

SECTION 01 74 00

CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. General Requirements
- B. Disposal Requirements

1.2 GENERAL REQUIREMENTS

- A. Execute cleaning during progress of the work and at completion of the work.

1.3 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.2 FINAL CLEANING

- A. Requirements: At the completion of work and immediately prior to final inspection, clean the entire project as follows:
 - 1. Thoroughly clean, sweep, wash, and polish all work and equipment provided under the Contract, including finishes. Leave the structures and site in a complete and finished condition to the satisfaction of the ENGINEER.
 - 2. Direct all subcontractors to similarly perform, at the same time, an equivalent thorough cleaning of all work and equipment provided under their contracts.
 - 3. Remove all temporary structures and all debris, including dirt, sand, gravel, rubbish and waste material.
 - 4. Should the CONTRACTOR not remove rubbish or debris or not clean the buildings and site as specified above, the OWNER reserves the right to have the cleaning done at the expense of the CONTRACTOR.
- B. Employ experienced workers, or professional cleaners, for final cleaning.
- C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- D. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces. Polish surfaces so designated to shine finish.
- F. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.
- G. Replace air-handling filters if units were operated during construction.
- H. Clean ducts, blowers, and coils, if air-handling units were operated without filters during construction.
- I. Vacuum clean all interior spaces, including inside cabinets.
- J. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.

- K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly-painted surfaces.
- L. Clean interior of all panel cabinets, pull boxes, and other equipment enclosures.
- M. Wash and wipe clean all lighting fixtures, lamps, and other electrical equipment which may have become soiled during installation.
- N. Perform touch-up painting.
- O. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- P. Remove erection plant, tools, temporary structures and other materials.
- Q. Remove and dispose of all water, dirt, rubbish or any other foreign substances.

3.3 FINAL INSPECTION

- A. After cleaning is complete the final inspection may be scheduled. The inspection will be done with the OWNER and ENGINEER.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 01 77 00
CONTRACT CLOSE OUT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Warranties and Bonds
- B. Record Drawings
- C. Special Tools

1.2 WARRANTIES AND BONDS

Prior to final payment deliver to the OWNER the original and one copy of all bonds, warranties, guarantees and similar documents, including those customarily provided by manufacturers and suppliers which cover a period greater than the one year correction period. Show OWNER as beneficiary of these documents.

1.3 RECORD DRAWINGS

At the site keep and maintain one record copy of all Contract Documents, reference documents and all technical documents submitted in good order. As the work progresses the Engineer or his designated representative shall record on one set of reproducible drawings all changes and deviations from the original Plans. He shall record the exact location of all changes in vertical and horizontal alignment by offsets and ties at each; sewer, water, electric, gas, communication and other services by off-set distance to permanent improvements such as building and curbs.

Prior to acceptance of the project and before final payment is made, the Engineer shall submit one (1) set of reproducible drawings, two (2) sets of blue-line or black-line prints, all marked "Drawings of Record". These Record Drawings must be certified by the Florida Registered Professional Engineer, who prepared the plans and signs and seals these plan, and submits AutoCAD compatible diskette copy of the drawings, and other applicable related records to the Department of Lee County Utilities.

These Record Drawings must be certified by the Florida Registered Professional Engineer, who prepared the plans and signs and seals these plans. The Record Drawings shall include vertical and horizontal alignment of all water, sewer, and effluent reuse lines, valves, tees, bends, reducers, hydrants, pump stations, service connections, meter boxes and/or pads, and other pertinent structures. Pipeline runs in excess of 152.4m, (500'), without fittings shall include vertical alignment information at 152.4m, (500') intervals. Said alignment shall be tied to permanent improvements, such as roadway and/or railroad centerlines and rights-of-way, building and property

corners, and shall be certified by a Professional Land Surveyor, licensed in the State of Florida. The Professional Land Surveyor can coordinate with the Contractor to install the necessary appurtenances on buried utilities to facilitate the survey after construction is completed. In addition, property strap numbers and street names shall be shown on the plan.

On a case by case basis, Lee County Utilities may waive the requirement for certification by a Professional Land Surveyor, licensed in the State of Florida. However, prior consent must first be obtained from Lee County Utilities. The County shall withhold final acceptance of the project until the requirement for record drawings and related records has been met. Record Drawings without detailed field verified horizontal and vertical locations of all facilities shown will be rejected.

1.4 SPECIAL TOOLS

Special tools are considered to be those tools which, because of their limited use, are not normally available but which are necessary for maintenance of particular equipment.

For each type of equipment provided under this CONTRACT, furnish a complete set of all special tools including grease guns and other lubricating devices, which may be needed for the adjustment, operation, maintenance, and disassembly of such equipment. Furnish only tools of high grade, smooth forged alloy tool steel. Manufacture grease guns of the lever type.

Furnish and erect one or more neat and substantial steel wall cases or cabinets with flat key locks and clips or hooks to hold each special tool in a convenient arrangement.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE MANUALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description
- B. Quality Assurance
- C. Submittals
- D. Format and Contents

1.2 DESCRIPTION

- A. Scope: Furnish to the ENGINEER 10 copies and a PDF of an Operation and Maintenance Manual for all equipment and associated control systems furnished and installed.

1.3 QUALITY ASSURANCE

- A. Reference Codes and Specifications: No current government or commercial specifications or documents apply.

1.4 SUBMITTALS

- A. Prior to the Work Reaching 50 Percent Completion, submit to the ENGINEER for approval two copies of the manual with all specified material. Submit the approval copies with the partial payment request for the specified completion. Within 30 days after the ENGINEER's approval of the two-copy submittal, furnish to the ENGINEER the remaining 8 copies of the manual. Provide space in the manual for additional material. Submit any missing material for the manual prior to requesting certification of substantial completion.

1.5 FORMAT AND CONTENTS

- A. Prepare and arrange each copy of the manual as follows:
 - 1. One copy of an equipment data summary (see sample form) for each item of equipment.
 - 2. One copy of an equipment preventive maintenance data summary (see sample form) for each item of equipment.

3. One copy of the manufacturer's operating and maintenance instructions. Operating instructions include equipment start-up, normal operation, shutdown, emergency operation and troubleshooting. Maintenance instructions include equipment installation, calibration and adjustment, preventive and repair maintenance, lubrication, troubleshooting, parts list and recommended spare parts.
 4. List of electrical relay settings and control and alarm contact settings.
 5. Electrical interconnection wiring diagram for equipment furnished including all control and lighting systems.
 6. Furnish all O&M Manual material on 8-1/2 by 11 commercially printed or typed forms or an acceptable alternative format.
- B. Organize each manual into sections paralleling the equipment specifications. Identify each section using heavy section dividers with reinforced holes and numbered plastic index tabs. Use 3-ring, hard-back binders Type No. VS11 as manufactured by K&M Company, Torrance, CA, or equal. Punch all loose data for binding. Arrange composition and printing so that punching does not obliterate any data. Print on the cover and binding edge of each manual the project title, and manual title, as furnished and approved by the ENGINEER.
- C. Leave all operating and maintenance material that comes bound by the equipment manufacturer in its original bound state. Cross-reference the appropriate sections of the CONTRACTOR's O&M manual to the manufacturers' bound manuals.
- D. Label binders Volume 1, 2, and so on, where more than one binder is required. Include the table of contents for the entire set, identified by volume number, in each binder.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

Lee County Utilities

RSW TRANSMISSION LINE – BEN HILL/TREELINE

Equipment Data Summary

Equipment Name: Specification Reference:

Manufacturer:

Name:

Address:

Telephone:

Number Supplied: Location/Service:

Model No: Serial No:

Type:

Size/Speed/Capacity/Range (as applicable):

Power Requirement (Phase/Volts/Hertz):

Local Representative:

Name:

Address:

Telephone:

NOTES:

Lee County Utilities

RSW TRANSMISSION LINE – BEN HILL/TREELINE

Preventive Maintenance Summary

Equipment Name:

Location:

Manufacturer:

Name:

Address:

Telephone:

Model No:

Serial No:

Maintenance
Task

Lubricant/Part

D W M Q SA A

O&M Manual
Reference

NOTES:

*D-Daily W-Weekly M-Monthly Q-Quarterly SA-Semi-Annual A-Annual

SECTION 01 78 36
WARRANTIES AND BONDS

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Compile specified warranties and bonds, as in Articles 6 and 13 of the General Conditions.
- B. Co-execute submittals when so specified.
- C. Review submittals to verify compliance with Contract Documents.
- D. Submit to the ENGINEER for review and transmittal to OWNER.

1.2 SUBMITTAL REQUIREMENTS

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Two original signed copies are required.
- C. Table of Contents. Neatly typed in orderly sequence. Provide complete information for each items.
 - 1. Product or work item.
 - 2. Firm, with name of principal, address and telephone number.
 - 3. Scope.
 - 4. Date of beginning warranty, bond or service and maintenance contract.
 - 5. Duration of warranty, bond or service maintenance contract.
 - 6. Provide information for OWNER'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.

1.3 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
 - 1. Size 8-1/2" x 11", punch sheets for standard 3-post binder.
 - a. 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-post binder, with durable and cleanable plastic covers and maximum post width of 2 inches.

1.4 WARRANTY SUBMITTAL REQUIREMENTS

- A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with the CONTRACTOR's for one (1) year, unless otherwise specified, commencing at the time of substantial completion.
- B. The CONTRACTOR shall be responsible for obtaining certificates for equipment warranty for all major equipment specified under Division 32 and 33, and which has a 1-HP motor, or which lists for more than \$1,000. The ENGINEER reserves the right to request warranties for equipment not classified as major. The CONTRACTOR shall still warrant equipment not considered to be "major" in the CONTRACTOR's one-year warranty period even though certificates of warranty may not be required.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 02 21 13
LINES AND GRADES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General
- B. Surveys
- C. Datum Plane
- D. Protection of Survey Data

1.2 GENERAL

- A. Construct all work in accordance with the lines and grades shown on the Drawings. Assume full responsibility for keeping all alignment and grade.

1.3 SURVEYS

- A. Reference Points: The OWNER will provide reference points for the work as described in the General Conditions. Base horizontal and vertical control points will be designated by the ENGINEER and used as datum for the Work. Perform all additional survey, layout, and measurement work.
 - 1. Keep ENGINEER informed, sufficiently in advance, of the times and places at which work is to be performed so that base horizontal and vertical control points may be established, and any checking deemed necessary by ENGINEER may be done, with minimum inconvenience to the ENGINEER and at no delay to CONTRACTOR. It is the intention not to impede the Work for the establishment of control points and the checking of lines and grades set by the CONTRACTOR. However, when necessary, suspend working operations for such reasonable time as the ENGINEER may require for this purpose. Costs associated with such suspension are deemed to be included in the Contract Price, and no time extension or additional costs will be allowed.
 - 2. Provide an experienced survey crew including an instrument operator, competent assistants, and any instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement of work performed by the CONTRACTOR.

1.4 DATUM PLANE

- A. All elevations indicated or specified refer to the Mean Sea Level Datum Plane, 1988 General Adjustment, of the United States Coast and Geodetic Survey and are expressed in feet and decimal parts thereof, or in feet and inches.

1.5 PROTECTION OF SURVEY DATA

- A. General: Safeguard all points, stakes, grade marks, known property corners, monuments, and benchmarks made or established for the Work. Reestablish them if disturbed and bear the entire expense of checking reestablished marks and rectifying work improperly installed.
- B. Records: Keep neat and legible notes of measurements and calculations made in connection with the layout of the Work. Furnish copies of such data to the ENGINEER for use in checking the CONTRACTOR's layout. Data considered of value to the OWNER will be transmitted to the OWNER by the ENGINEER with other records on completion of the Work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 03 11 00
CONCRETE FORMWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Provide concrete formwork for architectural concrete and structural concrete as specified to form concrete to profiles shown.
1. Architectural concrete is defined as concrete for the following exposed reinforced concrete surfaces:
 - a. Interior walls
 - b. Exterior walls to 6 inches below finish grade
 - c. Interior tank walls to 6 inches below normal operating water level
 - d. Beams
 - e. Columns
 - f. Undersides of floor slabs, roof slabs and stairs
 2. Provide concrete with smooth rubbed finish.
 3. Structural concrete is defined as all concrete that is not architectural concrete.
- B. Related Work Specified in Other Sections Includes:
1. Section 03 20 00 - Concrete Reinforcement
 2. Section 03 15 00 - Concrete Accessories
 3. Section 03 30 53 - Concrete for Non-Plant Work

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
1. ACI 318 - Building Code Requirements for Reinforced Concrete
 2. ACI SP-4 - Formwork for Concrete
 3. ACI 303R - Guide to Cast-in-Place Architectural Concrete

4. ACI 347 – Guide to Formwork for Concrete

1.3 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
1. CONTRACTORS Shop Drawings: Proposed form layout drawings and tie pattern layout drawings for Concrete. Review of these drawings does not relieve the CONTRACTOR of responsibility for adequately designing and constructing forms.
 2. Samples: Pieces of each type of sheeting, chamfer strips, form ties, form liners and rustication strips

1.4 QUALITY ASSURANCE

- A. Formwork Compliance: Use formwork complying with ACI SP-4, ACI 347 and ACI 303R.
- B. Mock-Up Erection: Erect, on the site where directed, a full size mock-up of a cast-in-place wall or panel a minimum of 10 feet by 10 feet by 12 inches thick as shown. Conform mock-up to requirements of ACI 303R.
1. Reinforce the panel as shown. Use form ties the same as those approved and with the form tie pattern similar to that approved. Use one face of the panel for smooth architectural concrete including "reveal" rustication with form joints, and the opposite face for form liner concrete.
 2. Plug the tie holes as specified to determine the correct mortar mixture to match the panel color. If required, remove and replace tie hole plugging mortar until an acceptable color match is obtained. After the sample panels have been approved, intentionally damage and patch portions of the finish surface of the panels for the purpose of determining the correct mixture for patching mortar and patching technique to match the original panel color and surface.
 3. Leave the approved mock-up on the job during construction as the standard of workmanship for the project. Remove mock-up from the premises after completion of the work.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable manufacturers are listed in the LCU Approved Materials List. Other manufacturers of equivalent products may be submitted.

2.2 MATERIALS

- A. Structural Concrete: Provide structural concrete form materials as follows:
1. Obtain approval for form material before construction of the forms.
 2. Use a barrier type form release agent.
 3. Use form ties, hangers, and clamps of such type that, after removal of the forms, no metal will be closer than one inch from concrete surface. Wire ties will not be permitted.
 4. Provide ties with swaged washers or other suitable devices to prevent seepage of moisture along the ties. Leave the ties in place.
 5. Use lugs, cones, washers, or other devices which do not leave holes or depressions greater than 7/8-inch in diameter.
- B. Architectural Concrete: Provide architectural concrete form materials as follows:
1. Construct forms using 3/4-inch thick, High Density Overlay (HDO) Plyform, Class 1 or 2, meeting the requirements of the American Plywood Association. Use surfacing materials having a minimum weight of 60-60.
 2. Use form coating and use thinner as recommended by manufacturer of the form coating, to coat cut or raw edges.
 3. Use she-bolts with water seals for form ties.
 4. Use form liners (see LCU Approved Materials List) having one-inch deep relief, in a fractured rib pattern to match existing. Furnish form liners in full height lengths with no horizontal joints, except where shown. Use wood for forms to be used with form liners.
 5. Use elastomeric vertical "V-groove" rustications in the concrete bands and the horizontal rustication joints shown in the form liner concrete of the profile shown.
 6. Use a barrier type VOC compliant form release agent.

PART 3 EXECUTION

3.1 DESIGN

- A. Design Responsibility: Be responsible for the design, engineering and construction of the architectural concrete formwork and the structural concrete formwork. Conform the work to the recommendations of ACI SP-4 and ACI 303R.

- B. **Setting Time and Slag Use:** The presence of fly ash or ground granulated blast furnace slag in the concrete mix for architectural concrete and structural concrete will delay the setting time. Take this into consideration in the design and removal of the forms.
- C. **Responsibility During Placement:** Assume and take sole responsibility for adequate design of all form elements for support of the wet concrete mixtures specified and delivered.
- D. **Consistency:** Design forms to produce concrete members identical in shape, lines and dimensions to members shown.

3.2 CONSTRUCTION DETAILS FOR FORMWORK

- A. **Structural Concrete Details:** Follow the following details for all structural concrete:
 - 1. Provide forms which are substantial, properly braced, and tied together to maintain position and shape and to resist all pressures to which they may be subjected. Make forms sufficiently tight to prevent leakage of concrete.
 - 2. Determine the size and spacing of studs and wales by the nature of the work and the height to which concrete is placed. Make forms adequate to produce true, smooth surfaces with not more than 1/8-inch variation in either direction from a geometrical plane. Provide horizontal joints which are level, and vertical joints which are plumb.
 - 3. Supply forms for repeated use in sufficient number to ensure the required rate of progress.
 - 4. Thoroughly clean all forms before reuse and inspect forms immediately before concrete is placed. Remove deformed, broken, or defective forms from the work.
 - 5. Provide temporary openings in forms at convenient locations to facilitate cleaning and inspection.
 - 6. Coat the entire inside surfaces of forms with a suitable form release agent just prior to placing concrete. Form release agent is not permitted on the reinforcing steel.
 - 7. Assume and take responsibility for the adequacy of all forms and remedying any defects resulting from their use.
- B. **Architectural Concrete Details:** Follow the following details for all Architectural Concrete:

1. Conform all construction details for formwork to "Construction Details for Formwork," subsections A1, A2, A3, A4, A6 and A7 and the requirements of this section.
2. Thoroughly clean and lightly recoat HDO plywood panels before each additional use. Do not use forms more than three times.
3. Install form liners and rustication strips in strict accordance with the manufacturer's written instructions and recommendations. Clog the ends of the form liner pattern and tape all form joints and edges using 1/8-inch thick by 3/4-inch wide foam tape centered on the joints, then caulk in accordance with the manufacturer's recommendations each time forms are set. Have a representative of the manufacturer present at the site to supervise the installation of the form liner for the entire project.
4. Install forms for smooth concrete in such a manner that there will be no horizontal form joints, and align the forms so that vertical joints occur only at "V-Groove" rustications. Space form ties in a uniform pattern vertically and horizontally. Position form ties in smooth concrete bands and in panels between "reveal" rustications, if any.
5. Erect beam and girder soffits with a camber of 1/2-inch in 20 feet and sufficiently braced, shored, and wedged to prevent deflection. Clamp column sides in accordance with this specification with metal column clamps, spaced according to the manufacturer's directions.
6. Provide external angles of walls, beams, pilasters, columns, window openings and girders with 3/4-inch bevel strips.
7. Give surfaces of concrete panel forms one thinned coat of form film.
8. Apply the release agent in strict accordance with the manufacturer's instructions.

3.3 FORM REMOVAL

- A. Structural Concrete Form Removal: Do not remove forms for structural concrete until the concrete has hardened sufficiently to support its own load safely, plus any superimposed load that might be placed thereon. Leave the forms in place for the minimum length of time indicated below or until the concrete has reached the minimum strength indicated as determined by testing, whichever time is reached first.
 1. The times indicated represent cumulative days or hours, not necessarily consecutive, during which the air surrounding the concrete is above 50 degrees F. These times may be decreased if reshores are installed.

	Minimum Time	Minimum Strength (psi)
a. Columns	12 hrs.	1300
b. Columns	12 hrs.	1300
c. Side forms for girders and beams	12 hrs.	1300
d. Walls	12 hrs.	1300
e. Bottom forms of slabs		
Under 10 feet clear span	4 days	2300
10 to 20 feet clear span	7 days	2700
Over 20 feet clear span	10 days	2900
f. Bottom forms of beams and girders		
Under 10 feet clear span	7 days	2700
10 to 20 feet clear span	14 days	3000
Over 20 feet clear span	21 days	3500

2. Increase form removal times as required if concrete temperature following placement is permitted to drop below 50 degrees F or if fly ash or ground granulated blast furnace slag is used in the concrete mix.
3. Withdraw the removable portion of form ties from the concrete immediately after the forms are removed. Clean and fill holes left by such ties with grout as specified in Cast-In-Place Concrete, Subsection Structural Concrete Surfaces.
4. Plug tie holes flush with the surface using portland cement mortar. Prewet tie holes with clean water and apply a neat cement slurry bond coat. Densely tamp mortar of a dry-tamp consistency into the tie holes exercising care so as not to smear mortar onto the finished concrete surface. Include sufficient white cement in the mortar mix to cause the plugged holes to blend in with the adjacent surfaces. Make sample patches with different mixes to assure that this requirement is met.

- B. Architectural Concrete Form Removal: Remove forms for architectural concrete in accordance with the above subsection 3.3 A, except that do not remove forms for vertical surfaces sooner than 12 hours nor longer than 36 hours after placement of concrete.

3.4 RESHORING

- A. Reshoring Method: Develop a system for reshoring and early removal of forms, in the event early stripping of forms becomes necessary. Include details and schedules in this system for each element which is to be reshored.

- B. Construction Load Support: Do not support construction loads upon any unshored portion of the structure exceeding the structural design loads.

3.5 TOLERANCES

- A. Tolerance Limits: Design, construct and maintain concrete form and place the concrete to provide completed concrete work within the tolerance limits set forth in ACI SP-4.

3.6 SURVEY OF FORMWORK

- A. Field Survey: Employ an engineer or surveyor to check by instrument survey the lines and levels of the completed formwork before concrete is placed and make whatever corrections or adjustment to the formwork are necessary to correct deviations from the specified tolerances.
- B. Placement Surveying Requirements: Check formwork during the placement of the concrete to verify that the forms, braces, tie rods, clamps anchor bolts, conduits, piping, and the like, have not been knocked out of the established line, level or cross section by concrete placement or equipment.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 03 15 00
CONCRETE ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing concrete accessories shown and specified herein such as waterstops, dovetail anchor slots, cast-in-place reglets, inserts, joint filler, preformed joint seal, joint sealant and neoprene pads.
- B. Products Installed: Waterstops, dovetail anchor slots, cast-in-place reglets, inserts, joint filler, preformed joint seal, joint sealant and neoprene pads.
- C. Related Work Specified in Other Sections Includes:
 - 1. Section 03 11 00 - Concrete Formwork
 - 2. Section 03 20 00 - Concrete Reinforcement
 - 3. Section 03 30 53 - Concrete for Non-Plant Work

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AASHTO - Standard Specifications for Highway Bridges
 - 2. ASTM A 240 - Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
 - 3. ASTM A 536 - Standard Specifications for Ductile-Iron Castings
 - 4. ASTM D 412 - Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
 - 5. ASTM D 3545 - Test Methods for Alcohol Content and Purity of Acetate esters by Gas Chromatography
 - 6. ASTM D 3575 - Test Methods for Flexible Cellular Materials Made From Olefin Polymers
 - 7. CRD-C513 - Specifications for Rubber Waterstops

8. CRD-C572 - Specifications for Polyvinyl Chloride Waterstop
9. Fed. Spec.
TT-S-00227 - Sealing Compound, Elastomeric Type, Multicomponent (for Calking, Sealing, and Glazing in Buildings and Other Structures)
10. Fed. Spec.
TT-S-00230 - Sealing Compound, Elastomeric Type, Single Component (for Calking, Sealing, and Glazing in Buildings and Other Structures)

1.3 SUBMITTALS

- A. General: Provide all Work related submittals, including the following, as specified in Division 1.
- B. Product Data and Information:
 1. Manufacturer's Data and Specifications: Submit printed manufacturer's data and specifications for each item used on this project.
 2. Samples: Provide one sample of each item used.
 3. Joint Sealant and Preformed Joint Seal: Indicate special procedures, surface preparation and perimeter conditions requiring special attention. All products in contact with potable water, shall be "NSF Standard 61" certified. Submit certified material records indicating approval for use with potable water.

1.4 DELIVERY, STORAGE AND HANDLING

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

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable manufacturers are listed in the LCU Approved Materials List. Other manufacturers of equivalent products may be submitted.

2.2 MATERIALS

- A. Extruded Waterstops: Provide waterstops made of extruded polyvinyl chloride unless otherwise shown or specified.
1. Do not use any reclaimed plastic material in their manufacture.
 2. Provide plastic waterstops meeting the requirements of CRD-C572, except as modified herein. Provide a Shore A/10 durometer hardness between 73 and 79, the tensile strength not less than 1850 psi, and specific gravity not more than 1.38.
 3. Unless otherwise shown, use waterstops for construction joints which are flat, at least 6 inches wide, and not less than 3/8-inch thick at the thinnest section. Provide these waterstops with ribbed longitudinal strips.
 4. Unless otherwise shown, provide waterstops for expansion joints at least 9 inches wide and not less than 1/4-inch thick at the narrowest point and not less than 3/8-inch thick immediately adjacent to the center of the waterstop. Provide the waterstop with ribbed longitudinal strips with a 3/4-inch inside diameter hollow bulb center. Limit joint movement to 1/4-inch under a tensile force of not more than 500 pounds per lineal inch.
- B. Stainless Steel Waterstops: Provide stainless steel waterstops where shown or specified.
1. Fabricate stainless steel waterstops from ASTM A 240 Type 316, 20 gauge stainless steel, conforming to the dimensions and profiles shown.
 2. Prefabricate and miter corners and intersections for all stainless steel waterstops. Make only butt joints in the field.
- C. Rubber Waterstops: Provide rubber water stops where shown or specified.
1. Provide rubber water stops of either the molded or extruded type, fabricated from a high grade tread type compound, either SBR or natural rubber, conforming to CRD-C513.
 2. Provide water stops for construction joints at least 6 inches wide and 3/8-inch thick and with solid end bulbs 3/4-inch in diameter.
 3. Provide water stops for expansion joints 9 inches wide and 3/8-inch thick and with solid end bulbs 1-inch in diameter and a hollow center bulb 1-1/2 inches in diameter with a 3/4-inch diameter center cavity.
- D. Expansion Joint Filler: Use joint filler for all expansion joints.

1. Provide a closed cell polyethylene or PVC joint filler of the thickness shown.
- E. Joint Sealant Requirements: Finish expansion joints with a joint sealant where shown or specified.

1. Joint sealant materials may be either a single component urethane compound meeting the requirements of Fed. Spec. TT-S-00230C, or a 2-component urethane compound meeting the requirements of Fed. Spec. TT-S-00227E, except as modified in this specification.
2. Provide the urethane sealant of 100 percent polymer, non-extended, containing no solvent, lime, or coal tar. Color as selected by the ENGINEER, but not black. Conform sealant properties to the following:

	Property	Value	Test Method
a.	Maximum final cure	3 days	--
b.	Minimum tensile strength	140 to 200 psi	ASTM D 412
c.	Minimum elongation	400%	ASTM D 412
d.	Modulus at 100% elongation	40-60 psi	ASTM D 412
e.	Shore A hardness	25-40	ASTM D 2240
f.	Solid content	98-100%	--
g.	Peel strength	20-40 lb/in.	Fed. Spec. TT-S-00230C Fed. Spec. TT-S-00227E
h.	Minimum recovery	80-90%	Fed. Spec. TT-S-00230C Fed. Spec. TT-S-00227E
i.	Initial tack-free cure	24-48 hrs.	Fed. Spec. TT-S-00230C Fed. Spec. TT-S-00227E

3. Provide primer as recommended by the manufacturer of the sealant, subject to approval.
4. Provide fillers and backup materials in contact with sealant which are nonimpregnated and free from asphalt, creosote, oil or extractable

plasticizers. Use a backup material of a closed cell polyethylene foam rod with a diameter 1/4-inch larger than the joint width.

F. Preformed Joint Seal: Provide a preformed joint seal where shown or specified.

1. Provide joint material which is resilient, non-extrudable, impermeable, closed-cell, cross-linked, ethylene vinyl acetate, low density, polyethylene copolymer, nitrogen blown material which is ultraviolet light, weather and wear resistant, and which is concrete beige in color.

2. Conform material properties with the following:

	Property	Value	Test Method
a.	Density, pcf	2.8 to 3.4	ASTM D 3575 Suffix: W, Method A
b.	Water Absorption total immersion 3 months	0.02% by volume	ASTM D 3575 Suffix: L
c.	Tensile Strength	125 psi	ASTM D 3575 Suffix: T
d.	Elongation before breaking	255%	ASTM D 3575 Suffix: T
e.	Working Temperature	-94 to 160 F	--

G. Neoprene Pads: Use neoprene pads as shown or required where slabs or beams must be prevented from bonding to footings, walls, columns or other rigid parts of the structure.

1. Use neoprene pads of a structural grade meeting the requirements of Section 25, Division 2 of the AASHTO Standard Specifications for Highway Bridges.

2. Do not use neoprene pads thinner than 1/4-inch.

H. Wedge Inserts: Make wedge inserts for 5/8-inch and 3/4-inch bolts of ductile iron conforming to ASTM A 536.

I. Dovetail Anchors: Provide dovetail anchors of one of the following types:

1. Dovetail anchors having a 3/16-inch by 1-inch by 1/2-inch stainless steel dovetail section with 3/16-inch diameter stainless steel wire.

2. Dovetail anchor slots of 24 gauge galvanized steel 1-inch by 1-inch by 5/8-inch throat. Fill anchor slots.

- J. Flashing Reglets: Provide flashing reglets of 24 gauge galvanized steel foam filled reglets.

PART 3 EXECUTION

3.1 INSTALLING OF WATERSTOPS

- A. Assembly of Extruded Waterstops: Prefabricate corners and intersections for all waterstops. Make only butt joints in the field. Miter and assemble corners and intersections with approved equipment, as described for field joints.
 - 1. Make field joints by cutting the ends of the sections to be spliced so they will form a smooth even butt joint. Heat the cut ends with the splicing tool until the plastic melts. Press the two ends together until the plastic cools. Do splicing in a way that limits damage to the continuity of the ribbed strips.
 - 2. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.
- B. Prefabricated Stainless Steel Waterstops: Prefabricate corners and intersections for all stainless steel waterstops. Make only butt joints in the field. Miter and weld corners and intersections.
 - 1. Provide field joints having a nominal 1-inch lap joint, with the exposed edge welded or brazed on each side.
 - 2. Make field joints with PVC waterstops as shown.
 - 3. At expansion joints, seal the base of the expansion section of the waterstop with at least one layer of 2-inch wide duct tape.
 - 4. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.
- C. Splices: Use splices made in the manufacturer's plant where possible for rubber waterstops.

1. Use a preformed rubber union or fitting and splicing cement as recommended by the manufacturer when splices are made.
 2. Carry waterstops in the walls into lower slabs and join them to the waterstops in the slabs. Make all waterstops continuous. Set waterstops accurately to the position and line shown. Hold edges securely fixed in position at intervals of not more than 24 inches so that they will not move during the placing of the concrete. Do not drive nails through the waterstops.
- D. Joint Filler Placement: Place joint filler for expansion joints against the completed portion of the work before the concrete for the next section is placed.
1. Fasten the filler to the hardened concrete with a compatible adhesive in accordance with manufacturer's instructions. Extend the filler through the thickness of the wall or slab and make it flush with the finished surface, except where a preformed joint seal or joint sealant is shown.
 2. In joints having a waterstop, fit the filler accurately on each side of the waterstop to prevent the intrusion of concrete.
- E. Preparation of 2-Component Sealants: Mix 2-component joint sealant using a slotted paddle and slow speed mixer for 5 to 8 minutes, continually working paddle from top to bottom until the sealant color is uniform. Scrape down the side of the container and paddle blade several times during the mixing operation to ensure uniform mixing.
1. Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, waterproofing compounds or form release materials prior to the application of primer and sealant.
 2. Prime all concrete joint surfaces and all surfaces exposed to water prior to sealing, with no exceptions. Prime all other surfaces as recommended by the manufacturer of the sealant. Provide the prime as recommended by the manufacturer of the sealant, subject to approval. Apply the primer by either brushing or spraying on the joint surfaces. Apply and install the sealant within 2 to 24 hours after the application of primer.
 3. For horizontal joints, install the sealant by pouring directly from a suitable shaped can or by flowing from a bulk-loading gun.
 4. Fill vertical joints from a gun, starting from the bottom, to avoid bridging and the formation of air voids.

5. Fill overhead joints from a gun, by laying a bead along each side of the joint and then filling the middle. Immediately after installation, tool in the sealant in order to establish firm contact with joint surfaces and to provide a smooth sealant surface. Tool in accordance with the manufacturer's instructions.
 6. Control joint depth with the use of joint fillers and backup materials. Make joint widths and sealant depths as shown. Do not exceed 1/2-inch for sealant depth.
- F. Preformed Joint Seal Surface Preparation: Properly prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are structurally sound, clean, dry, and free of all oil, grease, wax, water-proofing compounds or form release materials.
1. Blast clean or saw cut all existing concrete surfaces to expose a clean bare concrete surface. Allow new concrete to be well cured, and attain a minimum of 80 percent of the specified strength before installing sealant.
 2. Apply bonding adhesive, as recommended by the manufacturer to the concrete surfaces in strict compliance with the manufacturer's recommendations. Install the joint material under a compression of 25 percent and in one continuous operation, in accordance with manufacturer's recommendations. Do all splices and directional changes using heat welding method as recommended by the manufacturer.
- G. Unbonded Joints: Use unbonded horizontal joints as shown or required where slabs of beams must be prevented from bonding to footings, walls, columns or other rigid parts of the structure.
1. Prevent bonding by use of structural grade neoprene pads placed over the bearing surface of the footing, wall or other supporting part of the structure so as to isolate it from the new concrete being placed.
- H. Encasing Inserts: Encase wedge inserts, flashing reglets and dovetail anchor slots in the concrete as shown. Take special care to place and maintain them to the proper lines and grades and to compact concrete thoroughly around them to prevent the passage of water. Set these items before placing concrete and thoroughly brace them to prevent movement during the progress of the work. Provide dovetail anchor slots spaced not more than 16 inches apart for all concrete walls faced with masonry.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing concrete reinforcement as shown and specified herein. Reinforcement includes all steel bars, wire and welded wire fabric as shown and specified.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 03 11 00 - Concrete Formwork
 - 2. Section 03 30 53 - Cast-In-Place Concrete for Non-Plant Work

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ACI SP66 - ACI Detailing Manual
 - 2. ACI 318 - Latest edition "Building Code Requirements for Reinforced Concrete"
 - 3. ASTM A 185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
 - 4. ASTM A 615/A615M - Deformed and Plains Billet-Steel Bars for Concrete
 - 5. ASTM A 706/A706M - Low Alloy Steel Deformed Bars for Concrete Reinforcement
 - 6. ASTM A 775/A775M - Epoxy Coated Reinforcing Steel Bars
 - 7. AWS D1.4 - Structural Welding Code - Reinforcing Steel
 - 8. ACI 315 - Guide to Presenting Reinforcing Steel Design Details
 - 9. CRSI - Recommended Practice for Placing Reinforcing Bars

1.3 SUBMITTALS

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

1. Product Data and Information: Submit manufacturers literature with product data, and material description of fusion bonded epoxy coating for reinforcement and reinforcement accessories, including manufacturer's recommendations for field touch-up of bars and cut ends when epoxy coated reinforcement is specified to be used.
2. CONTRACTORS' Shop Drawings: Submit checked Working Drawings, including bar lists, schedules, bending details, placing details and placing plans and elevations for fabrication and placing reinforcing steel conforming to "ACI Detailing Manual SP-66".
 - a. Do not bill wall and slab reinforcing in sections. Show complete elevations of all walls and complete plans of all slabs, except that, when more than one wall or slab are identical, only one such elevation or plan is required. These plans and elevations need not be true views of the walls or slabs shown. Bill every reinforcing bar in a slab on a plan. Bill every reinforcing bar in a wall on an elevation. Take sections to clarify the arrangement of the steel reinforcement. Identify all bars, but do not bill on such sections.
 - b. For all reinforcing bars, unless the location of a bar is clear, give the location of such bar or bars by a dimension to some structural feature which will be readily distinguishable at the time bars are placed.
 - c. Make the reinforcing steel placing drawings complete for placing reinforcement including the location of support bars and chairs, without reference to the design drawings.
 - d. Submit Detailer certification that every reinforcing steel placing drawing and bar list is completely checked and corrected before submittal for approval.
 - e. If, after reinforcing steel placing drawings and bar lists have been submitted for approval, a review reveals that the drawings and lists obviously have not been checked and corrected they will be returned for checking and correcting by the Detailer.
3. Samples: Submit the following samples when epoxy coated reinforcement is specified to be used.
 - a. 12-inch long epoxy-coated steel reinforcing bar, of any size typical to this Project
 - b. One of each type of epoxy-coated reinforcement accessory used on this Project
 - c. 12-inch long, nylon coated tie wire

4. Certificates: Test certificates of the chemical and physical properties covering each shipment of reinforcing steel bars.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1 (and as follows:)
 1. Delivery Requirements: Have reinforcing steel delivered to the work in strongly tied bundles. Identify each group of both bent and straight bars with a metal tag giving the identifying number corresponding to the reinforcing steel placing drawings and bar lists.
 2. Storage: Properly store all bars in an orderly manner, with all bars completely off the ground. Keep bars clean after delivery to the site of the work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed in the LCU Approved Materials List. Other manufacturers of equivalent products may be submitted.

2.2 MATERIALS

- A. Steel Bars: Use new billet steel bars, deformed bars, meeting the requirements of ASTM A 615/A625M Grade 60 for reinforcing steel bars.
 1. Roll all reinforcing steel bars with special deformations or identifying marks indicating the ASTM Specification and Grade.
 2. Use bars free from defects, kinks and from bends that cannot be readily and fully straightened in the field.
 3. Supply reinforcing bars in lengths which will allow convenient placement in the work and provide the required lap of joints as shown. Provide dowels of proper length, size and shape for tying walls, beams, floors, and the like together.
- B. Epoxy Coating: Conform fusion bonded epoxy coated reinforcing steel bars to ASTM A 775/A775M when used. Leave portions of the reinforcing steel bars uncoated where mechanical connections are shown.
- C. Welded Wire Fabric: Use welded wire fabric of the electrically welded type, with wires arranged in rectangular patterns, of the sizes shown or specified and meeting the requirements of ASTM A 185.

- D. Supports and Accessories: Provide bar supports and other accessories and, if necessary, additional supports to hold bars in proper position while concrete is being placed.
1. Use side form spacers against vertical or sloping forms to maintain prescribed side cover and cross position of bars.
 2. Use individual hi-chairs with welded cross ties or circular hoops to support top bars in slabs thicker than 8 inches.
 3. Bolsters, chairs and other accessories:
 - a. Use hot-dipped galvanized or provide plastic coated legs when in contact with forms for surfaces of concrete other than architectural surfaces.
 - b. Use stainless steel when in contact with forms for architecturally exposed surfaces.
 - c. Use epoxy coated bolsters, chairs and accessories including wire ties for epoxy coated reinforcing bars.
 - d. Use chairs of an approved type and space them properly to support and hold reinforcing bars in position in all beams and slabs including slabs placed directly on the subgrade or work mat. Do not use continuous hi-chairs for supporting of top bars in slabs over 8 inches in thickness.
- E. Mechanical Connections: Provide mechanical connections that develop at least 125 percent of the specified yield strength of the bar in tension.
- F. Stirrups and Ties: Provide stirrups and ties as shown and specified and meeting the requirements of ASTM A 185.

2.3 FABRICATION

- A. Drawing Review Prior to Fabrication: Do not fabricate any material before final review and approval of shop drawings.
- B. Bending and Cutting: Cut bars to required length and bend accurately before placing. Bend bars in the shop unless written approval for field bending is obtained. If field bending is permitted, do it only when the air temperature, where the bending operation is performed, is above 30 degrees F. Do not field bend bars which have been partially embedded in concrete.
- C. Splices: Use lapped splices for tension and compression splices unless otherwise noted.

- D. Cleaning: Clean and bend reinforcement in accordance with ACI 315 and ACI 318.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Placement: Place all bars in accordance with CRSI "Recommended Practice for Placing Reinforcing Bars".
- B. Tolerances: Place bars used for top reinforcement in slabs to a vertical tolerance of plus or minus 1/4-inch. Place all other reinforcement to the tolerances given to ACI 318.
- C. Cleaning: Have reinforcing steel delivered without rust other than that accumulated during transportation to the work. At all times, fully protect reinforcing steel from moisture, grease, dirt, mortar and concrete. Before being placed in position, thoroughly clean reinforcing steel of all loose mill scale and rust and of any dirt, oil, grease coatings, or other material that might reduce the bond. If there is a delay in depositing concrete, inspect and satisfactorily clean the steel immediately before the concrete is placed.
- D. Bar Positioning: Place bars in the exact positions shown with the required spacing and cross wire bars securely in position at intersections to prevent displacement during the placing of the concrete. Fasten the bars with annealed wire of not less than 17 gauge or other approved devices.
- E. Bar Extension Beyond Formwork: On any section of the work where horizontal bars extend beyond the length of the forms, perforate the form or head against which the work ends or at the proper places to allow the bars to project through a distance at least equal to the lap specified.
- F. Unacceptable Materials: Do not place reinforcing steel with damaged, unsuitably bonded epoxy-coating or rusting. If approved, mars, exposed threads of mechanical connections and cut ends may be field coated with approved epoxy coating material.
- G. Review of Placement: Have reinforcing placement reviewed by the ENGINEER before concrete is placed.
- H. Welding - Not Approved: Do not use reinforcing bar assemblies made by welding of any kind, or accessories of any kind which require field welding to reinforcing bars.
- I. Welding - Approved: Where welding of reinforcing steel is shown, AWS D1.4 "Structural Welding Code - Reinforcing Steel" applies.
- J. Tension and Compression Lap Splices: Conform tension and compression lap splices to ACI 318 with all supplements. Avoid splices at points of maximum tensile stress wherever possible. Provide temperature bars with the clear spacing shown.

Stagger all bar splices in hoop tension bars in circular tanks with not more than 50 percent of the bars spliced in any one direction. Have welded splices made by certified welders in accordance with AWS D1.4.

- K. Welded Wire Fabric: Place welded wire fabric in the positions shown, specified or required to fit the work. Furnish and place suitable spacing chairs or supports, as specified for bars, to maintain the fabric in the correct location. Where a flat surface of fabric is required, provide flat sheets, when available. Otherwise reverse roll the fabric or otherwise straighten to make a perfectly flat surface before placing. Obtain approval for the length of laps not indicated.
- L. Concrete Cover: Place reinforcing steel and welded wire fabric and hold in position so that the concrete cover, as measured from the surface of the bar or wire to the surface of the concrete, is as shown or specified.

END OF SECTION

SECTION 03 30 53

CONCRETE FOR NON-PLANT WORK

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. The extent of concrete work is shown on the drawings.

1.2 CODES AND STANDARDS

- A. ACI 347 "Recommended Practice for Concrete Formwork"; ACI 304 "Recommended Practice for measuring, Mixing, Transporting, and Placing Concrete"; comply with applicable provisions.
- B. Reference to standard specifications herein shall be construed as to be in reference to the latest revision or edition.

1.3 STORAGE

- A. Immediately upon receipt at the site, cement that is to be site mixed shall be stored in a dry, weather tight building, properly ventilated and with provisions for prevention of moisture absorption.
- B. Reinforcing shall be protected from the weather.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: Cement shall conform to standard specifications for "Portland Cement", ASTM C150, Type I for concrete not exposed to sewage and ASTM C150, Type II or ASTM C150, Type I with sulfide resistant properties equal to Type II for concrete exposed to sewage.
- B. Aggregate: Concrete aggregate shall conform to the current specifications for "Concrete Aggregate", ASTM Designation C33.
- C. Water: Water used in mixing concrete shall be fresh, clean, and free from injurious amounts of oil, acid, alkali or organic matter.
- D. Ready-Mix Concrete: Ready-mixed concrete may be used at the option of the CONTRACTOR provided that such concrete meets the requirements of these specifications and of ASTM Designation C94 for "Ready-Mixed Concrete".

- E. High-Early-Strength Concrete: Concrete made with high-early-strength Portland cement shall be used only when specifically authorized by the ENGINEER. The 7-day compressive strength of concrete made with high-early-strength cement shall be at least equal to the minimum 28-day compressive strength specified. All provisions of these specifications shall be applicable to high-early-strength concrete except the cement shall conform to ASTM Designation C150, Type III.

2.2 RELATED MATERIALS

- A. Reinforcing: Deformed Reinforcing Bars, ASTM A615; Grade 60 unless otherwise indicated.
- B. Welded Wire Fabric: ASTM A185.
- C. Liquid Membrane-Forming Curing Compound: ASTM C309, Type I.
- D. Form Materials:
 - 1. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
 - 2. Exposed Concrete Surfaces: Suitable material to suit project conditions.
- E. Waterstops: To be used in joints shall be #10 gage steel sheet, 4" wide, welded continuous through the joint, unless detailed otherwise.
- F. Chemical Floor Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gallon.
 - 1. Apply to exposed concrete slabs not indicated or scheduled to receive subsequent finishes.

2.3 QUALITY

- A. Strength: The minimum 28-day compressive strength of reinforced concrete shall be 4,000 psi, unless shown otherwise on the drawings.
 - 1. Each cubic yard of 4,000 psi concrete shall contain no less than 517 lbs. of cement. The total water content per bag of cement shall not exceed 6.0 gallons.
- B. Strength: The minimum 28-day compressive strength of non-reinforced concrete shall be 2,500 psi, unless shown otherwise on the drawings.
 - 1. Each cubic yard of 2,500 psi concrete shall contain no less than 440 lbs. of cement. The total water content per bag shall not exceed 7.5 gallons.

- C. Mix Proportions: All concrete materials shall be proportioned so as to produce a workable mixture with a slump between 2" and 4".
- D. Tests:
 - 1. The CONTRACTOR shall provide, for test purposes, one set of three cylinders taken from each day's pour or each 50 cubic yards placed, whichever is least or as directed by the ENGINEER. The CONTRACTOR at his expense shall supply test samples and an independent testing laboratory at the CONTRACTOR's expense will make tests. Sampling and testing of concrete shall be made in accordance with ASTM C-143 and ASTM C-31. The standard age of test shall be at 7 days and 28 days; and, when approved by the ENGINEER, a 45 day test may be used. If the test strength of the cylinders falls below the minimum allowable compressive strength, the ENGINEER shall have the right to order the CONTRACTOR to remove and renew that day's pour of concrete or the CONTRACTOR shall accept such deductions in the final payment as the OWNER may deem reasonable.
 - 2. Sampling and testing of concrete materials shall be made in accordance with ASTM Designations. The CONTRACTOR at his expense shall supply test samples, and an independent testing laboratory at the CONTRACTOR's expense shall make tests. The source from which concrete aggregates are to be obtained shall be selected by the CONTRACTOR well in advance of the time when they will be required in the work; and suitable samples, as they are to be used in the concrete, shall be furnished in advance of the time when the placing of the concrete is expected to begin.

PART 3 EXECUTION

3.1 FORMING AND PLACING CONCRETE

- A. Formwork: Construct so that concrete members and structures are of correct size, shape, alignment, elevation and position, complying with ACI 347.

Clean and adjust forms prior to concrete placement. Apply form release agents for wet forms, as required. Retighten forms during and after concrete placement if required to eliminate mortar leaks.

3.2 REINFORCEMENT

- A. Position, support and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- B. Install welded wire fabric in lengths as long as possible, lapping at least one mesh.

- C. Installation of Embedded Items: Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.

3.3 CONCRETE PLACEMENT

- A. Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
- B. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all parts of the forms.
- C. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing. Concrete shall not be placed when the surrounding air temperature is below 40°F. and dropping.
 - 1. In cold weather comply with ACI 306.
 - 2. In hot weather comply with ACI 305.

3.4 CONCRETE FINISHES

- A. Nonslip Broom Finish: Apply nonslip broom finish to exterior concrete and sidewalks.
 - 1. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with the ENGINEER before application.

3.5 BONDING AND GROUTING

- A. Before depositing new concrete on or against concrete that has set, existing surfaces shall be thoroughly roughened and cleaned of glaze, foreign matter, and loose particles. An epoxy coating shall be applied for bonding the new concrete to the old.

3.6 CURING

- A. Concrete shall be kept continuously (not periodically) wet for a period of at least five consecutive days by covering with water or with an approved water saturated covering. Water for curing shall be clean and free from any elements, which might cause staining, or discoloration of the concrete surface.
- B. Sidewalks and floor slabs may be cured by spraying with a Membrane-Forming curing compound, applied as per manufacturer's recommendations. This material shall not be used on any interior slabs to which an applied finish is to be bonded.

3.7 PATCHING

- A. Any concrete which is not formed as shown on the drawings, or is out of alignment or level or shows a defective surface, shall be considered as not conforming with the intent of these specifications and shall be removed from the job by the CONTRACTOR at his expense, unless the ENGINEER grants permission to patch the defective area. This shall be done in accordance with the procedures above. Honeycomb consisting of 1/2" diameter holes or greater shall be considered a defective surface. Permission to patch any such area shall not be considered a waiver of the ENGINEER's right to require complete removal of the defective work if the patching does not, in his opinion, satisfactorily restore the quality of the concrete and appearance of the surface.
- B. As the forms are removed, fins, rough edges, and offsets shall be ground smooth. Holes to 1/2", slight honeycomb, and minor defects shall be wet and filled with a 1:2 mix of cement mortar, matching color of surrounding concrete, and then troweled to a uniform plane. As soon as they have been troweled, the patched areas shall be sprayed with a curing compound, which will not destroy future bonding properties. Three days after application of curing compound, the entire surface shall be finished by wetting and applying a 1:2 mix of cement mortar with a cement brick. Using the brick, mortar shall be rubbed into pits or indentations and excess mortar rubbed off to provide a uniformly textured surface. When the surface has dried, all loose sand and dust shall be removed and the surface then hosed down with water.

3.8 TOLERANCES

- A. Tolerances for concrete work shall be in accordance with ACI 347.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 05 50 01

GALVANIZING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: All galvanizing of metals when such coating is specified, except as otherwise shown, specified or required.

1.2 REFERENCES

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

1. ASTM A 123 - Specification for Zinc-Coated (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM A 153 - Specification for Zinc Coating (Hot-Dip) On Iron and Steel Hardware
3. ASTM A 924 - Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
4. ASTM A 385 - Practice for Providing High-Quality Zinc-Coatings (Hot-Dip)
5. ASTM A 392 - Specification for Zinc-Coated Steel Chain-Link Fence Fabric
6. ASTM A 53 - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
7. ASTM A 121 - Specification for Zinc-Coated (Galvanized) Steel Barbed Wire
8. ASTM A 143 - Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
9. ASTM A 384 - Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanization of Steel Assemblies
10. ASTM B 6 - Specification for Zinc (Slab Zinc)
11. MIL-P-21035B - Paint High Zinc Dust Content, Galvanizing Repair
12. MIL-P-26915C - Primer Coating Zinc Dust Pigmented for Steel Surfaces

PART 2 PRODUCTS

2.1 MATERIALS

- A. Standard: Meet the requirements of ASTM B 6 and "Prime Western" grade, or equal, for zinc for galvanizing, zinc coating or plating.

PART 3 EXECUTION

3.1 PREPARATION

- A. General: Blast clean or grind smooth wrought metals and castings. Tumble and grind flush all high spots when a smooth coat is required for castings. Normalize castings to prevent cracking.
- B. Base Metal Cleaning: Thoroughly clean base metal. Remove all welding slag and burrs. Remove surface contaminants and coatings which would not be removable by the normal chemical cleaning process in the galvanizing operation, by blast cleaning, by immersion in a caustic bath, acid pickle and flux or other approved method.
- C. Product Preparation: Fabricate structural steel products and assemblies to be galvanized in accordance with ASTM A 143, A 384, A385 and Class I guidelines as shown in "Recommended Details of Galvanized Structures" as published by American Hot-Dip Galvanizers Association, Inc.

3.2 APPLICATION

- A. Hot Dip: Use the hot-dip process for galvanizing as required by the appropriate ASTM and American Hot-Dip Galvanizers Association, Inc. specifications.
 - 1. Do not allow the dipping to come in contact with or rest upon the dross during the operation.
 - 2. Do not use procedures tending to agitate the dross.
- B. Required Facilities: Perform the galvanizing and coating in a plant having the required facilities to produce the quality of coatings specified and with ample capacity for the volume of work required. Handle and ship galvanized material in a manner which will avoid damage to the zinc coating.
- C. Requirements: Perform galvanizing in accordance with the requirements of the following specifications:

<u>Item</u>	<u>ASTM</u>
1. Iron and steel products	A 123
2. Iron and steel hardware	A 153
3. Chain for chainwheel operators	A 153
4. Chainwheels and Guides	A 123
5. Steel sheets	A 924
6. Assembled products	A 385 & A 123
7. Steel chain link fence fabric	A 392 Class II
8. Steel pipe	A 53
9. Steel barbed wire	A 121

3.3 INSTALLATION

- A. Field Coating for Touch-Up: Coat all field welds, abraided areas where damage is more than 3/16-inch wide or uncoated cut edges in material more than 1/10-inch thick with an organic zinc-rich paint complying with MIL-P-21035B or MIL-P-26915C in multiple coats to dry film thickness of 8 mils.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 05 56 00

METAL CASTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Miscellaneous ferrous and nonferrous castings.

1. This classification includes wheel guards, valve boxes, manhole frames and covers, manhole steps, stop plank grooves, brackets and supports for piping and gutter inlets, floor drains, cleanouts and special malleable iron castings and inserts.

1.2 REFERENCES

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

1. ASTM A 27/A27M - Specification for Steel Castings, Carbon for General Applications
2. ASTM A 47 - Specification for Ferric Malleable Iron Castings
3. ASTM A 48 - Specifications for Gray Cast Iron Castings
4. ASTM A 148/A148M - Specifications for Steel Castings
5. ASTM A 536 - Specifications for Ductile Iron Castings
6. ASTM B 26/B26M - Aluminum
7. ASTM B 148 - Aluminum Bronze Sand Castings
8. ASTM B 138 - Manganese Bronze

PART 2 PRODUCTS

2.1 WORKMANSHIP

A. Provide castings accurately made to the approved dimensions, and plane or grind castings where marked or where otherwise necessary to secure flat and true surfaces. Make allowance in the patterns so that the specified thickness is not reduced. Provide manhole covers which conform to the details shown and which are true and seat at all points. Supply castings showing the name of the manufacturer

and the country of manufacture. No plugging or welding of defective castings will be permitted.

2.2 WEIGHTS

- A. Reject castings with a weight which is less than the theoretical weight based on required dimensions by more than 5 percent. Provide facilities at the site for weighing castings in the presence of the ENGINEER, or furnish invoices showing true weights, certified by the supplier.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Erect all castings to accurate grades and alignment, and when placing in concrete carefully support castings to prevent movement during concreting.

3.2 PAINTING

- A. Clean metal castings thoroughly before painting. Give manhole frames and covers and valve boxes one coat of primer and two coats of an approved asphaltum varnish or other approved coating at the point of manufacture. Deliver all other castings to the job site unpainted. Paint all other castings as specified in Section 09 90 00.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 INTENT

- A. The intent of this Specifications is to provide the material and workmanship necessary to produce complete protection of the surfaces to be coated for Lee County Utilities. This includes all surface preparation, pre-treatment, coating application, touch-up of factory coated surfaces, protection of surfaces not to be coated, clean-up, and appurtenant work, all in accordance with the requirements of the Contract Documents. Throughout this specification "ENGINEER" refers to the Lee County Utilities Project Manager or Contract Manager. And "OWNER" refers to Lee County Utilities.

1.2 PURPOSE

- A. The purpose of this Specification is to generally outline the work contemplated for the painting and protective coating work performed for Lee County Utilities, including Contract Operations, Capital Improvement Projects, and Developer Contributed Assets as defined under Scope below; together with the General Conditions, Special Provisions and all other Technical Specifications included herewith. All paints and materials used on interior tank or treatment unit surfaces shall conform to AWWA and/or Florida Department of Environmental Protection (FDEP) regulations as they may apply to potable water or wastewater service. The manufacturer furnishing the coating material may be required to furnish certification to the ENGINEER/OWNER that the materials meet these provisions.

1.3 DESCRIPTION

- A. The extent of painting work is shown on the project drawings, contracts and schedules, and as specified herein.
- B. The work includes painting and finishing of interior and exterior exposed items and surfaces throughout the project, except as otherwise specified or shown on the drawings.
 - 1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of the work.
- C. The work includes field painting of exposed bare and covered pipes and ducts including color coding, and of hangers, exposed steel and iron work, tanks,

vessels, and primed metal surfaces of equipment installed under the mechanical and electrical work, except as otherwise indicated.

- D. Paint all exposed surfaces normally painted in the execution of a building project whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, or are not specifically excluded from the painting work, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the OWNER will select these from standard colors available for the materials systems specified.

1.4 PAINTING NOT INCLUDED

- A. The following categories of work are not included as part of the field-applied finish work, unless otherwise noted on the drawings or in the Contract Documents.
 - 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal, metal fabrications, hollow metal work, and similar items. Also, for fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories.
 - 2. Pre-Finished Items: Unless otherwise shown or specified, do not include painting when factory-finishing or installer finishing is specified for such items as, but not limited to, finished electrical equipment including light fixtures, switchgear and distribution cabinets.
 - 3. Concealed Surfaces: Unless otherwise shown or specified, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas. Painting of galvanized work that will be concealed in the completed work is not required. Do not paint structural steel to be encased in concrete, nor structural steel specified not to be painted under Division 5. Except for touch-up as specified in Part 3, painting of shop primed structural steel and ferrous metals that will be concealed in the completed work is not required.
 - 4. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plating, copper, bronze and similar finished materials will not require finish painting, unless otherwise specified.
 - 5. Operating and Machined Parts and Labels: Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, machined surfaces, grease fittings, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting unless otherwise specified.

- a. Do not paint over any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.
- 6. Other Surfaces: Do not apply to glass, manhole frames and covers, aluminum platform gratings, stair treads, door thresholds, concrete wearing surfaces, or other walking surfaces unless otherwise specified.

1.5 CODES, STANDARDS AND REGULATIONS

- A. The work herein specified shall be performed in a legally acceptable manner, and it shall be the responsibility of the CONTRACTOR to obtain any and all licenses, permits, and legal approvals required to perform the work specified.
- B. All material and work covered by this specification shall comply with all currently approved or accepted provisions of applicable codes and standards published by the following organizations:

ANSI	-	American National Standards Institute 11 West 42nd New York, NY 10036 212-642-4900
API	-	American Petroleum Institute 1220 L Street N.W. Washington, DC 20005 202-682-8000
ASTM	-	American Society for Testing and Materials 100 Barr Harbor Dr. West Conshohocken, PA. 19428 610-832-9500
AWS	-	American Welding Society 550 N.W. LeJeune Rd. Miami, FL 33126 305-443-9353
AWWA	-	American Water Works Association 6666 West Quincy Avenue Denver, CO. 80235 303-794-7711
FM	-	Factory Mutual Research 1151 Boston-Providence Turnpike Norwood, MA 02062 617-762-4300

- NACE - National Association of Corrosion Engineers
PO Box 218340
Houston, TX 77218
1440 South Creek Dr.
Houston, TX. 77084-4906
713-492-0535

- NEMA - National Electrical Manufacturer's Association
2101 L Street N.W. Ste. 300
Washington DC 20037
202-457-8400

- NFPA - National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269-9101
617-770-3000

- OSHA - Occupational Safety and Health Act
U.S. Department of Labor
Occupational Safety & Health Administration
8040 Peters Rd. Bldg. H-100
Fort Lauderdale, FL 33324
954-424-0242

- SAE - Society of Automotive Engineers
400 Commonwealth Dr.
Warrendale PA. 15096-0001
412-776-4841

- SSPC - Steel Structures Painting Council
40 24th Street
Pittsburgh, PA 15222
412-281-2331

- SSPWC - Standard Specifications for Public Works Construction
Building News, Inc.
3055 Overland Avenue
Los Angeles, CA 90034
310-202-7775

- UBC - Uniform Building Code
Published by ICBO

- UL - Underwriters Laboratories Inc.
333Psingsten Rd.
Northbrook IL. 67062
312-273-4255

- C. The CONTRACTOR shall comply with all applicable Federal, state, and local laws and ordinances.

1.6 ACCEPTABLE COATING MANUFACTURERS

- A. Material manufacturers approved by the Engineer are acceptable provided that they are established to the satisfaction of the ENGINEER as being compatible with and of equal quality to the coatings of the company listed. The CONTRACTOR shall provide satisfactory documentation from the firm manufacturing the proposed material that the material meets the specified requirements and is equivalent or better than the listed materials in the following properties:
 - 1. Quality
 - 2. Durability
 - 3. Resistance to abrasion and physical damage
 - 4. Life expectancy
 - 5. Ability to recoat in future
 - 6. Solids content by volume
 - 7. Dry film thickness per coat
 - 8. Compatibility with other coatings
 - 9. Suitability for the intended service
 - 10. Resistance to chemical attack
 - 11. Temperature limitations in service and during application
 - 12. Type and quality of recommended undercoats and topcoats
 - 13. Ease of application
 - 14. Ease of repairing damaged areas
 - 15. Stability of colors
- B. The cost of all testing and analyzing of the proposed substitute materials that may be required by the ENGINEER, shall be paid by the CONTRACTOR. If the proposed substitution requires changes in the contract work, the CONTRACTOR shall bear all such costs involved and the costs of allied trades affected by the

substitution. These substitutions for other manufacturers must be made and approved prior to the bid date opening.

1.7 SUBMITTALS

- A. Coating Materials List: The CONTRACTOR shall provide six (6) copies of a coating materials list which indicates the manufacturer and the coating number, keyed to the coating schedule herein, for approval of the ENGINEER. The submittals shall be made sufficiently in advance of the coating operations to allow ample time for checking, correcting, resubmitting and rechecking.
- B. Paint Manufacturer's Information: For each paint system to be used, the CONTRACTOR shall submit the following listed data prior to beginning painting operations.
 - 1. Paint manufacturer's data sheet for each product used.
 - 2. Technical and performance information that demonstrates compliance with the system performance and material requirements.
 - 3. Paint manufacturer's instructions and recommendations on surface preparation and application.
 - 4. Colors available for each product (where applicable).
 - 5. Compatibility of shop and field applied coatings (where applicable).
 - 6. Material safety data sheet for each product used.
- C. Samples and Manufacturer's Certificate: Provide all submittals, including the following, as specified in Division 1.
 - 1. Submit manufacturer's standard color chart for color selection.
 - 2. Submit specimens, approximately 8 by 10 inches in size, for custom mixed colors for approval, not including color coding colors.
 - 3. Where equipment is customarily shipped with a standard finish, submit samples of the proposed color and finish for approval prior to shipping.
 - 4. Furnish affidavits from the manufacturer certifying that materials furnished conform to the requirements specified and that paint products have been checked for compatibility.
 - 5. Submit a supplementary schedule of paint products with mil thickness, and solids by volume, including all paint applied in the shop and in the field.

Provide a schedule that is in accordance with the recommendations of the paint manufacturer.

6. Furnish affidavits from the manufacturer certifying that coatings in immersion service contain no water-soluble solvents or corrosion inhibitive (active) pigments with slight water solubility.

1.8 DELIVERY AND STORAGE

- A. Deliver all coating materials to the job site in original, new and unbroken, sealed packages and containers bearing manufacturer's name and label, and the following information, all of which shall be plainly legible at the time of use:
 1. Name or title of material.
 2. Fed. Spec. number, if applicable.
 3. Manufacturer's stock number and date of manufacturer.
 4. Manufacturer's formula or specification number.
 5. Manufacturer's batch number.
 6. Manufacturer's name.
 7. Contents by volume, for major pigment and vehicle constituents.
 8. Thinning instructions.
 9. Application instructions.
 10. Color name and number.
 11. Expiration date.
- B. Store paint materials and painting tools and equipment, including solvents and cleaning materials, in a well ventilated, dry area and away from high heat. Do not store in building or structure being painted, nor leave overnight therein. Follow manufacturer's recommendations for the safe storage of paints and solvents. CONTRACTOR shall store materials in compliance with all local, state, and federal regulations.

1.9 QUALITY ASSURANCE

- A. Inspection by the ENGINEER, or the waiver of inspection of any particular portion of the work, shall not relieve the CONTRACTOR of his responsibility to perform the work in accordance with these Specifications.

- B. Inspection Devices: The CONTRACTOR shall furnish, until final acceptance of the work, inspection devices in good working condition for the detection of holidays, measurement of surface profile, and measurement of dry film thicknesses of the protective coatings. Surface preparation comparison visual standards, profile and dry film thickness devices shall be made available for the ENGINEER's use at all times while coating is being done. The CONTRACTOR shall provide the services of a trained operator of the holiday detection devices until the final acceptance of such coatings. Holiday detection devices shall be operated only in the presence of the ENGINEER.
- C. Surface Cleanliness: Preparation of metallic surfaces shall be based upon comparison with SSPC-VIS 1 (ASTM D2200), and as described herein. The CONTRACTOR shall furnish the photographic standards. To facilitate inspection, the CONTRACTOR shall, on the first day of abrasive blasting operations, abrasive blast metal panels to the standards specified. Plates shall measure a minimum of 8.5 inches by 11 inches. Panels meeting the requirements of the Specifications shall be initialed by the CONTRACTOR and the OWNER's representative and coated with a clear non-yellowing finish. One of these panels shall be prepared for each type of abrasive blasting and shall be used as a comparison standard throughout the project. The CONTRACTOR shall provide SSPC-VIS 1 Surface Preparation Standards for use during the abrasive blasting operations.
- D. Surface Profile: The blast abrasive shall be suitable to achieve the blast profile as required for the coating system used. The CONTRACTOR shall furnish for the ENGINEER's use, a Keane-Tator Surface Comparator No. 372 or approved equal.
- E. Film Thickness Testing: On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC "Paint Application Specification No. 2" (SSPC-PA2), using a magnetic-type dry film thickness gauge such as Mikrotest Model FM, Elcometer Model 111/1EZ, Positector 2000 or approved equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least eight (8) hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.
- F. Holiday Testing: The CONTRACTOR shall holiday test all coated ferrous surfaces inside a steel reservoir, or other surfaces which will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures. Areas which contain holidays shall be marked and repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.
1. Coatings With Thickness Exceeding 20 Mils: For surfaces having a total dry film coating thickness exceeding 20 mils: Pulse-type holiday detector

such as Tinker & Razor Model AP-W, D.E. Stearns Co. Model 14/20, or approved equal shall be used. The unit shall be adjusted to operate at the voltage required to cause a spark jump across an air gap equal to twice the specified coating thickness.

2. Coatings With Thickness of 20 Mils or Less: For surfaces having a total dry film coating thickness of 20 mils or less: Tinker & Razor Model M-1 non-destructive type holiday detector, K-D Bird Dog or approved equal shall be used. The unit shall operate at less than 75-volts. For thicknesses between 10 and 20 mils, a non-sudsing type wetting agent, such as Kodak Photo-Flo, or equal shall be added to the water prior to wetting the detector sponge.

1.10 MANUFACTURER'S REPRESENTATIVE

- A. The CONTRACTOR shall require the protective coating manufacturer to furnish a qualified technical representative to visit the project site for technical support and as may be necessary to resolve field problems attributable or associated with the manufacturer's products furnished under this contract or the application thereof.

1.11 SAFETY AND HEALTH REQUIREMENTS

- A. General: The CONTRACTOR shall provide and require use of personal protective and safety equipment for persons working in or about the project site, in accordance with requirements of OSHA Safety and Health Standards for Construction (29CFR 1910, 1915, and 1926) its revisions, and all other applicable regulations. The CONTRACTOR shall also comply with the coating manufacturer's printed instructions, appropriate technical bulletins, manuals, and material safety data sheets in the handling of potentially hazardous or harmful materials.
- B. Head and Face Protection and Respiratory Devices: The CONTRACTOR shall require all persons to wear protective helmets while in the vicinity of the work. In additions, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying, half-mask or mouthpiece respirators with appropriate filters. Barrier creams shall be used on any exposed areas of skin.
- C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion proof. Forced air ventilation shall be provided to reduce the concentration of air contaminants to the degree such that a hazard does not exist and to assist in the proper curing of coatings applied in a confined area. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

- D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels permitted under OSHA regulations, the CONTRACTOR shall provide and require the use of approved hearing protection devices.
- E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the ENGINEER, the CONTRACTOR shall provide additional illumination to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the ENGINEER.
- F. Temporary Access: All temporary ladders and scaffolding shall conform to applicable safety requirements. Scaffolding shall be erected where requested by the ENGINEER to facilitate inspection and shall be moved by the CONTRACTOR to locations as requested by the ENGINEER.
- G. Cloths and cotton waste that might constitute a fire hazard shall be placed in fire resistant closed metal containers until removed from the project site or destroyed at the end of each work day.

1.12 WARRANTY

- A. All work covered under the Contract shall be guaranteed against defective workmanship and materials for a period of one (1) year after completion and acceptance of the work. A first anniversary inspection will be scheduled by the CONTRACTOR during the eleventh (11th) month following acceptance of the work. A report shall be furnished to the OWNER describing the condition of the paint system and other work covered under the Contract. Tank draining shall be coordinated with the OWNER. Any latent defects found during this inspection shall be promptly repaired by the CONTRACTOR at no additional cost to the OWNER. Any location where coats of paint have peeled off, bubbled or cracked, and any location where rusting is evident, shall be considered a failure of the paint system. The CONTRACTOR shall make repairs at all points where failures are observed by removing the deteriorated coating, cleaning the surfaces and recoating with the same paint system. Any such repair work shall be completed by the CONTRACTOR within thirty (30) days after written notice of such defects unless otherwise negotiated.
- B. Failure on the part of the CONTRACTOR to schedule this warranty inspection will not relieve him of warranty responsibility and any defects found by the OWNER after the normal warranty period will be assumed to have occurred during the one (1) year while the warranty was in effect.

PART 2 PRODUCTS AND COATING SYSTEMS

2.1 GENERAL

- A. Definitions: The term "paint", "coatings", or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pre-treatment, primer, intermediate coat, or finish coat. The term "DFT" means minimum dry film thickness.
- B. Suitability: The CONTRACTOR shall use suitable coating materials as recommended by the manufacturer. Materials shall comply with Volatile Organic Compound (VOC) limits applicable at the Site.
- C. Material Sources: Where manufacturers and product numbers are listed, it is to show the type and quality of coatings that are required. If a named product does not comply with VOC limits in effect at the time of Bid opening, that product will not be accepted, and the CONTRACTOR shall propose a substitution product of equal quality that does comply. Proposed substitute materials will be considered as indicated below. Coating materials shall be materials that have a record of satisfactory performance in industrial plants, manufacturing facilities, and water and wastewater treatment plants.
- D. Compatibility: In any coating system, only compatible materials from a single manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the approval of the ENGINEER, a barrier coat shall be applied between all existing prime coats and subsequent field coats to insure compatibility.
- E. Containers: Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, and name of manufacturer, all of which shall be plainly legible at the time of use.
- F. Substitute or "Or-Equal" Products
 - 1. To establish equality under Section 01 60 00 - Products, Materials, Equipment and Substitutions, the CONTRACTOR shall furnish satisfactory documentation from the manufacturer of the proposed substitute or "or-equal" product that the material meets the indicated requirements and is equivalent or better in the following properties:
 - a. Minimum and maximum recoat times
 - b. Minimum and maximum cure time for immersion
 - c. Abrasion resistance per ASTM D4060 using CS17 Wheel
 - d. Maximum and minimum dry film thickness per coat
 - e. Compatibility with other coatings

- f. Suitability for the intended service
 - g. Resistance to chemical attack
 - h. Temperature limitations during application and in service
 - i. Type and quality of recommended undercoats and topcoats
 - j. Ease of application
 - k. Ease of repairing damaged areas
 - l. Stability of colors
2. Protective coating materials shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions. When requested, the CONTRACTOR shall provide the ENGINEER with the names of not less than 10 successful applications of the proposed manufacturer's products that comply with these requirements.
 3. If a proposed substitution requires changes in the WORK, the CONTRACTOR shall bear such costs involved as part of the WORK.

2.2 COLORS AND FINISHES

- A. All colors and shades of colors for all coats of paint shall be as selected or specified. Paint colors, surface treatment, gloss, and finishes, are indicated or specified in the "schedules" of the contract documents. Color and gloss not indicated or specified will be selected by the OWNER.
- B. Each coat shall be of a slightly different shade, as directed by the ENGINEER, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples or shall be customer mixed to match color samples furnished by the ENGINEER. Final acceptance of colors will be from samples applied on the job.
- C. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated.
- D. Paint Coordination: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Furnish information to manufacturers, fabricators, suppliers and others where necessary on the characteristics of the finish materials to be used, to ensure compatible prime coats of use. Provide barrier coats over incompatible primers or remove and re-prime as required.
- E. Color Coding: All exposed piping in structures, aboveground or in pipe trenches, shall be color code painted in strict accordance with the color code chart presented in Paragraph 3-15 of this section. All colors shall be as specified or as selected by the OWNER.

2.3 UNDERCOATS AND THINNERS

- A. Undercoats: Provide undercoat paint produced by the same manufacturer as the finish coats.
- B. Thinners: Use only thinners approved by the paint manufacturer and use only within recommended limits.

2.4 INDUSTRIAL COATING SYSTEMS

- A. The CONTRACTOR shall use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.
- B. Protective Coating Materials: Products shall be standard coatings produced by recognized manufacturers regularly engaged in production of such materials for application on essentially identical facilities to those proposed in this project. Where requested, the CONTRACTOR shall provide the ENGINEER with the names of not less than ten (10) successful applications of the proposed manufacturer's products, which have been proven over a three (3) year period of time, demonstrating compliance with this specification requirement.
- C. System 1 - Alkyd Enamel

1. Materials

Primer	Manufacturer's recommendation
Finish Coat	1 component alkyd enamel
Type	high quality alkyd, medium long enamel
Demonstrated suitable for	ferrous and nonferrous surfaces in industrial exposure, producing high gloss surface that is resistant to mild corrosion and chemical fumes, has good color and gloss retention, good weathering, and sunlight resistance
VOC Content, max	420 grams per liter

2. Application and manufacturers

Prime Coat (DFT = 2 to 4 mils)	Finish Coat (DFT = 2 to 4 mils)	Total System DFT
PPG Amercoat 5105	Amercoat 5450	4 to 8 mils
Tnemec Series L69	Tnemec Series 2H	
Devoe Devprime 1401	Devoe Devlac 1431	
Carboline Carbocoat 150	Carbocoat 45	
Sherwin Williams Kem Bond HS	S-W Industrial Enamel HS	

D. System 2 - Aluminum Silicone

1. Material

Type	High heat silicone with aluminum
Demonstrated suitable for	Ferrous surfaces, continuous temperatures of 1000 deg F
VOC Content, max	637 grams per liter

2. Application and manufacturers

Total System DFT = 3 mils
Carboline Thermaline 4700 - Aluminum, 2 coats
International Intertherm 50, 2-3 coats
Sherwin William Hi-Temp Coatings 1000V, 2 coats.

E. System 2 (VOC-Limited) - Aluminum Silicone

1. Material

Type	High heat silicone containing aluminum
Demonstrated suitable for	Ferrous surfaces with continuous temperatures at 1000 deg F and peaks of 1200 deg F
VOC Content, max	420 grams per liter

2. Application and manufacturers

Total System DFT = 3 mils
PPG- Amercoat 872 followed by PPG- Amercoat 873
Carboline Thermaline 4700 VOC Aluminum , 2 coats.
Sherwin Williams Hi-Temp Coatings 1000V , 2 coats.
International Intertherm 1202 UPC (1 coat – 4 mils)

F. System 3 - Epoxy/Polyurethane

1. Materials

Primer type	rust-inhibitive, 2 component epoxy
VOC Content, max	285 g/L
Finish type	2 component aliphatic polyurethane
VOC Content, max	300 g/L
Demonstrated suitable for	ferrous surfaces, superior color and gloss retention, exceptional resistance to weathering, chemical fumes, and splash

2. Application and manufacturers

Prime Coat (DFT = 3 - 5 mils)	Finish Coat (DFT = 3 - 4 mils)	TOTAL SYSTEM DFT
PPG- Amerlock 400/2	PPG- Amershield	6 - 9 MILS
Carboline Carboguard 893	Carboline Carbothane 134 HG (2 coats)	
Devoe Devran 224V	Devoe Dethane 379H	
Tnemec Hi-Build Epoxoline II Series L69	TNEMEC SERIES 750UVX	
Sherwin Williams Macropoxy 646	Sherwin Williams Hi-Solids Polyurethane	

G. System 3 (VOC-Limited) - Epoxy/Polyurethane

1. Materials

Primer type	rust-inhibitive, 2 component epoxy
VOC Content, max	250 g/L
Finish type	2 component aliphatic polyurethane
VOC Content	250 g/L, max
Demonstrated suitable for	Superior color and gloss retention, resistance to weathering, chemical fumes and splash

2. Application and manufacturers

Prime Coat (DFT = 3 - 5 mils)	Finish Coat (DFT = 3 -4 mils)	TOTAL SYSTEM DFT
Carboline 893	Carboline 134 VOC	6 - 9 MILS
Devoe Devran 224V	Devoe 379H	
Tnemec Hi-Build EpoXoline II Series L69	Tnemec Series 750UVX	
PPG Amerlock 400/2	Amershield VOC	
Sherwin Williams Macropoxy 646	S W Hi-Solids Polyurethane 100	

H. System 4 - Inorganic Zinc/Epoxy/Polyurethane

1. Material

Prime Coat	Inorganic zinc silicate, water or solvent based, 2 component
zinc content in dry film	83 percent, minimum
VOC Content, max	325 grams per liter
Demonstrated suitable for	Ferrous metal, providing superior corrosion, chemical, and abrasion resistance, recommended for use as primer under epoxy
Intermediate Coat	2 component epoxy, high build, recommended by manufacturer for application over inorganic zinc primer
VOC Content, max	276 grams per liter
Demonstrated suitable for	Outstanding chemical, corrosion, and abrasion resistance
Finish Coat	2 component aliphatic or acrylic polyurethane
VOC Content, max	315 grams per liter
Demonstrated suitable for	Superior color and gloss retention, resistance to chemical fumes and severe weathering, abrasion resistance

2. Application and manufacturers

Surface preparation for primer	SSPC SP 6
Anchor profile for primer	per manufacturer

Prime Coat (DFT = 2 - 4 mils)	Intermediate Coat (DFT = 3 - 5 mils)	Finish Coat (DFT = 2 - 4 mils)	Total System DFT
PPG- Dimetcote 9HS or Dimetcote 21-5	Amercoat 385	Amercoat 450H	7 - 13 mils
Carboline Carbozinc 11HS or 11WB	Carboguard 890	Carbothane 134HG	
Devoe Cathacote 302H	Devran 224V	Devthane 379H	
Tnemec Tneme- Zinc 94H20	Tnemec Series L69	Tnemec Series 750 UVX	
Sherwin Williams Zinc Clad II Plus	S W Macropoxy 646	S W Hi-Solids Polyurethane	

I. System 4 (VOC-Limited) - Inorganic Zinc/Epoxy/Polyurethane

1. Materials

Prime Coat	Inorganic zinc silicate, water-based, 2 component
zinc content in dry film	79 percent, minimum
VOC content, max	0 grams per liter
Demonstrated suitable for	Ferrous metal, providing superior corrosion, chemical, and abrasion resistance, recommended for use as primer under epoxy
Intermediate Coat	2 component epoxy, high build, recommended by manufacturer for application over inorganic zinc primer
Demonstrated suitable for	Outstanding chemical, corrosion, and abrasion resistance
VOC content, max	250 grams per liter
Finish Coat	2 component aliphatic or acrylic polyurethane
Demonstrated suitable for	Superior color and gloss retention, resistance to chemical fumes, severe weathering, and abrasion
VOC content, max	250 grams per liter

2. Application and manufacturers

Surface preparation for primer	SSPC SP 10
Anchor profile for primer	per manufacturer

Prime Coat (DFT = 3 - 4 mils)	Intermediate Coat (DFT = 4 - 6 mils)	Finish Coat (DFT = 3 - 4 mils)	Total System DFT
PPG- Dimetcote 21-5	Amerlock 400/2	Amershield VOC	10 - 14 mils
Carboline Carbozinc 11WB	Carboguard 893	Carbothane 134VOC	
Tnemec Tneme-Zinc 94H20	Tnemec Series L69	Tnemec Series 750 UVX	
Sherwin Williams Zinc Clad XI	S W Macropoxy 646	S-W Hi-Solids Polyurethane 250	
Devoe Cathacote 305	Devoe Devran 224V	Devoe Devthane 379H	

J. System 5 - Inorganic Zinc, Water Based

1. Material

Type	water based zinc silicate, 2 component
Percent Zinc in dry film	83, min
VOC Content, max	0 grams per liter
Demonstrated suitable for	Severe weathering and moderate chemical fumes, continuous temperatures of 750 deg F

2. Application and manufacturers

Product (2 coats at 2 - 4 mils each)	Total System DFT
PPG- Dimetcote 21-5	4 - 8 mils
Devoe Cathacoat 305	
Carboline Carbozinc 11 WB	
Sherwin Williams Zinc Clad XI	

K. System 6 - Acrylic Latex

1. Material

Primer	Product, surface preparation, and DFT as recommended by manufacturer for the surface
Finish Type	Single component, water based acrylic latex, with fungicide
VOC Content, max	180 grams per gallon
Demonstrated suitable for	PVC piping, weather and mild chemical resistance, excellent color and gloss retention

2. Application and manufacturers

Finish (at least 2 coats required)	Total System DFT
PPG- Amercoat 220	primer plus 6 mils
Carboline Carbocrylic 3359	
Tnemec Series 1028 Enduratone	
Sherwin Williams Metalatex	
Devoe Devcryn 530	

L. System 7 - Epoxy, Equipment

1. Materials

Primer Type	2 component epoxy, recoatable up to one year
Demonstrated suitable for	Rust inhibitive, outstanding chemical, abrasion, and weathering resistance, resistance to splash, washdown, and condensation. Immersion capability is not required
VOC content, max	330
Finish Type	2 component epoxy, available in many colors
Demonstrated suitable for	Outstanding chemical, abrasion, and weathering resistance, resistance to splash, washdown, and condensation. Immersion capability is not required
VOC content, max	330

2. Application and manufacturers

Prime Coat (DFT = 4 to 6 mils)	FINISH COAT (DFT = 3 TO 4 MILS)	TOTAL SYSTEM DFT
PPG-Amerlock 400	Amerlock 400	7 to 10 mils
Tnemec Series L69	Tnemec Series L69	
Devoe Devran 224V	Devran 224V	
Carboline Carboguard 888	Carboguard 888	
Sherwin Williams Macropoxy 646	S W Macropoxy 646	

M. System 7 (VOC-Limited) - Epoxy, Equipment

1. Materials

Primer Type	2 component epoxy, recoatable up to one year
Demonstrated suitable for	Rust inhibitive, outstanding chemical, abrasion, and weathering resistance, resistance to splash, washdown, and condensation. Immersion capability is not required
VOC content, max	250
Finish Type	2 component epoxy, available in many colors
Demonstrated suitable for	Outstanding chemical, abrasion, and weathering resistance, resistance to splash, washdown, and condensation. Immersion capability is not required
VOC content, max	250

2. Application and manufacturers

Prime Coat (DFT = 4 - 5 mils)	Finish Coat (DFT = 4 - 5 MILS)	Total System DFT
Devoe Bar-Rust 231	Devoe 224V	8 - 10 mils
PPG- Amerlock 400/2	Amerlock 400/2	
Tnemec Series L69	Tnemec Series L69	
Carboguard 60	Carboguard 60	
Sherwin Williams Macropoxy 646	S W Macropoxy 646	

N. System 8 - Inorganic Zinc/Epoxy, Equipment

1. Materials

Primer type	Water or solvent-based inorganic, self-curing zinc silicate
Zinc content in dry film, min	84 percent
VOC content, g/L, max	323
Demonstrated suitable for	Superior corrosion, chemical and abrasion resistance, recommended as primer under epoxy
Finish type	2 component polyamide epoxy available in many colors
VOC content, g/L, max	250
Demonstrated suitable for	Good resistance to chemical attack, weathering, splash, washdown, and condensation

2. Application

Prime Coat (DFT = 3 to 4 mils)	Finish Coats (2 or more) (DFT = 4 to 8 mils each)	Total System DFT
PPG- Dimetcote 9 HS	Amerlock 400	11 to 20 mils
Carboline Carbozinc 11HS	Carboguard 890	
Tnemec Hydro-Zinc 94H2O	Tnemec Series L69	
Sherwin Williams Zinc Clad II Plus	S W Macropoxy 646	
Devoe Cathacote 302H	Devoe Devran 224V	
International Interzinc 22HS	International Interseal 670HS	

O. System 8 (VOC-Limited) - Inorganic Zinc/Epoxy, Equipment

1. Materials

Primer type	Water-based inorganic, self-curing zinc silicate
Zinc content in dry film	83 percent, min
Demonstrated suitable for	Superior corrosion, chemical and abrasion resistance, recommended as primer under epoxy
Finish type	2 component polyamide epoxy
VOC Content, max	215 g/L
Demonstrated suitable for	Good resistance to chemical attack, weathering, splash, washdown, and condensation, available in many colors

2. Application and manufacturers

Prime Coat (DFT = 3 to 5 mils)	Finish Coats (2 or more) (DFT = 4 to 6 mils each)	Total System DFT
Devoe Cathacote 305	Devran 224V	11 to 17 mils
Carboline Carbozinc 11WB	Carboguard 890	
PPG- Dimetcote 21-5	Amerlock 400/2	
Sherwin Williams Zinc Clad XI	S-W Macropoxy 646	

P. System 9 - Acrylic, Concrete

1. Materials

Filler-Sealer Type	Epoxy or acrylic masonry sealer, for concrete and CMU, for wet and dry conditions
Primer	as recommended by manufacturer
VOC Content, g/L, max	75
Finish Type	single component waterborne acrylic, industrial grade, high molecular weight
VOC Content, g/L, max	180
Demonstrated suitable for	concrete under mild to moderate exposure conditions, splash but not immersion

2. Application and manufacturers

Prime Coat (Filler-Sealer)	Finish Coat (DFT = 5 - 7 mils) (2 or more coats)	Total System DFT
Tnemec EnviroFill 130	Tneme-Crete 180 Series	5 - 7 mils plus primer
PPG- Amerlock 400BF and Amercoat 114A	Amercoat 220P	
Carboline Sanitile 500	Carbocrylic 3359DTM	
Sherwin Williams Cement Plex 875 (acrylic) and Kem Cati Coat (epoxy)	S W Metalatex	
Devoe Tru-Glaze 4015	Devoe Devcryn 1449	

Q. System 10 - Polyurethane, Fiber Glass

1. Materials

Primer Type	as recommended by manufacturer
Finish Type	2 component aliphatic polyurethane
Demonstrated suitable for	Fiberglass, superior color and gloss retention, resistance to acid and alkali splash, fumes, and severe weathering, no immersion
VOC content, g/L max	300

2. Application and manufacturers

Prime Coat (3 to 4 mils)	Finish Coats (4 to 6 mils)	Total System DFT
PPG- Amerlock 400	Amershield	7 to 10 mils
Tnemec Series 750 UVX	Tnemec Series 750 UVX	
Carboline Carbocrylic 120 (2 coats)	Carbothane 134 HG (2 coats)	
SHERWIN WILLIAMS MACROPOXY 646	S-W Hi-Solids Polyurethane	
DEVOE DEVRAN 224V	Devoe Devthane 379H	

R. System 10 (VOC-Limited) - Polyurethane, Fiber Glass

1. Materials

Primer Type	as recommended by manufacturer
Finish Type	2 component aliphatic polyurethane
Demonstrated suitable for	Fiberglass, superior color and gloss retention, resistance to acid and alkali splash, fumes, and severe weathering, no immersion
VOC content, max	250 g/L

2. Application

Prime Coat (3 to 4 mils)	Finish Coats (4 to 6 mils)	TOTAL SYSTEM DFT
Devoe Bar-Rust 231	DEVTHANE 379H (2 coats)	7 to 10 mils
Carboline Carbocrylic 120 (2 coats)	Carbothane 134 VOC (2 coats)	
PPG Amerlock 400	Amershield VOC	
Tnemec Epoxoline Series L69	Tnemec Series 750 UVX	
Sherwin Williams Macropoxy 646	S-W Hi-Solids Polyurethane 250	

2.5 SUBMERGED AND SEVERE SERVICE COATING SYSTEMS

A. System 100 - Amine Cured Epoxy

1. Material

Type	high build, amine cure epoxy
VOC content, g/L max	220
Demonstrated suitable for	steel, long term immersion in water and wastewater, resistant to corrosion, chemical fumes, good color retention
Certification	NSF 61 if in contact with potable water

2. Application and manufacturers

Products (3 coats or more)	Total System DFT
<u>PPG- Amercoat 133</u>	15 to 17 mils For non-submerged valves and other equipment, DFT = 10 to 12 mils
Carboline Carboguard 891HS	
International Bar-Rust 233H	
Tnemec Epoxoline Series L69	
Sherwin Williams Macropoxy 646 PW	

B. System 101 - Polyamide Epoxy

1. Materials

Type	high build polyamide cure epoxy
VOC content, max, g/L	366
Demonstrated suitable for	long term immersion in water and wastewater, resistant to corrosion and chemical fumes, good color retention
Certification	NSF 61 if in contact with potable water

2. Application and manufacturers

Products (3 coats or more)	<u>Total System DFT</u>
<u>PPG- Amercoat 370</u>	11 - 13 mils
Tnemec Pota-Pox Series 20	

Carboline Carboguard 61	
Sherwin Williams Macropoxy 646 PW for water and Dura-Plate 235 for wastewater	
Devoe Bar-Rust 233H	

C. System 101 (VOC-Limited) - Polyamide Epoxy

1. Materials

Type	high build polyamide cure epoxy
VOC content, max, g/L	250
Demonstrated suitable for	long term immersion in water and wastewater, resistant to corrosion and chemical fumes, good color retention
Certification	NSF 61 if in contact with potable water

2. Application and manufacturers

Products (3 coats or more)	<u>Total System DFT</u>
<u>Devoe Bar-Rust 233H</u>	12 - 18 mils
Tnemec L140F	
PPG- Amerlock 400/2	
Carboguard 61	
Sherwin Williams Macropoxy 646 PW for water and Dura-Plate 235 for wastewater	

D. System 102 - Epoxy, Steel Reservoirs

1. Materials: In accordance with AWWA D102 - Coating Steel-Water Storage Tanks, System ICS-2.

Type	2 component epoxy, polyamide or amine-cure type
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Demonstrated suitable for	Steel, long term immersion in potable water
VOC content, g/L max	366
Certification required	NSF 61

2. Application and manufacturers

First Coat (2 - 4 mils)	Second Coat (3 - 5 mils)	Finish Coat (4 - 6 mils)	<i>Total System DFT</i>
PPG- Amerlock 2	Amerlock 2	Amerlock 2	9 - 15 mils
Carboline Carboguard 891	Carboguard 891	Carboguard 891	
Tnemec Pota-Pox L140F	Tnemec L140F	Tnemec L140F	
Sherwin Williams Macropoxy 646 PW	S-W Macropoxy 646 PW	S-W Macropoxy 646 PW	
Devoe Bar Rust 233H	Devoe Bar-Rust 233H	Devoe Bar-Rust 233H	

E. System 102 (VOC-Limited) - Epoxy, Steel Reservoirs

1. Materials: In accordance with AWWA D102 - Coating Steel-Water Storage Tanks, System ICS-2.

Type	2 component epoxy, polyamide or amine-cure
Demonstrated suitable for	long term immersion in potable water
VOC content, g/L max	250
Certification required	NSF 61

2. Application and manufacturers

First Coat (3 - 5 mils)	Second Coat (4 - 6 mils)	Finish Coat (5 - 7 mils)	Total System DFT
PPG- Amercoat 133	Amercoat 133	Amercoat 133	12 - 18 mils
Carboline Carboguard 891	Carboguard 891	Carboguard 891	
Tnemec Pota-Pox Plus L140F	Tnemec L140F	Tnemec L140F	
Sherwin Williams Macropoxy 646 PW	S-W Macropoxy 646 PW	S-W Macropoxy 646 PW	
Devoe Bar Rust 233H	Devoe Bar-Rust 233H	Devoe Bar-Rust 233H	

3. All lap roof plate edges, both sides, shall be pre-coated. If necessary, primer exposed on exterior of roof may be removed prior to welding. Pre-coating shall extend at least 6-inches from plate edges.
4. Touch-up coating shall be done for areas damaged during erection, or areas not pre-coated. The CONTRACTOR shall spot sandblast to SSPC SP-5 - White Metal Blast Cleaning, before application of coating. Material used for touch-up shall be the indicated material or a compatible primer recommended by the manufacturer.
5. All edges, nuts, bolts, lap joints, weld seams, and the roof rim angle shall receive one brush-applied coat prior to the application of the first complete spray coat.
6. Curing Period: Prior to immersion, the completed system shall be subjected to at least 240 hours of curing time with the metal temperature at a minimum of 70 degrees F, or 480 hours at a minimum of 60 degrees F, both conditions at a maximum relative humidity of 50 percent and under the forced ventilation conditions required by the paragraph entitled Curing of Coatings. More curing time or a higher temperature shall be provided if recommended by the epoxy coating manufacturer. If the environmental conditions do not provide the necessary minimum temperature, use heated air to provide the necessary heat for curing. Other combinations of curing time and temperature may be used if the coating manufacturer presents satisfactory documentation and test results to substantiate that the degree of curing is equal or greater than curing for 240 hours at 70 degrees F.

F. System 103 - Fusion Bonded Epoxy

1. Material

Type	100 percent solids fusion bond epoxy
Demonstrated suitable for	fluidized bed or electrostatic spray application, recommended for pumps, valves, pipe appurtenances, tanks, pipe hangers, flow meters, and hydrants
Certification requirement	NSF 61

2. Application in accordance with AWWA C213 and the following:

Product	Surface and DFT
3M Scotchkote 134 or 206N	Valves 12-mils
	All others 16-mils

G. System 104 - Polyurethane, Concrete

1. Materials

Filler-sealer type	epoxy material with portland cement and aggregate
Primer type	Phenolicamine or polyamidoamine epoxy
VOC content, g/L max	250
Finish type	aromatic elastomeric polyurethane
Demonstrated suitable for	concrete and concrete block masonry, long term immersion in water and wastewater and service where subject to splash and spill of water and wastewater treatment chemicals
VOC content, g/L max	250
Certification requirement, where coating will be in contact with potable water	NSF 61

2. Application and manufacturers

Filler-Sealer	Primer	Finish Coat
	DFT = 3 - 7-mils	DFT = 100 - 125-mils, 75 mils for potable water

Tnemec MortarClad 218	Tnemec Pota-Pox L140 (potable water) Epoxoprime 201 (wastewater)	Elasto-Shield 406 (max 75 mils for potable water)
PPG-Amerlock 400/BF	Amerlock 400/2	Amerlock 490
Sherwin Williams Steel Seam FT 910	S-W Dura-Plate 235	S-W Sherflex (Max 100 mils for potable water)
International Ceilcote 400 Corocrete	Polibrid 670-S	Polybrid 705

H. System 105 - Epoxy, Concrete

1. Materials

Filler-sealer type	Epoxy material with portland cement and aggregate
Primer type	100% solids epoxy
VOC content, g/L max	100
Finish type	Amine cure epoxy/aggregate-filled epoxy
Demonstrated suitable for	Sewer manhole & wastewater facility, long term immersion in wastewater service where subject to chemical and bacteriological attack found in municipal sanitary sewer system
VOC content, g/L max	100

2. Application and manufacturers

Filler-Sealer	Primer DFT = 5 – 10 mils	Finish Coat DFT = 125 – 150 mils
RLS Raven 210	RLS Raven 155	Raven 405 FS
Sauereisen Filler Compound 209 or 209FS	Per Sauereisen	SewerGard 210
		Warren Environmental

2.6 SPECIAL COATING SYSTEMS

A. System 200 - Acrylic, Wood and Gypsum Board

1. Materials

Primer type	as recommended by manufacturer
Finish type	single component, water based, acrylic, fungicide added
VOC content, max, g/L	250
Demonstrated suitable for	wood, mild to moderate exposure inside and outside building, and gypsum board, inside

2. Application and manufacturers

Prime Coat (1.5 to 2.5 mils)	Finish Coat (4 to 6 mils) (2 coats)	Total System DFT
PPG- Amercoat 220P	Amercoat 220P	5.5 to 8.5 mils
Carboacrylic 120	Carboacrylic 3359	
Tnemec Series 115 Unibond	Tnemec Series 1028 Enduratone	
Sherwin Williams PrepRite ProBlock	S-W Metalatex	
Devoe Devcryn 520	Devoe Devcryn 1449	

PART 3 EXECUTION

3.1 MANUFACTURER'S SERVICES

- A. The CONTRACTOR shall require the protective coating manufacturer to furnish a qualified technical representative to visit the Site for technical support as may be necessary to resolve field problems.
- B. For submerged and severe service coating systems, the CONTRACTOR shall require the paint manufacturer to furnish the following services:
 1. The manufacturer's representative shall provide at least 6 hours of on-Site instruction in the proper surface preparation, use, mixing, application, and curing of the coating systems.
 2. The manufacturer's representative shall observe the start of surface preparation, mixing, and application of the coating materials for each coating system.

3.2 WORKMANSHIP

- A. Skilled craftsmen and experienced supervision shall be used on coating WORK.
- B. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure thorough surface preparation. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given so that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other precautionary measures.
- C. Damage to other surfaces resulting from the WORK shall be cleaned, repaired, and refinished to original condition.

3.3 STORAGE, MIXING AND THINNING OF MATERIALS

- A. Manufacturer's Recommendations: Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed. No substitutes or other deviations will be permitted without written permission of the ENGINEER. The CONTRACTOR shall supply the ENGINEER with copies of each manufacturer's instructions in accordance with the requirements of Paragraph 1-07, "SUBMITTALS".
- B. All protective coating materials shall be used within the manufacturer's recommended shelf life.
- C. Storage and mixing of paint or other coating materials shall be performed only in those areas designated by the ENGINEER.

3.4 PREPARATION FOR COATING

- A. General: All surfaces to receive protective coatings shall be cleaned as specified herein prior to application of said coatings. The CONTRACTOR shall examine all surfaces to be coated and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application. Do not paint over dirt, rust, scale, oil, grease, moisture, scuffed surfaces or other foreign material or in conditions otherwise detrimental to the formation of a durable paint bond and film.

- B. Protection of Surfaces Not to be Coated: Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations. All hardware, lighting fixtures, switch plates, machined surfaces, couplings, shafts, bearings, nameplates on machinery and other surfaces not to be painted shall be removed, masked or otherwise protected. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.
- C. Protection of Adjacent Work and Areas: Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair to the satisfaction of the OWNER any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.
- D. Protection of Painted Surfaces: Cleaning and coating shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly-coated surfaces.

3.5 ENVIRONMENTAL REQUIREMENTS

- A. No coating work shall be performed under the following conditions:
 - 1. Surface or ambient temperatures exceed the manufacturer's recommended maximum or minimum allowable.
 - 2. Dust or smoke laden atmosphere.
 - 3. Damp or humid conditions, where the relative humidity is above the manufacturer's maximum allowable.
 - 4. Substrate and ambient temperatures are less than 5°F above the dew point and are decreasing. Dew point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce, Weather Bureau psychrometric tables. Elcometer 319 Dew Point meter or equal may also be used.
 - 5. Ambient temperature that is expected to drop below 50°F or less than 5°F above the dew point within 8 hours after application of coating.

3.6 SURFACE PREPARATION STANDARDS

- A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this Specification:

1. Solvent Cleaning (SSPC-SP1): The method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces through the use of solvent, vapor, emulsion, alkaline, and/or steam.
2. Hand Tool Cleaning (SSPC-SP2): The method for removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter through the use of non-power hand tools.
3. Power Tool Cleaning (SSPC-SP3): The method for removing all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter through the use of power assisted hand tools.
4. White Metal Blast Cleaning (SSPC-SP5): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint.
5. Commercial Blast Cleaning (SSPC-SP6): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint. Evenly dispersed very light shadows, streaks, and discolorations caused by stains of rust, mill scale, and previously applied paint may remain on no more than 33% of the surface.
6. Brush-off Blast Cleaning (SSPC-SP7): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface.
7. Near-White Blast Cleaning (SSPC-SP10): The method of preparing steel surfaces which, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, and paint. Evenly dispersed very light shadows, streaks, and discolorations caused by stains of rust, mill scale, and previously applied paint may remain on no more than 5% of the surface.

3.7 SURFACE PREPARATION

- A. General: Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 1. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or

area, reinstall the removed items by workmen skilled in the trades involved.

2. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly painted surfaces. Remove mildew in accordance with the paint manufacturer's recommendations.

3.8 NEW FERROUS METAL SURFACE PREPARATION (UNGALVANIZED)

- A. The minimum abrasive blasting surface preparation shall be as specified in the coating system schedules included at the end of this section. Where there is a conflict between these Specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.
- B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers (NACE) Standard TM-01-70.
- C. All oil, grease, welding fluxes and other surface contaminants shall be removed by alkaline cleaning per SSPC-SP1 prior to blast cleaning.
- D. All sharp edges shall be rounded or chamfered and all burrs, surface defects and weld splatter shall be ground smooth prior to blast cleaning.
- E. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. CONTRACTOR shall submit data and samples for approval on abrasives to be used on the Project. Abrasives that are used shall be designed for the specific purpose of blast cleaning. Abrasives shall be free of contaminants and chlorides. Ordinary builder's sand shall not be considered to be approved abrasive material. ENGINEER will periodically sample abrasives used at the job site for comparison with approved submitted materials.
- F. The abrasive shall not be reused unless otherwise approved by the ENGINEER. For automated shop blasting systems, clean oil and moisture-free abrasives shall be maintained.
- G. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.
- H. Compressed air for air blast cleaning shall be supplied at adequate pressure from well-maintained compressors equipped with oil/moisture separators which remove all contaminants.

- I. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming or other approved method prior to painting.
- J. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.
- K. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.
- L. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, the SSPC-SP2, Hand Tool Cleaning, or SSPC-SP3, Power Tool Cleaning, will be permitted.
- M. Shop applied coatings of unknown composition shall be completely removed before the specified coatings are applied. Valves, castings, ductile iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by Solvent Cleaning per SSPC-SP1 before the abrasive blast cleaning work has been started.
- N. Shop primed equipment shall be alkaline cleaned in the field before finish coats are applied.

3.9 FERROUS METAL SURFACE PREPARATION (GALVANIZED)

- A. All installation and erection caused blemishes to galvanized surfaces shall be touched up in accordance with ASTM A780 prior to coating.
- B. Galvanized ferrous metal shall be alkaline cleaned per SSPC-SP1 to remove oil, grease, and other contaminants detrimental to adhesion of the protective coating system to be used.
- C. Pretreatment coatings of surfaces shall be in accordance with the printed recommendations of the coating manufacturer. Galvanized metals may be cleaned with suitable organic solvent such as a rust inhibitor or aqueous alkaline solution per ASTM D6386.

3.10 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS, EXCLUDING STEEL TANK OR TREATMENT UNIT INTERIORS (IN ADDITION TO REQUIREMENTS IN PARAGRAPHS 3-05 AND 3-06).

- A. General: All grease, oil, heavy chalk, dirt, or other contaminants shall be removed by solvent or detergent cleaning prior to abrasive blast cleaning. The

CONTRACTOR shall determine the generic type of the existing coatings by laboratory testing, at no additional cost to the OWNER.

- B. Abrasive Blast Cleaning: The CONTRACTOR shall provide the degree of cleaning specified in the coating system schedule for the entire surface to be coated. If the degree of cleaning is not specified in the schedule, deteriorated coatings shall be removed by abrasive blast cleaning to SSPC-SP6, Commercial Blast Cleaning. Areas of tightly adhering coatings shall be cleaned to SSPC-SP7, Brush-Off Blast Cleaning, with the remaining thickness of existing coating not to exceed 3 mils.
- C. Incompatible Coatings: If coatings to be applied are not compatible with existing coatings, the CONTRACTOR shall apply intermediate coatings per the paint manufacturer's recommendation for the specified abrasive blast cleaning. A small trial application shall be conducted for compatibility prior to painting large areas.
- D. Unknown Coatings: Coatings of unknown composition shall be completely removed prior to application of new coatings.

3.11 SURFACE PREPARATION FOR REPAINTING EXISTING STEEL

- A. The entire structure is to be completely pressure washed at 3,000 to 5,000 psi with potable water.
- B. All areas shall be cleaned/sandblasted to the surface preparation standards as specified herein, or superseded by the bid form.
- C. All cleaned areas are to be primed the same work day that they are cleaned and blasted.

3.12 PRESSURE WASH CLEANING FOR REPAINTING EXISTING CONCRETE

- A. The entire structure is to be pressure washed at 3,000 to 5,000 psi with a solution of 50% water and bleach to yield a mixture with a minimum concentration of 2-1/2% sodium hypochlorite.
- B. The entire structure is to be completely rinsed by pressure washing at 3,000 to 5,000 psi with potable water.

3.13 CONCRETE AND CONCRETE BLOCK MASONRY SURFACE PREPARATION

- A. Surface preparation shall not begin until at least 30 days after the concrete has been placed.
- B. All efflorescence, chalk, dust, dirt, oil and grease shall be removed by Detergent Cleaning per SSPC-SP1 before abrasive blast cleaning.

- C. Concrete, concrete block masonry surfaces, previously painted concrete and masonry and deteriorated concrete and masonry surfaces to be coated shall be abrasive blast cleaned to remove laitance, paint, deteriorated concrete, and roughen the entire surface equivalent to the surface of the No. 80 grit flint sandpaper. Concrete shall have a consistent, even texture (void free) and shall be patched where needed.
- D. Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Do not paint over surfaces where the moisture content exceeds that permitted in the manufacturer's printed directions.
- E. If acid etching is required by the coating application instructions, the treatment shall be made after sandblasting. After acid etching, rinse surfaces with clean water to neutralize the acid and test the pH. The pH shall be between 7.0 and 8.0.
- F. Surfaces shall be clean and dry and as recommended by the coating manufacturer before coating is started.
- G. Unless required for proper adhesion, surfaces shall be dry prior to coating. The presence of moisture shall be determined with a moisture detection device such as Delmhors Model DB or approved equal.

3.14 PLASTIC, FIBERGLASS AND NONFERROUS METALS SURFACE PREPARATION

- A. Plastic and Fiberglass surfaces shall be sanded or Brush Off Blast Cleaned, SSPC-SP7, prior to solvent cleaning with a chemical compatible with the coating system primer. If blast cleaned, use 60-80 mesh abrasive.
- B. Non-ferrous metal surfaces shall be Solvent Cleaned, SSPC-SP1, followed by sanding or Brush Off Blast Cleaning, SSPC-SP7.
- C. All surfaces shall be clean and dry prior to coating application.

3.15 WOOD SURFACE PREPARATION

- A. Clean wood surfaces to be painted of all dust, dirt, grease, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, with either manual or mechanical means, as applicable, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of the priming coat. After priming, fill holes and

imperfections in finish surfaces with putty or plastic woodfiller. Sandpaper smooth when dried and dust off.

- B. Prime or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood.

3.16 WORKMANSHIP

- A. Skilled craftsmen and experienced supervision shall be used on all work.
- B. Clean drop cloths shall be used. All damage to surfaces resulting from the work hereunder shall be leaned, repaired, and refinished to the complete satisfaction of the ENGINEER, at no cost to the OWNER.
- C. All coatings shall be applied under dry and dust-free conditions. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to ensure that they have been thoroughly cleaned and that they receive an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, alligating, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding. Special attention shall be given to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other approved precautionary measures.

3.17 SHOP COATING REQUIREMENTS

- A. All items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the specified or approved color. The methods, materials, application, equipment and all other details of shop painting shall comply with these Specifications. If the shop primer requires top- coating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.
- B. All items of equipment, or parts and surfaces of equipment which are submerged when in service, with the exception of pumps and valves shall have all surface preparation and coating work performed in the field.
- C. The interior surfaces of steel water reservoirs shall have all surface preparation and coating work performed in the field.
- D. For certain pieces of equipment, it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switch-gear or main control boards, submerged parts of the pumps, ferrous metal passages in valves, or other items

where it is not possible to obtain the specified quality in the field. Such equipment shall be shop primed and finish coated in the field with the identical material after installation. The CONTRACTOR shall require the manufacturer of each such piece of equipment to certify as part of its shop drawings that the surface preparation is in accordance with these Specifications. The coating material data sheet shall be submitted with the shop drawings for the equipment.

- E. For certain small pieces of equipment, the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.
- F. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 6 months before finish coating, or less time if recommended by the coating manufacturer.
- G. Damage to shop-applied coatings shall be repaired in accordance with this section and the coating manufacturer's printed instructions prior to finish painting.
- H. The CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment shop drawings.

3.18 APPLICATION OF COATINGS

- A. The application of protective coatings to steel substrates shall be in accordance with "Paint Application Specification No. 1", (SSPC-A-1), Steel Structures Painting Council.
- B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The CONTRACTOR shall schedule such inspection with the ENGINEER in advance.
- C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be painted in the same working day.
- D. Coatings shall be prepared, mixed and applied in accordance with the manufacturer's instructions and recommendations, and these Specifications. If directions differ, the most stringent requirements shall be followed.

- E. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
- F. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the coating materials. Remove the film, and if necessary, strain the material before using.
- G. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe (brushed or gloved) painting for these areas.
- H. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.
- I. Job Conditions: The following job conditions will be strictly enforced during the application of coatings for the project.
 - 1. Apply water-base coatings only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F and 90 degrees F unless otherwise permitted by the paint manufacturer's printed instructions.
 - 2. Apply solvent-thinned coatings only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F and 95 degrees F unless otherwise permitted by the paint manufacturer's printed instructions.
 - 3. Do not apply paint in dust or smoke laden atmosphere, high winds, rain, fog or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
 - 4. Do not apply coatings when the temperature is less than 5 degrees F above the dewpoint. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Weather Bureau psychrometric tables.
 - 5. Do not apply coatings when the outside air temperature is expected to drop below 45 degrees F or less than 5 degrees F above the dewpoint, within 8 hours after application of the coating.
 - 6. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

J. The finish coat on all work shall be applied after all concrete, masonry, and equipment installation is complete and the work areas are clean and dust-free.

K. General Considerations:

1. Apply paint as specified and in accordance with the manufacturer's directions. Use brushes for applying first coat on wood and on metals other than steel and sheet metal and items fabricated from steel and sheet metal. For other coats on wood, metal and other substrates, use applicators and techniques best suited for the type of material being applied.
2. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
3. Paint surfaces behind movable equipment the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment with prime coat only before final installation of equipment.
4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
5. Paint the back sides of removable or hinged covers to match the exposed surfaces.
6. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated or specified.
7. Sand lightly between each succeeding enamel coat.
8. Omit the field prime coat on shop-primed surfaces and touch up painted metal surfaces which are not to be finished painted and which will not be exposed to view in the completed work. Do not omit primer on metal surfaces specified to be finish coated or on metal surfaces that will be exposed to view in the completed work.

L. Scheduled Painting:

1. Apply the first coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- M. Minimum Coating Thickness: Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as specified or, if not specified, as recommended by coating manufacturer.
- N. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces, and on the outside or exterior of buildings or structures:
1. Mechanical items to be painted include, but are not limited to, the following:
 - a. Piping, valves, pipe hangers, and supports.
 - b. Pumps
 - c. Tanks
 - d. Duct work, insulation
 - e. Motors, mechanical equipment, and supports
 - f. Accessory items
 2. Electrical items to be painted include, but are not limited to, the following:
 - a. Conduit and fittings
 - b. Switchgear
- O. Prime Coats: Apply a prime coat to material, equipment and surfaces which are required to be painted or finished, and which have not been prime coated by others. Clean and prime unprimed ferrous metals as soon as possible after delivery of the metals to the job site. Recoat primed and sealed surfaces where there is evidence of suction spots or /unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- P. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surfaces imperfections.
- Q. Pigmented, Opaque Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- R. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.19 CURING OF COATINGS

- A. The CONTRACTOR shall provide curing conditions in accordance with the conditions recommended by the coating material manufacturer or by these Specifications, whichever is the more stringent requirement, prior to placing the completed coating system into service.
- B. Forced Air Ventilation of Steel Reservoirs and Enclosed Hydraulic Structures: Forced air ventilation is required for the application and curing of coatings on the interior surfaces of steel reservoirs and enclosed hydraulic structures. During curing periods, continuously exhaust air from a manhole in the lowest shell ring or in the case of an enclosed hydraulic structure, from the lowest level of the structure using portable ducting. After all interior coating operations have been completed, provide a final curing period for a minimum of 10 days, during which time the forced air ventilation system shall operate continuously. For additional requirements, refer to the specific written instructions of the manufacturer for the coating system being applied.

3.20 COLOR CODING

- A. All exposed piping shall be color coded. After the finish coat has been applied, label each line with stenciled legends identifying the nature of the pipe contents and the direction of flow. This stenciled identification shall appear in one or more places in the line as deemed necessary by the ENGINEER. Stencil legends shall be white for all pipe except white color coded pipe, which shall have black legends. Labels shall occur a minimum of every 15 feet of straight piping and at all bends. Minimum stencil size shall be two-inch letters for 4-inch and larger diameter piping and one-inch letters for 2-inch to 3-1/2-inch diameter piping. Piping 1-1/2-inch diameter and smaller shall be identified using plastic wrap-around pipe markers.
- B. Items to be coded but not specifically mentioned shall be coated in a color selected by the ENGINEER or OWNER.
- C. All paints/coatings used in potable water contact areas must have AWWA and EPA classification and approvals.
- D. All requirements of the Occupational Safety and Health Act (OSHA) concerning color coding and safety markings shall be considered part of these Specifications unless specifically excluded.
- E. Any paint/coating requirements/specifications not specifically addressed in the foregoing shall be decided upon as required by the ENGINEER.

- F. Every valve or connection, where it may be possible for a worker to be exposed to a hazardous substance, shall be labeled per General Industry Safety Orders, Article 112, OSHA Occupational Safety and Health Standards 29CFR1910.

3.21 COATING SYSTEM SCHEDULES

A. COATING SYSTEM SCHEDULE, FERROUS METAL - NOT GALVANIZED (FM):

	Item	Surface Prep.	System No.
FM-1	All surfaces indoors and outdoors, exposed or covered, except those included below.	Commercial blast cleaning SSPC SP 6/NACE 3	(1) alkyd enamel or (3) epoxy/ polyurethane
FM-1	All surfaces indoors and outdoors, exposed or covered, except those included below.	Near white metal blast cleaning SSPC SP 10/NACE 2	(4) inorganic zinc/epoxy/polyurethane
FM-1	All surfaces indoors and outdoors, exposed or covered, except those included below.	Manufacturer recommendation	(6) acrylic latex
FM-2	Surfaces in chlorination room, chlorine storage room.	Commercial blast cleaning SSPC SP 6/NACE 3	(100) amine cure epoxy
FM-3	Surfaces of equipment and ferrous surfaces submerged or intermittently submerged in potable water, utility water, and wastewater including all surfaces lower than 2 feet above high water level in hydraulic structures, and all surfaces inside enclosed hydraulic structures and vents (excluding shop-coated valves, couplings, pumps).	White metal blast cleaning SSPC SP 5/NACE 1	(100) amine cure epoxy
FM-4	Surfaces exposed to high temperature (between 150 and 600 degrees F).	Near white metal blast cleaning SSPC SP 10/NACE 2	(5) inorganic zinc, water-based
FM-5	Surfaces exposed to high temperature (between 600 and 1000 degrees F).	Near white metal blast cleaning SSPC SP 10/NACE 2	(2) aluminum silicone
FM-6	Where indicated, ferrous surfaces in water passages of all valves 2-inch size and larger, exterior surfaces of submerged	White metal blast cleaning SSPC SP 5/NACE 1	(101) polyamide epoxy

	valves.		
FM-7	Where indicated, ferrous surfaces in water passages and submerged surfaces of all pumps which have discharge size of 4 inches or larger.	White metal blast cleaning SSPC SP 5/NACE 1	(100) amine cure epoxy
FM-8	Ferrous surfaces of sleeve couplings.	Solvent cleaning SSPC SP 1, followed by white metal blast cleaning SSPC-SP 10/NACE 2	(103) fusion bond epoxy
FM-9	All ferrous surfaces of sluice gates, flap gates, and shear gates, including wall thimbles.	White metal blast cleaning SSPC SP 5/NACE 1	(101) polyamide epoxy
FM-10	Buried surfaces that are not indicated to be coated elsewhere.	Near white metal blast cleaning SSPC SP 10/NACE 2	(100) amine cure epoxy
FM-11	External surfaces of buried steel tanks.	White Metal blast cleaning SSPC SP 5/NACE 1	(100) amine cure epoxy
FM-12	Indoor architectural sheet metal, flashings, doors, frames, and exposed ducts	Commercial Blast Cleaning SSPC SP 6/NACE 3	(1) Alkyd Enamel
FM-13	Surfaces of indoor equipment, not submerged	Commercial blast cleaning SSPC SP 6/NACE 3	(7) epoxy, equipment

- B. COATING SYSTEM SCHEDULE, FERROUS METAL - GALVANIZED (FMG):
All galvanized surfaces except for the following items shall be coated unless required by other Sections: (1) Floor gratings and frames, (2) Handrails, (3) Stair treads, (4) Chain link fencing and appurtenances.

	Item	Surface Prep.	System No.
FMG-1	All exposed surfaces indoors and outdoors, except those included below.	Solvent cleaning SSPC SP 1	(1) alkyd enamel or (3) epoxy/polyurethane
FMG-2	Surfaces in chlorinator room, chlorine storage room.	Solvent cleaning SSPC SP 1	(100) amine cure epoxy
FMG-3	Indoor architectural sheet metal, flashings, doors, frames, and exposed ducts	Solvent cleaning SSPC SP 1	(1) Alkyd Enamel
FMG-4	Surfaces buried or submerged in water or wastewater, including all surfaces lower than two feet above high-water level and all surfaces inside enclosed hydraulic structures and vents.	Solvent cleaning SSPC SP 1 followed by brush-off grade blast cleaning SSPC SP 7/NACE 4	(100) amine cure epoxy

- C. COATING SYSTEM SCHEDULE, NON-FERROUS METAL, PLASTIC, FIBERGLASS (NFM): Where isolated non-ferrous parts are associated with equipment or piping, the CONTRACTOR shall use the coating system for the adjacent connected surfaces. Do not coat handrails, gratings, frames or hatches. Only primers recommended by the coating manufacturer shall be used.

	Item	Surface Prep.	System No.
NFM-1	All exposed surfaces, indoors and outdoors, except those included below.	Solvent cleaned SSPC SP 1	(1) alkyd enamel or (4) epoxy/polyurethane
NFM-2	Chlorination room, chlorine storage room.	Solvent cleaned SSPC SP 1	(100) amine cure epoxy
NFM-3	Polyvinyl chloride plastic piping, indoors and outdoors, or in structures, not submerged.	Solvent cleaned SSPC SP 1	(6) acrylic latex

- D. COATING SYSTEM SCHEDULE - CONCRETE AND CONCRETE BLOCK MASONRY (C):

	Item	Surface Prep.	System No.
C-1	All surfaces indoors and outdoors, where indicated.	Per paragraph 3.13	(9) acrylic, concrete or (104) polyurethane, concrete
C-2	Surfaces submerged in water or wastewater, including (a) between 2-feet above high water elevation and 2-feet below low water elevation in an open structure and (b) all surfaces above 2-feet below low water elevation in an enclosed structure.	Per paragraph 3.13	(104) polyurethane, concrete
C-3	Floor slab and walls, exposure to chemicals, where indicated.	Per paragraph 3.13	(104) polyurethane, concrete
C-4	Walls, floors, exposure to chemical splash, washdown, where indicated	Per paragraph 3.13	(104) polyurethane, concrete
C-5	Interior surfaces of sewer manholes, including sidewalls, bottom, and metal appurtenances, for manholes indicated.	Per paragraph 3.13	(105) epoxy, concrete

E. COATING SYSTEM SCHEDULE – MISCELLANEOUS SURFACES (MS):

	Item	Surface Prep.	System No.
MS-1	Wood, indoors and outdoors, and gypsum board indoors.	Per manufacturer's printed instructions	(200) acrylic

3.22 CLEAN-UP AND PROTECTION

- A. Clean Up: During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day. Upon completion of painting work, clean window glass and other paint-spattered surfaces located on site and off site. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- B. Protection: Protect work of other trades located on site and off site, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting.

1. Provide "Wet Paint" signs, as required, to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.
2. At the completion of work of other trades, touch up and restore all damaged or defaced painted surfaces.

3.23 APPEARANCE AND INSPECTION

- A. All painting shall be accomplished in a workmanlike manner and shall be free of unsightly sags, runs, bubbles, drips, waves, laps, alligating, unnecessary brush marks and overspray or other physical defects and shall be uniform in color.
- B. The CONTRACTOR shall provide all rigging, scaffolding and other equipment necessary for a satisfactory inspection of a complete paint system and acceptance by the ENGINEER/OWNER.
- C. Inspection shall be conducted by an inspector selected by the ENGINEER/OWNER in the presence of the OWNER's representative and the CONTRACTOR or his representative. Provisions for calibrated and functional test equipment is the responsibility of the CONTRACTOR.
- D. The paint film shall be free of pinholes and holidays as determined by the use of an approved holiday detector as defined in Paragraph 1-09 of this Section.
- E. The paint film shall be randomly checked for dry film thickness as stipulated in the "Coating System" sections of these specifications. Thicknesses shall be checked with a properly calibrated and approved magnetic gauge as defined in Paragraph 1-09 of this Section.

3.24 REPAIR OF DEFECTS IN PAINT

- A. Any defects discovered during inspection, such as low film millage, holidays or pinholes, shall be repaired with the same materials as used for the original finish coat(s). Excessive low millage could require extra full coat(s) of paint.
- B. A final inspection will be conducted by the ENGINEER/OWNER or his representative after any necessary repairs and prior to final acceptance of the job.

3.25 DISINFECTION OF POTABLE WATER STORAGE TANKS

- A. Description: This paragraph specifies disinfection procedures for potable water storage tanks.

- B. Quality Assurance: The following documents are a part of this section as specified and modified. In case of conflict between the requirements of this paragraph and those of the listed documents, the requirements of this paragraph shall prevail.

Reference

Title

AWWA D105, latest revision

Disinfection of Water Storage Facilities

- C. Information to be Provided: Affidavit of Compliance as described in AWWA D105.
- D. After the tank has been painted and the interior surfaces have thoroughly dried, the CONTRACTOR shall remove all visible dirt and contaminating materials. The interior of the tank shall be disinfected in accordance with Chlorination Method 2 of AWWA D105. The CONTRACTOR shall furnish all of the chlorine required.
- E. The CONTRACTOR shall be responsible for obtaining proper disinfection as determined by bacteriological testing. Samples for bacterial analyses will be taken and analyzed by the OWNER. Two consecutive samples are required to pass the bacteriological tests for the tank to comply with these disinfection requirements.
- F. Water for filling the tank after the initial disinfection will be provided by the OWNER. If bacteriological testing shows the presence of coliform bacteria, the tank shall be re-disinfected. The CONTRACTOR shall pay the OWNER for water required to fill the tank after the first filling at currently approved General Service water rates for the OWNER.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for clearing of all areas within the Contract limits and other areas shown, including work designated in permits and other agreements, in accordance with the requirements of Division 1.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 31 23 16 - Excavation - Earth and Rock
 - 2. Section 31 23 23 - Backfilling
 - 3. Section 32 92 00 - Lawn Restoration

1.2 DEFINITIONS

- A. Clearing: Clearing is the removal from the ground surface and disposal, within the designated areas, of trees, brush, shrubs, down timber, decayed wood, other vegetation, rubbish and debris as well as the removal of fences.
- B. Grubbing: Grubbing is the removal and disposal of all stumps, buried logs, roots larger than 1-1/2 inches, matted roots and organic materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TREE REMOVAL

- A. Tree Removal Within Property Limits: Remove trees and shrubs as needed for the installation of water main.
 - 1. Remove trees and shrubs to avoid damage to trees and shrubs designated to remain.
 - 2. Grub and remove tree stumps and shrubs felled within the (property limits) (right-of-way) to an authorized disposal site. Fill depressions created by

such removal with material suitable for backfill as specified in Section 31 23 23.

- B. Tree Removal Outside Property Limits: Do not cut or damage trees outside the right-of-way and easements unless shown to be removed or unless written permission has been obtained from the property owner. Furnish three copies of the written permission before removal operations commence.
- C. If the landowner desires the timber or small trees, the CONTRACTOR shall cut and neatly pile it in 4 ft. lengths for removal by the OWNER; otherwise, the CONTRACTOR shall dispose of it by hauling it away from the project site.

3.2 TREES AND SHRUBS TO BE SAVED

- A. Protection: Protect trees and shrubs within the Project limits that are not required to be removed.
 - 1. Work within the limits of the tree drip line with extreme care using either hand tools or equipment that will not cause damage to trees.
 - a. Do not disturb or cut roots unnecessarily. Do not cut roots 1-1/2 inches and larger unless approved.
 - b. Immediately backfill around tree roots after completion of construction in the vicinity of trees.
 - c. Do not operate any wheeled or tracked equipment within drip line.
 - 2. Protect vegetation from damage caused by emissions from engine-powered equipment.
 - 3. During working operations, protect the trunk, foliage and root system of all trees to be saved with boards or other guards placed as shown and as required to prevent damage, injury and defacement.
 - a. Do not pile excavated materials within the drip line or adjacent to the trunk of trees.
 - b. Do not allow runoff to accumulate around trunk of trees.
 - c. Do not fasten or attach ropes, cables, or guy wires to trees without permission. When such permission is granted, protect the tree before making fastening or attachments by providing burlap wrapping and softwood cleats.
 - d. The use of axes or climbing spurs for trimming will not be permitted.

- e. Provide climbing ropes during trimming.
- 4. Remove shrubs to be saved, taking a sufficient earth ball with the roots to maintain the shrub.
 - a. Temporarily replant if required, and replace at the completion of construction in a condition equaling that which existed prior to removal.
 - b. Replace in kind if the transplant fails.
- 5. Have any tree and shrub repair performed by a tree surgeon properly licensed by the State of Florida and within 24 hours after damage occurred.

3.3 CLEARING AND GRUBBING

- A. Clearing: Clear all items specified to the limits shown and remove cleared and grubbed materials from the site.
 - 1. Do not start earthwork operations in areas where clearing and grubbing is not complete, except that stumps and large roots may be removed concurrent with excavation.
 - 2. Comply with erosion, sediment control and storm management measures as specified in Division 1.
- B. Grubbing: Clear and grub areas to be excavated, areas receiving less than 3 feet of fill and areas upon which structures are to be constructed.
 - 1. Remove stumps and root mats in these areas to a depth of not less than 18 inches below the subgrade of sloped surfaces.
 - 2. Fill all depressions made by the removal of stumps or roots with material suitable for backfill as specified in Section 31 23 23.
- C. Limited Clearing: Clear areas receiving more than 3 feet of fill by cutting trees and shrubs as close as practical to the existing ground. Grubbing will not be required.
- D. Dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved dump. 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.

3.4 TOPSOIL

- A. Stripping: Strip existing topsoil from areas that will be excavated or graded prior to commencement of excavating or grading and place in well-drained stockpiles in approved locations.

3.5 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

- A. The CONTRACTOR shall exercise extreme care to avoid unnecessary disturbance of developed private property along the route of the construction. Trees, shrubbery, gardens, lawns, and other landscaping, which in the opinion of the ENGINEER must 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. Clean up the construction site across developed private property directly after construction is completed upon approval of the ENGINEER.
- E. Any commercial signs, disturbed or removed, shall be restored to their original condition within 24 hours.

3.6 PRESERVATION OF PUBLIC PROPERTY

- A. The appropriate paragraphs of Articles 3.5 and 3.6 of these Specifications shall apply to the preservation and restoration of public lands, parks, rights-of-way, easements, and all other damaged areas.

END OF SECTION

SECTION 31 23 16

EXCAVATION - EARTH AND ROCK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for performing opencut excavations to the widths and depths necessary for constructing structures, pipelines and conduits including excavation of any material necessary for any purpose pertinent to the construction of the Work.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 31 10 00 - Site Clearing
 - 2. Section 31 40 00 - Shoring, Sheet piling and Bracing
 - 3. Section 31 23 23 - Backfilling

1.2 DEFINITIONS

- A. Earth: "Earth" includes all materials which, in the opinion of the ENGINEER, do not require blasting, barring, wedging or special impact tools for their removal from their original beds, and removal of which can be completed using standard excavating equipment. Specifically excluded are all ledge and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.
- B. Rock: "Rock" includes all materials which, in the opinion of the ENGINEER, require blasting, barring, wedging and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock for removal from their original beds and which have compressive strengths in their natural undisturbed state in excess of 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Dewatering Excavation Plan: Develop an excavation dewatering plan that considers site ground and groundwater conditions, the type and arrangement of the equipment to be used and the proper method of groundwater disposal. Prepare the dewatering plan before beginning excavations below groundwater. Maintain one copy of the dewatering plan at the project site to be available for inspection while all dewatering operations are underway.

1.4 SITE CONDITIONS

- A. Geotechnical Investigation: Geotechnical investigations and reports were prepared by Allied Engineering & Testing, Inc. (report dated March 6, 2009) and Ardaman & Associates, Inc. (report dated December 27, 2020) and was intended only for use by the OWNER and ENGINEER in preparing the Contract Documents.
 - 1. The geotechnical investigation report may be examined for whatever value it may be considered to be worth. However, this information is not guaranteed as to its accuracy or completeness.
 - 2. The geotechnical investigation report is not part of the Contract Documents.
- B. Actual Conditions: Make any geotechnical investigations deemed necessary to determine actual site conditions.
- C. Underground Utilities: Locate and identify all existing underground utilities prior to the commencement of Work.
- D. Quality and Quantity: Make any other investigations and determinations necessary to determine the quality and quantities of earth and rock and the methods to be used to excavate these materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

- A. Clearing: Clear opencut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 31 10 00, includes removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during trench excavation.
- B. Banks: Shore or slope banks to the angle of repose to prevent slides or cave-ins in accordance with Section 31 40 00.
- C. Safety: Whenever an excavation site or trench is left unattended by the CONTRACTOR or when an area is not within 100 feet of observation by the CONTRACTOR, the excavation site or trench shall be filled and/or, at the OWNER's discretion, protected by other means to prevent accidental or unauthorized entry. Such protection shall include barricades and other protection devices requested by the ENGINEER or OWNER, including temporary fencing, snow fencing, or temporary "structure" tape. Such safety items shall not relieve the CONTRACTOR of any site

safety requirements or liabilities established by Federal, State and local laws and agencies, including OSHA, but is intended as additional safety measures to protect the general public.

- D. Hazardous Materials: If encountered, take care of hazardous materials not specifically shown or noted in accordance with Section 01 57 00.
- E. During excavation and any site work, storm water pollution prevention measures shall be taken to ensure that water quality criteria are not violated in the receiving water body and all state and local regulatory requirements are met.

3.2 STRUCTURE EXCAVATION

- A. Excavation Size: Provide excavations of sufficient size and only of sufficient size to permit the Work to be economically and properly constructed in the manner and of the size specified.
- B. Excavation Shape: Shape and dimension the bottom of the excavation in earth or rock to the shape and dimensions of the underside of the structure or drainage blanket wherever the nature of the excavated material permits.
- C. Compaction: Before placing foundation slabs, footings or backfill, proof roll the bottom of the excavations to detect soft spots.
 - 1. For accessible areas, proof roll with a ten wheel tandem axle dump truck loaded to at least 15 tons or similarly loaded construction equipment.
 - 2. For small areas, proof roll with a smooth-faced steel roller filled with water or sand, or compact with a mechanical tamper.
 - 3. Make one complete coverage, with overlap, of the area.
 - 4. Overexcavate soft zones and replace with compacted select fill in accordance with Part 3, Section 3.9.

3.3 TRENCH EXCAVATION

- A. Preparation: Properly brace and protect trees, shrubs, poles and other structures which are to be preserved. Unless shown or specified otherwise, preserve all trees and large shrubs. Hold damage to the root structure to a minimum. Small shrubs may be preserved or replaced with equivalent specimens.
- B. Adequate Space: Keep the width of trenches to a minimum, however provide adequate space for workers to place, joint and backfill the pipe properly.

1. The minimum width of the trench shall be equal to the outside diameter of the pipe at the joint plus 8-inches for unsheeted trench or 12 inches for sheeted trench.

The maximum width of trench, measured at the top of the pipe, shall not exceed the outside pipe diameter plus 2 feet, unless otherwise shown on the drawing details or approved by the ENGINEER. Trench walls shall be maintained vertical from the bottom of the trench to a line measured one foot above the top of the pipe. From one foot above the top of the pipe to the surface the trench walls shall conform with OSHA Regulations.

2. In sheeted trenches, measure the clear width of the trench at the level of the top of the pipe to the inside of the sheeting.
3. Should the maximum trench widths specified above be exceeded without written approval, provide concrete cradle or encasement for the pipe as directed. No separate payment will be made for such concrete cradle or encasement.

C. Depth:

1. Excavate trenches to a minimum depth of 8 inches below the bottom of the pipe or the bottom of encasement for electrical ducts, unless otherwise shown, specified or directed, so that bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for duct encasement, pipe barrels and bells.
2. Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as additional undercuts backfilled with #57 stone compacted in 6-inch lifts, below the standard 8-inches minimum trench undercut. Excavation below trench grade that is not ordered in writing by the ENGINEER shall be backfilled to trench grade and compacted.

CI. Unstable or Unsuitable Materials: If unstable or unsuitable material is exposed at the level of the bottom of the trench excavation, excavate the material in accordance with the subsection headed "Authorized Additional Excavation", Article 3.9.

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

3. Crushed stone, washed shell and gravel shall be as specified in Section 31 23 23.
 4. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as a change in the Work.
- E. Length of Excavation: Keep the open excavated trench preceding the pipe or electrical duct laying operation and the unfilled trench, with pipe or duct in place, to a minimum length which causes the least disturbance. Provide ladders for a means of exit from the trench as required by applicable safety and health regulations.
- F. Excavated Material: Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available. Where stockpiling of excavated material is required, the Contractor shall be responsible for obtaining the sites to be used and shall maintain his operations to provide for natural drainage and not present an unsightly appearance.
- G. Water: Allow no water to rise in the trench excavation until sufficient backfill has been placed to prevent pipe or duct flotation.

3.4 SHORT TUNNEL EXCAVATION

- A. Short Tunnel Requirements: In some instances, trees, shrubs, utilities, sidewalks and other obstructions may be encountered, the proximity of which may be a hindrance to open-cut trench excavation. In such cases, excavate by means of short tunnels in order to protect such obstructions against damage.
1. Construct the short tunnel by hand, auger or other approved method approximately 6 inches larger than the diameter of pipe bells or outer electrical duct encasement.
 2. Consider such short tunnel work incidental to the construction of pipelines or conduits and all appurtenances. The need for short tunnels will not be grounds for additional payment.

3.5 EXCAVATION FOR JACKING AND AUGERING

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

3.6 ROCK EXCAVATION

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

1. Rock removed from the excavation becomes the property of the CONTRACTOR. Transport and dispose of excavated rock at an off-site disposal location. Obtain the off-site disposal location.
 2. Remove all shattered rock and loose pieces.
- B. Structure Depths: For cast-in-place structures, excavate the rock only to the bottom of the structure, foundation slab, or drainage blanket.
- C. Trench Width: Maintain a minimum clear width of the trench at the level of the top of the pipe of the outside diameter of the pipe barrel plus 4 feet, unless otherwise approved.
- D. Trench Depth: For trench excavation in which pipelines or electrical ducts are to be placed, excavate the rock to a minimum depth of 8 inches below the bottom of the pipe or duct encasement. Provide a cushion of sand or suitable crushed rock. Refill the excavated space with pipe bedding material in accordance with Section 31 23 23. Include placing, compacting and shaping pipe bedding material in the appropriate Contract Items.
- E. Manhole Depths: For manhole excavation, excavate the rock to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter. Refill the excavated space with pipe bedding material in accordance with Section 31 23 23. Include placing, compacting and shaping pipe bedding material for manhole bases in the appropriate Contract Items.
- F. Over-excavated Space: Refill the excavated space in rock below structures, pipelines, conduits and manholes, which exceeds the specified depths with 2,500 psi concrete, crushed stone, washed shell, or other material as directed. Include refilling of over-excavated space in rock as part of the rock excavation.
- G. Other Requirements: Follow, where applicable, the requirements of the subsections on Article 3.3, "Trench Excavation" and Article 3.2, "Structure Excavation".
- H. Payment: Rock excavation, including placing, compacting and shaping of the select fill material, will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.
- I. Blasting: Perform authorized blasting by authorized and qualified workers as approved as to the number, length, placing and direction, and loading of holes. Do not use charges which will make the excavation unduly large or irregular, nor shatter the rock upon or against which masonry is to be built, nor injure masonry or existing structures at the site or in the vicinity.

1. Cover each blast with a woven wire cable mat weighted with heavy timbers. Blasting will not be permitted within 25 feet of existing or of the completed pipeline or structure. Control blasts in tunnels so that the material surrounding the tunnel base proper is not loosened or displaced.
2. Discontinue blasting whenever it is determined that further blasting may injure or damage adjacent rock, masonry, utility lines, or other structures. In such cases, excavate the remaining rock by barring, wedging, or other approved methods.
3. Where sewers, gas, water, steam, or other utility ducts or lines, catch basin connections, or other structures have been exposed during excavation, adequately protect such structures from damage before proceeding with the blasting. Promptly repair any structure damaged by blasting at no addition to the Contract Price.
4. Take due precautions to prevent accidental discharge of electric blasting caps from current induced by radar, radio transmitters, lightning, adjacent powerlines, dust storms or other sources of extraneous electricity.
5. Keep a sufficient quantity of explosives on hand to avoid delay to the Work on the site when rock excavation is in progress. At no time keep a quantity in excess of that which will be required for use within the following 12 hours.
6. Store, handle and use such explosives in conformity with all laws, ordinances, and regulations of the County or governing body governing the storage and use of explosives at the construction site.
7. Provide a magazine keeper to keep accurate daily records and account for each piece of explosive, detonator and equipment from time of delivery at the magazine until used or removed from the site. Abandon no explosives or blasting agents.
8. Take sole responsibility for the methods of handling, use, and storage of explosives and any damage to persons or property resulting therefrom. Approval of these methods or failure to order that blasting be discontinued does not relieve the CONTRACTOR of any of this responsibility.

3.7 FINISHED EXCAVATION

- A. Finish: Provide a reasonably smooth finished surface for all excavations, which is uniformly compacted and free from irregular surface changes.
- B. Finish Methods: Provide a degree of finish which is ordinarily obtainable from blade-grade operations, except as otherwise specified in Section 31 23 23.

3.8 PROTECTION

- A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.
- B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.
- C. It shall be the CONTRACTOR's responsibility to acquaint himself with all existing conditions and to locate all structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, work shall be coordinated with the facility owner and performed so as to cause as little interference as possible with the service rendered by the facility disturbed. Facilities or structures damaged in the prosecution of the work shall be repaired and/or replaced immediately, in conformance with current standard practices of the industry, or according to the direction of the owner of such facility, at the CONTRACTOR's expense.
- D. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 1.

3.9 AUTHORIZED ADDITIONAL EXCAVATION

- A. Additional Excavation: Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:
 - 1. In case the materials encountered at the elevations shown are not suitable.
 - 2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.
- B. Refill Materials: Refill such excavated space with either authorized 2500 psi concrete or compacted select fill material, in compliance with the applicable provisions of Section 31 23 23.
- C. Compaction: Where necessary, compact fill materials to avoid future settlement. As a minimum, unless otherwise specified or directed, backfill layers shall not exceed 6-inches in thickness for the full trench width and compaction shall equal 95% of maximum density, or 98% if under paved area of roadway, as determined by using ASTM D 1557. Compaction density tests shall be made at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.
- D. Payment: Additional earth excavations so authorized and concrete or select fill materials authorized for filling such additional excavation and compaction of select fill materials will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

3.10 UNAUTHORIZED EXCAVATION

- A. **Stability:** Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed Article 3.9, "Authorized Additional Excavation", with such material and in such manner as may be approved in order to provide for the stability of the various structures.
- B. **Refill Materials:** Refill spaces beneath all manholes, structures, pipelines, or conduits excavated without authority with 2500 psi concrete or compacted select fill material, as approved.
- C. **Payment:** Refill for unauthorized excavation will not be measured and no payment will be made therefor.

3.11 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

- A. **Stockpiling Suitable Materials:** Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.
- B. **Stockpile Locations:** Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.
- C. **Excess Materials:** CONTRACTOR shall be responsible to transport and dispose of surplus excavated material and excavated material unsuitable for backfilling or embankments at an off-site disposal location secured by the CONTRACTOR.

3.12 REMOVAL OF WATER

- A. **Water Removal:** At all times during the excavation period and until completion and acceptance of the WORK at final inspection, provide ample means and equipment with which to remove promptly and dispose of properly all water entering any excavation or other parts of the WORK.
- B. **Dry Excavations:** Keep the excavation dry.
- C. **Water Contact:** Allow no water to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set and, in any event, not sooner than 12 hours after placing the masonry or concrete.
- D. **Discharge of Water:** Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.

- E. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.
- F. Sanitary Sewers: Discharge no water into sanitary sewers.
- G. Storm Sewers: Discharge no water containing settleable solids into storm sewers.
- H. Repair: Promptly repair any and all damage caused by dewatering the Work.

END OF SECTION

SECTION 31 23 23

BACKFILLING

PART 1 GENERAL

1.1 SUMMARY

- A. General Requirements: Backfill all excavation to the original surface of the ground or to such other grades as may be shown or required. For areas to be covered by topsoil, leave or stop backfill (12) inches below the finished grade or as shown. Obtain approval for the time elapsing before backfilling against masonry structures. Remove from all backfill, any compressible, putrescible, or destructible rubbish and refuse and all lumber and braces from the excavated space before backfilling is started. Leave sheeting and bracing in place or remove as the work progresses.
- B. Equipment Limitations: Do not permit construction equipment used to backfill to travel against and over cast-in-place concrete structures until the specified concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, the above restriction may be modified providing the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.
- C. Related Work Specified in Other Sections Includes:
 - 1. Section 31 10 00 - Site Clearing
 - 2. Section 31 23 16 - Excavation – Earth and Rock

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM D 1557 - Standard Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 in Drop

PART 2 PRODUCTS

2.1 BACKFILL MATERIAL - GENERAL

- A. General: Backfill with sound materials, free from waste, organic matter, rubbish, boggy or other unsuitable materials.
- B. General Materials Requirements: Conform materials used for backfilling to the requirements specified. Follow common fill requirements whenever drainage or

select fill is not specified. Determine and obtain the approval of the appropriate test method where more than one compaction test method is specified.

- C. Frozen Materials: Do not use frozen material for backfilling.

2.2 DRAINAGE FILL

- A. Materials for Drainage Fill: Use clean gravel, crushed stone, or other suitable material conforming to the gradation specified for drainage fill. Clay and fine particles are unacceptable in drainage fill. Provide drainage fill of a grade between the following limits:

U.S. Standard Sieve	Percent Passing By Weight
1-1/2 inch	100
1 inch	95-100
1/2 inch	45-65
#4	5-15
#16	0-4

2.3 SELECT FILL

- A. Materials for Select Fill: Use clean gravel, crushed stone, washed shell, or other granular or similar material as approved which can be readily and thoroughly compacted to 95 percent of the maximum dry density obtainable by ASTM D 1557.

- 1. Allowed Materials: Grade select fill between the following limits:

U.S. Standard Sieve	Percent Passing By Weight
2 inch	100
1-1/2 inch	90-100
1 inch	75-95
1/2 inch	45-70
#4	25-50
#10	15-40
#200	5-15

- 2. Unallowed Materials: Very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet are unacceptable as select fill.

2.4 COMMON FILL

- A. Materials for Common Fill: Material from on-site excavation may be used as common fill provided that it can be readily compacted to 90 percent of the maximum dry density obtainable by ASTM D 1557, and does not contain unsuitable material. Select fill may be used as common fill at no change in the Contract Price.
- B. Granular Materials On-Site: Granular on-site material, which is fairly well graded between the following limits may be used as granular common fill:

U.S. Standard Sieve	Percent Passing by Weight
3 inch	100
#10	50-100
#60	20-90
#200	0-20

- C. Cohesive Materials On-Site: Cohesive site material may be used as common fill.
 - 1. The gradation requirements do not apply to cohesive common fill.
 - 2. Use material having a liquid limit less than or equal to 40 and a plasticity index less than or equal to 20.
- D. Material Approval: All material used as common fill is subject to approval. If there is insufficient on-site material, import whatever additional off-site material is required which conforms to the specifications and at no additional cost.

2.5 UTILITY PIPE BEDDING

- A. Class A (special utility bedding). Should special bedding be required due to depth of cover, impact loadings or other conditions, Class A bedding shall be installed, as shown in Section 6 of the Lee County Utilities Operations Manual.
- B. Class B (minimum utility bedding). The bottom of the trench shall be shaped to provide a firm bedding for the utility pipe. The utility shall be firmly bedded in undisturbed firm soil or hand shaped unyielding material. The bedding shall be shaped so that the pipe will be in continuous contact therewith for its full length and shall provide a minimum bottom segment support for the pipe equal to 0.3 times the outside diameter of the barrel.

PART 3 EXECUTION

3.1 ELECTRICAL DUCT AND PRECAST MANHOLE BEDDING

- A. Bedding Compaction: Bed all electrical ducts and precast manholes in well graded, compacted, select fill conforming to the requirements except as otherwise shown, specified, or required. Extend electrical duct bedding a minimum of 6 inches below the bottom of the duct encasement for the full trench width. Compact bedding thickness no less than 6 inches for precast concrete manhole bases.
- B. Concrete Work Mats: Cast cast-in-place manhole bases and other foundations for structures against a 2500 psi concrete work mat in clean and dry excavations, unless otherwise shown, specified or required.
- C. Bedding Placement: Place select fill used for bedding beneath electrical ducts and precast manhole bases, in uniform layers not greater than 9 inches in loose thickness. Thoroughly compact in place with suitable mechanical or pneumatic tools to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- D. Use of Select Fill: Bed existing underground structures, tunnels, conduits and pipes crossing the excavation with compacted select fill material. Place bedding material under and around each existing underground structure, tunnel, conduit or pipe and extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

3.2 PIPE BEDDING AND INITIAL BACKFILL

- A. Hand Placement: Place select fill by hand for initial pipe backfill from top of bedding to 1 foot over top of pipes in uniform layers not greater than 6 inches in loose thickness. Tamp under pipe haunches and thoroughly compact in place the select fill with suitable mechanical or pneumatic tools to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- B. Stone Placement: Do not place large stone fragments in the pipe bedding or backfill to 1 foot over the top of pipes, nor nearer than 2 feet at any point from any pipe, conduit or concrete wall.
- C. Unallowed Materials: Pipe bedding containing very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet is unacceptable.

3.3 BEDDING PLACEMENT AND BACKFILL FOR PIPE IN SHORT TUNNEL

- A. Bed pipelines or electrical ducts placed in short tunnels in select fill or 2500 psi concrete. Completely fill the remainder of the annular space between the outside of the pipe wall and the tunnel wall with select fill, suitable job-excavated material, or 2500 psi concrete, as approved. Suitably support pipelines or ducts in short tunnels to permit placing of backfill suitably tamped in place.

3.4 TRENCH BACKFILL

- A. General: Backfill material shall be clean earth fill composed of sand, clay and sand, sand and stone, crushed stone, or an approved combination thereof. Backfilling shall be accomplished under two specified requirements: First Lift, from trench grade to a point 12 inches above the top of the utility, and, Second Lift, from the top of the First Lift to the ground surface. Where thrust blocks, encasements, or other below-grade concrete work have been installed, backfilling shall not proceed until the concrete has obtained sufficient strength to support the backfill load.
- B. First Lift: Fine material shall be carefully placed and tamped around the lower half of the utility. Backfilling shall be carefully continued in compacted and tested layers not exceeding 6 inches in thickness for the full trench width, until the fill is 12 inches above the top of the utility, using the best available material from the excavation, if approved. The material for these first layers of backfill shall be lowered to within 2 feet above the top of pipes before it is allowed to fall, unless the material is placed with approved devices that protect the pipes from impact. The "First Lift" shall be thoroughly compacted and tested before the "Second Lift" is placed. Unless otherwise specified, compaction shall equal 98% of maximum density, as determined by ASTM D 1557. The "First Lift" backfill shall exclude stones, or rock fragments larger than the following:

<u>Pipe Type</u>	(Greatest Dimension-Inches) <u>Fragment Size (Inches)</u>
Steel	2
Concrete	2
Ductile Iron	2
Plastic	1
Fiberglass	1

- C. Second Lift: The remainder of the trench, above the "First Lift", shall be backfilled and tested in layers not exceeding 6 inches. The maximum dimension of a stone, rock, or pavement fragment shall be 6 inches. When trenches are cut in pavements or areas to be paved, compaction, as determined by ASTM D 1557, shall be equal to 98% of maximum density, with compaction in other areas not less than 95% of maximum density in unpaved portions of the Rights-of-Way or 90% of maximum density in other areas.

As an alternative, or if required under roadways, Flowable Fill may be substituted. If Flowable Fill is to be used, a fabric mesh shall be installed between the "first lift" and the Flowable Fill. Flowable Fill shall be in accordance with Section 4.7.AH of the Lee County Utilities Operations Manual.

- D. Compaction Methods: The above specified compaction shall be accomplished using accepted standard methods (powered tampers, vibrators, etc.), with exception that the first two feet of backfilling over the pipe shall be compacted by hand-operated tamping devices. Flooding or puddling with water to consolidate backfill is not

acceptable, except where sand is the only material utilized and encountered and the operation has been approved by the OWNER.

- E. Density Tests: Density tests for determination of the above specified compaction shall be made by an independent testing laboratory and certified by a Florida Registered, Professional ENGINEER at the expense of the Developer or CONTRACTOR. Test locations will be determined by the OWNER but in any case, shall be spaced not more than 100 feet apart where the trench cut is continuous. If any test results are unsatisfactory, the CONTRACTOR shall re-excavate and re-compact the backfill at his expense until the desired compaction is obtained. Additional compaction tests shall be made to each site of an unsatisfactory test, as directed, to determine the extent of re-excavation and re-compaction if necessary.

Copies of all density test results shall be furnished on a regular basis by the ENGINEER, to Lee County Utilities. Failure to furnish these results will result in the project not being recommended for acceptance by Lee County

- F. Dropping of Material on Work: Do trench backfilling work in such a way as to prevent dropping material directly on top of any conduit or pipe through any great vertical distance. Do not allow backfilling material from a bucket to fall directly on a structure or pipe and, in all cases, lower the bucket so that the shock of falling earth will not cause damage.
- G. Distribution of Large Materials: Break lumps up and distribute any stones, pieces of crushed rock or lumps which cannot be readily broken up, throughout the mass so that all interstices are solidly filled with fine material.

3.5 STRUCTURE BACKFILL

- A. Use of Select Fill: Use select fill underneath all structures, and adjacent to structures where pipes, connections, electrical ducts and structural foundations are to be located within this fill. Use select fill beneath all pavements, walkways, and railroad tracks, and extend to the bottom of pavement base course or ballast.
 - 1. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable approved mechanical or pneumatic equipment.
 - 2. Compact backfill to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- B. Use of Common Fill: Use common granular fill adjacent to structures in all areas not specified above, unless otherwise shown or specified. Select fill may be used in place of common granular fill at no additional cost.
 - 1. Extend such backfill from the bottom of the excavation or top of bedding to the bottom of subgrade for lawns or lawn replacement, the top of previously existing ground surface or to such other grades as may be shown or required.

2. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable equipment, as specified above.
 3. Compact backfill to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.
- C. Use of Clay: In unpaved areas adjacent to structures for the top 1 foot of fill directly under lawn subgrades use clay backfill placed in 6-inch lifts. Compact clay backfill to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.
1. Use clay having a liquid limit less than or equal to 40 and a plasticity index less than or equal to 20.

3.6 COMPACTION EQUIPMENT

- A. Equipment and Methods: Carry out all compaction with suitable approved equipment and methods.
1. Compact clay and other cohesive material with sheep's-foot rollers or similar equipment where practicable. Use hand held pneumatic tampers elsewhere for compaction of cohesive fill material.
 2. Compact low cohesive soils with pneumatic-tire rollers or large vibratory equipment where practicable. Use small vibratory equipment elsewhere for compaction of cohesionless fill material.
 3. Do not use heavy compaction equipment over pipelines or other structures, unless the depth of fill is sufficient to adequately distribute the load.

3.7 BORROW

- A. Should there be insufficient material from the excavations to meet the requirements for fill material, borrow shall be obtained from pits secured and tested by the CONTRACTOR and approved by the OWNER. Copies of all test results shall be submitted to Lee County Utilities.

3.8 FINISH GRADING

- A. Final Contours: Perform finish grading in accordance with the completed contour elevations and grades shown and blend into conformation with remaining natural ground surfaces.
1. Leave all finished grading surfaces smooth and firm to drain.
 2. Bring finish grades to elevations within plus or minus 0.10 foot of elevations or contours shown.

- B. Surface Drainage: Perform grading outside of building or structure lines in a manner to prevent accumulation of water within the area. Where necessary or where shown, extend finish grading to ensure that water will be carried to drainage ditches, and the site area left smooth and free from depressions holding water.

3.9 RESPONSIBILITY FOR AFTERSSETTLEMENT

- A. Aftersettlement Responsibility: Take responsibility for correcting any depression which may develop in backfilled areas from settlement within one year after the work is fully completed. Provide as needed, backfill material, pavement base replacement, permanent pavement, sidewalk, curb and driveway repair or replacement, and lawn replacement, and perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved.

3.10 INSPECTION AND TESTING OF BACKFILLING

- A. Sampling and Testing: Provide sampling, testing, and laboratory methods in accordance with the appropriate ASTM Standard Specification. Subject all backfill to these tests.
- B. Compaction density tests shall be made at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.
- C. Correction of Work: Correct any areas of unsatisfactory compaction by removal and replacement, or by scarifying, aerating or sprinkling as needed and recompaction in place prior to placement of a new lift.

END OF SECTION

SECTION 31 40 00

SHORING, SHEETING AND BRACING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Work required for protection of an excavation or structure through shoring, sheeting, and bracing.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 31 23 16 - Excavation - Earth and Rock
 - 2. Section 31 23 23 - Backfilling

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. CONTRACTOR's Submittals: All sheeting and bracing shall be the responsibility of the CONTRACTOR to retain qualified design services for these systems, and to be completed with strict adherence to OSHA Regulations. Submit complete design calculations and working drawings of proposed shoring, sheeting and bracing which have been prepared, signed and sealed by a Licensed Professional Engineer experienced in Structural Engineering and registered in the State of Florida, before starting excavation for jacking pits and structures. Use the soil pressure diagram shown for shoring, sheeting and bracing design. ENGINEER's review of calculations and working drawings will be limited to confirming that the design was prepared by a licensed professional engineer and that the soil pressure diagram shown was used.

1.3 REFERENCES

- A. Design: Comply with all Federal and State laws and regulations applying to the design and construction of shoring, sheeting and bracing.
- B. N.B.S. Building Science Series 127 "Recommended Technical Provisions for Construction Practice in Shoring and Sloping Trenches and Excavations.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Do work in accordance with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54), and the Florida Trench Safety Act. The

CONTRACTOR shall also observe 29 CFR 1910.46 OSHA's regulation for Confined Space Entry.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND MATERIALS

- A. Material Recommendations: Use manufacturers and materials for shoring, sheeting and bracing as recommended by the Licensed Professional Engineer who designed the shoring, sheeting, and bracing.

PART 3 EXECUTION

3.1 SHORING, SHEETING AND BRACING INSTALLATION

- A. General: Provide safe working conditions, to prevent shifting of material, to prevent damage to structures or other work, to avoid delay to the work, all in accordance with applicable safety and health regulations. Properly shore, sheet, and brace all excavations which are not cut back to the proper slope and where shown. Meet the general trenching requirements of the applicable safety and health regulations for the minimum shoring, sheeting and bracing for trench excavations.
 - 1. CONTRACTOR's Responsibility: Sole responsibility for the design, methods of installation, and adequacy of the shoring, sheeting and bracing.
- B. Arrange shoring, sheeting and bracing so as not to place any strain on portions of completed work until the general construction has proceeded far enough to provide ample strength.
- C. If ENGINEER is of the opinion that at any point the shoring, sheeting or bracing are inadequate or unsuited for the purpose, resubmission of design calculations and working drawings for that point may be ordered, taking into consideration the observed field conditions. If the new calculations show the need for additional shoring, sheeting and bracing, it should be installed immediately.
- D. Monitoring: Periodically monitor horizontal and vertical deflections of sheeting. Submit these measurements for review.
- E. Accurately locate all underground utilities and take the required measures necessary to protect them from damage. All underground utilities shall be kept in service at all times as specified in Division 1.
- F. Driven Sheet piling: Drive tight sheet piling in that portion of any excavation in paved or surface streets City collector and arterial streets and in State and County highways below the intersection of a one-on-one slope line from the nearest face of the excavation to the edge of the existing pavement or surface.

- G. Sheeting Depth: In general drive or place sheeting for pipelines to a depth at elevation equal to the top of the pipe as approved.
1. If it is necessary to drive sheeting below that elevation in order to obtain a dry trench or satisfactory working conditions, cut the sheeting off at the top of the pipe and leave in place sheeting below the top of the pipe.
 2. Cut off sheeting not designated as "Sheeting Left in Place". The cut ends of sheeting left adjacent to the pipe will be paid for as "Sheeting Left in Place".
 3. Do not cut the sheeting until backfill has been placed and compacted to the top of the pipe.
- H. Sheeting Removal: In general, remove sheeting and bracing above the top of the pipe as the excavation is refilled in a manner to avoid the caving in of the bank or disturbance to adjacent areas or structures. Sheeting shall be removed as backfilling progresses so that the sides are always supported or when removal would not endanger the construction of adjacent structures. When required to eliminate excessive trench width or other damages, shoring or bracing shall be left in place and the top cut off at an elevation 2.5 feet below finished grade, unless otherwise directed.
1. Carefully fill voids left by the withdrawal of the sheeting by jetting, ramming or otherwise.
 2. No separate payment will be made for filling of such voids.
- I. Permission for Removal: Obtain permission before the removal of any shoring, sheeting or bracing. Retain the responsibility for injury to structures or to other property or persons from failure to leave such shoring, sheeting and bracing in place even though permission for removal has been obtained.
- J. Preload internal braces to 50 percent of the design loads.
- K. Proof test tie backs to 133 percent of the design loads and lock off tie backs at 75 percent of the design loads.

3.2 SHEETING LEFT IN PLACE FOR PROTECTION

- A. Ordered Left in Place: In addition to sheeting specified or shown to be left in place, the ENGINEER may order, in writing, any or all other shoring, sheeting or bracing to be left in place for the purpose of preventing injury to the structures, pipelines or to other property or to persons.
1. Cutoff sheeting left in place at the elevation shown or ordered, but, in general, at least 2.5 feet below the final ground surface.
 2. Drive up tight any bracing remaining in place.

- B. Right to Order: Do not construe the right to order shoring, sheeting and bracing left in place as creating any obligation to issue such orders.
- C. Payment: Shoring, sheeting and bracing left in place, by written order, will be paid for under the appropriate Contract Items or where no such items exist, as changes in the work.

END OF SECTION

SECTION 32 10 01

PAVEMENT REPAIR AND RESTORATION

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and remove and replace pavements over trenches excavated for installation of pipelines as shown on the drawings and/or specified herein.

1.2 GENERAL

- A. All damage, as a result of work under this project, done to existing pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipelines, conduits, drains, catch basins, or stabilized areas or driveways and including all obstructions not specifically named herein, shall be repaired in a manner satisfactory to the ENGINEER. Bid prices shall include the furnishing of all labor, materials, equipment, and incidentals necessary for the cutting, repair, and restoration of the damaged areas unless pay items for specific types of repair are included in the Bid Form.
- B. Keep the surface of the backfilled area of excavation in a safe condition 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 OWNER or State requirements for pavement repair and as described herein.
- C. All materials and workmanship shall be first class and nothing herein shall be construed as to relieve the CONTRACTOR from this responsibility. The OWNER reserves the right to require soil bearing or loading tests or materials tests, should the adequacy of the foundation or the quality of materials used, be questionable. Costs of these tests shall be borne by the OWNER, if found acceptable; the costs of all failed tests shall be borne by the CONTRACTOR.
- D. All street and road repair shall be made in accordance with the details indicated on the drawings and in accordance with the applicable requirements of these Specifications and meeting the permit requirements and approval of the governing Department of Transportation agencies.
- E. Pavement or roadway surfaces cut or damaged shall be replaced by the CONTRACTOR in equal or better condition than the original, including stabilization, base course, surface course, curb and gutter or other appurtenances. The CONTRACTOR shall obtain the necessary permits prior to any roadway work.

Additionally, the CONTRACTOR shall provide advance notice to the appropriate authority, as required, prior to construction operations.

1. Roadway Restoration (within Lee County Department of Transportation & Engineering jurisdiction): Restoration shall be in accordance with the requirements set forth in the "Right-of-Way Utility Construction Activities Policy" and these Standards. The materials of construction and method of installation, along with the proposed restoration design for items not referred or specified herein, shall receive prior approval from Lee County DOT.
 - a. Where existing pavement is to be removed, the surface shall be mechanical saw cut prior to trench excavation, leaving a uniform and straight edge parallel or perpendicular to the roadway centerline with minimum disturbance to the remaining adjacent surfacing. The width of cut for this phase of existing pavement removal shall be minimal.
 - b. Immediately following the specified backfilling and compaction, a temporary sand seal coat surface shall be applied to the cut areas. This temporary surfacing shall provide a smooth traffic surface with the existing roadway and shall be maintained until final restoration. Said surfacing shall remain for a minimum of ten (10) days in order to assure the stability of the backfill under normal traffic conditions. Thirty (30) days following this period and prior to sixty (60) days after application, the temporary surfacing shall be removed, and final roadway surface restoration accomplished.
 - c. In advance of final restoration, the temporary surfacing shall be removed, and the existing pavement mechanically sawed straight and clean to the stipulated dimensions, if needed. Following the above operation, the CONTRACTOR shall proceed immediately with final pavement restoration in accordance with the requirements set forth by Lee County Department of Transportation.
2. Roadway Restoration (outside Lee County Department of Transportation jurisdiction) – Work within the rights-of-way of public thoroughfares which are not under jurisdiction of Lee County, shall conform to the requirements of the Governmental agency having jurisdiction or the Florida Department of Transportation, if no governmental agencies have jurisdiction. Work within State Highway right-of-way shall be in full compliance with all requirements of the permit drawings, and to the satisfaction of the Florida Department of Transportation.

1.3 QUALITY ASSURANCE

- A. Applicable provisions of the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", and Supplemental Specifications hereunder govern the work under this Section. The Florida Department of Transportation will hereafter be referred to as FDOT.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials utilized in flexible base pavement and base course shall be as specified in the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction".

PART 3 EXECUTION

3.1 CUTTING PAVEMENT

- A. Cut and remove pavement as necessary for installing the new pipelines and appurtenances and for making connections to existing pipelines.
- B. Before removing pavement, the pavement shall be marked for cuts nearly paralleling pipelines and existing street lines. Asphalt pavement shall be cut along the markings with a jackhammer, rotary saw, or other suitable tool, leaving a uniform and straight edge with minimum disturbance to the remaining adjacent surface.
- C. No pavement shall be machine pulled until completely broken and separated along the marked cuts.
- D. The pavement adjacent to pipeline trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, remove the damaged pavement and shall replace it at his own expense.

3.2 GENERAL RESTORATION

- A. The restoration of existing street paving, driveways, etc., shall be restored, replaced or rebuilt using the same type of construction as was in the original. Be responsible for restoring all such work, including sub-grade and base courses where present. Obtain and pay for such local or other governmental permits as may be necessary for the opening of streets. Meet any requirements other than those herein set forth which may effect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- B. In all cases, maintain, without additional compensation, all permanent replacement of street paving, done under this Contract until accepted by the OWNER, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.
- C. Complete all the final resurfacing or re-paving of streets or roads, over the excavations and relay paving surfaces of roadbed that have failed or been damaged prior to acceptance by the OWNER. Backfilling of trenches and the preparation of sub-grades shall conform to the requirements of Section 31 23 23.

- D. All re-paving or resurfacing shall be done in accordance with Florida Department of Transportation Specifications, to which the following requirement of trench backfill will be added: Where pipeline construction crossed paved areas such as streets, the top 24 inches of trench below the road bases or concrete slabs shall be backfilled with compacted A-4 or better matter that will provide a bearing value of not less than 75 when tested by the Florida Department of Transportation Soil Bearing Test Methods.

3.3 PRIME AND TACK COATS

- A. The work shall consist of the application of bituminous prime and tack coats on the previously prepared base course in accordance with Section 300 of the FDOT Specifications.

3.4 WEARING COURSE

- A. The work shall consist of the construction of plant-mixed hot bituminous pavement to the thickness indicated in the drawings conforming to Type III asphaltic concrete in accordance with Section 333 of the FDOT Specifications. The requirements for plant and equipment are specified in Section 320 and the general construction requirements for asphaltic concrete pavement are contained in Section 330 of the FDOT specifications.

3.5 TESTING

- A. All field testing shall be performed by an independent laboratory employed by the OWNER. All materials shall be tested and certified by the producer. Tests repeated because sub-grade or base does not meet specified compaction shall be at the CONTRACTOR's expense.

3.6 MISCELLANEOUS RESTORATION

- A. Sidewalks cut or damaged by construction shall be restored in full sections or blocks to a minimum thickness of four inches. Concrete curb or curb gutter shall be restored to the existing height and cross section in full sections or lengths between joints. Concrete shall be as specified on the drawings. Grassed yards, shoulders and parkways shall be restored to match the existing sections with grass seed or sod of a type matching the existing grass.

3.7 CLEANUP

- A. 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.

END OF SECTION

SECTION 32 16 00

SIDEWALKS, DRIVEWAYS AND CURBS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Sidewalks, sidewalk ramps, driveways, curbs and drive approaches complete with concrete materials, concrete curing compounds, joint materials, field quality control and appurtenances.

1.2 REFERENCES

- A. Reference Standards: Conform the work for this Section to the applicable portions of the following standard Specifications.
 - 1. ASTM - American Society of Testing and Materials
 - 2. AASHTO - American Association of State Highway and Transportation Officials
 - 3. FDOT - Florida Department of Transportation - Standard Specifications for Road and Bridge Construction.
 - 4. FAC - Florida Accessibility Code.
 - 5. ADAAG - American with Disabilities Act Accessibility Guidelines
 - 6. UFAS - Uniform Federal Accessibility Standards

1.3 SUBMITTALS

- A. Reports: Written permission for the use of all local disposal sites Furnish copies to the ENGINEER.

1.4 JOB CONDITIONS

- A. Environmental Requirements:
 - 1. Temperature: Comply with the requirements for concrete installation due to outside ambient air temperatures as specified under Article 3.3.1 of this Section.
- B. Protection:
 - 1. Protection Against Rain: Comply with the requirements for protecting new work against damage from Rain, as specified under Article 3.3.1 of this Section.
 - 2. Protection Against Cold Weather: Comply with the requirements for protecting new work against damage from cold weather, as specified under Article 3.3.1 of this Section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Concrete: Use 2,500 psi concrete except as modified herein.
- B. Ready-Mixed Concrete: Use ready-mixed concrete which conforms to ASTM C94, Alternate 2.
- C. Water: Use water for mixing and curing concrete reasonably clean and free from oil, salt, acid, alkali, chlorides, sugar, vegetable, or other substances injurious to the finished product. Waters from sources approved by the local Health Department as potable may be used without test. Test water requiring testing in accordance with the current Method of Test for Quality of Water to be Used in Concrete, AASHTO T-26.
- D. Concrete Curing Compounds: Use white membrane curing compound for curing concrete which conforms to AASHTO M148, Type 1 clear, or Type 2 while per FDOT Section 925.
- E. Premolded Joint Filler: Use fiber joint filler which conforms to ASTM D1751. Use filler of the thickness, as specified herein, or as directed by the ENGINEER.
- F. Steel Hook Bolts: Use hook bolts which conform to ASTM A706, or for Grade 60 of ASTM A615, A616, or A617. Use 5/8-inch diameter hook bolts self tapping.
- G. Joint Sealant: Use hot-poured type joint sealant which conforms to ASTM D1190.

PART 3 EXECUTION

3.1 CONTRACTOR'S VERIFICATION

- A. Excavation and Forming: Prior to the installation of any concrete, examine the excavation and forms for the proper grades, lines, and levels required to receive the new work. Ascertain that all excavation and compacted subgrades are adequate to receive the concrete to be installed.
 - 1. Correct all defects and deficiencies before proceeding with the work.
- B. Existing Improvements: Investigate and verify location of existing improvements to which the new work is to be connected.
 - 1. Making necessary adjustment in line and grade to align the new work with the existing improvements must be approved by the ENGINEER prior to any change.

3.2 PREPARATION

- A. Forms: Use wood or metal forms, straight and free from warp, clean, and sufficient strength to resist springing during the process of depositing concrete against them.
 - 1. Use full depth of the concrete forms.

3.3 INSTALLATION

- A. Sidewalks, Sidewalk Ramps, Driveways and Driveway Approaches: Construct all sidewalks and sidewalk ramps six (6) inches thick. Construct sidewalks five (5) feet wide unless otherwise noted on the Plans or directed by the ENGINEER, and slope per ADA requirements. Normally, sidewalks will be located within the right-of-way, parallel the property lines, at a distance of 1-foot from the property line.
 - 1. Construct alleys, driveways and approaches six (6) inches thick. Construct the width of the driveways and driveway approaches as shown on the Plans or as directed by the ENGINEER.
- B. Removal of Existing Curb for Sidewalk Ramps and Driveway Approaches: Conform construction of sidewalk ramps within street intersections where curbed pavement existing to the current FDOT Roadway and Traffic Design Standards.
 - 1. Saw cut, to full depth of pavement, and remove a minimum of an 18-inch wide curb and gutter section where there is no proper curb drop for the sidewalk ramp or driveway approach. When mountable curbs are present, remove a 24-inch wide curb and gutter section for the construction of sidewalk ramps, as specified above.
 - 2. Remove curb and gutter as determined by the ENGINEER in the field but remove curb and gutter at least as wide as the proposed sidewalk ramp plus 1-foot on each side.
 - 3. Replace the removed curb and gutter section with materials, equal to what was removed and seal joint with hot poured rubber asphalt.
- C. Install 5/8 inch diameter self tapping hook bolts, in the existing concrete pavement as indicated on the Plans prior to placing concrete for the removed curb and gutter section.
- D. Placement of Forms: Use wood forms, straight and free from warp, of nominal depth for sidewalk sections less than 25 feet in length.
 - 1. Stake forms to line and grade in a manner that will prevent deflection and settlement.

2. When unit slab areas are to be poured, place slab division forms such that the slab division joints will be straight and continuous.
 3. Set forms for sidewalk ramps to provide a grade toward the centerline of the right-of-way in accordance with current standards. Use a uniform grade, except as may be necessary to eliminate short grade changes.
 4. Oil forms before placing concrete. Leave forms in place at least 12 hours after the concrete is placed. Place forms ahead of the pouring operations to maintain uninterrupted placement of concrete.
 5. The use of slip form pavers can be allowed when approved by the ENGINEER in lieu of the construction system described above.
- E. Joints: Construct transverse and longitudinal expansion and plane-of-weakness joints at the locations specified herein, or as indicated on the Plans or as directed by the ENGINEER.
1. Place the transverse expansion joints for the full width and depth of the new work. Use transverse expansion joints placed against an existing pavement a minimum of six (6) inches deep but no less than the thickness of the concrete being placed.
 2. Conform longitudinal expansion joints to the requirements as transverse expansion joints.
 3. Construct joints true to line with their faces perpendicular to the surface of the sidewalk. Install the top slightly below the finished surface of the sidewalk. Construct transverse joints at right angles to the centerline of the sidewalk and construct longitudinal joints parallel to the centerline or as directed by the ENGINEER.
 4. Place transverse expansion joints, 1/2-inch thick, through the sidewalk at uniform intervals of not more than 50 feet and elsewhere as shown on the Plans, or as directed by the ENGINEER.
 5. Place expansion joints, 1/2-inch thick, between the sidewalk and back of abutting parallel curb, buildings or other rigid structures, concrete driveways and driveway approaches. When directed by the ENGINEER, place the expansion joint between sidewalks and buildings 1-foot from the property line and parallel to it.
 6. Form plane-of-weakness joints every five (5) feet. Form joints by use of slab divisions forms extending to the full depth of the concrete or by cutting joints in the concrete, after floating, to a depth equal to 1/4 the thickness on the sidewalk. Construct cut joints not less than 1/8-inch or more than 1/4-inch in width and finish smooth and at right angles to the centerline on the sidewalk.

- F. Placing and Finishing Concrete: Place all concrete on a prepared unfrozen, smooth, leveled, rolled and properly compacted base. Place concrete on a moist surface with no visible water present.
1. Deposit the concrete, in a single layer to the depth specified. Spade or vibrate and compact the concrete to fill in all voids along the forms and joints. Strike off the concrete with a strike board until all voids are removed and the surface has the required grade and cross section as indicated on the Plans, or as directed by the ENGINEER.
 2. Float the surface of the concrete just enough to produce a smooth surface free from irregularities. Round all edges and joints with an edger having a 1/4-inch radius.
 3. Broom the surface of sidewalks, driveways and approaches to slightly roughen the surface.
 4. Texture the surface of the sidewalk ramps with a coarse broom transversely to the ramp slope, and coarser roughen than the remainder of the sidewalk. Contrast the ramp slope in color (using a brick-red dye or approved equal) from the remainder of the sidewalk. Comply with minimum color contrast and slope requirements from FAC, UFAS, ADAAG, Local Government Standards, or as directed by the ENGINEER.
- G. Curing: After finishing operations have been completed and immediately after the free water has left the surface, completely coat and seal the surface of the concrete (and sides if slip-forming is used) with a uniform layer of white membrane curing compound. Do not thin the curing compound. Apply the curing compound at the rate of one gallon per 200 square feet of surface.
- H. Barricades: Place suitable barricades and lights around all newly poured sidewalks, sidewalk ramps, driveways, driveway approaches and curb and gutter sections in order to protect the new work from damage from pedestrians, vehicles and others until the concrete has hardened.
1. Leave barricades in place for a minimum of two (2) days, except for driveway approaches and curb and gutter sections. Leave barricades in place for a minimum of three (3) days.
 2. Remove and replace any concrete that suffers surface or structural damage at no additional cost.
- I. Protection:
1. Against Rain: Protect new concrete from the effects of rain before the concrete has sufficiently hardened. Have available on the job site at all times enough

burlap or 6-mil thick polyurethane film to cover and protect one day's work. Stop work and cover completed work when rain appears eminent. As soon as the rain ceases, uncover the concrete and burlap drag the surface where necessary. Apply curing compound to any areas where the compound has been disturbed or washed away.

2. **Against Cold Weather:** If concrete is placed between December 15 and February 15, have available on the site sufficient amount of clean, dry straw or hay to cover one (1) day's production. If the temperature reaches 40 degrees F and is falling, place the hay or straw 12 inches thick, immediately after the curing compound is applied.
 3. **Concrete Temperature Limitations:** Do not place concrete when the temperature of the concrete at the point of placement is above 90 degrees F.
- J. **Cleanup:** After the concrete has gained sufficient strength, but no sooner than within 12 hours, remove the fixed forms and backfill the spaces on both sides with sound earth of topsoil quality. Compact, level and leave backfill in a neat condition.
- K. **Gutters and Curbs:** Construct gutters and curbs in accordance with Section 520 FDOT Standard Specifications for Road and Bridge Construction, latest edition, including supplements.

3.4 FIELD QUALITY CONTROL

- A. **Concrete Delivery Ticket:** Use a ticket system for recording the transportation of concrete from the batching plant to point of delivery. Issue this ticket to the truck operator at the point of loading and give to the ENGINEER upon delivery.
- B. **Concrete Delivery Rejection:** Remove concrete not permitted for inclusion in the work by the ENGINEER from the site. Rejection of concrete will be determined through Field Quality Control and elapsed time from mixer charging to delivery.
- C. **Concrete Testing at Placement:** Perform tests of each batch of concrete delivered, each 50 cubic yards, or whenever consistency appears to vary. The sampling and testing of slump, air content and strength will be performed at no cost to the OWNER.
1. **Sampling:** Secure composite samples in accordance with the Method of Sampling Fresh Concrete, ASTM C172.
 2. **Slump Test:** Test in accordance with ASTM C143. Use the least slump possible consistent with workability for proper placing of the various classifications of concrete.
 - a. Place structural concrete for walls and slabs, by means of vibratory equipment, with a slump of four (4) inches.

- b. A tolerance of up to 1-inch above the indicated maximum will be allowed for individual batches provided the average for all batches or the most recent ten (10) batches tested, whichever is fewer, does not exceed the maximum limit.
- 3. Air Content: Determine air content of normal weight concrete in accordance with Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C23 1, or by the volumetric method, ASTM C 173, for each strength test.
- 4. Compressive Strength: Make two (2) strength tests of three (3) samples each for each 50 cubic yards, or fraction thereof, of each mix design of concrete placed in any one (1) day.
 - a. Handling Samples: Mold and cure three (3) specimens from each sample in accordance with Method of Making and Curing Concrete Test Specimens in the Field, ASTM C31. Record any deviations from the requirements of this Standard in the test report.
 - b. Testing: Test specimens in accordance with Method of Test for Compressive Strength of Cylindrical Concrete Specimens, ASTM C39. Test one (1) specimen at seven (7) days for information and test two (2) at 28 days for acceptance. Use the average of the strengths of the two (2) specimens tested at 28 days. Discard results if one (1) specimen in a test manifests evidence of improper sampling, molding or testing, and use the strength of the remaining cylinder. Should both specimens in test shown any of the above defects, discard the entire test.
 - c. Acceptance of Concrete: The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified 28-day strength and no individual strength test results falls below the specified 28-day strength by more than 500 psi. If the strength test is not acceptable, perform further testing to qualify the concrete.
 - d. Concrete Temperature: Determine the temperature of concrete sample for each strength test.
- D. Reductions due to deficiencies in thickness or compressive strength are additive, that is, if an area is deficient by 3/8 inch and under strength by 200 psi, the total reduction is 20% plus 02% or 40% reduction.

END OF SECTION

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SECTION 32 31 13

CHAIN LINK FENCING AND GATES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing and installing (aluminum) (galvanized steel) (vinyl coated galvanized steel) chain link fencing and gates.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 03 30 53 – Concrete for Non-Plant Work
 - 2. Section 09 90 00 – Painting and Coating

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM A53 - Pipe Specifications
 - 2. ASME B36.10M - Welded and seamless wrought steel pipe
 - 3. FS RR-F-191 - Fencing, Wire and Post, Metal

1.3 DESIGN

- A. General: Provide fencing of the chain-link type and seven feet high with six feet of diamond mesh woven wire fabric topped by extension arms with a vertical height of approximately one foot above the top of the fabric. Design the extension arms slanted out at an angle of 45 degrees and provide the arms to carry three double strands of barbed wire. Locate the fence as shown.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed in the LCU Approved Materials List.

2.2 TENSION WIRE

- A. For the tension wire for the fence bottom use (minimum 6-gauge galvanized coil spring steel) (fusion color coated as specified for the fabric) (6-gauge alloy 6061) (minimum 7-gauge galvanized coil spring steel).

2.3 TOP AND BRACE RAILS

- A. General: Furnish the top rail in approximately 20-foot lengths with couplings approximately 6 inches long for each joint. Provide one coupling in each 5 with an expansion spring. Provide the rail continuous from end-to-end for each run of fence. Provide brace rails at all terminal posts, locate the rails midway between the top and bottom of the fabric and extend from the terminal post to the first adjacent line post. Securely fasten rails at both ends. Provide top and brace rails that are (galvanized steel fusion color coated as specified for framework in Subsection 1.03 C) (galvanized steel) (aluminum alloy Type 6063-T6).
- B. Pipe Type: (For galvanized steel top and brace rails, use 1-1/4-inch, Schedule 40 pipe or a 1.625- by 1.25-inch roll-formed section with minimum bending strength of 192 pounds on 10-foot span.) (For aluminum top and brace rails, use 1-1/4-inch, Schedule 40 pipe.)

2.4 POSTS

- A. General: Provide all posts that are (aluminum alloy 6063-T6 conforming to Fed. Spec. RR-F-191) (galvanized steel pipe or roll-formed section) (coated as specified for vinyl coated framework, posts and hardware in Subsection 1.03 C).
- B. Pipe Posts: Provide pipe posts as follows:
 - 1. For end, corner and pull posts use 2-1/2-inch, Schedule 40 pipe
 - 2. For line posts use 2-inch, Schedule 40 pipe
 - 3. For gate posts use the following pipes for different leaves:
 - a. For leaves up to 6 feet wide, use 2-1/2-inch Schedule 40 pipe
 - b. For leaves over 6 feet to 12 feet wide, use 3-1/2-inch Schedule 40 pipe
 - c. For leaves over 12 feet to 18 feet wide, use 6-inch Schedule 40 pipe
- C. Bending Strength (and Weight): Provide materials with the minimum bending strength (and weights for aluminum posts) based on a 6-foot cantilever for rolled formed or tube posts as follows:

		Minimum Bending Strength, lbs		Minimum Weight, lbs/ft
		Galvanized Steel	<u>Aluminum</u>	Aluminum
1.	End, Corner and Pull Posts:			
	2.875" O.D. roll formed or	444		
	2-1/2-inch square tube	547		
	2-1/2-inch square, heavy wall extrusion		646	2.90
2.	Line Posts:			
	For fences 8 feet maximum height 1.875- by 1.625-inch C-Section	245		
	For fabric height to 6 feet 1.875-inch by 1.625-inch H-Section		202	0.913
	For fences over 8 feet high 2.25- by 1.703-inch C-Section	347		
	For fabric height to 7 feet and more 2.25-inch by 1.875-inch H-Section		325	1.22
3.	Gate Posts:			
	For leaves up to 6 feet wide (2.875-inch O.D. roll formed or	444		
	2-1/2-inch square tube	645		
	For leaves to 6 feet wide 2-1/2-inch square, heavy wall extrusion		646	2.90
	For leaves over 6 feet wide to 12 feet wide 3-1/2-inch Schedule 40 pipe			3.15
	For leaves over 12 feet to 18 feet wide 6-inch Schedule 40 pipe			6.56

2.5 GATES

- A. General: For the perimeter construction of gates with leaves up to 6 feet wide, use 1-1/2-inch square and for gates with leaves greater than 6 feet wide, use 2-inch square (steel tube).
- B. Braces: Provide the gates with sufficient horizontal and vertical members and bracing to ensure structural stability to prevent sagging and to provide for the attachment of fabric, hardware and accessories. Provide gates with diagonal cross bracing consisting of 3/8-inch diameter adjustable length truss rods where necessary to provide frame rigidity without sag or twist.
- C. Cantilever Sliding Gates: Furnish cantilever overhang as follows:

<u>Gate Leaf Size</u>	<u>Overhang</u>
6'-0" to 10'-0"	6'-6"
11'-0" to 14'-0"	7'-6"
15'-0" to 22'-0"	10'-0"
12'-0" to 30'-0"	12'-0"

- 1. For gates leaf sizes 23'-0" to 30'-0", add one additional 2-inch square lateral support rail welded adjacent to the top horizontal rail. Make the bottom rail of 2" x 4" tubing weighing 1.71 pounds per foot.
- 2. Provide all cantilever overhang frames having 3/8-inch (galvanized steel) (aluminum) brace rods.
- 3. Provide the enclosed track made of a combined track and rail aluminum extrusion having a total weight of 3.72 pounds per foot and designed to withstand a reaction load of 2,000 pounds.
- 4. Provide each gate leaf with two swivel type zinc die cast trucks having four sealed lubricant ball-bearing wheels, 2-inch in diameter by 9/16-inch in width, with two side rolling wheels to insure alignment of the truck in the track. Hold trucks to post brackets by 7/8-inch diameter ball bolts with 1/2-inch shank. Design truck assemblies to take the same reaction load as the track.
- 5. Install gates on 4-inch OD Schedule 40 (galvanized) (aluminum) posts weighing 9.1 pounds per foot. Use three posts for single slide gate and four posts for double slide gate.
- 6. Provide guide wheel assemblies for each supporting post. Provide each assembly consisting of two rubber wheels 4 inches in diameter attached to a post so that the bottom horizontal member will roll between the wheels which can be adjusted to maintain gate frames plumb and in proper alignment.

Gate Accessories: Equip gates with hinges, latches, center stops, hasps, holdbacks, and padlocks. Provide hinges, latches, center stops, hasps, and holdbacks that are cast iron, malleable iron, or pressed steel hot-dip galvanized after fabrication. Provide double gates with a center drop bar and gate holdbacks.

- D. Latches: Provide gate latches that are positive locking, pivoting type with the padlocking arrangement accessible from either side of the gate.
- E. Hinges: Hang all gates on offset hinges to permit swinging the gate through a 180-degree arc to lie, when not obstructed, along and parallel to the line of the fence.
- F. Barbed Wire: Top gates with barbed wire on extension arms the same as specified for the fence.

2.6 ATTACHMENTS

- A. General: Provide all attachments fabricated of galvanized carbon steel.
- B. Tension Bars: Provide 3/16-inch by 3/4-inch galvanized carbon steel tension bars attached to the terminal posts by means of beveled edge bands.
- C. Truss Rods: Provide 3/8-inch diameter galvanized carbon steel truss rods. Securely mount truss rods between the line post end of the brace rail and the base of the terminal post.
- D. Post Tops: Provide post tops of galvanized pressed steel or malleable iron to form weathertight caps for (pipe) (post or tube posts). Make provisions for installation or passage of the top rail.
- E. Brace and Tension Bands: Provide galvanized steel brace bands and tension bands, of the "unclimbable" beveled edge type with 3/8-inch diameter square shouldered aluminum carriage bolts, nonremovable from outside of the fence.
- F. Rail Couplings: Provide rail couplings of the outside sleeve type, not less than six inches long, self-centering, which allows for expansion and contraction. Provide galvanized steel rail couplings.
- G. Fabric Ties: Provide 11-gauge galvanized steel fabric ties.
- H. Hog Rings: Provide 11-gauge wire, aluminum alloy, Type 6061-T6 hog rings.
- I. Extension Arms: Provide galvanized pressed steel extension arms for supporting the barbed wire. Design the arms with an adequate cross section to withstand without failure or permanent deflection a perpendicular force of 250 pounds applied at the end of the arm when the arm is securely attached to the post. Construct extension arms to be slanted out.
 - 1. Provide aluminum arms conforming to Fed. Specs. RR-F-191.
 - 2. Provide Vee-type arm at 45 degrees to vertical with a vertical height approximately one foot above the top of the fabric, one for each post.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Install all fencing and accessories according to the manufacturer's recommendations. Do not begin installation and erection before final grading is completed, unless otherwise approved.
- B. Excavation: Drill or hand excavate (using post hole digger) holes for posts to the diameter and spacing indicated, in firm, undisturbed or compacted soil.
 - 1. If not indicated, excavate holes for each post to the minimum diameter recommended by the fence manufacturer, but not less than four times the largest cross-section of the post.
 - 2. Unless otherwise indicated excavate the hole depths approximately 3 inches lower than the post bottom, with the bottom of posts set not less than 36 inches below the finished grade surface.
- C. Tension Wire: Attach the tension wire to the bottom of the fabric by hog rings spaced at 24-inch intervals and to terminal posts by brace bands.
- D. Posts: Set posts plumb in concrete encasement at not more than 10-foot centers in the line of the fence with the tops properly aligned. Extend concrete encasement for line posts a minimum of three feet below finish grade with a minimum diameter of ten inches. Extend concrete encasement for terminal, corner and gate posts 40 inches below finished grade, except gate posts for leaves greater than 6 feet, for which extend the encasement 54 inches below grade. Provide the minimum diameter of encasement for terminal, corner and gate posts to be sufficient to provide not less than four inches between any part of the post and the face of the concrete and in no case provide the diameter to be less than 12 inches. Set line posts 32 inches into the concrete and set all other posts 36 inches, except gate posts for leaves greater than 6 feet wide, which are to be set 48 inches into the concrete. Slope the top exposed surface of the concrete to shed water and provide a neat appearance.
 - 1. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold posts in position during placement and finishing operations.
 - a. Unless otherwise indicated, extend the concrete footing 2 inches above grade and trowel to a crown to shed water.
 - 2. Where aluminum is in contact with concrete, coat the aluminum as specified in Section 09 90 00.
- E. Fasteners: Install nuts for tensions bands and hardware bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent nut removal.

3.2 GALVANIZING

- A. Provide galvanizing meeting the requirements of Section 05 50 01.

END OF SECTION

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SECTION 32 90 01
LANDSCAPING WORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Soil, soil preparation, soil tests, excavation, planting, seeding, sodding, pruning, edging, fertilizing and maintenance.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 31 23 16 - Excavation, Earth and Rock
 - 2. Section 31 23 23 - Backfilling
 - 3. Section 32 92 00 - Lawn Restoration

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM C 33 - Specification for Concrete Aggregates

1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Soil Tests: Submit soil test results.
- C. Maintenance Instruction Manual: Upon completion of the landscaping work and prior to final payment, furnish a landscaping maintenance manual. Include complete and detailed instructions on the recommended maintenance procedure to be followed for maintaining lawns and each species of plant material. Include a schedule of all planted and seeded materials and all pertinent growing and maintenance information and requirements for watering, fertilizing, lime applications, spraying, cultivating, pruning and weed control.

1.4 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver, store and handle all products and materials as specified in Division 1 (and as follows:)
- B. Top Soil: Deliver top soil in a dry state without enough moisture to allow it to be packed or squeezed into a ball.

- C. Balled and Bare Root Plants: Immediately after delivery, set all balled plants on the ground with the balls well protected with soil. Water and properly maintain all plants until planting. Plant or heel in bare rooted plants which cannot be planted immediately upon delivery. No materials heeled in for more than a week may be used. Before the roots are covered, open bundler and separate the plants.
- D. Grass Seed: Deliver grass seed in standard size bags of the vendor, showing weight, analysis and name of vendor. Store the seed so as not to impair its effectiveness.
- E. Sod: Deliver sod to the site in fresh condition and within two days of the time it has been dug. Install sod immediately upon delivery to the site. If installation is delayed, store sod in a cool, shady place no longer than 48 hours after delivery.
- F. Fertilizer: Deliver fertilizer mixed as specified, in standard size bags, showing weight, analysis and the name of the manufacturer. Store the fertilizer in a weatherproof storage place in a manner that will keep it dry without affecting its effectiveness.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Seeding and Sodding: Sowing warm season grass seed is permitted in Spring between March 15th and June 1st or in Fall between August 15th and October 15th. Sow seed when the wind velocity is below 5 mph. Place warm season sod between March 15th and June 1st or between August 15th and October 15th, or during the season or seasons which are normal for such work as determined by weather conditions and accepted practice in the locality and as approved. Uninstalled sod left on site for more than 48 hours will not be accepted.
- B. Planting: Unless otherwise directed, plant deciduous material from March 1st to June 1st and from September 1st to December 1st. Plant evergreen material from April 1st to June 1st and from September 1st to November 1st.

1.6 WARRANTY

- A. General: Apply the warranty to all seeded, sodded and planted areas. Have the warranty period commence after the final acceptance of all landscaping work exclusive of all replacement plant materials.
- B. Plant Material: Warranty plant materials for a period of one year.
- C. Seeded Areas: Warranty seeded lawn areas to the time of establishment of an acceptable uniform stand of grass. All seed shall be alive and in

satisfactory condition at the end of the warranty period. There shall be an additional 60 day warranty on all areas of replaced seed.

- D. Sod: Warranty sod to 180 days following final acceptance. All sod shall be alive and in satisfactory condition at the end of the warranty period. There shall be an additional 60 day warranty on all areas of replaced sod.

1.7 MAINTENANCE

- A. General: Maintain all seeded, sodded and planted areas during the warranty period.
- B. Grass Areas: Maintain all seeded and sodded areas to well establish a uniform stand of weed-free grass. Reseed or resod areas failing to develop a uniform stand.
- C. Trees, Shrubs and Ground Covers: Cultivate trees, shrubs and ground covers and weed and water when necessary, but not less than twice a month, to prevent plant material from dying. Replace any plant material which is found to be dead or dying during the warranty period to original specifications upon request. Include the full cost of replacing dead or dying plant material in the Contract Amount. No separate payment will be made for replacements. Maintain plant material to be alive, in good growing condition and free of weeds.
- D. Replacement: Replace plant material and resod or reseed only during the specified planting seasons and warranty the replacement material for the same period of time as the original material.

PART 2 PRODUCTS

2.1 SOIL

- A. Topsoil: Provide a natural friable topsoil of the region, rich in organic matter, without any material toxic to plant growth and of uniform quality, free of large roots, sticks, hard clay, weeds, brush, stones over 1-inch in maximum dimension or other litter or waste products. Provide topsoil containing no decomposed stone, salts or alkali, and not less than 15 parts per million of available nitrates, 3 parts per million of available phosphorus, 15 parts per million of potash, and having a pH of not less than 5.0 nor more than 7.2 at a depth of 6 inches for sod, 12 inches for groundcover, 24 inches for shrubs, 36 inches for trees/palms below the surface of the field from which it is removed. Provide topsoil with a mechanical analysis as follows:

Sieve	Percentage Passing
1 inch	100
1/4 inch	97-100
No. 100	40-60

- B. Planting Soil: Prepare planting soil by mixing 1/3 part native soil, 1/3 part topsoil and 1/3 peat or organic compost.

2.2 GRASS SEED AND SOD

- A. See Section 32 92 00 Lawn Restoration for Southwest Florida appropriate Seed Mix.
- B. Bahia Grass Seed: Provide a fresh, clean, new crop of “Argentine” Bahia or “Pensacola” Bahia grass seed composed of 75 percent Bahia grass and 25 percent brown top millet. Provide seed components free of noxious weed seeds and not less than 85 percent germination. Rate: 10lb/1,000sf, 50 percent sowed in 2 directions for uniformity of coverage.
- C. Argentine or Pensacola Bahia Grass Seed: Provide a fresh, clean, new crop of grass seed composed of 75 percent Bahia grass and 25 percent brown top millet Provide seed components free of noxious weed seeds and not less than 85 percent germination.

Tag each sack in accordance with the agricultural seed laws of the United States and the State of Florida. Show on each tag the producer's guarantee as to the year grown, the percentage of purity, the percentage of germination and the tests by which the percentages were determined. Provide seed for this project having a test date within 6 months of the date of sowing.

- D. Sod: Provide nursery-grown Argentine Bahia or Saint Augustine “Floritam” to match existing sod type. Saint Augustine “Floritam” or Bahia sod shall be free of weeds, a minimum of 1-inch thick of dense growth and cut with sharp edges. Saint Augustine sod shall be in 18- inch widths and not less than 3 feet long. (Bahia sod shall be 6 inches wide and no less than 2 feet long) Sod shall be delivered to the site within two days. Sod which has been allowed to have the roots dry out or on which the grass has turned brown will not be accepted.

2.3 PLANT MATERIALS

- A. General: Provide plant materials that are true to species or variety, sound, healthy, vigorous acclimated plants free from defects, disfiguring knots, sun-

scaled injuries, abrasions of the bark, plant diseases and insect eggs, borers and all other forms of infestations. Provide material that has normal, well-developed branch systems and vigorous root systems and that is freshly dug, nursery-grown stock grown under the same climatic conditions as the Project location. Provide material grown under climatic conditions similar to those in the locality of the project for at least 2 years and transplanted or root pruned at least in the last 3 years.

- B. Plant Size: Dimension a plant as it stands in its natural position. Measure trees under 4 inches in caliper at a point 6 inches above the ground and trees more than 4 inches in caliper at a point 12 inches above ground. All plant sizes as specified on the drawings shall be considered minimum sizes. Do not cut back large shrubs to sizes specified.
- C. Balled, Burlapped and Platformed Plants: Dig balled and burlapped, as well as balled and platformed, plants with sufficient roots and a solid ball of earth securely held in place by burlap and stout natural fiber rope. Manufactured balls are not acceptable. Provide balled and platformed plants with sturdy platforms of a size equal to the diameter of the horizontal midsection of the ball of earth.
- D. Bare-Rooted Plants: Dig bare-rooted plants with sufficient root spread and depth to ensure full recovery and development of the plants. Cover roots for these plants with a uniformly thick coating of mud by being puddled immediately after they are dug.
- E. Inspection: Submit plants to inspection for approval at the place of growth, for conformity to specification requirements as to quality, size and variety. In addition to the place of growth inspection, submit plants to inspection for approval upon delivery at the project site or during the progress of the work, for size and condition of balls or roots, diseases, insects, and latent defects or injuries. Remove rejected plants immediately from the site. Do not substitute plants for those specified unless approved in writing by the COUNTY or COUNTY's representative.

2.4 ACCESSORIES

- A. Mulch: Provide shredded hardwood, pine barks or other approved materials for mulch. Cypress mulch is prohibited.

2.5 TESTS

- A. Sample: Submit a 10-ounce sample of the proposed topsoil to a testing laboratory in sealed containers to prevent contamination.

- B. Analysis: Analyze the topsoil sample to determine the amount of lime necessary and the appropriate fertilizer mix and quantity required for planting, seeding and sodding.

PART 3 EXECUTION

3.1 GRADES

- A. General: Existing and final contours shown depict finished grades after completion of landscaping work.
- B. Lawn Grades: Grade lawns to meet walks, curbs and adjoining surfaces after uniform settlement of surfaces. Correct water pockets or ridges which appear after surface settlement takes place on or before the end of the guarantee period.

3.2 EXCAVATION FOR PLANTING

- A. General: Obtain approval for all plant locations before excavation. Remove from the site all material that is surplus and unsuitable for backfill.
- B. Ground Cover and Grass Areas: Excavate for ground cover and grass areas to the required depths for grass to receive 6 inches of topsoil and for groundcover to receive 12 inches of planting soil.
- C. Plant Pits: Excavate plant pits with vertical sides and a circular outline.
 - 1. Dig tree and evergreen pits at least twice the diameter of the ball, and deep enough to permit an 8-inch layer of compacted planting soil beneath the ball.
 - 2. Dig shrub pits a minimum of twice the diameter of the ball and deep enough to allow 6 inches of compacted planting soil beneath the ball.
- D. Drain: Install tree sump drains for all trees, ornamental trees, and evergreens planted in locations where poorly drained soils result in soil percolation rates that are 2 inches per hour or less. Tree sump drains shall be constructed at the bottom of planting pit with a vertical augered hole, minimum of 8 inches wide, filled with a 6-inch thick layer of 3/4-inch washed gravel. Depth of the tree sump shall penetrate through the occluded soil layer to an appropriate depth to assure positive percolation. Cover the gravel layer with a filter mat before backfilling the planting pit with soil.

3.3 SOIL CONDITIONING

- A. Disking: Before the application of topsoil, sodding or seeding, disk the area to be seeded or sodded to a depth of 6 inches. Continue the disking until the subsoil surface is sufficiently broken to provide a good bond between subsoil and topsoil. Spread 6 inches of planting soil over the disked area to a uniform depth and density.
- B. Ground Limestone: Incorporate ground limestone, if required by the results of the soil test report, into the upper 3 inches of planting soil. Uniformly spread fertilizer and mix into the soil to a depth of 1-1/2 inches or as recommended by the manufacturer.

3.4 SEEDING AND SODDING

- A. Seeding: Sow seed at the rate of 10 lbs/1,000 sf or as recommended by the seed producer. Evenly rake the surface after seeding with a fine-tooth rake. Mulch all newly seeded areas and cover with a minimum of 1/4-inch of straw or hay, approximately at the rate of 1 bale per 1,000 square feet, then thoroughly wet.
- B. Sodding: Lay sod in such a manner that the surface is smooth and even and all edges abut one another tightly. Water and roll sod so that a bond is produced between the prepared topsoil and the sod. On slopes greater than 3 to 1, lay sod perpendicular to the slope to prevent sliding, stake installed sod with approved wooden sod stakes at a minimum rate of three stakes per square yard of sod.

3.5 PLANTING

- A. Layout: Outline locations for trees, shrubs, evergreens and bed and stake for approval. Obtain location approval prior to commencing planting operations.
- B. Setting Plants: Set plants plumb and straight with the crown at finished grade. Compact soil around the base of the ball, and fill the void 3/4 of the way up from the bottom. Water each plant immediately. After the water has completely drained, fill the plant pits to finished grade. Properly spread out roots of bare root plants and carefully work topsoil among them. Cut off any broken or frayed roots with a clean cut. Form a shallow basin, the size of the ball with a ridge of soil to facilitate watering. After that operation is completed, apply a second watering immediately. Finish all planting pits and beds within a period of 3 days following installation. Construct tree saucers, cultivate and outline planting pits with a neat edge, when necessary.
- C. Mulching: Immediately after planting operations are completed, cover all tree and shrub pits with specified mulch to a minimum depth of 3 inches.

Limit mulch for trees to outside edge of saucer diameter and, for shrubs, the entire shrub bed. Maintain a 4 inch to 6 inch clear zone of mulch around the collar (trine) of each plant.

- D. Pruning: Prune each tree and evergreen with clean, sharp tools in accordance with standard horticultural practice to preserve the natural character of the plant. Remove suckers and all dead, broken or badly bruised branches.
- E. Wrapping: If specified on the drawings, wrap the tree trunks of all trees with burlap tree wrapping securely tied with suitable cord at top and bottom and at 2-foot intervals along the trunk. Overlap the wrapping 2 inches top and bottom and entirely cover the trunk from the ground to the height of the second branch, neat and snug.
- F. Guying: Guy trees as necessary to be plumb and straight through final inspection. Remove guy wires at completion of project.
- G. Watering: During planting, thoroughly saturate the soil around each plant with water and as many times later as seasonal conditions require until the end of the guarantee period.

3.6 EDGING

- A. General: Establish a neat edge where planting areas meet grass areas, with spade or edging tools, immediately after all planting and seeding is completed. Establish good flowing curves as shown. Maintain edging until the end of the guarantee period.

3.7 GRAVELED AREAS

- A. General: Lay a weed barrier in accordance with the manufacturer's recommendations and top with a 4-inch layer of gravel. Edge graveled areas with metal edging.

END OF SECTION

SECTION 32 92 00
LAWN RESTORATION

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. The work in this section consists of furnishing all labor, material and equipment to replace and maintain all areas disturbed during construction by establishing a stand of grass, within the areas called for by the furnishing and placing grass sod, or seeding, or seeding and mulching.

1.2 REFERENCE DOCUMENTS

- A. The materials used in this work shall conform to the requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction as follows:
 - 1. Sod - Section 981-2
 - 2. Fertilizer - Section 982
 - 3. Water - Section 983

1.3 SUBMITTALS

- A. Submit certifications and identification labels for all sodding supplied as specified in Section 01 33 00.

PART 2 PRODUCTS

2.1 SODDING

- A. Types: Sod may be of either St. Augustine or Argentine Bahia grass or as that disturbed, as established prior to construction. It shall be well matted with roots. When replacing sod in areas that are already sodded, the sod shall be the same type as the existing sod.
- B. Sod shall be provided as required in accordance with Florida Department of Transportation Specifications 575 and 981. The CONTRACTOR shall furnish sod equal to and similar in type as that disturbed. Placement and watering requirements shall be in accordance with FDOT Specifications Section 575.
- C. The sod shall be taken up in commercial-size rectangles, preferably 12-inch by 24-inch or larger, except where 6-inch strip sodding is called for.

- D. The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. It shall be planted as soon as possible after being dug and shall be shaded and kept moist from the time it is dug until it is planted.
- E. Sod should be handled in a manner to prevent breaking or other damage. Sod shall not be handled by pitch forks or by dumping from trucks or other vehicles. Care shall be taken at all times to retain the native soil on the roots of each sod roll during stripping and handling. Sod that has been damaged by handling during delivery, storage or installation will be rejected.

2.2 FERTILIZER

- A. Chemical fertilizer shall be supplied in suitable bags with the net weight certification of the shipment. Fertilizer shall be 12-8-8 and comply with Section 982 of the FDOT Standard Specification for Road and Bridge Construction.
- B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.
- C. The chemical designation of the fertilizer shall be 12-8-8, with at least 50 percent of the nitrogen from a nonwater-soluble organic source. The nitrogen source may be a unreaformaldehyde source provided it is not derived from a waste product of the plastic industry.

2.3 EQUIPMENT

- A. The device for spreading fertilizer shall be capable of uniformly distributing the material at the specified rate.

2.4 NETTING

- A. Netting is fabricated of material similar to Geoscope Landscape Fabric or approved equal.

2.5 GRASSING

- A. 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.
- B. Grass seed shall be Argentine Bahia, 60 #/acre March 1 to November 1, 50 #/acre with 20 #/acre of rye grass seed November 1 to March 1. Argentine Bahia seed shall be a scarified seed having a minimum active germination of 40% and total of 85%.

- C. Mulch material shall be free of weeds and shall be oat straw or rye, Pangola, peanut, Coastal Bermuda, or Bahia grass hay.

2.6 TOPSOIL

- A. Topsoil stockpiled during excavation may be used. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the OWNER. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants, and grassing specified herein.

2.7 MULCH

- A. Mulch shall be fresh cypress mulch. Rate of application specified herein shall correspond to depth not less than 1-inch or more than 3-inches according to texture and moisture content of mulch material.

2.8 WATER

- A. 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 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

3.1 SOD BED PREPARATION

- A. Areas to be sodded and/or seeded shall be cleared of all rough grass, weeds, and debris, and brought to an even grade.
- B. The soil shall then be thoroughly tilled to a minimum 8-inch depth.
- C. The areas shall then be brought to proper grade, free of sticks, stones, or other foreign matter over 1-inch in diameter or dimension. The surface shall conform to finish grade, less the thickness of sod, free of water-retaining depressions, the soil friable and of uniformly firm texture.

3.2 INSPECTION

- A. Verify that soil preparation and related preceding work has been completed.
- B. Do not start work until conditions are satisfactory.

3.3 SOD HANDLING AND INSTALLATION

- A. During delivery, prior to planting, and during the planting of sod areas, the sod panels shall at all times be protected from excessive drying and unnecessary exposure of the roots to the sun. All sod shall be stacked during construction and planting so as not to be damaged by sweating or excessive heat and moisture.
- B. After completion of soil conditioning as specified above, sod panels shall be laid tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered.
- C. Sod shall be placed at all areas where sod existed prior to construction, on slopes of 3 horizontal on 1 vertical (3:1) or greater, in areas where erosion of soils will occur, and as directed by the ENGINEER. On areas where the sod may slide, due to height and slope, the ENGINEER may direct that the sod be pegged, with pegs driven through the sod blocks into firm earth, at suitable intervals.

3.4 USE OF SOD ON ROADWAY PROJECTS

- A. In accordance with the FDOT District One Standard Practice, permanent green grass shall be established at the completion of roadway construction and maintenance work. The following shall apply to all restoration involving State or County roadways:
 - 1. Sod in lieu of seed and mulch shall be used on all roadways with urban (raised curb) typical sections.
 - 2. One inch water per week shall be required for a minimum of four (4) consecutive weeks for the purpose of establishing sod. This can be waived during construction, if and only if there is a minimum of one inch of rain per week on all sod on the project.
 - 3. Sod shall be placed on slopes 1:3 or greater. Staked sod shall be placed on slopes 1:2 or greater.
 - 4. On all curves with superelevation, sod shall be placed from the edge of pavement to the toe of slope on the downhill side(s) for the entire length of the superelevated roadway. On multi-lane divided rural facilities, sod shall be placed in the median and on the inside of the curve in the superelevated areas. This does not apply to reverse crowns.
 - 5. For all projects with less than 10,000 square yards grass area, sod shall be used.
 - 6. On tangent sections and on outside of curves, sod shall be used between the edge of pavement and a point 4 feet beyond the shoulder break point.
 - 7. The entire width of sod should not exceed 15 feet from the edge of pavement.
 - 8. Sod is to be used to eliminate narrow seed and mulch areas. Areas less than 6 feet in width shall be sodded.
 - 9. Sod shall be placed around drainage structures as per the standard Indexes and extended to the edge of pavement.

3.5 SOD MAINTENANCE

- A. The sod shall produce a dense, well established growth. The CONTRACTOR shall be responsible for the repair and re-sodding of all eroded or bare spots until project acceptance. Repair to sodding shall be accomplished as in the original work.
- B. Sufficient watering shall be done by the CONTRACTOR to maintain adequate moisture for optimum development of the seeded and sodded areas. Sodded areas shall receive no less than 1.5 inches of water per week for at least 2 weeks. Thereafter, the CONTRACTOR shall apply water for a minimum of 60 days as needed until the sod takes root and starts to grow or until final acceptance, whichever is latest.

3.6 CLEANING

- A. Remove debris and excess materials from the project site.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 33 05 01

LEAKAGE TESTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Testing for any signs of leakage in all pipelines and structures required to be watertight.
 - 1. Test gravity sewers and drain lines by low pressure air testing.
 - 2. Test all other pipelines with water under the specified pressures.
- B. Operation of Existing Facilities: Conduct all tests in a manner to minimize as much as possible any interference with the day-to-day operations of existing facilities or other contractors working on the site.

1.2 PERFORMANCE REQUIREMENTS

- A. Written Notification of Testing: Provide written notice when the work is ready for testing, and make the tests as soon thereafter as possible.
 - 1. Personnel for reading meters, gauges, or other measuring devices, will be furnished.
 - 2. Furnish all other labor, equipment, air, water and materials, including meters, gauges, smoke producers, blower, pumps, compressors, fuel, water, bulkheads and accessory equipment.

1.3 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C 600 - Installation of Ductile-Iron Water Mains and Their Appurtenances

1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Testing Report: Prior to placing the sewer system in service submit for review and approval a detailed bound report summarizing the leakage test data, describing the test procedure and showing the calculations on which the leakage test data is based.

1. Reference Sewer Line Data

a. For Low Pressure Air Testing

- (1) The length and diameter of the section of line tested (MH to MH) including any laterals.
- (2) A complete description of test procedures and methods, including:
 - (a) Trench backfilling and sewer cleaning status
 - (b) Type of plugs used and where
 - (c) Depth of sewer, and ground water pressure over sewer pipe
 - (d) Stabilization time period and air pressure
 - (e) Actual air test pressures used if ground water is present
 - (f) The allowed time by specifications
 - (g) The actual test time
 - (h) The air pressure at beginning and end of test
- (3) The name of the inspector/tester and the date(s) and time(s) of all testing, including any retesting.
- (4) A description of any repairs made.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 LEAKAGE TESTING

- A. All new sewer and water pipelines installed shall be tested for leakage. The test used will be Hydrostatic Testing for pressure lines and Low Pressure Air Testing for gravity lines. Tests to be performed will be indicated by the ENGINEER and witnessed by the ENGINEER and the Lee County Utilities representatives.

1. Flushing

- a. All mains shall be flushed to remove all sand and other foreign matter. The velocity of the flushing water shall be at least 4 fps. Flushing shall be terminated at the direction of the ENGINEER. dispose of the flushing water without causing a nuisance or property damage.
- b. Temporary flush out connections shall be installed on all dead end water mains at the locations shown on the Drawings and in accordance with the detail shown in Section 9 of the Lee County Utilities Operations Manual.

2. Hydrostatic Testing

Perform hydrostatic testing of the system as set forth in the following, and shall conduct said tests in the presence of representatives from the COUNTY and other authorized agencies, with 48 hours advance notice provided.

Piping and appurtenances to be tested shall be within sections between valves unless alternate methods have received prior approval from the COUNTY. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. All piping shall be thoroughly cleaned and flushed prior to testing to clear the lines of all foreign matter. While the piping is being filled with water, care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

Hydrostatic testing shall be performed with a sustained pressure for a minimum of two (2) hours at 150 psi pressure or 2-1/2 times working pressure, whichever is higher, unless otherwise approved by Lee County Utilities, for a period of not less than two (2) hours. Testing shall be in accordance with the applicable provisions as set forth in the most recent edition of AWWA Standard C600. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD (P)^{1/2}}{133,200}$$

Where,

- L = Allowable leakage in gallons per hour;
- S = Length of pipe tested in feet;
- D = Nominal diameter of the pipe in inches;
- P = Average test pressure maintained during the leakage test in pounds per square inch

For 150 psi, $L = (9.195 \times 10^{-5}) SD$

The testing procedure shall include the continued application of the specified pressure to the test system, for the one hour period, by way of a pump taking

supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced from said container.

Should the test fail, necessary repairs shall be accomplished by the CONTRACTOR and the test repeated until results are within the established limits. The CONTRACTOR shall furnish the necessary labor, water, pumps, and gauges at specified location(s) and all other items required to conduct the required testing and perform necessary repairs.

General. All sanitary sewers and associated service lines shall be constructed watertight to prevent infiltration and/or exfiltration. All new sanitary sewer systems will be subject to low pressure air testing.

3. Low Pressure Air Test

After completing backfill of a section of gravity sewer line, conduct a Line Acceptance Test using low pressure air. The test shall be performed using the below stated equipment, according to state procedures and under the supervision of the ENGINEER and in the presence of a Lee County Utilities representative, with 48 hours advanced notice provided.

a. Equipment:

1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
2. Pneumatic plugs shall resist internal bracing or blocking.
3. All air used shall pass through a single control panel.
4. Three individual hoses shall be used for the following connections:
 - a. From control panel to pneumatic plugs for inflation.
 - b. From control panel to sealed line for introducing the low pressure air.
 - c. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

b. Procedures:

All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psi. The sealed pipe shall be pressurized

to 5 psi. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole to manhole reach of pipe has been backfilled and cleaned and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psi. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psi greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 psi minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of line being tested shall be termed "Acceptable", if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any ground water that may be over the pipe) is greater than the time shown for the given diameters in the following table:

<u>Pipe Diameter</u> <u>In Inches</u>	<u>Minutes</u>
8	4.0
10	5.0
12	5.5
16	7.5
18	8.5
24	11.5

Time in minutes = 0.472 D
D = Diameter of pipe in inches.

In areas where ground water is known to exist, the CONTRACTOR shall install capped pipe adjacent to the top of one of the sewer lines. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, and a measurement of the height in feet of water over the invert of the pipe shall be taken. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 psi. This increases the 3.5 psi to 8.5 psi, and the 2.5 psi to 7.5 psi. The allowable drop of one pound and the timing remain the same).

If the installation fails to meet this requirement, the CONTRACTOR shall, at his own expense, determine the source of leakage. He shall then repair or replace all defective materials and/or workmanship.

3.2 LEAKAGE TESTS FOR STRUCTURES

- A. Structure Leakage Testing: Perform leakage tests of wet wells, tanks, vaults and similar purpose structures before backfilling, by filling the structure with water to the overflow water level and observing the water surface level for the following 24 hours.
1. Make an inspection for leakage of the exterior surface of the structure, especially in areas around construction joints.
 2. Leakage will be accepted as within the allowable limits for structures from which there are no visible leaks.
 3. If visible leaks appear, repair the structure by removing and replacing the leaking portions of the structure, waterproofing the inside, or by other methods approved.
 4. Water for testing will be provided by the OWNER at the CONTRACTOR's expense.

END OF SECTION

SECTION 33 05 02

ROADWAY CROSSINGS BY OPEN CUT

PART 1 GENERAL

1.1 SCOPE OF WORK

The CONTRACTOR shall provide all labor, materials, equipment, supervision and incidentals required to install the pipeline as shown on the Drawings in Lee County Streets by method of open cut.

1.2 SUBMITTAL

- A. Submit shop drawings to the ENGINEER for review.
- B. CONTRACTOR shall adhere to the requirements of Section 01 55 26.
- C. The CONTRACTOR shall engage the services of a Professional Engineer who is registered in the State of Florida to design all cofferdam and sheeting and bracing systems which the CONTRACTOR feels necessary for the execution of his work. The CONTRACTOR's Engineer shall submit to the ENGINEER a signed statement that he has been employed by the CONTRACTOR to design all sheeting and bracing systems. After the systems have been installed, the CONTRACTOR's Engineer shall furnish to the ENGINEER an additional signed statement that the cofferdams and sheeting and bracing systems have been installed in accordance with his design.
- D. If a detour is required, a traffic control plan shall be submitted for approval to Lee County, municipalities and/or the Florida Department of Transportation.
- E. A plan for maintenance of traffic in accordance with Index 600 through 650 of the Florida Department of Transportation Specifications shall be submitted by the CONTRACTOR.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall meet those specified in other applicable portions of this Specification.

PART 3 EXECUTION

3.1 GENERAL

- A. Trench dimensions for open cutting of road crossings are shown on the Drawings.

- B. The CONTRACTOR will be limited to a 24-hour period to complete the open-cut crossing. The road surface shall be repaved, with temporary pavement, if necessary, at the end of the 24-hour period.
- C. The CONTRACTOR shall notify Lee County DOT forty-eight (48) hours in advance of starting construction.

3.2 INSTALLATION

A. Temporary Roadways

1. Temporary roadways required for traffic relocation shall be constructed of materials meeting the requirements of the FDOT. Temporary roadways shall be used when crossing a state highway right-of-way or at the direction of the ENGINEER.
2. Temporary roadways shall be maintained in good condition throughout their use.
3. Drainage shall be maintained through all existing ditches by the use of culvert pipe as necessary.
4. Drawings indicating the type and location of temporary roadways shall be submitted as discussed in Paragraph 1.04.C. for approval prior to beginning work.
5. Where detours are permitted, the CONTRACTOR shall provide all necessary barricades and signs as required to divert the flow of traffic. While traffic is detoured, the CONTRACTOR shall expedite construction operations and periods when traffic is being detoured will be strictly controlled by the ENGINEER.
6. Lee County DOT will inspect all work being done.
7. All work at the roadway crossing shall be performed and completed in a manner fully satisfactory to Lee County DOT.

B. Maintenance of Traffic

1. The requirements specified herein are in addition to the plan for Maintenance of Traffic as specified in Sections 01 31 13 and 01 55 26.
2. The CONTRACTOR shall furnish during construction and any subsequent maintenance within State secondary road right-of-ways and Lee County streets, proper signs, signal lights, flagmen, and other warning devices for the protection of traffic all in conformance with the latest Manual on Uniform Traffic Control and Safe Streets and Highways, and the Florida Manual of Traffic Control and

Safe Practices for Street and Highway Construction, Maintenance and Utility Operations. Information as to the above may be obtained from FDOT Division engineers. The ENGINEER, County Engineer, or FDOT Manager of the right-of-way of their representatives reserves the right to stop any work for non-compliance.

3. The CONTRACTOR shall take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. The CONTRACTOR shall be fully responsible for damage or injuries whether or not police protection has been provided.
4. Unless permission to close a County street is received in writing from the proper authority, all excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the CONTRACTOR's operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the ENGINEER.
5. The CONTRACTOR shall be fully responsible for the installation of adequate safety precautions, for maintenance of the channelization devices, and for the protection of the traveling public.
6. At all open cut crossings, a minimum of one-way traffic shall be maintained during the daylight hours, and two-way traffic at night.

C. Installation of Pipeline

1. Pavement removal, sheeting, shoring and bracing, excavation and backfill, and dewatering shall meet the requirements of the applicable portions of this Specification.
2. The pipe shall be installed in accordance with these Specifications.
3. The trench shall be backfilled in accordance with the requirements of Section 31 23 23.
4. Pavement replacement shall be in accordance with Section 32 10 01 of this Specification.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 33 05 03

LAYING AND JOINTING BURIED PIPELINES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Installation of all underground pipelines. Provide pipeline materials, coatings and linings as specified and pipe of the types, sizes and classes shown or specified.
1. Use proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of the pipe and fittings.
 2. Use suitable fittings where shown and at connections or where grade or alignment changes require offsets greater than those recommended and approved.
 3. Lay all underground pipelines not supported on piles or concrete cradle in select fill bedding material.
 4. Close off all lines with bulkheads when pipe laying is not in progress.
- B. Related Work Specified in Other Sections Includes:
1. Section 31 23 16 - Excavation - Earth and Rock
 2. Section 31 23 23 - Backfilling
 3. Section 33 05 01 - Leakage Tests
 4. Section 33 11 01 - Polyvinyl Chloride (PVC) Water Main Pipe
 5. Section 33 11 02 - High Density Polyethylene (HDPE) Pipe and Fittings
 6. Section 33 11 03 - Ductile Iron Pipe and Fittings
 7. Section 33 11 12 - Disinfection

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
1. ASTM D 2774 - Practice for Underground Installation of Thermoplastic Pressure Piping
 2. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances

3. ASTM A 307 - Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile
4. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, C25, 125, 250, 800
5. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges
6. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
7. AWWA C115/A21.15 - Flanged Ductile-Iron Pipe With Threaded Flanges
8. ASTM E 165 - Practice for Liquid Penetrant Examination
9. ASTM E 709 - Practice for Magnetic Particle Examination

1.3 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows:
- B. Transportation and Delivery: Take every precaution to prevent injury to the pipe during transportation and delivery to the site.
- C. Loading and Unloading: Take extreme care in loading and unloading the pipe and fittings.
 1. Work slowly with skids or suitable power equipment, and keep pipe under perfect control at all times.
 2. Under no condition is the pipe to be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating.
- D. Sling: When handling the pipe with a crane, use a suitable sling around the pipe.
 1. Under no condition pass the sling through the pipe.
 2. Use a nylon canvas type sling or other material designed to prevent damage to the pipe and coating.
 3. When handling reinforced concrete pipe or uncoated steel or ductile iron pipe, steel cables, chain or like slings are acceptable.
- E. Damaged Piping: If in the process of transportation, handling, or laying, any pipe or fitting is damaged, replace or repair such pipe or pipes.

- F. Blocking and Stakes: Provide suitable blocking and stakes installed to prevent pipe from rolling.
 - 1. Obtain approval for the type of blocking and stakes, and the method of installation.
- G. Storage for Gaskets: Store gaskets for pipe joints in a cool place and protect gaskets from light, sunlight, heat, oil, or grease until installed.
 - 1. Do not use any gaskets showing signs of checking, weathering or other deterioration.
 - 2. Do not use gasket material stored in excess of six months without approval.

1.4 FIELD CONDITIONS

- A. Repair of Sanitary Sewers and Services: Rebed, in compacted select fill material, sanitary sewers which cross over the new pipe or which cross under the new pipe with less than 12 inches clear vertical separation. Compact the bedding to densities required for new pipeline construction and extend bedding below the sewer to undisturbed earth. Reconstruct sewers damaged by pipeline construction.
 - 1. Furnish and install all materials and do all work necessary for the reconstruction or repairs of sanitary sewers and services.
 - 2. Provide pipe for reconstruction of sanitary sewers and services meeting the appropriate specification requirements.
 - 3. Provide pipe of the same size as the existing sewer or when the same size is not available, use the next larger size of pipe. Obtain approval of joints made between new pipe and existing pipe.

PART 2 PRODUCTS

- A. The materials allowed for buried sewer pipes are PVC, HDPE or fiberglass. Use of ductile iron pipe is not allowed for sewer construction without specific approval of Lee County Utilities.

PART 3 EXECUTION

3.1 PREPARATION

- A. Dry Trench Bottoms: Lay pipe only in dry trenches having a stable bottom.
 - 1. Where groundwater is encountered, make every effort to obtain a dry trench bottom.

2. If a dry trench bottom has not been obtained due to improper or insufficient use of all known methods of trench dewatering, then the order to excavate below grade and place sufficient select fill material, crushed stone, or 2500 psi concrete over the trench bottom may be given.
3. If all efforts fail to obtain a stable dry trench bottom and it is determined that the trench bottom is unsuitable for pipe foundation, obtain an order, in writing, for the kind of stabilization to be constructed.
4. Perform trench excavation and backfill in accordance with Sections 31 23 16 and 31 23 23.

3.2 INSTALLATION

- A. General: Install all piping in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Where pipe deflections are used, do not exceed 80 percent of the maximum deflection limits shown in AWWA C600.
 1. Arrange miscellaneous pipelines, which are shown in diagram form on the Plans, clear of other pipelines and equipment.
- B. Code Requirements: Provide pipeline installations complying with AWWA C600 for iron pipe, AWWA Manual M11 for steel pipe, ASTM D 2774 for thermoplastic pressure piping, and as modified or supplemented by the Specifications.
- C. Pipe Laying - General:
 1. For pipelines intended for gravity flow, begin pipeline laying at the low end of a run and proceed upgrade.
 2. Generally, lay all pipe with bells pointing ahead.
 3. Carefully place each pipe and check for alignment and grade.
 4. Make adjustments to bring pipe to line and grade by scraping away or filling in select fill material under the body of the pipe.
 5. Wedging or blocking up the pipe barrel is not permitted.
 6. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home.
 7. As the work progresses, clean the interior of pipelines of all dirt and superfluous materials of every description.

8. Keep all lines absolutely clean during construction.
 9. Lay pipelines accurately to line and grade.
 10. During suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other material from entering the pipe.
- D. Pipe Laying - Trenches:
1. Lay all pipelines in trench excavations on select fill bedding, concrete cradle or other foundations as shown, specified or ordered in writing.
 2. Properly secure the pipe against movement and make the pipe joints in the excavation as required.
 3. Carefully grade and compact pipe bedding.
 4. Bell Holes:
 - a. Cut out bell holes for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.
 - b. Thoroughly tamp bell holes full of select fill material following the making of each joint.
- E. Other Foundations: Install pipelines laid on other types of foundations as specified for such other foundations or as ordered in writing.
- F. Ductile Iron Pipe Mechanical Joints:
1. Assembly: In making up mechanical joints, center the spigot in the bell.
 - a. Thoroughly brush the surfaces with which the rubber gasket comes in contact with a wire brush just prior to assembly of the joint.
 - b. Brush lubricant over the gasket just prior to installation.
 - c. Place the gasket and gland in position, bolts inserted, and the nuts tightened fingertight.
 - d. Tighten the nuts with a torque wrench so that the gland is brought up toward the pipe evenly. Torque wrenches shall be set as specified in AWWA C111. Spanner type wrenches not longer than specified in AWWA C111 may be used with the permission of Lee County Utilities.

- e. Prime all bolts by dipping with a bituminous coating, except the threads. Coat threads immediately prior to installation of nuts.
2. Torques: Apply the following range of bolt torques:

<u>Size Inches</u>	<u>Range of Torque - ft. lbs</u>
5/8	45 - 60
3/4	75 - 90
1	85 - 100
1-1/4	105 - 120

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

G. Ductile Iron Pipe Rubber Gasket Joints:

1. Assembly: In making up the rubber gasket joint, brush the gasket seat in the socket thoroughly with a wire brush and wipe the gasket with a cloth.
 - a. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat.
 - b. Apply a thin film of lubricant to the inside surface of the gasket that will come in contact with the entering pipe.
 - c. Brush the plain end of the pipe to be entered thoroughly with a wire brush and place it in alignment with the bell of the pipe to which it is to be joined.
 - d. Exert sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket to make the joint.
2. Positioning: Before proceeding with backfilling, feel completely around the joint using a feeler gauge to confirm that the gasket is in its proper position.
 - a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.
 - b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.
3. Optional Mechanical Joints: Use mechanical joint fittings that meet the requirements of Section 33 11 03 with the rubber gasket joint pipe when specified or when rubber gasket fittings are not available.

- H. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.
1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.
- I. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.
1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.
- J. Concrete Encasement: Concrete encasement shall be constructed in accordance with Lee County standard details when:
1. A waterline crosses at a depth which provides less than 18 inches clear distance from sewer lines. Encasement shall extend a minimum 10 feet on each side of the point of crossing. Encase the sewer main unless specifically approved by Lee County Utilities.
 2. A waterline running parallel to a sewer line provides less than 10 feet separation. Encase the sewer main unless specifically approved by Lee County Utilities.
 3. The Engineer has ordered the line encased.
- The points of beginning and ending of pipe encasement shall be not more than 6 inches from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.
- K. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem.
1. Satisfactorily reset any valve box which is moved from its original position, preventing the operation of the extension valve stem.
 2. Replace any extension valve stem which has been damaged so that it can be operated.
- L. Jacking:
1. General: Perform jacking as shown. After jacking is completed, seal the ends of the casing pipe with brick masonry.

- a. Jacking Pit: Provide jacking pit of adequate length to provide room for the jacking frame, the jacking head, reaction block, the jacks, rig, and jacking pipe.
 - b. Construct the pit to be sufficiently wide to allow ample working space on each side of the jacking frame and sufficiently deep so that the invert of the pipe will be at the elevation desired for the completed line when placed on the guide frame.
 - c. Tightly sheet the pit and keep it dry at all times.
 - d. Provide adequate protective railings at the top of the pit at all times.
2. Jacking Frame: Design the jacking frame so that it applies a uniform pressure over the entire pipe wall area of the pipe to be jacked.
 3. Reaction Blocks: Adequately design the reaction blocks to carry the thrust of the jacks to the soil without excessive soil deflection in a manner which avoids any disturbance of adjacent structures or utilities.
 4. Hydraulic Jacks: Use hydraulic jacks in the jacking operation, and take extreme care to hold the casing pipe to exact line and grade.
 5. Advance Excavation: Advance excavation by augering.
 6. Casing Pipe: Furnish steel casing pipe, unless otherwise specified, conforming to ASTM A 139 with wall thicknesses and pipe diameters shown on the Plans. Provide full penetration butt welded pipe joints.
 7. Fill Material: Use fill material, consisting of 1-1/4 pounds of Bentonite per gallon of water, during jacking to fill any voids between the casing pipe and the earth.

M. Identification:

1. Identification Tape: For all types of pipe to be installed, 3-inch detectable marking tape, of appropriate color, shall be placed along the entire pipe length. In all cases, marking tape shall be installed 12 inches to 18 inches below the finished grade during backfill operations. All PVC pipe, PVC fittings, and identification tape shall be color-coded per standards outlined in the Utility Location and Coordinating Council's Uniform Color Code as specified in Section 4 of the Lee County Utilities Operations Manual.
2. Locating Wire: A locating tracing wire shall also be installed with PVC, HDPE and fiberglass pipes and shall be a continuous No. 12 insulated copper tracing wire laid in the trench on top of the utility pipe and attached to the pipe at ten (10) foot intervals. This continuous tracing wire shall run along the entire pipe and be stubbed out at valves, pressure clean-outs and air release valves.

3.3 FIELD QUALITY CONTROL

- A. Testing: Test pipelines in accordance with Section 33 05 01.
 - 1. Test valves in place, as far as practicable, and correct any defects in valves or connections.
- B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.
 - 1. Cut away any lumps or projections on the face of the spigot end or the shoulder.
 - 2. Do not use any cracked, broken, or defective pieces in the work.
 - 3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

3.4 CLEANING

- A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work.
- B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

3.5 DISINFECTION

- A. General: Disinfect all pipelines that are to carry potable water in accordance with Section 33 11 12.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 33 05 24

DIRECTIONAL DRILLING

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. Provide all necessary tools, materials and equipment to successfully complete the installation of directionally, drilled piping as specified herein and shown on the drawings. The CONTRACTOR shall be responsible for the final constructed product, and for furnishing the qualified labor and superintendence necessary for this method of construction.
- B. Furnish all items necessary to perform the horizontal directional drilling operation and construct the pipe to the lines and grade shown on the drawings.
- C. Boring must use techniques of creating or directing a borehole along a predetermined path to a specified target location. This must involve use of mechanical and hydraulic deviation equipment to change the boring course and must use instrumentation to monitor the location and orientation of the boring head assembly along a predetermined course.
- D. Drilling must be accomplished with fluid-assist mechanical cutting. Boring fluids shall be a mixture of bentonite and water or polymers and additives. Bentonite sealants and water will be used to lubricate and seal the mini-tunnel. It is mandatory that minimum pressures and flow rates be used during drilling operation as not to fracture the sub-grade material around and or above the bore.
- E. The mobile drilling system shall utilize small diameter fluid jets to fracture and mechanical cutters to cut and excavate the soil as the head advances forward.
- F. Steering shall be accomplished by the installation of an offset section of drill stem that causes the cutterhead to turn eccentrically about its centerline when it is rotating. When steering adjustments are required, the cutterhead offset section is rotated toward the desired direction of travel and the drill stem is advanced forward without rotation.
- G. The mobile drilling system must be capable of being launched from the surface at an inclined angle and drilling a 2 inch to 3 inch diameter pilot hole. The pilot hole will then be enlarged with reamers as required.

1.2 REFERENCE STANDARDS

- A. Lee County Design Manual

- B. American Association of State Highway and Transportation Officials (AASHTO).
- C. Occupational Safety and Health Administration (OSHA).

1.3 DEFINITIONS

- A. CONTRACTOR's Construction Drawings shall be defined as drawings by which the CONTRACTOR proposes to construct, operate, build, etc., the referenced item. The submission of these drawings shall be required for the sole purpose of providing the sufficient details to verify that the CONTRACTOR's work in progress is in accordance with the intent of the design.

1.4 SUBMITTALS

- A. The ENGINEER will base the review of submitted details and data on the requirements of the completed work, safety of the work in regards to the public, potential for damage to public or private utilities and other existing structures and facilities, and the potential for unnecessary delay in the execution of the work. Such review shall not be construed to relieve the CONTRACTOR in any way of his responsibilities under the contract. CONTRACTOR shall not commence work on any items requiring CONTRACTOR's construction drawings or other submittals until the drawings and submittals are reviewed and accepted by the ENGINEER.

- B. The CONTRACTOR shall:

1. Submit for review complete construction drawings and/or complete written description identifying details of the proposed method of construction and the sequence of operations to be performed during construction, as required by the method of tunnel excavation approved. The drawings and descriptions shall be sufficiently detailed to demonstrate to the ENGINEER whether the proposed materials and procedures will meet the requirements of this specification. CONTRACTOR shall submit arrangement drawings and technical specifications of the machine and trailing equipment (including any modifications), three-year experience record with this type of machine and a copy of the manufacturer's operation manual for the machine.
2. CONTRACTOR's construction drawings shall be submitted on the following items.
 - a. Complete details of the equipment, methods and procedures to be used, including but not limited to primary lining installation, timing of installation in relation to the excavation plan and sequence, bulkheads, etc.
 - b. Grouting techniques, including equipment, pumping procedures, pressure grout types, mixtures and plug systems.
 - c. Method of controlling line and grade of excavation.

- d. Details of muck removal, including equipment type, number, and disposal location.
 - e. Proposed contingency plans for critical phases and areas of directional drilling.
 - C. Quality Control Methods. At least 10 days prior to the start of directional drilling, CONTRACTOR shall submit a description of his quality control methods he proposes to use in his operations to the ENGINEER. The submittal shall describe:
 - 1. Procedures for controlling and checking line and grade.
 - 2. Field forms for establishing and checking line and grade.
 - D. Safety. Procedures including, but not limited to, monitoring for gases encountered shall be submitted.
 - E. Hazardous chemical list as well as all MSDS and technical data sheets.
- 1.5 DESIGN CRITERIA
 - A. Compatibility of Methods.
 - 1. The methods of excavation, lining, and groundwater control shall be compatible.
- 1.6 JOB CONDITIONS
 - A. Safety Requirements
 - 1. Perform work in a manner to maximize safety and reduce exposure of men and equipment to hazardous and potentially hazardous conditions, in accordance with applicable safety standards.
 - 2. Whenever there is an emergency or stoppage of work which is likely to endanger the excavation or adjacent structures, operate a full work force for 24 hours a day, including weekends and holidays, without intermission until the emergency or hazardous conditions no longer jeopardize the stability and safety of the work.
 - B. Air Quality.
 - 1. Conduct directional drilling operations by methods and with equipment, which will positively control dust, fumes, vapors, gases or other atmospheric impurities in accordance with applicable safety requirements.

1.7 PERMITS

- A. Obtain any and all other permits required for prosecution of the work.

PART 2 PRODUCTS

2.1 GENERAL

- A. Refer to Section 33 11 02 for HDPE pipe material.

PART 3 EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall be responsible for his means and methods of directional drilling construction and shall ensure the safety of the work, the CONTRACTOR's employees, the public, and adjacent property, whether public or private.
- B. Anticipate that portions of the drilled excavation will be below the groundwater table.
- C. Comply with all local, state and federal laws, rules and regulations at all times to prevent pollution of the air, ground and water.

3.2 EQUIPMENT

- A. Diesel, electrical, or air-powered equipment will be acceptable, subject to applicable federal and state regulations.
- B. Any method or equipment that the CONTRACTOR can demonstrate will produce the specified results will be considered.
- C. Employ equipment that will be capable of handling the various anticipated ground conditions. In addition, the equipment shall:
 - 1. Be capable of minimizing loss of ground ahead of and around the machine and providing satisfactory support of the excavated face at all times.
 - 2. Provide a system to indicate whether the amount of earth material removed is equivalent to that displaced by the advance of the machine such that the advance rate may be controlled accordingly.
- D. Provide adequate secondary containment for any and all portable storage tanks.

3.3 DIRECTIONAL DRILLING DATA

- A. Daily logs of construction events and observations shall be submitted on at least the following:
 - 1. Location and elevation of significant soil strata boundaries and brief soil descriptions.
 - 2. Jacking pressures and torsional forces, if applicable.

3.4 CONTROL OF THE TUNNEL LINE AND GRADE

- A. Construction Control.
 - 1. Establish and be fully responsible for the accuracy of his own control for the construction of the entire project, including structures, tunnel line and grade.
 - 2. Establish control points sufficiently far from the tunnel operation not to be affected by construction operations.
 - 3. Maintain daily records of alignment and grade and shall submit three copies of these records to the ENGINEER. However, the CONTRACTOR remains fully responsible for the accuracy of his work and the correction of it, as required.
 - 4. Check control for the bore alignment against an above ground undisturbed reference at least once each hour and once for each 50 feet of tunnel constructed, or more often as needed or directed by the ENGINEER.

3.5 DISPOSAL OF EXCESS MATERIAL

- A. Where such effort is necessary, cost for groundwater control during the course of the tunnel work shall be included in the unit contract price for the work.
- B. Dewatering required during the course of the project to lower water table, to remove standing water, surface drainage seepage, or to protect ongoing work against rising waters or floods shall be considered incidental to the work being performed.

END OF SECTION

(NO TEXT FOR THIS PAGE)

SECTION 33 11 01

POLYVINYL CHLORIDE (PVC) WATER MAIN PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required, and install polyvinyl chloride (PVC) waterline, fittings, service connections and appurtenances as shown on the Drawings and as specified herein.
- B. All water mains less than or equal to 12 inches in diameter shall be constructed of PVC, unless otherwise approved by Lee County Utilities.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. This standard references the documents listed below. They form a part of this standard to the extent specified herein. In any case of conflict, the requirements of this standard shall prevail.
 - 1. ASTM D1598 - Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
 - 2. ASTM D1599 - Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.
 - 3. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
 - 4. ASTM A252 -
 - 5. ASTM D2464 -
 - 6. ASTM B88 -
 - 7. ASTM 2737 -
 - 8. ASTM D3139 - Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 - 9. ASTM F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - 10. AWWA C110 -

11. AWWA C153 -

1.3 SUBMITTAL

- A. Submit to the Engineer within fourteen days after receipt of Notice-to-Proceed a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.
- B. Submit for approval, as provided in the Supplement to the General Conditions, complete, detailed shop drawings of all PVC pipe and fittings.
- C. Submit and shall comply with pipe manufacturer's recommendations for handling, storing, and installing pipe and fittings.

PART 2 PRODUCTS

2.1 WATER MAIN

- A. Polyvinyl Chloride (PVC) Pipe
 - 1. All 4-inch through 12-inch diameter PVC pipe shall be rated per AWWA, C900, DR18, Class 150. Water mains larger than 12 inches shall be constructed of Ductile Iron Pipe.
 - 2. PVC pipe less than 4-inches in diameter shall be Schedule 80 with a pressure rating of 200 psi solvent welded, including blow-off assemblies. PVC pipe will be acceptable for pipe diameters of 12 inches or less.
 - 3. The potable water mains shall be blue in color.
 - 4. All pipe shall be manufactured in the United States.
- B. Steel Encasement Pipe: Conform to ASTM Designation A252, Grade 2. Joints shall be welded completely around the pipe by a certified welder. Pipe shall meet all AASHTO standards and Florida DOT requirements.
- C. Fittings:
 - 1. PVC Pipe: Fittings shall be ductile iron mechanical joint, with a working pressure of 250 psi and conforming to AWWA Specifications C110 or C153.
 - 2. Acceptable manufactures of fittings can be found in the LCU Approved Materials List.
 - 3. All fittings shall be manufactured in the United States.

- D. Joint Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall conform to the details shown on the drawings in Section 9 of the Lee County Utilities Operations Manual. Concrete thrust blocks may be utilized as additional restraint if approved by Lee County Utilities.
1. See the LCU Approved Materials List for Joint restraint devices for C-900 PVC pipe used with ductile iron mechanical joint fittings, Bell joint restraint devices for PVC push joint pipe, and restraints for C-900 PVC fittings.
 2. Bolts and nuts shall be Ductile Iron, T-Head type with hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface.
- E. Joint Design: PVC pipe 4 inches in diameter or larger shall have provisions for expansion and contraction provided in the joints. All joints shall be designed for push-on make-up connections. Push-on joint may be a coupling manufactured as an integral part of the pipe barrel consisting of a thickened section with an expanded bell with a groove to retain a rubber sealing ring of uniform cross section, similar and equal to John's Mannville ring-type and Ethyl Bell Ring or may be made with a separate twin gasketed coupling similar and equal to Certainteed Fluid-Type.

2.2 IDENTIFICATION

- A. Pipe shall bear identification markings that will remain legible after normal handling, storage, and installation. Markings shall be applied in a manner that will not weaken or damage the pipe. Marking shall be applied at intervals of not more than 5 feet on the pipe. Marking on the pipe shall include the following:
1. Nominal size and OD base.
 2. PVC
 3. Dimension ration
 4. AWWA pressure rating.
 5. AWWA designation.
 6. Manufacturer's name and trademark.
 7. Manufacturer's production code, including day, month, year, shift, plant, and extruder of manufacturer.
 8. All PVC water pipe shall be color-coded blue.

PART 3 EXECUTION

3.1 WATER MAIN INSTALLATION

- A. Polyvinyl Chloride (PVC) water pipe shall be installed in accordance with the manufacturer's recommendation, as shown on the drawings, and as specified herein.
- B. The Contractor shall use care in handling, storage, and installation of pipe and fittings. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's recommendation. Under no circumstances shall pipe or fittings be dropped into the trench.
- C. Pipe shall be laid to lines and grade shown on the drawings with bedding and backfill as shown on the drawings. Blocking under the pipe will not be permitted.
- D. When laying is not in progress, or the potential exists for dirt or debris to enter the pipe, the open ends of the pipe shall be closed with plug or by other approved means.

3.2 SERVICE CONNECTIONS

- A. All potable service taps shall be located in open/green areas unless specifically approved by Lee County Utilities. Any service taps that are approved within a paved area, a 2-inch cast iron body gate valve shall be used in lieu of a corporation stop.
- B. Service connections shall be installed at the locations and in the manner shown on the Drawings.
- C. Service clamps for PVC mains shall be full-circle bearing types as shown on the details in Section 6 of the Lee County Utilities Operations Manual.
- D. Corporation stops and curb stops shall be fitted with a compression connection outlet with split-lock devices for polyethylene or copper pipe.
- E. On curbed streets the exact location for each installed service shall be marked by etching or cutting a "W" in the concrete curb; where no curb exists or is planned, locations shall be adequately marked by a method approved by Lee County Utilities.
- F. Service connection shall not be installed on pipelines 16 inches and larger unless extenuating conditions exist and said connection is approved by Lee County Utilities.
- G. When practical, in new residential, commercial, or/and industrial subdivisions, the corporation stop shall be located at the intersecting property line or in the center of the lot.
 - 1. Copper Pipe Copper pipe for 3/4-inch to 1-inch service line installations shall be American manufactured, Type K, and conform to the requirements of ASTM designation B88. Brass compression couplings with screw-clamp fittings shall be used with copper pipe.

2. Polytubing Polyethylene Tubing will be acceptable in sizes from 1-1/2 inches to 2 inches in diameter. Tubing for service lines shall be of a type approved by the National Sanitation Foundation for use in transmitting fluids for human consumption. The tubing shall be designed for a minimum burst pressure of 630 psi for water at 23°C, and shall be manufactured in accordance with the requirements of ASTM D2737 and shall be blue in color.

3.3 CLEANING

- A. At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipe lines by flushing with water and pigged to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed at the Contractor's expense.

3.4 TESTING AND DISINFECTION

- A. Test completed water pipeline in accordance with Section 33 05 01. Disinfect completed water pipeline in accordance with Section 33 11 12.

END OF SECTION

SECTION 33 11 02

HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required to install High Density Polyethylene (HDPE) pressure pipe, fittings, and appurtenances as shown on the Drawings and specified in the Contract Documents.
- B. High Density Polyethylene (HDPE) – Lee County Utilities has the option of approving the use of HDPE for water main crossings of roadways, ditches, canals, and environmentally sensitive lands. HDPE water mains shall have the same equivalent internal diameter and equivalent pressure class rating as the corresponding PVC pipe, unless otherwise approved by Lee County Utilities. For all roadway crossings refer to the design manual for casing requirements. The Department of Transportation having jurisdiction of said road and right-of-way must grant specific approval.

1.2 REFERENCED STANDARDS

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

1.3 QUALIFICATIONS

- A. All HDPE 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.

1.4 SUBMITTALS

- A. Submit to the ENGINEER, a list of materials to be furnished, the names of the suppliers, and the appropriate shop drawings for all HDPE pipe and fittings.
- B. Submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.
- C. Submit shop drawings showing installation method and the proposed method and specialized equipment to be used.

1.5 INSPECTIONS AND TESTS

- A. All work shall be inspected by an Authorized Representative of the OWNER who shall have the authority to halt construction if, in his opinion, these specifications or standard construction practices are not being followed. Whenever any portion of these specifications is violated, the ENGINEER or his authorized representative, shall, by written notice, order further construction to cease until all deficiencies are corrected.

1.6 WARRANTY AND ACCEPTANCE

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

PART 2 PRODUCTS

2.1 POLYETHYLENE PIPE AND FITTINGS

- A. Polyethylene pressure pipe shall be manufactured from PE3408 polyethylene and shall meet AWWA C906 standards. When specified by the ENGINEER on the construction drawings, as an alternate to PVC, HDPE, Ductile iron pipe sized (DIPS) piping can be used for buried applications. Iron pipe sized (IPS) HDPE piping can be used for above-ground applications. HDPE (IPS) SDR-11 Hydrostatic Design Basis (HDB) piping shall be used for the riser pipes from the pump discharge and manifold as shown on the drawings.
- B. Where HDPE pipe is joined to HDPE pipe, it shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the pipe manufacturer and fusion equipment supplier specifications. The CONTRACTOR installing thermal butt fused HDPE pipe shall have a minimum of five years experience performing this type of work.
- C. Qualification of Manufacturer: The Manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these specifications. The Manufacturer's production facilities shall be open for inspection by the OWNER or his authorized representative. Qualified manufacturers shall be approved by the OWNER.

- D. Approved Manufacturer: Manufacturers that are qualified and approved are listed in the LCU Approved Materials List.
- E. Materials: Materials used for the manufacture of polyethylene pipe and fittings shall be PE3408 high density polyethylene meeting cell classification 345434C or 345434E per ASTM D 3350; and shall be listed in the name of the pipe and fitting manufacturer in PPI (Plastics Pipe Institute) TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73°F. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.
- F. Interchangeability of Pipe and Fittings: Polyethylene pipe and fittings shall be produced by the same Approved Manufacturer. Products made by subcontractor's or Manufacturer's distributor are not acceptable. Pipe and fittings from different Approved Manufacturers shall not be interchanged.
- G. Polyethylene Pipe: Polyethylene pipe shall be manufactured in accordance with ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter or ASTM D 3035, Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, (from pipe) dimensions and either quick burst or ring tensile strength (equipment permitting).
- H. Color Identification: HDPE must have at least three equally spaced horizontal colored marking stripes. Permanent identification of piping service shall be provided by adhering to the following colors (in accordance with the coloring code in Section 09 90 00).
- Blue – raw water
 - Blue – potable water
 - Green – wastewater, sewage
 - Pantone Purple – reuse or reclaimed water
- I. Polyethylene Fittings and Custom Fabrications: Polyethylene fittings and custom fabrications shall be molded or fabricated by the pipe manufacturer. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe. All fittings and custom fabrications shall be fully rated for the same internal pressure as the mating pipe. Pressure de-rated fabricated fittings are prohibited.
- J. Molded Fittings: Molded fittings shall be manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked. Each production lot of molded fittings shall be subjected to the tests required under ASTM D 3261.
- K. Fabricated Fittings: Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings.

Fabricated fittings shall be rated for internal pressure service equivalent to the full service pressure rating of the mating pipe. Directional fittings 16" IPS and larger such as elbows, tees, crosses, etc., shall have a plain end inlet for butt fusion and flanged directional outlets. Part drawings shall be submitted for the approval of the ENGINEER.

- L. Polyethylene Flange Adapters: Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder. The sealing surface of the flange adapter shall be machined with a series of small v-shaped grooves to provide gasketless sealing, or to restrain the gasket against blow-out.
- M. Back-up Rings and Flange Bolts: Flange adapters shall be fitted with lap joint flanges pressure rated equal to or greater than the mating pipe. The lap joint flange bore shall be chamfered or radiused to provide clearance to the flange adapter radius. Flange bolts and nuts shall be Grade 2 or higher.

2.2 MANUFACTURER'S QUALITY CONTROL

- A. The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials. Incoming polyethylene materials shall be inspected for density, melt flow rate, and contamination. The cell classification properties of the material shall be certified by the supplier, and verified by Manufacturer's Quality Control. Incoming materials shall be approved by Quality Control before processing into finished goods. Outgoing materials shall be checked for:
 - Outside diameter, wall thickness, and eccentricity as per ASTM D2122 at a frequency of at least once/hour or once/coil, whichever is less frequent.
 - Out of Roundness at frequency of at least once/hour or once/coil, whichever is less frequent.
 - Straightness, inside and outside surface finish, markings and end cuts shall be visually inspected as per ASTM F714 on every length of pipe.

2.3 COMPLIANCE TESTS

- A. In case of conflict with Manufacturer's certifications, the CONTRACTOR, ENGINEER, or OWNER may request re-testing by the manufacturer or have re-tests performed by an outside testing service. All re-testing shall be at the requestor's expense, and shall be performed in accordance with the Specifications.
- B. Installation shall be in accordance with Manufacturer's recommendations and this specification. All necessary precautions shall be taken to ensure a safe working environment in accordance with the applicable codes and standards.

PART 3 EXECUTION

3.1 INSTALLATION OF HIGH DENSITY POLYETHYLENE PRESSURE PIPE AND FITTINGS

- A. All high density polyethylene (HDPE) pressure pipe shall be installed by direct bury, directional bore, or a method approved by the OWNER/ENGINEER prior to construction. If directional bore is used, or if directed by the OWNER/ENGINEER, the entire area of construction shall be surrounded by silt barriers during construction.

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

3.2 HEAT FUSION JOINING

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

3.3 MECHANICAL JOINING

- A. Polyethylene pipe and fittings may be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or mechanical couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material. Mechanical couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins. External joint restraints shall not be used in lieu of fully restrained mechanical couplings.

3.4 BRANCH CONNECTIONS

- A. Branch connections to the main shall be made with saddle fittings or tees.

3.5 EXCAVATION

- A. Trench excavations shall conform to this specification, Section 31 23 16, the plans and drawings, as otherwise authorized in writing by the ENGINEER or his approved representative, and in accordance with all applicable codes. Excess groundwater shall be removed by the CONTRACTOR. Where necessary, trench walls shall be shored or reinforced.

3.6 LARGE DIAMETER FABRICATED FITTINGS

- A. Fabricated directional fittings 16" IPS and larger shall be butt fused to the end of a pipe. The flanged directional outlet connections shall be made up in the trench.

3.7 MECHANICAL JOINT AND FLANGE INSTALLATION

- A. Mechanical joints and flange connections shall be installed in accordance with the Manufacturer's recommended procedure. Flange faces shall be centered and aligned to each other before assembling and tightening bolts. In no case shall the flange bolts be used to draw the flanges into alignment. Bolt threads shall be lubricated, and flat washers shall be fitted under the flange nuts. Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the Manufacturer. At least one hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the Manufacturer. The final tightening torque shall be 100 ft-lbs or less as recommended by the Manufacturer.

3.8 FOUNDATION AND BEDDING

- A. Pipe shall be laid on grade and on a stable foundation in accordance with Section 31 23 23.

3.9 PIPE HANDLING

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

3.10 TESTING

- A. Low Pressure Air Testing: A single test of the entire fused section that includes a low-pressure air test at 5 psi for 15 minutes shall be required in the presence of the ENGINEER or their representative.

Perform all butt fusion joints in the presence of the ENGINEER or his representative. Record the temperature and corresponding time for each fusion joint.

- B. Hydrostatic Pressure Testing: HDPE pipes shall be pressure tested in a similar manner as for PVC force main in accordance with Section 33 05 01.

END OF SECTION

SECTION 33 11 03

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required, and install ductile iron pipe, fittings and appurtenances as shown on the Drawings and as specified herein.
- B. NOTE: No buried ductile iron pipe shall be acceptable for sanitary force main construction. All water mains larger than 12 inches shall be constructed of Ductile Iron Pipe and shall be used for all vertical deflections ditch crossings, subaqueous crossings, and all paved surfaces unless otherwise approved by Lee County Utilities.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 33 05 03 - Laying and Jointing Buried Pipe

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards: (Latest Revision)
 - 1. ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - 2. ANSI/AWWA C110/A21.10 Ductile-Iron Fittings, 3 in. Through 48 Inches, for Water and Other Liquids. (C110 2-48 inches).
 - 3. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 4. ANSI/AWWA C115/A21.15 Flanged Ductile-Iron Pipe with Threaded Flanges.
 - 5. ANSI/AWWA C150/A21.50 Thickness Design of Ductile-Iron Pipe.
 - 6. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids.
 - 7. ANSI/AWWA C153/A21.53 Ductile-Iron Compact Fittings, 3 inches through 64 inches, for Water and Other Liquids.
 - 8. AWWA C600 Installation of Ductile Iron Water Mains and Their Appurtenances.

9. AWWA C602

10. ASTM G62

11. ASTM F477 Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Material

1.4 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Submit shop drawings of pipe and fittings in accordance with the requirements in the General Conditions, the requirements of the referenced standards and the following supplemental requirements as applicable:
1. Certified dimensional drawings of all valves, fittings, and appurtenances.
 2. For pipe 48 inches in diameter and larger, a line layout and marking diagram shall indicate the specific number and location (station) of each fitting.
 3. In all cases, a line layout to indicate the limits of each reach of restrained joints, or of concrete encasement shall be supplied.
- B. Certifications: Furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, which indicates that all tests have been made and that all results comply with the requirements of AWWA C151, including but not necessarily limited to the following:
1. Acceptance Tests.
 2. Hydrostatic Tests.
 3. Low Temperature Impact Tests.
- C. Additional Documentation: Foundry records shall be furnished in the form of written transcripts upon request.
- D. All expenses incurred for certification, testing, and data submittal shall be borne by the CONTRACTOR or the Supplier.

1.5 QUALITY ASSURANCE

- A. Inspection: All pipe shall be available for inspection at the place of manufacture prior to shipping in accordance with the provisions of the referenced standards. Notify the ENGINEER in writing not less than 10 calendar days prior to the shipping of the pipe.
- B. The ENGINEER shall be given access to all areas where manufacturing and testing is performed and shall be permitted to make all inspections necessary to confirm manufacturer compliance with these Specifications.
- C. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of the referenced standards as applicable.

- D. Provide data on material tests at no additional cost to the OWNER.
- E. In addition to those tests specifically required, the ENGINEER may request additional samples of any material including lining and coating samples for testing by the OWNER. The additional samples shall be furnished at no additional cost to the OWNER.

1.6 CORROSION PROTECTION

- A. The allowed force main pipe materials are polyvinyl chloride (PVC) or high-density polyethylene (HDPE) or fiberglass. Use of ductile iron pipe (DIP) and DIP fittings are not allowed without the specific approval of Lee County Utilities. Where a force main is expected to flow full pipe at all times, DIP may be used after specific approval by Lee County Utilities. The DIP pipe will be required to have an approved lining (see LCU Approved Materials List). The lining consists of a minimum of 60 mils thick polyethylene lining with a fusion bonded epoxy primer layer to the DIP pipe. This lining must extend through the bell of the pipe to a point under the sealing gasket. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of the lined pipe has passed the holiday testing at production per ASTM G62 with a minimum of 10,000-volt charge.
- B. If specifically approved by Lee County Utilities for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

PART 2 PRODUCTS

2.1 GENERAL

- A. Cement mortar lined ductile iron pipe shall conform to ANSI/AWWA C151 and C104, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents.
- B. Markings: Legibly mark specials 48 inches in diameter and larger in accordance with the laying schedule and marking diagram. All fittings shall be marked at each end with top field centerline.

- C. Handling and Storage: The pipe shall be handled by wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe and its lining. The use of equipment or handling, which might injure the pipe and its lining, will not be permitted. Stockpiled pipe shall be suitably supported and shall be secured to prevent accidental rolling. All other pipe handling equipment and methods shall be acceptable to the ENGINEER.
- D. Laying lengths: Maximum pipe laying lengths shall be 20 feet.
- E. Finish: The pipe shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing and roughness, in accordance with ANSI/AWWA C104.
- F. Closures and Correction Pieces: Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing shown on the Drawings or line layouts where applicable.

2.2 PIPE DESIGN CRITERIA

- A. General: Ductile Iron pipe shall be designed in accordance with the requirements of ANSI/AWWA C150 as applicable and as modified in this Section.
- B. Pipe Wall Thickness for Internal Pressure: The pipe shall be designed with a net thickness to withstand the design internal pressure in accordance with the hoop stress formula. In addition to the requirements of the Section, the minimum wall thickness shall be in accordance with the minimum thickness wall depicted in table 50.5 of ANSI/AWWA C150.
- C. Ductile Iron Pipe shall be a minimum of Class 50 or pressure Class 250 and will be accepted in any diameter for use within the water distribution system.
- D. All aboveground water main pipe shall be painted blue. The pipe wall thickness shall not be less than that required by a working pressure of 250 psi in laying condition Type 4 "B" with 5-foot cover in conformance with ANSI Standard A21.50.

2.3 MATERIALS

- A. Ductile Iron Pipe: Pipe materials shall conform to the requirements of ANSI/AWWA C151.
- B. Cement: Cement for mortar lining shall conform to the requirements of ANSI/AWWA C104; provided that cement for mortar lining shall be Type II or V. A fly ash or pozzolan shall not be used.
- C. Adapters to connect ductile iron pipe or fittings to pipe or fittings of dissimilar materials shall be supplied by the CONTRACTOR in accordance with the pipe manufacturer recommendations, and as approved by the ENGINEER.

2.4 SPECIALS AND FITTINGS

- A. Fittings for ductile iron pipe shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3 inches through 48 inches and shall have a minimum pressure rating of 250 psi. Ductile iron fittings shall be cement lined, seal coated and outside coated as specified. Ductile Iron fittings larger than 48 inches shall conform to the above referenced standard with the necessary modifications for the larger size manufacturer's standard.
- B. All above-ground fittings in direct contact with wastewater shall be HDPE or ductile iron flanged joints with a minimum pressure rating of 250 psi conforming to ANSI A21.10. If above-ground ductile iron fitting is used, the fitting shall be lined with an approved liner (see LCU Approved Materials List) applied in strict accordance with the manufacturer's specifications to a dry film thickness of 40 mils. All above-ground fittings shall have a factory applied exterior epoxy coating in accordance with AWWA C550.

2.5 DESIGN OF PIPE

- A. General: The pipe furnished shall be ductile iron pipe, mortar-lined, with rubber gasketed joints.
- B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C151.
- C. Pipe Dimensions: The pipe shall be of the diameter and class shown. The minimum wall thickness for each pipe size shall be as specified herein or shown on the Drawings.
- D. Fitting Dimensions: The fittings shall be of the diameter shown and class specified.
- E. Joint Design: Ductile Iron pipe and fittings shall be furnished with mechanical joints, push-on joints and flanged joints as follows:
 - 1. For buried pipe applications, unless otherwise indicated, mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11, with the minimum pressure rating of 250 psi.
 - 2. For above-ground or buried vault applications, unless otherwise indicated, flanged joints shall conform to ANSI/AWWA C115/A21.15, with the minimum pressure rating of 250 psi. All above-ground fittings shall be painted blue.
- F. Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall conform to the details shown on the drawings in Sections 9 of the Lee County Utilities Operations Manual. Concrete thrust blocks may be utilized as additional restraint if approved by Lee County Utilities.

1. See LCU Approved Materials List for Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe.
 2. See LCU Approved Materials List for Bell joint restraint devices for ductile iron push joint pipe.
- G. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself will provide watertight joints under all operating conditions when properly installed. Require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.
- H. Gaskets shall be a Buna N, Neoprene, or a Nitril-based rubber product approved by the County. Gaskets shall have clean tips unless otherwise specified. Elastomeric gaskets conforming to ASTM F-477 shall also be acceptable.
- I. Shop-applied interior linings and exterior coatings shall be applied evenly to the nominal thickness specified. Holiday free cement is not possible to manufacture. Exterior coatings: asphalt coating for buried pipe or primed pipe cannot be furnished holiday free.

2.6 CEMENT-MORTAR LINING

- A. Cement-Mortar Lining For Shop Application: Except as otherwise provided herein, interior surfaces of all ductile iron pipe shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C104. Ductile-Iron pipefittings need not have the cement-mortar lining applied centrifugally. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be repaired in the filed in accordance with ANSI/AWWA C104.
- B. The nominal wet lining thickness shall be as follows:

Nominal Factory Nominal Replacement		
Nominal Pipe Diameter (in.)	Applied Lining Thickness (in.)	Lining Thickness (in.)
3-12	1/8	1/8
14-24	3/16	3/16
30-64	1/4	1/4

- C. Protection of Pipe Lining/Interior: All shop-applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with ANSI/AWWA C104.

2.7 EXTERIOR COATING OF PIPE

- A. Exterior Coating of Exposed Piping: The exterior surfaces of pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of rust-inhibitive primer conforming to the requirements of Section 09 90 00, "Painting and Coating". All above-ground pipe shall be painted blue.
- B. Exterior Coating of Buried Piping: The exterior coating shall be an asphaltic coating approximately 1 mil thick, conforming to ANSI/AWWA C151.

2.8 CORROSION PROTECTION

- A. The allowed force main pipe materials are polyvinyl chloride (PVC) or high-density polyethylene (HDPE) or fiberglass. Use of ductile iron pipe (DIP) and DIP fittings are not allowed without the specific approval of Lee County Utilities. Where a force main is expected to flow full pipe at all times, DIP may be used after specific approval by Lee County Utilities. The DIP pipe will be required to have an approved lining (see LCU Approved Materials List). The lining consists of a minimum of 60 mils thick polyethylene lining with a fusion bonded epoxy primer layer to the DIP pipe. This lining must extend through the bell of the pipe to a point under the sealing gasket. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of the lined pipe has passed the holiday testing at production per ASTM G62 with a minimum of 10,000-volt charge.
- B. If specifically approved by Lee County Utilities for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPE

- A. Handling and Storage: All pipe, fittings, etc., shall be carefully handled and protected against damage, impact shocks, and free fall and in accordance with ANSI/AWWA C600. Pipe shall not be placed directly on rough, rocky ground but in such instances shall be supported in a manner which will protect the pipe against injury whenever stored at such trench site or elsewhere. No pipe shall be installed where the lining or coating show defects that may be harmful as determined by the ENGINEER. Such

damaged lining or coating shall be repaired, or a new undamaged pipe shall be furnished and installed.

- B. All pipe damaged prior to Substantial Completion or during warrantee period shall be repaired or replaced by the CONTRACTOR.
- C. Inspect each pipe and fitting prior to installation to ensure that no damaged portions of the pipe get installed.
- D. Before placement of pipe in the trench, each pipe or fitting shall be thoroughly cleaned of any foreign substance, which may have collected therein and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the work.
- E. Pipe Laying: The pipe shall be installed in accordance with ANSI/AWWA C600.
- F. Pipe shall be laid directly on the bedding material. No blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Excavations shall be made as needed to facilitate removal of handling devices after the pipe is laid. Bell holes shall be formed at the ends of the pipe to prevent point loading at the bells or couplings. Excavation shall be made as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.
- G. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the ENGINEER may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 70 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount which will be detrimental to the strength and water tightness of the finished joint.
- H. Pipe and Specials Protection: The openings of all pipe and specials shall be protected with suitable bulkheads to prevent unauthorized access by persons, animals, water, or any undesirable substance. At all times, means shall be provided to prevent the pipe from floating.
- I. Pipe Cleanup: As pipe laying progresses, keep the pipe interior free of all debris. Completely clean the interior of the pipe of all sand, dirt, mortar splatter and any other debris following completion of pipe laying, pointing of joints, and any necessary interior repairs per ANSI/AWWA C600 and C602 prior to testing and disinfecting the completed pipeline. Pipe larger than 12" diameter will utilize a polyurethane foam plug "Poly Pig" to remove all debris from main.

3.2 RUBBER GASKETED JOINTS

- A. Rubber Gasketed Joints: Immediately before jointing pipe, the bell end of the pipe shall be thoroughly cleaned, and a clean rubber gasket shall be placed in the bell

groove. The bell and spigot end of push-on joint pipe shall be carefully cleaned and lubricated with a vegetable-based lubricant or per manufacturer's recommendation. The spigot end of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position. Tilting of the pipe to insert the spigot into the bell will not be permitted.

3.3 INSTALLATION OF PIPE APPURTENANCES

- A. Installation of Valves: All valves shall be handled in a manner to prevent any injury or damage to any part of the valve. All joints shall be thoroughly cleaned and prepared prior to installation. Adjust all stem packing and operate each valve prior to installation to insure proper operation.
- B. All valves shall be installed so that the valve stems are plumb and in the location shown on the Drawings.
- C. Mechanical joints consisting of bell, socket, gland, gasket, bolts, and nuts shall conform to ANSI Standard A21.11. Bolts and nuts shall be high strength, low alloy, Cor-Ten, T-Head Type having hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface. Single sealed gasket push-on type joints shall conform to the requirements of ANSI A21.11 (see LCU Approved Materials List).
- D. Mechanical joint retainer glands may be used to restrain mechanical joint pipe and fittings to the plain end of ductile iron pipe and fittings when used in conjunction with thrust blocks of reduced size. The Utilities ENGINEER must approve thrust block size. Joint flexibility shall be maintained.

3.4 TESTING AND DISINFECTION

- A. Test completed water pipeline in accordance with Section 33 05 01. Disinfect completed water pipeline in accordance with Section 33 11 12.

END OF SECTION

(NO TEXT FOR THIS PAGE.)

SECTION 33 11 12

DISINFECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Disinfection of all pipelines, tanks, structures, conduits and equipment which are to store, handle or carry potable water. Furnish all labor, water, chemicals and equipment, including taps, corporation stops, temporary pumps and other items necessary to perform the Work, except as otherwise specified.

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C651 - Disinfecting Water Mains
 - 2. AWWA C652 - Disinfection of Water-Storage Facilities

1.3 QUALITY ASSURANCE

- A. Disinfection Standards: Disinfect in accordance with AWWA C651 for water mains and AWWA C652 for water storage facilities and equipment.
- B. Chlorinated Water Disposal: Dispose of old highly chlorinated water in accordance with applicable regulations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 WATER MAIN DISINFECTION

- A. Following acceptable pressure testing, disinfect all sections of the water distribution system and receive approval thereof from the appropriate agencies, prior to placing in service. Advance notice of 24 hours shall be provided to the County before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA Standard C601, "Disinfecting Water Main" and all appropriate approval agencies.
- B. The disinfecting agent shall be free chlorine in aqueous solution with sustained concentration for 12 hours or more of not less than 50 parts per million. Chlorine may

be derived from Chlorine gas, or 70% (high test) calcium hypochlorite (HTH or Perchloron, or equal). Administration may be by any of the several methods described in AWWA Standard C601 as proposed by the CONTRACTOR and approved by the ENGINEER. Proposals as to method must be made prior to commencement of the disinfection process.

- C. Following contact with chlorine solution, the system shall be thoroughly flushed out. Samples shall then be taken using sterile containers obtained from the County Health Department. Samples shall be taken by the CONTRACTOR and delivered by him to the County Health Department or approved laboratory for analysis.
- D. If samples do not demonstrate satisfactory results, the disinfection procedure shall be repeated until two series of satisfactory samples are obtained, the period between such series of samples to be a minimum of 24 hours.
- E. Water released into the environment shall meet federal, state, and local regulatory agencies residual chlorine limit before the point of discharge to a water body. Contractor is required to submit a dechlorination plan that includes all elements for implementation of the plan for review/approval. This plan must comply with AWWA C655 Field Dechlorination.

3.2 DISINFECTION PROCEDURES FOR TANKS

- A. Disinfect potable water storage tanks and equipment in accordance with AWWA C652, Method 2 or 3, using sodium hypochlorite.
 - 1. In Method 2, spray method, spray the entire interior surface of the tank with chlorinated water containing 200 mg/l of available chlorine. After spraying, allow the tank to stand at least two hours before filling with fresh water.
- B. After disinfection, allow the tanks and equipment to overflow until the chlorine residual is approximately 2 mg/l.

END OF SECTION

SECTION 33 12 16

WATER VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. 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.

1.2 REFERENCES

- A. Codes, specifications, and standards referred to by number or title form a part of this Section to the extent required by the references to codes, specifications, and standards. Latest revisions, as of the date of bid opening, apply, unless otherwise noted on the Drawings or specified in this Section.

B. Standards

Designation	Title
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
ANSI/AWWA C500	Gate Valves
ANSI/AWWA C509	Resilient-Seated Gate Valves 3 through 12 NPS, for Water Systems
ANSI/AWWA C510	Double Check Valve Backflow Prevention Assembly
ANSI/AWWA C511	Reduced-Pressure Principle Backflow Prevention Assembly
AWWA C550	Protection Interior Coatings for Valves and Hydrants
ANSI/B16.1	Gray Iron Pipe Flanges and Flanged Fittings, Class 25, 125, and 250
ANSI/B16.3	Malleable Iron Threaded Fittings, Class 150 and 300
ANSI/B16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys
ASTM A48	Standard Specification for Gray Iron Castings

ASTM A126	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A276	Specification for Stainless and Steel Bars and Shapes
ASTM A231	Standard Specification for Chromium-Vanadium Alloy Steel Spring Wire
ASTM D429	Standard Test Methods for Rubber Property – Adhesion to Rigid Substrates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A743	Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, and Nickel-Base Corrosion-Resistant for General Application
ASTM D2794	Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
MSS SP-60	Connecting Flange Joint Between Tapping Sleeves and Tapping Valves

1.3 DEFINITIONS

- A. References to valve sizes on the Drawings and in the Specifications are intended to be nominal size, and shall be interpreted as nominal size.

1.4 SUBMITTALS

- A. General: as specified in:
 1. General Conditions;
 2. Supplementary General Conditions;

1.5 QUALITY ASSURANCE

- A. Testing: Test valves as specified in this Section.

PART 2 PRODUCTS

2.1 GENERAL:

- A. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.

- B. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

2.2 MANUFACTURERS

- A. See LCU Approved Materials List.

2.3 DESIGN

- A. Resilient, Wedge or Gate Valves and Boxes

1. Valves for pipe less than 2" in diameter shall conform to the requirements of AWWA C509 (latest revision) and shall be cast iron, single wedge, non-rising stem, screwed bonnet, 125 pounds S.P., 200 pounds W.O.G with stuffing box repackable under pressure and all parts renewable. Ends shall be as shown or indicated on the drawings.
2. Resilient, wedge or gate valves 2" in diameter and larger shall be cast or ductile iron body, non-rising stem, bronze mounted gate valves, mechanical joint conforming to requirements of the AWWA Standard C509 and shall be provided with a 2" square operating nut. Valves shall be resilient, wedge, or gate type and shall turn to the left (counter clockwise) to open. The wedge or gate shall be cast iron or ductile iron per ASTM A536, minimum 65,000 psi strength and, completely encapsulated with urethane rubber, permanently bonded to the wedge or gate to meet ASTM test for rubber metal bond, ASTM D429. The valve stems for non-rising stem assemblies shall be cast bronze with integral collars in full compliance with AWWA. The NRS stem stuffing box shall be the O-ring seal type with two rings located above thrust collar; the two rings shall be replaceable with valve fully open and subjected to full rated working pressure.
3. There shall be two low torque thrust bearings located above and below the stem collar. The stem nut shall be independent of wedge and shall be made of solid bronze. There shall be a smooth unobstructed waterway free of all pockets, cavities and depressions in the seat area. The body and bonnet shall be coated with fusion bonded epoxy both interior and exterior. The valve shall be designed and tested to be opened and closed under a differential pressure of 150 psi or greater.

- B. Valves for Buried Service

1. Valves for buried service shall meet all the requirements as specified herein for interior except that buried valves shall have mechanical joint ends.
2. All buried valves shall have cast-iron three-piece valve boxes, valve boxes shall be provided with suitable heavy bonnets to extend to such elevation at the finished grade surface as directed by the ENGINEER. The barrel shall be two-piece, screw type, having 53" shaft. The upper section shall have a flange

at the bottom having sufficient bearing area to prevent settling, shall be designed so as to prevent the transmission of surface loads directly to the valve or piping, and shall be complete with cast iron covers. Covers shall have "WATER" cast into the top. The covers shall be so constructed as to prevent tipping or rattling. Valve boxes shall be manufactured by an approved manufacturer (see LCU Approved Materials List).

3. One tee-handled wrench of suitable length shall be furnished to operate each valve with a valve box.
4. Where valves are located out of pavement, the boxes shall be adjusted to finished grade and a concrete slab two feet square and six inches thick shall be poured around the box.
5. Valve boxes shall be of the heavy duty, traffic bearing cast iron, adjustable screw type with a drop cover. The valve box assembly shall consist of a bottom section, top section and cover which is cast from gray iron, formulated to ASTM specification A-48 latest revision, class 30 minimum and shall be free from blowholes, shrinkage or other imperfections not true to pattern. The shaft size shall be 5 1/4" and the adjustable length shall be from 18" to 24". The wall thickness shall be 3/16" \pm 1/16". The weight of the assembly shall be 61 pounds \pm 2 pounds, with the cover weight being a minimum of 12 pounds.
6. The name of the manufacturer and foundry of origin shall be cast into each of the components of the assembly in legible form. The assembly shall be suitable for highway traffic wheel loads of 16,000 pounds and shall withstand a proof load test of 25,000 pounds without failure or permanent deflection, as per Federal Specification RR-F-621-C, latest revision. The valve box shall be cast, machined, assembled, and packaged within the United States and shall fully comply with the Buy American provisions of Public Law 102-240, enacted 12/18/91.

C. Gate Valves Greater Than 20 Inches

1. Valves larger than 20" in diameter and larger shall be approved by the County and shall be epoxy-coated, cast or ductile iron body mechanical joint type conforming to requirements of the AWWA Standards and shall be provided with a 2" square operating nut.
2. 20" or larger resilient gate valve must have a 4" bypass line and 4" gate valve. If an approved equal resilient gate valve (see LCU Approved Materials List) is used, the 4" bypass line and 4" gate valve is not required. Butterfly valves may be used for valves greater than 24" without the 4" bypass line and 4" gate valve.

D. Check Valves

1. Check valves smaller than 4" shall have a bronze body with a bronze disk. Check valves shall absolutely prevent the return of water back through the valve when the inlet pressure decreases below the delivery pressure.
2. The valve must be full opening, tight seating and its seat right shall be renewable and must be securely held in place by a threaded joint; the valve disc shall be bronze and shall be suspended from a non-corrosive shaft which will pass through a stuffing box.
3. The check valve 4" and larger shall be a rubber flapper type swing check valve and the body and cover shall be cast iron construction meeting ASTM A126 Class B or Ductile Iron construction. The flapper shall be Buna-N having an "O" ring seating edge and be internally reinforced with steel.
4. Flapper to be captured between the body and the body cover in a manner to permit the flapper to flex from closed to full open position during flow through the valve. Flapper shall be easily removed without need to remove valve from line. Check Valves to have full pipe size flow area. Seating surface to be on a 45° angle requiring the flapper to travel only 35° from closed to full open position, for minimum head loss and non-slam closure.
5. Non-slam closing characteristic shall be provided through a short 35° disc stroke and a memory flex disc return action.
6. When essential to create backflow thru the check valve, i.e.; to prime or backflush a clogged pump, an external backflow device shall be included.
7. Valve exterior to be painted Phenolic Primer Red Oxide for high resistance to corrosion.
8. Materials of construction shall be certified in writing to conform to A.S.T.M. specified above.
9. Valve shall be of an approved make and model (see LCU Approved Materials List).

E. Backflow Prevention Devices

1. Backflow prevention devices for fire protection systems which do not utilize chemical additives or an auxiliary water supply shall be double detector check valve assemblies, shall be USC approved, painted red, and meet all requirements of ANSI/AWWA C510 For all other applications, backflow prevention devices shall be reduced pressure principle assemblies and shall be USC approved, and shall meet all requirements of ANSI/AWWA C511 and the Southern Standard Plumbing Code. Refer to Section 9 of the Lee County Utilities Operations Manual for details and Section 17196.

F. Air Release Valves

1. Air release valves shall be of the short body, automatic type as shown on the Lee County Standard Detail No. 9.27 in the Operations Manual. The valve body shall be cast iron construction, ASTM A126, Class B, and all internal working parts shall be 300 Series stainless steel, and BUNA-N orifice button. The inlet openings shall be 1" NPT screwed connection. The venting orifice shall be 3/16" in diameter and shall be installed to vent a minimum of 1 foot above the flood elevation. Air release valves shall be of an approved make and model (see LCU Approved Materials List).

G. Tapping Valves and Sleeves

1. Tapping valves shall be of non-rising stem type of O-Ring seals and conform to the applicable requirement as specified above for valves and shall have one flange joint end and mechanical joint end.
2. Valve end connecting to tapping sleeve shall have a flange for bolting to the sleeve. The flange shall have a tongue which fits a recess in sleeve. Tongues shall meet the requirements of MSS SP-60. Resilient-seated gate valves having a port diameter equal to or exceeding 1/4 inch over nominal diameter shall not require a tongue. Flange dimensions and drilling shall meet the requirements of ANSI B16.1. Mechanical joints shall meet the requirements of ANSI/AWWA C111/A21.11. A full nominal diameter cutter shall be used for tapping.
3. Tapping valves 16" and smaller, shall be installed vertically. Tapping valves larger than 16" shall be installed horizontally and shall have bypass valves. Tapping valves installed horizontally shall have rollers and tracks. Valves 16" and larger, shall have gear operators with enclosed gear cases suitable for buried service. Gear cases shall be extended type or totally enclosed type. Extended type gear cases shall have bolted side plates to cover stem and stuffing box.

H. Meter Boxes

1. Meters shall be installed in an approved meter box (see LCU Approved Materials List).
2. Meters larger than 2" shall be installed above ground and approved by Lee County Utilities. Refer to Lee County standard details.

Meter boxes, which need to be replaced, shall be of an approved make and model (see LCU Approved Materials List).

PART 3 EXECUTION

3.1 INSTALLATION

- A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the ENGINEER before they are installed.
- B. After installation, all valves and appurtenances shall be tested at least one hour 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 ENGINEER.
- 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. Flanged joints shall be made with Series 300, stainless steel bolts. All exposed bolts shall be made with Series 300 stainless steel bolts.
- E. 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.
- F. 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, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flaires. After the bolts have been inserted and all nuts have been made up finger-tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.
- G. Valves shall be carefully inspected, opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Gate valves,

unless shown otherwise, shall be set with their stems vertically above the center line of the pipe. Any valve that does not operate correctly shall be removed and replaced.

- H. Valve boxes shall be carefully centered over the operating nuts of the valves so as to permit a valve wrench or key to be fitted easily to the operating nut. Valve boxes shall be set to conform to the level of the finished surface and held in position by a ring of concrete placed under the support flange as shown on the details in Section 9 of the Lee County Utilities Operations Manual. The valve box shall not transmit surface loads to the pipe or valve. Care shall be taken to prevent earth and other material from entering the valve box.

Any valve box which is out of alignment or whose top does not conform to the finished ground surface shall be dug and reset. Before final acceptance of the work, all valve boxes shall be adjusted to finish grade. Valve operating risers shall be installed with any valves required to ensure that the operating nut is 30 inches or less from the ground surface.

3.2 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive a coating of epoxy in accordance with AWWA Standard C550 and meets or exceeds all test requirements including the Food and Drug Administration Document Title 21 of the Federal Regulations on Food Additives, Section 175.000 entitled "Resinous and Polymeric Coating"; Impact Test Requirement in accordance with the ASTM D2794.

END OF SECTION

SECTION 33 12 19

HYDRANTS

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

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

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Section 33 12 16 – Water Valves and Appurtenances
- B. Section 03 30 53 – Concrete for Non-Plant Work
- C. Section 09 90 00 – Painting and Coating

1.3 QUALITY ASSURANCE

- A. Install hydrants to meet current requirements of Lee County Utilities.
- B. Provide manufacturer's certificate those products meet or exceed minimum requirements as specified.

1.4 SUBMITTALS

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

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. During loading, transportation and unloading, exercise care to prevent damage to materials.
- B. Handling: Fire hydrants should be unloaded carefully. The hydrant should be carefully lowered from the truck to the ground, not dropped. Only hoists and slings with adequate load capacity to handle the weight of the hydrant shall be used.
- C. Storage: Should be stored in the fully closed position to prevent entry of foreign material that could cause damage to the seating surfaces. Whenever practical, hydrants should be stored indoors. If outside storage is required, means should be provided to protect the operating mechanism. In outside storage, parts and flanges should be protected from the weather and foreign materials.

PART 2 PRODUCTS

2.1 FIRE HYDRANTS

- A. Fire hydrants shall be of the compression type with break away upper sections capable of ready replacement without loss in the event of traffic damage. Each hydrant shall have a 6" bottom inlet connection and valve opening at least 5-1/4 inches in diameter. Hydrants shall turn to the left (counter clockwise) to open. Each hydrant shall be fitted with one 4-1/2-inch pumper connection and two 2-1/2 inch hose connections, both having threads that conform to the Fire Division Standard for the area. Hose caps shall be chained to the hydrant barrel and fitted with nuts similar to the hydrant operating nuts. Each hydrant shall have a barrel of sufficient length to bring the bottom of the 6" pipe connection 3 feet below the surface of the finished ground. Each hydrant shall be made in at least two sections bolted together. All interior working parts of the hydrant shall be removable from the top of the hydrant to allow repairs without removing the hydrant barrel after it has been installed. Hydrants shall have renewable O-ring stem seals. Hydrant barrels shall be painted AWWA Safety Yellow. They shall be designed for a working pressure of 150 psi and will conform to AWWA Standard C502, "Dry-Barrel Fire Hydrants".
- B. Hydrant shall have no drain parts. If parts exist, they shall be plugged with a threaded plug.
- C. Operating stem shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir with O-ring seals.
- D. Hydrants shall be designated for 150 psi working pressure and shop tested to 300 psi pressure with main valve both opened and closed. Under test the valve shall not leak, the automatic drain shall function and there shall be no leakage into the bonnet.
- E. Hydrant guard posts (bollards) shall be 6-inch diameter Class 50 ductile iron pipe.
- F. Acceptable models are listed in the LCU Approved Materials List.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Hydrants shall be set plumb and in true alignment with mains. They shall utilize concrete thrust blocks or restrained joints and Grade-Lok adapters as shown in details in Section 9 of the Lee County Utilities Operations Manual. Backfilling around hydrants shall be carefully done so as not to disturb the hydrant and shall be thoroughly compacted so as to support the hydrant securely. The hydrants shall have

between 18" and 24" clearance measured from finish grade to the center of pumper connection.

- B. Hydrant guard posts (bollards) shall be 6 feet long, buried 3 feet below finished grade, filled with 2500 psi concrete and painted AWWA safety yellow as shown on the Lee County Standard Details.

END OF SECTION

(NO TEXT FOR THIS PAGE)

PROJECT PERMITS & SEMINOLE GULF RAILWAY LICENSE AGREEMENT

**RSW TRANSMISSION LINES
– BEN HILL/TREELINE**



LEE COUNTY
SOUTHWEST FLORIDA

**LEE COUNTY UTILITIES
RSW TRANSMISSION LINES – BEN HILL/TREELINE**

PERMITS & SEMINOLE GULF RAILWAY LICENSE AGREEMENT

Agency/Permit Name	Permit #	Date Issued
Lee County/Limited Review Development Order	LDO2020-00309	Pending
Lee County / Certificate to Dig	DIG2020-00124	09/10/2020
Florida - Lee County Department of Health	0125562-472-DSC	08/04/2020
Florida Department of Environmental Protection / Environmental Resource Permit	391009-001	8/10/2020
Florida Department of Transportation	2020-H-192-00159	08/05/2020
Seminole Gulf Railway License Agreement	SLGR #0681	



09/10/2020

CERTIFICATE TO DIG

Debi Pendlebury
2122 Johnson Street
Fort Myers, FL 33901
2394612439

RE: Project: RSW 24" Transmission Line -Ben Hill-Treeline

DIG #: DIG2020-00124

Address: 1 ROW SIX MILE CROSSING BLVD

FMSF #:

Strap #: 25-45-24-00-00000.0000

D.O. #: LDO2020-00309

The Application for a Certificate to Dig has been APPROVED for:

Install a 24" Water Transmission Main to provide a secondary way to send water to south and west Lee County within existing easements and ROW (see cover letter)

Conditions:

It is the applicant's responsibility to obtain ALL the required permits and approvals - including Building Permits - prior to the project initiation. This Certificate to Dig can in no way be construed as a Building Permit.

If objects, sites, artifacts, or human remains are uncovered, STOP all ground disturbing activity and contact Lee County Planning at 239-533-8535 or 239-533-8585. It is the responsibility of the applicant to notify the contractor of this condition.

Applicant must comply with Florida State Statute 872.05 (see attached brochure).

Certified by: Jessica Sulzer

Date: 09/10/2020

INTRODUCTION

Florida has joined with the Federal Government and other states in the passage of laws dealing with the protection of archaeological sites. Rapidly increasing development and illicit digging activities have resulted in the destruction of valuable prehistoric and historic archaeological sites and materials. Of particular concern are sites containing native American Indian and other historically significant burials not in marked cemeteries.

In Florida such sites are protected by law. Chapter 872, Florida Statutes (F.S.), protects human burials on public and private property. Federal law also protects native American graves and remains in certain circumstances. Chapter 267, F.S., and Public Law 96-95 protect all archaeological sites on state and federally-owned lands, respectively. Also trespass and vandalism laws (810.19 and 806.13, F.S.) help protect archaeological sites.

LEGISLATIVE INTENT

Chapter 872, F.S. decrees that all human burials and human skeletal remains be accorded equal treatment and respect based upon common human dignity without reference to ethnic origin, cultural background or religious affiliation. This applies to all human burials, human skeletal remains and associated burial artifacts, found upon or within any public or private land in the state, including submerged lands, and excluding native American burials on Federally-owned lands protected by the Native American Indian Graves Repatriation Act. Section 872.05, F.S. ("Florida's Unmarked Human Burial Act"), mandates that all types of human burial sites including Indian mounds, "lost"

historic and prehistoric cemeteries, and other unmarked burials be responsibly treated once they are discovered, and that certain procedures specified in the law be followed. The law is intended to ensure the protection of burials in place rather than their excavation, although removal is sometimes necessary.

DEFINITIONS

An "unmarked human burial" is any human skeletal remains or associated burial artifacts or any location, including any burial mound or earthen or shell monument, where human skeletal remains or associated burial artifacts are discovered or believed to exist on the basis of archaeological or historical evidence, excluding any burial marked or previously marked by a tomb, monument, grave-stone, or other structure or thing placed or designated as a memorial of the dead. [NOTE: The excluded burials are considered "marked human burials" coming under the jurisdiction of 872.02, F.S.]

An "artifact" is any object made or used by people.

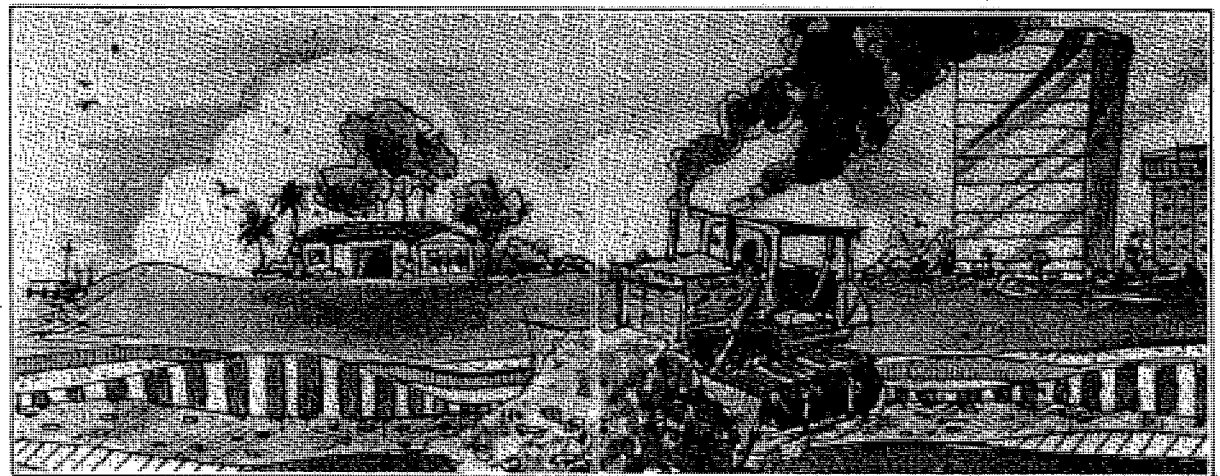
An "associated burial artifact" is any artifact intentionally buried with human remains, or identified as a possession of an accidentally buried individual.

WHAT TO DO

Help protect unmarked human burial sites by reporting them to the State Archaeologist, who is also the Chief of the Bureau of Archaeological Research in the Florida Department of State, Division of Historical Resources (BAR). Site forms may be obtained by writing or calling [(850) 245-6444] the BAR's Florida Site File.

Also, any person who knows or has reason to know that an unmarked human burial is being unlawfully disturbed, destroyed, defaced, mutilated, removed, excavated, or exposed must immediately notify the local law enforcement agency (sheriff/police) with jurisdiction where the unmarked human burial is located.

When an unmarked human burial is discovered, all activity that may disturb the unmarked human burial shall cease immediately, and the



district medical examiner (DME, the coroner) shall be notified. The DME will determine whether the remains are under the DME's jurisdiction or that of the State Archaeologist. Activities shall not resume unless authorized by the district medical examiner or State Archaeologist. The telephone number of the State Archaeologist is (850) 245-6444.

WHAT HAPPENS

If the DME finds that the unmarked human burial may be involved in a legal investigation or represents the burial of an individual who has been dead less than 75 years, the DME shall assume jurisdiction of such burial. If the DME finds that the burial is not involved in a legal investigation and represents the burial of an individual who has been dead 75 years or more, he shall notify the State Archaeologist. The State Archaeologist shall consult a human skeletal analyst who shall report within 15 days as to the cultural and biological characteristics of the human skeletal remains and where such burial or remains should be held prior to final disposition. The State Archaeologist follows the procedures in Florida Department of State Rule 1A-44, Florida Administrative Code, in determining the final disposition of the burial or remains.



A THIEF OF TIME

He's Stealing From You!

PENALTIES

Any person who willfully and knowingly disturbs an unmarked burial or burials, or destroys, mutilates, defaces, injures, or removes any burial mound, earthen or shell monument containing human skeletal remains or associated artifacts or other structures or things placed or designed for a memorial, or disturbs the contents of a tomb or grave is guilty of a third degree felony punishable by up to five years in prison and up to \$5,000 fine for each offense.

Any person who has knowledge that an unmarked human burial is being disturbed, vandalized, or damaged and fails to notify the local law enforcement agency with jurisdiction in the area is guilty of a second degree misdemeanor punishable by up to 60 days in jail and up to \$500 in fines.

State Archaeologist
Bureau of Archaeological Research
Division of Historic Resources
500 South Bronough Street
Tallahassee, FL 32399-0250
Phone: (850) 245-6444
Email: dhr.dos.state.fl.us/bar/arch.html

FLORIDA'S UNMARKED BURIAL LAW



872.05
Florida Statutes



LCU CIP # 2021 # 7193
RECEIVED
AUG 08 2020
wrong date
OK

APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

See page 4 for instructions.

Permit NO: 0125562-472 DCB
ISSUED IN COMPLIANCE WITH REGULATIONS
All Permit Conditions Must Be Complied With.
Permit Number Required When Requesting
Bacteriological Sampling by Health Dept.

I. General Project Information

A. Name of Project: RSW 24" Transmission Line, Ben Hill-Treeline

B. Description of Project and Its Purpose:

The purpose of this project is to provide approximately 5 miles of 24" potable water main to serve as a transmission main for Lee County Utilities and includes the following:
10 LF of 8", 65 LF of 12", and 205 LF of 16" PVC C900 DR18 water mains installed via open cut method; 21,835 LF of 24" and 5 LF of 30" DIP Pressure Class 250 water mains installed via open cut method; and 3,155 LF 30" of HDPE DR9 (DIPS) via HDD. Installation of gate valves consisting of (2) 8", (7)12", (1)16" and (14)24"; 9 ARV's, 2 connections to existing 8" water mains, 1 connection to an existing 24" water main and 1 connection to existing 30" water main.

C. Does project create a "new system" as described under subsection 62-555.525(1), F.A.C.? Yes, and a completed copy of Form 62-555.900(20), New Water System Capacity Development Financial and Managerial Operations Plan, is attached. No.

D. Location of Project

1. County Where Project Located: Lee

2. Description of Project Location:

Project begins just south of the Ben C. Pratt/US 41 Intersection, just south of the WalMart entrance and runs east towards Ten Mile Canal and then south along Ten Mile Drive, then east under the Michael G. Rippe Parkway, then continues east along southside of Briarcliff Ditch canal, then south along westside of Briarcliff Ditch canal, then east under Dusty Road, then continues east along southside of Briarcliff Ditch canal, then north along Briarcliff Ditch canal then east along South Conveyance Channel canal and connects to an existing Water Main.

3. Latitude and Longitude of Each New Treatment Plant and Each New Raw Water Source (attach additional sheets if necessary):

Name of New Treatment Plant or Raw Water Source	Latitude	Longitude
	° ' "N	° ' "W
	° ' "N	° ' "W
	° ' "N	° ' "W
	° ' "N	° ' "W
	° ' "N	° ' "W

E. Estimate of Cost to Construct Project: \$

F. Estimate of Dates for Starting and Completing Construction of Project: Starting May 2021 and Completing November 2022

G. Applicant

PWS/Company Name: Lee County Public Utilities		PWS Identification No.: * 5364048-1	
PWS Type: * <input checked="" type="checkbox"/> Community <input type="checkbox"/> Non-Transient Non-Community <input type="checkbox"/> Transient Non-Community <input type="checkbox"/> Consecutive			
Contact Person: Mark Sunyak, P.E.		Contact Person's Title: Lee County Public Utilities Engineering Manager	
Contact Person's Mailing Address: 1500 Monroe St., 3rd Floor			
City: Fort Myers		State: FL	Zip Code: 33901
Contact Person's Telephone Number: 239-533-8572		Contact Person's Fax Number:	
Contact Person's E-Mail Address: MSunyak@leegov.com			

* This information is required only if the applicant is a public water system (PWS).

H. Public Water System (PWS) Supplying Water to Project

PWS Name: Lee County Public Utilities		PWS Identification No.: 5364048-1	
PWS Type: <input checked="" type="checkbox"/> Community <input type="checkbox"/> Non-Transient Non-Community <input type="checkbox"/> Transient Non-Community <input type="checkbox"/> Consecutive			
PWS Owner: Lee County Public Utilities			
Contact Person: Mark Sunyak, P.E.		Contact Person's Title: Lee County Public Utilities Engineering Manager	
Contact Person's Mailing Address: 1500 Monroe St., 3rd Floor			
City: Fort Myers		State: FL	Zip Code: 33901
Contact Person's Telephone Number: 239-533-8572		Contact Person's Fax Number:	
Contact Person's E-Mail Address: MSunyak@leegov.com			

APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

Project Name: RSW 24" Transmission Line, Ben Hill-Treeline	Applicant: Lee County Public Utilities
--	--

I. Public Water System (PWS) that Will Own Project after It Is Placed into Permanent Operation

PWS Name: Lee County Public Utilities		PWS Identification No.: *5364048-1	
PWS Type: * <input checked="" type="checkbox"/> Community <input type="checkbox"/> Non-Transient Non-Community <input type="checkbox"/> Transient Non-Community <input type="checkbox"/> Consecutive			
PWS Owner: Lee County Public Utilities			
Contact Person: Mark Sunyak, P.E.		Contact Person's Title: Lee County Public Utilities Engineering Manager	
Contact Person's Mailing Address: 1500 Monroe St., 3rd Floor			
City: Fort Myers		State: FL	Zip Code: 33901
Contact Person's Telephone Number: 239-533-8572		Contact Person's Fax Number:	
Contact Person's E-Mail Address: MSunyak@leegov.com			

* This information is required only if the owner/operator is an existing PWS.

J. Professional Engineer(s) or Other Person(s) in Responsible Charge of Designing Project*

Company Name: Johnson Engineering, Inc.			
Designer(s): David Brice Trouteaud, P.E.		Title(s) of Designer(s): Engineer of Record	
Qualifications of Designer(s):			
<input checked="" type="checkbox"/> Professional Engineer(s) Licensed in Florida – License Number(s): 69783			
<input type="checkbox"/> Public Officer(s) Employed by State, County, Municipal, or Other Governmental Unit of State†			
<input type="checkbox"/> Plumbing Contractor(s) Licensed in Florida – License Number(s): ^			
Mailing Address of Designer(s): 2122 Johnson Street			
City: Fort Myers		State: FL	Zip Code: 33901
Telephone Number of Designer(s): 239-461-2438		Fax Number of Designer(s): 239-334-3661	
E-Mail Address(es) of Designer(s): dbt@johnsoneng.com			

* Except as noted in paragraphs 62-555.520(3)(a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more professional engineers licensed in Florida.

† Attach a detailed construction cost estimate showing that the cost to construct this project is \$10,000 or less.

^ Attach documentation showing that this project will be installed by the plumbing contractor(s) designing this project, documentation showing that this project involves a public water system serving a single property and fewer than 250 fixture units, and a detailed construction cost estimate showing that the cost to construct this project is \$50,000 or less.

III Certifications

A. Certification by Applicant

I am duly authorized to sign this application on behalf of the applicant identified in Part I.G of this application. I certify that, to the best of my knowledge and belief, this project complies with Chapter 62-555, F.A.C., and provides assurance of compliance with Chapter 62-550, F.A.C. I also certify that construction of this project has not begun yet.

7/20/2020	Mark Sunyak, P.E.	Lee County Public Utilities Engineering Manager
Signature and Date	Printed or Typed Name	Title

B. Certification by PWS Supplying Water to Project

I am duly authorized to sign this application on behalf of the PWS identified in Part I.H of this application. I certify that said PWS will supply the water necessary to meet the design water demands for this project. I certify that, to the best of my knowledge and belief, said PWS's connection to this project will not cause said PWS to be, or contribute to said PWS being, in noncompliance with Chapter 62-550 or 62-555, F.A.C. I also certify that said PWS has reviewed the preliminary design report or drawings, specifications, and design data for this project and that said PWS considers the connection(s) between this project and said PWS acceptable as designed.

- Name(s) of Water Treatment Plant(s) to Which this Project Will Be Connected: Corkscrew Water Treatment Plant
- Total Permitted Maximum Day Operating Capacity of Plant(s), gpd: 15.0 (with ASR 18.24)
- Total Maximum Day Flow at Plant(s) as Recorded on Monthly Operating Reports During Past 12 Months, gpd: 13.156 in May 2020

7/20/2020	Mark Sunyak, P.E.	Lee County Public Utilities Engineering Manager
Signature and Date	Printed or Typed Name	Title

APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

Project Name: RSW 24" Transmission Line, Ben Hill-Treeline	Applicant: Lee County Public Utilities
--	--

C. Certification by PWS that Will Own Project after It Is Placed into Permanent Operation

I am duly authorized to sign this application on behalf of the PWS identified in Part I.I of this application. I certify that said PWS will own this project after it is placed into permanent operation. I also certify that said PWS has reviewed the preliminary design report or drawings, specifications, and design data for this project and that said PWS considers this project acceptable as designed

Signature and Date	Mark Sunyak, P.E.	Lee County Public Utilities Engineering Manager
	Printed or Typed Name	Title

D. Certification by Professional Engineer(s) in Responsible Charge of Designing Project*

I, the undersigned professional engineer licensed in Florida, am in responsible charge of preparing the preliminary design report or drawings, specifications, and design data for this project. I certify that, to the best of my knowledge and belief, the design of this project complies with Chapter 62-555, F.A.C., and provides assurance of compliance with Chapter 62-550, F.A.C.

Signature, Seal, and Date:
Affix Seal
Printed/Typed Name: DAVID BRICE TROUETAUD, P.E.
License Number: 69783
Portion of Engineering Document(s) for Which Responsible: 100%

Signature, Seal, and Date:
Affix Seal
Printed/Typed Name: DAVID BRICE TROUETAUD, P.E.
License Number: 69783
Portion of Engineering Document(s) for Which Responsible: 100%

Signature, Seal, and Date:
Affix Seal
Printed/Typed Name:
License Number:
Portion of Engineering Document(s) for Which Responsible:

Signature, Seal, and Date:
Affix Seal
Printed/Typed Name:
License Number:
Portion of Engineering Document(s) for Which Responsible:

** Except as noted in paragraphs 62-555.520(3) (a) and (b), F.A.C., projects shall be designed under the responsible charge of one or more professional engineers (PEs) licensed in Florida. If this project is being designed under the responsible charge of one or more PEs licensed in Florida, Part II.D of this application shall be completed by the PE(s) in responsible charge. If this project is not being designed under the responsible charge of one or more PEs licensed in Florida, Part II.D does not have to be completed.*

APPLICATION FOR A SPECIFIC PERMIT TO CONSTRUCT PWS COMPONENTS

INSTRUCTIONS: This application shall be completed and submitted by persons proposing to construct or alter public water system components unless such proposed construction or alteration is permitted under the Department of Environmental Protection's (DEP's) "General Permit for Construction of Water Main Extensions for Public Water Systems," in which case Form 62-555.900(7) is to be completed and submitted, or under the DEP's "General Permit for Construction of Lead or Copper Corrosion Control, or Iron or Manganese Sequestration, Treatment Facilities for Small or Medium Public Water Systems," in which case Form 62-555.900(18) is to be completed and submitted. Complete and submit one copy of this application to the appropriate DEP District Office or Approved County Health Department (ACHD) along with payment of the proper application processing fee and one copy of the following information:

- either a preliminary design report or drawings, specifications, and design data (the preliminary design report or drawings, specifications, and design data shall contain all pertinent information required under subsection 62-555.520(4), F.A.C.); and
- the Florida Public Service Commission (FPSC) certificate of authorization to provide water service if the project involves construction of a new public water system subject to the jurisdiction of the FPSC.

All information provided on this application shall be typed or printed in ink. Application processing fees are listed in paragraph 62-4.050(4) (n), F.A.C. Checks for application processing fees shall be made payable to the Department of Environmental Protection or to the appropriate ACHD. Preliminary design reports, drawings, specifications, and design data prepared under the responsible charge of one or more professional engineers licensed in Florida shall be signed, sealed, and dated by the professional engineer(s) in responsible charge. NOTE THAT A SEPARATE APPLICATION AND A SEPARATE APPLICATION PROCESSING FEE ARE REQUIRED FOR EACH NON-CONTIGUOUS PROJECT.*

* *Non-contiguous projects are projects that are neither interconnected nor located nearby one another (i.e., on the same site, on adjacent streets, or in the same neighborhood).*



FLORIDA DEPARTMENT OF Environmental Protection

South District
Post Office Box 2549
Fort Myers, Florida 33902-2549
SouthDistrict@FloridaDEP.gov

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Noah Valenstein
Secretary

September 9, 2020

Lee County Utilities - Mark Sunyak
c/o Robert Isley
Johnson Engineering
2122 Johnson Street
Fort Myers, Florida 33901
RDI@Johnsoneng.com

File No.: 0391009-001 EG, Lee County

Dear Lee County Utilities - Mark Sunyak :

On August 10, 2020, we received your notice of intent to use a General Permit (GP), pursuant to Rule 62-330.453, Florida Administrative Code to perform the following activities:

Project 001: To install 24,340-linear feet of HDPE 24" water transmission line via open trench and horizontal directional drill under two ditches adjacent to Ten Mile Canal and Six Mile Cypress Slough and one horizontal directional drill under Seminole Gulf Railway, Michael G. Rippe Parkway and Briarcliff Ditch, and;

Project 002: including two aerial transmission crossings; 97-linear feet over Ten Mile Canal and 55-linear feet over Briarcliff Ditch in Class III Waters, Lee County.

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 did not qualify for the **federal review portion** of this verification request. Specifically, the activity is not covered by the State Programmatic General Permit. **Additional authorization must be obtained prior to commencement of the proposed activity.** This letter does not relieve you from the responsibility of obtaining other federal, state, or local authorizations that may be required for the activity. Please refer to the specific section(s) dealing with that portion of the review below for advice on how to proceed.

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.

If you have any questions regarding this matter, please contact Schuyler Houfek by telephone at (239) 344-5654 or by e-mail at Schuyler.Houfek@floridadep.gov.

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 Rules 62-330.453 and 62-330.455 and 62-330.455, Florida Administrative Code. Any activities performed under a general permit are subject to general conditions required in Rule 62-330.405, Florida Administrative Code (attached), and the specific conditions of Rule 62-330.453 and 62-330.455, Florida Administrative Code (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 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 of the Florida Statutes, Title 62, Florida Administrative Code, and in accordance with the operating agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, Florida Administrative Code.

2. Proprietary Review – NOT REQUIRED

The activity does not appear to be located on sovereign submerged lands, and does not require further authorization under Chapter 253 of the Florida Statutes, or Chapters 18-20 or 18-21 of the Florida Administrative Code.

3. Federal (SPGP) Review – NOT APPROVED

Your proposed activity as outlined on your application and attached drawings does not qualify for Federal authorization pursuant to the State Programmatic General Permit and a SEPARATE permit or authorization shall be required from the Corps. You must apply separately to the Corps using their *APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT*, ENG FORM 4345, or alternative as allowed by their regulations. More information on Corps permitting may be found online in the Jacksonville District Regulatory Division Source Book at: <https://www.saj.usace.army.mil/Missions/Regulatory/Source-Book/>.

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, Florida Statutes, and Chapter 18-14, Florida Administrative Code.

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 Rules 28-106.201 and 28-106.301, 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, 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, or via electronic correspondence at Agency_Clerk@dep.state.fl.us. 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 and persons entitled to written notice under Section 120.60(3), F.S., 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. You cannot justifiably rely on the finality of this decision unless notice of this decision and the right of substantially affected persons to challenge this decision has been duly published or otherwise provided to all persons substantially affected by the decision. While you are not required to publish notice of this action, you may elect to do so pursuant Rule 62-110.106(10)(a).

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. If you do not publish notice of this action, this waiver will not apply to persons who have not received written notice of this action.

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, or via electronic correspondence at Agency_Clerk@dep.state.fl.us, before the 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 Florida Rules of Appellate Procedure 9.110 and 9.190 with the Clerk of the Department in the Office of General Counsel (Station #35, 3900 Commonwealth Boulevard, 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 must be filed within 30 days from the date this action is filed with the Clerk of the Department.

Executed in Fort Myers, Florida

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Sincerely,



Megan Mills
Permitting Program Administrator
South District

Enclosures:

21 Project drawings
62-330.405, Florida Administrative Code
62-330.453, Florida Administrative Code
62-330.455, Florida Administrative Code

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this document and all attachments, including all copies, were sent to the addressee and to the following listed persons:

U.S. Army Corps of Engineers, Fort Myers Office, fdep.other@usace.army.mil

FILING AND ACKNOWLEDGMENT

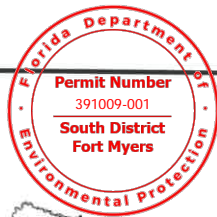
FILED, on this date, pursuant to Section 120.52(7), F.S., with the designated Department clerk, receipt of which is hereby acknowledged.



Clerk

September 9, 2020

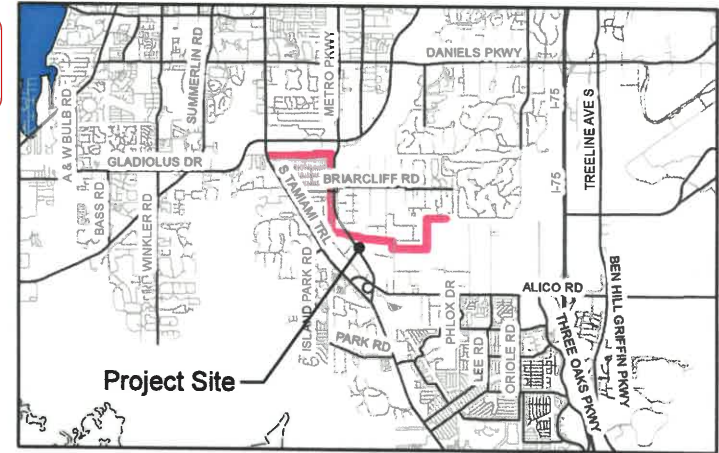
Date



STATE OF FLORIDA

Sheet Number	Sheet Title
1	Location Map
2	Quad Map
3	Soils Map
4	FLUCFCS Legend
5	FLUCFCS and Plan View Key Sheet
6	FLUCFCS and Plan View 1-3
7	FLUCFCS and Plan View 4-6
8	FLUCFCS and Plan View 7-9
9	FLUCFCS and Plan View 10-12
10	FLUCFCS and Plan View 13-15
11	FLUCFCS and Plan View 16-18
12	FLUCFCS and Plan View 19-21
13	FLUCFCS and Plan View 22-24
14	FLUCFCS and Plan View 25-27
15	FLUCFCS and Plan View 28-29
16	Mud Pit, Trench, and Silt Fence Details
17	Pipe Support Detail
18	Aerial Crossing Profiles
19	Directional Drill Profiles 1
20	Directional Drill Profiles 2
21	Directional Drill Profiles 3

Driving Directions:
From the intersection of U.S. 41 and Daniels Parkway drive south approximately 1.5 miles and the beginning of the project will be on the East side of U.S. 41.

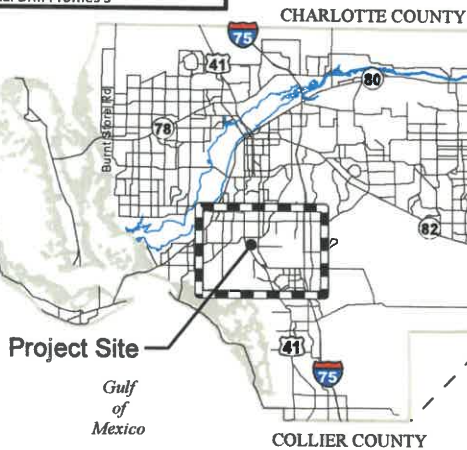


STREET MAP
N.T.S.



Digitally SIGNED VICINITY AERIAL
N.T.S.

Notes: Aerial Photo 2019



LEE COUNTY
N.T.S.

NOTES:
These drawings are for permitting purposes only and are NOT intended for construction use.

Section 25 & 36, Township 45 South, Range 24 East
Section 1, Township 46 South, Range 24 East
Section 5 & 6, Township 46 South, Range 25 East
Section 32, Township 45 South, Range 25 East
Latitude: 26d 30' 11" N, Longitude: 81d 50' 15" W



signed by
David B. Trouteaud
Date:
2020.08.06
14:48:47
-04'00'

REGISTERED PROFESSIONAL ENGINEER 69783 FLORIDA LICENSE NO.
DAVID B. TROUTEAUD, PE
Date _____

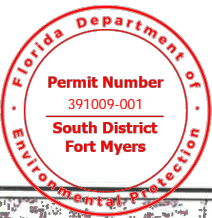
RSW 24" Water Transmission Line
Lee County, Florida



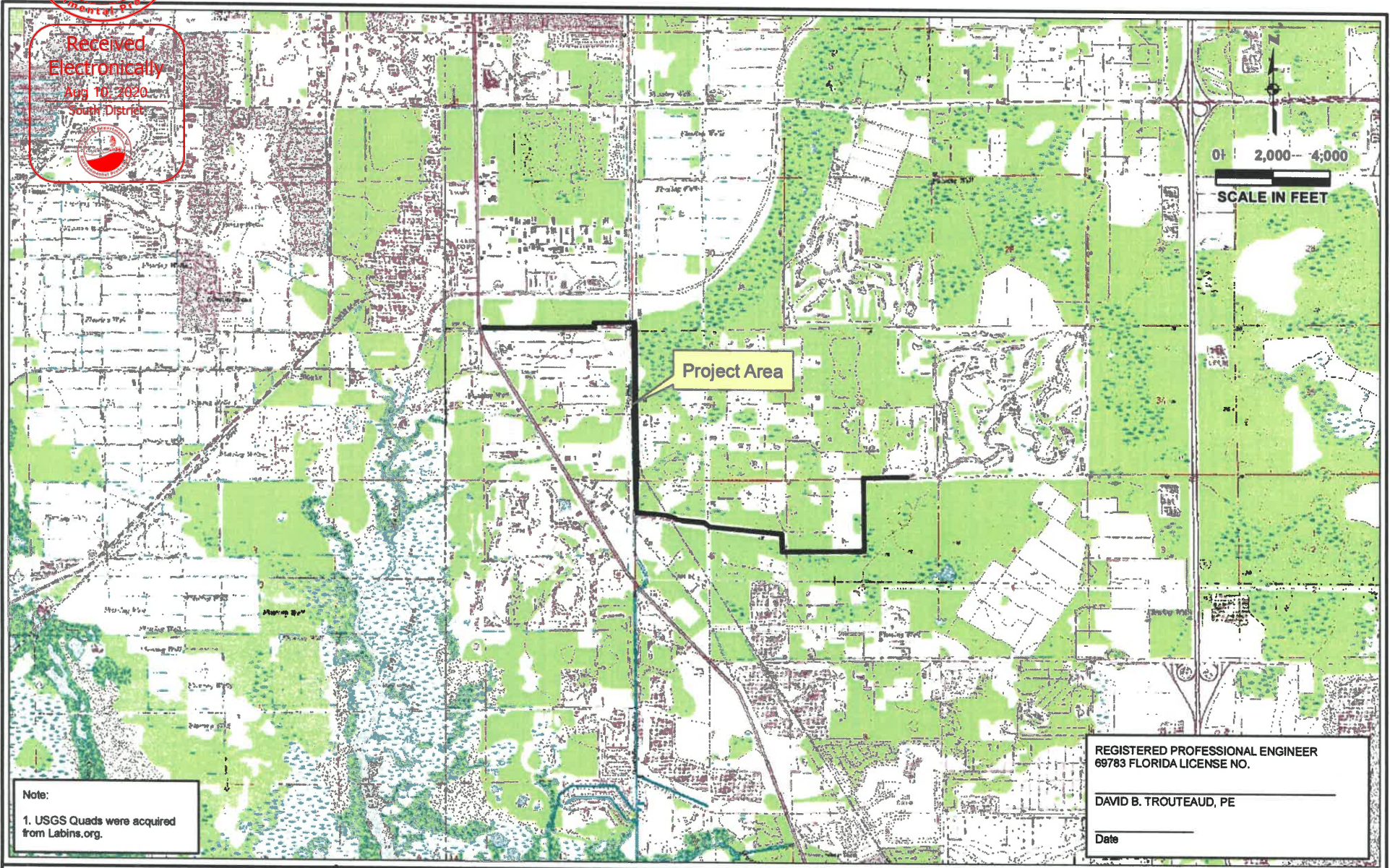
JOHNSON ENGINEERING, INC.
2122 JOHNSON STREET
P.O. BOX 1550
FORT MYERS, FLORIDA 33902-1550
PHONE (239) 334-0046
FAX (239) 334-3661
E.B. #642 & L.B. #642

Location Map

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277		Not to Scale	1



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Note:
1. USGS Quads were acquired from Labins.org.

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Date _____

Document Path: O:\2019\20192277-000\Environmental\Permitting\Quad.mxd

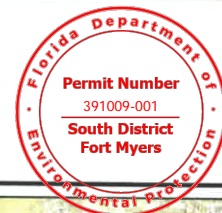
RSW 24" Water Transmission Line
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USGS Quad Map

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277		As Shown	02



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Project Area

Legend

Project Boundary

NRCS Soils

Status

Non-Hydric

Hydric

NRCS Soils Legend

Soil No	Description	Status
6	Hallandale Fine Sand	Non-Hydric
10	Pompano Fine Sand	Hydric
12	Felda Fine Sand	Hydric
13	Boca Fine Sand	Non-Hydric
14	Valkaria Fine Sand	Hydric
27	Pompano Fine Sand, Depressional	Hydric
28	Immokalee Sand	Non-Hydric
33	Oldsmar Sand	Non-Hydric
39	Isles Fine Sand, Depressional	Hydric
59	Urban Land	Unranked
73	Pineda Fine Sand, Depressional	Hydric
99	Water	Unranked

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RSW 24" Water
Transmission Line
Lee County, Florida



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NRCS Soils Map

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277		As Shown	3

\\fms01\Drawings\2019\20192277-000\Environmental\Permitting\Permit Exhibits.dwg (LEGEND) BKM Aug 04, 2020 -- 3:38pm

FLUCFCS Legend

FLUCFCS CODE	DESCRIPTION	TOTAL	STATUS	Impacts	
				Acreage	Cubic Yards
211	Improved Pasture	6.16± Ac.	N	0	0
514	Ditch	0.89± Ac.	SW	0.002	3
621	Cypress	0.11± Ac.	W	0	0
621 E1	Cypress (1-24% Exotics)	0.03± Ac.	W	0	0
740	Disturbed Lands	10.85± Ac.	N	0	0
812	Railroad	0.03± Ac.	N	0	0
814	Roadways	0.31± Ac.	N	0	0
832	Electrical Transmission Lines	0.03± Ac.	N	0	0
Total		18.41± Ac.		0.002± Ac.	3 cy

Legend

N Non-Wetland
 SW Surface Water
 W Wetland



NOTES:

- Nomenclature and delineations as per the Florida Land Use Cover and Forms Classification System (FLUCFCS) (FDOT 1999).
- The jurisdictional lines shown have not been verified by agency staff.
- Aerial photographs shown were provided by Lee County government and have a flight date of 2019.
- Single row silt fence shall be installed along entire project limits, except at close proximity to wetlands or surface waters, which shall have double row silt fence installed.

LEGEND	
	Project Limits
	FLUCFCS Polygons & Codes
	Wetlands(0.14 ac.)
	Surface Waters (0.89 ac.)
	Temporary Mud Pit
	HDD Entry/Exit
	Water Main
	Right of Way
	Temporary Easement
	Existing Easement
	FLUCFCS
	Double Row Silt Fence

REGISTERED PROFESSIONAL ENGINEER
 FLORIDA LICENSE NO. 69783

DAVID B. TROUTEAUD, PE

DATE

RSW 24" Water Transmission Line
 Lee County, Florida

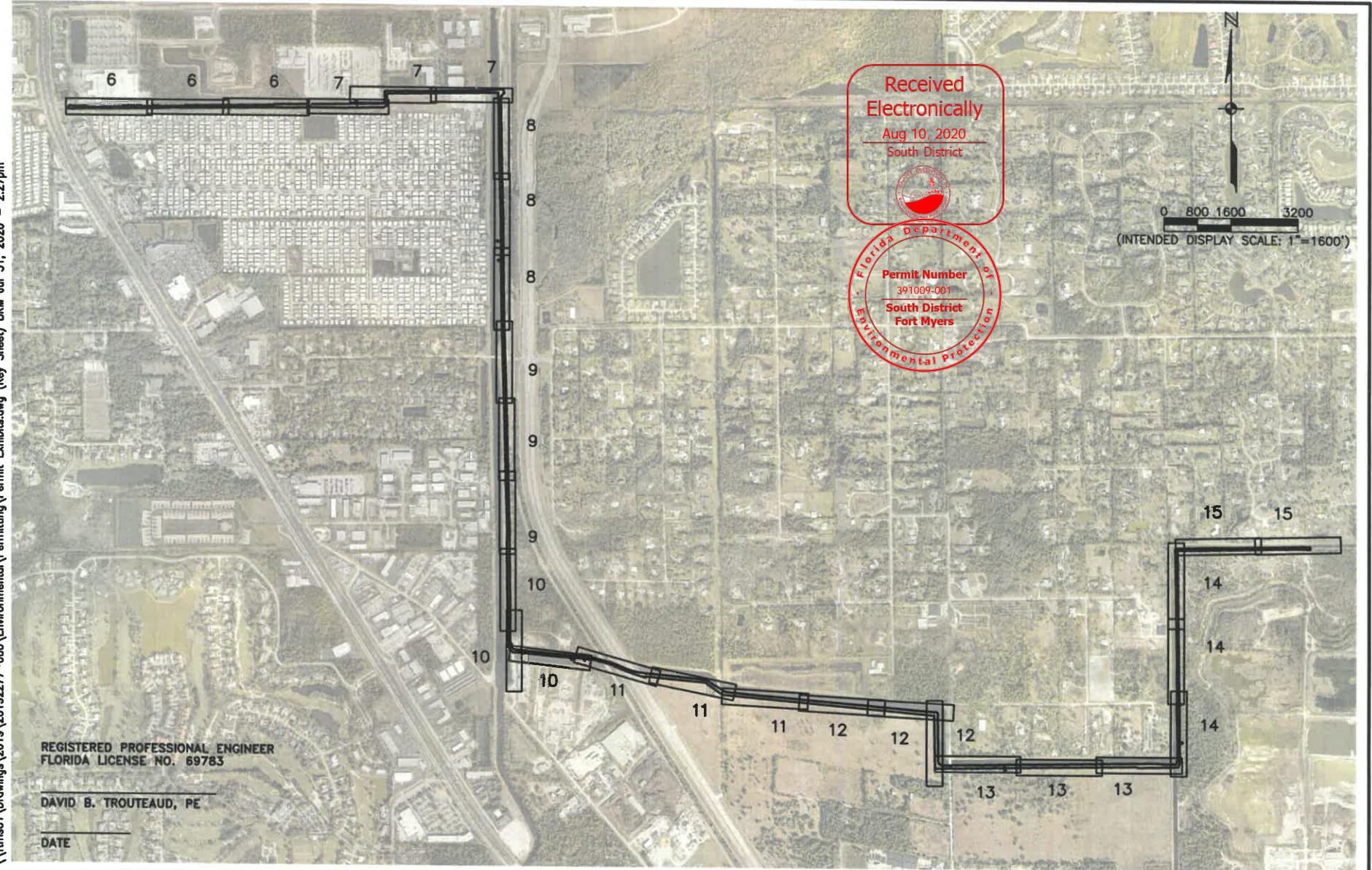


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FLUCFCS LEGEND

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	As Shown	04

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RSW 24" Water Transmission Line
Lee County, Florida

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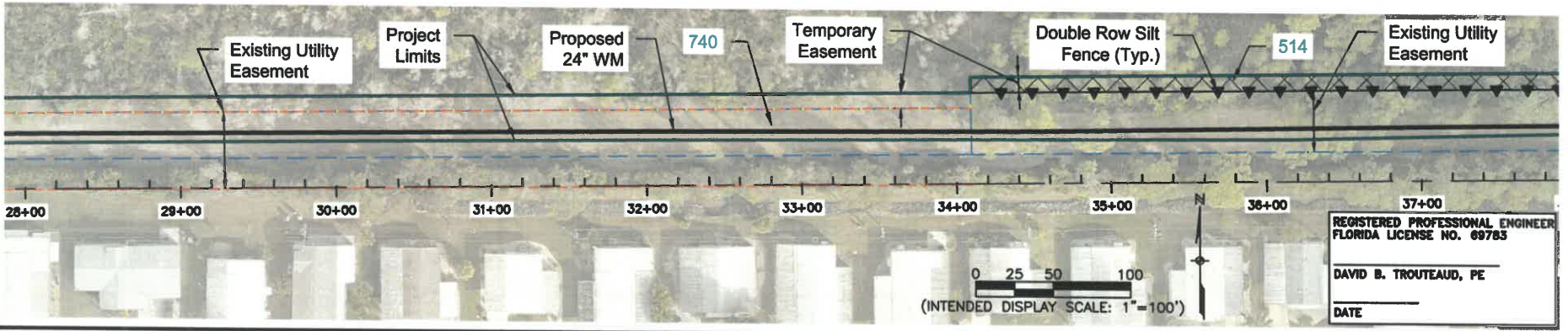
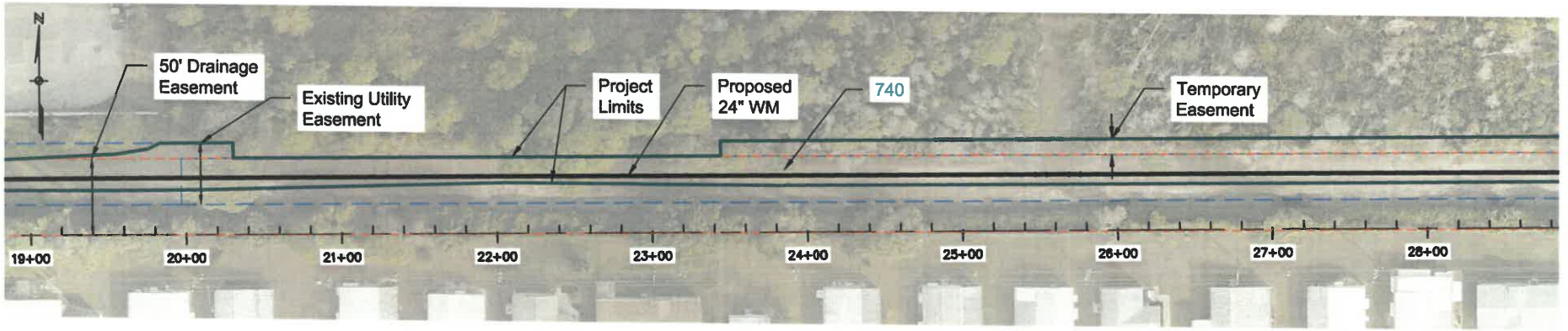
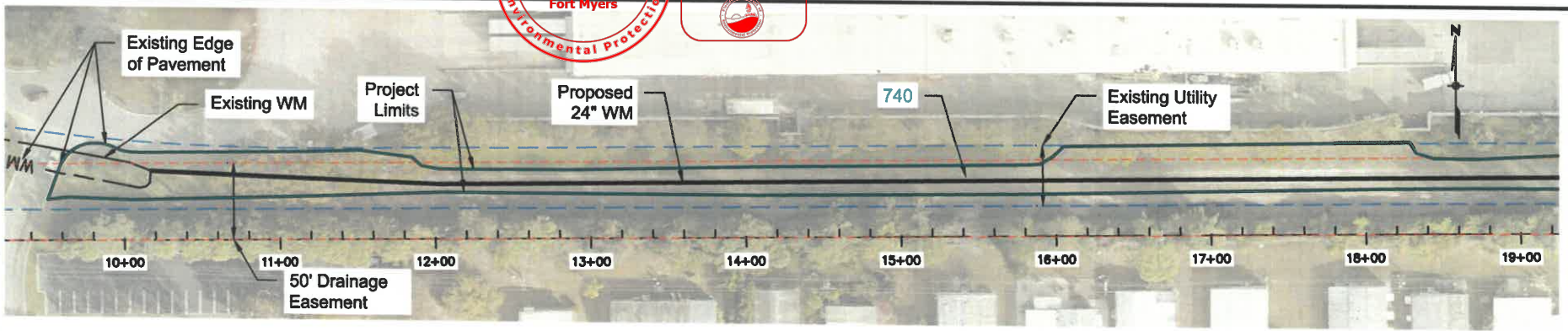
JOHNSON ENGINEERING, INC.
2122 JOHNSON STREET
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FLUCFCS AND PLAN VIEW KEY SHEET

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	As Shown	05



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RSW 24" Water Transmission Line
 Lee County, Florida



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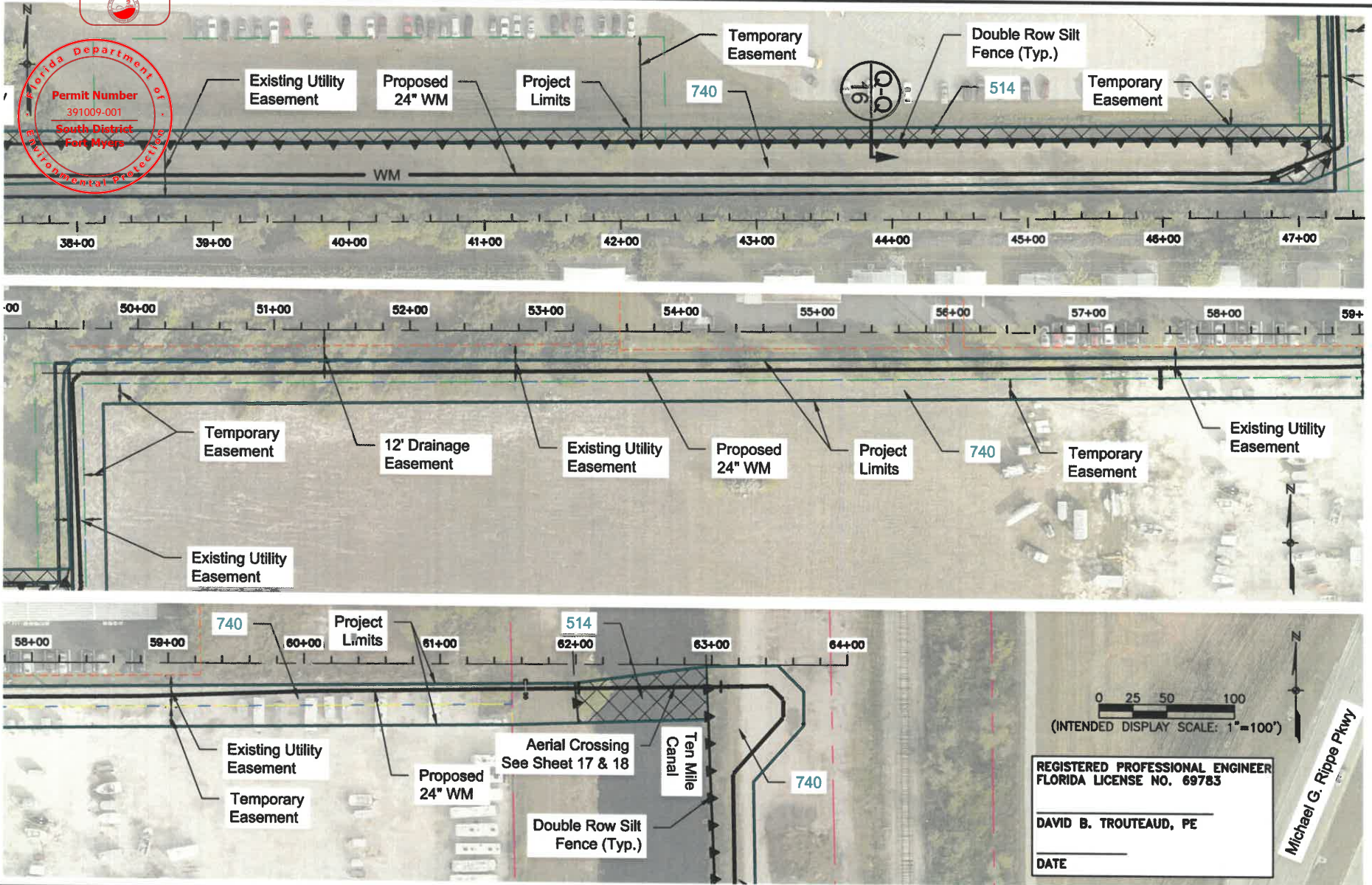
FLUCFCS AND PLAN VIEW 1-3

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	06

Received Electronically
 Aug 10, 2020
 South District

Florida Department of
 Permit Number
 391009-001
 South District
 Fort Myers

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0 25 50 100
 (INTENDED DISPLAY SCALE: 1"=100')

REGISTERED PROFESSIONAL ENGINEER
 FLORIDA LICENSE NO. 69783

DAVID B. TROUTEAUD, PE

DATE _____

Michael G. Rippe Pkwy

RSW 24" Water Transmission Line
 Lee County, Florida



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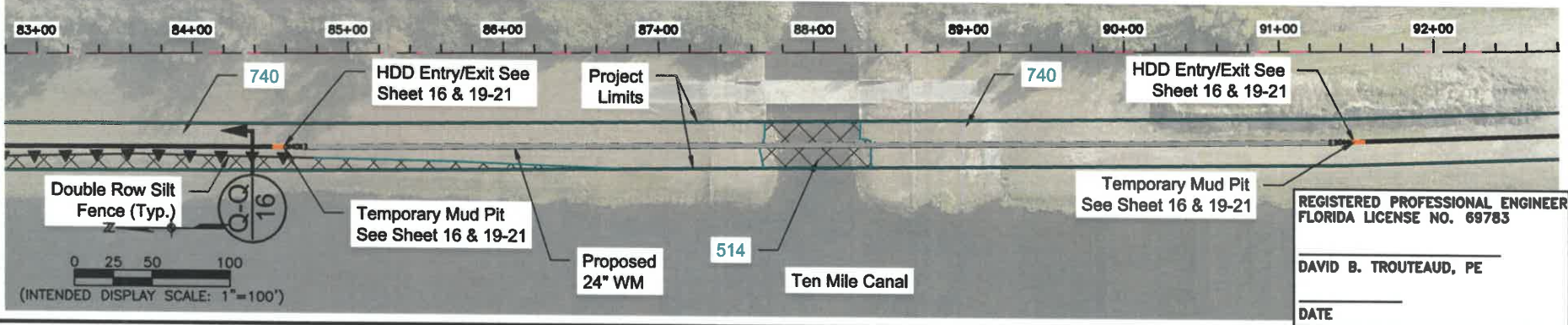
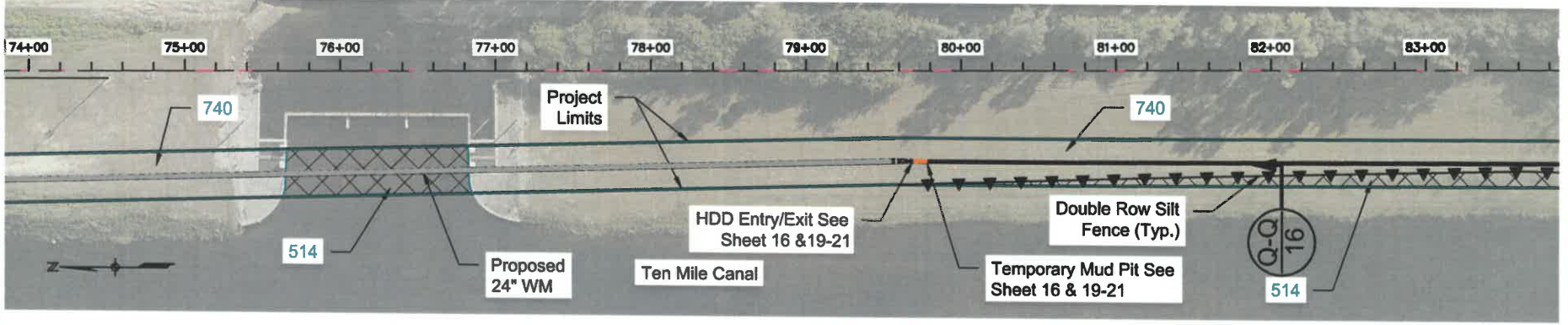
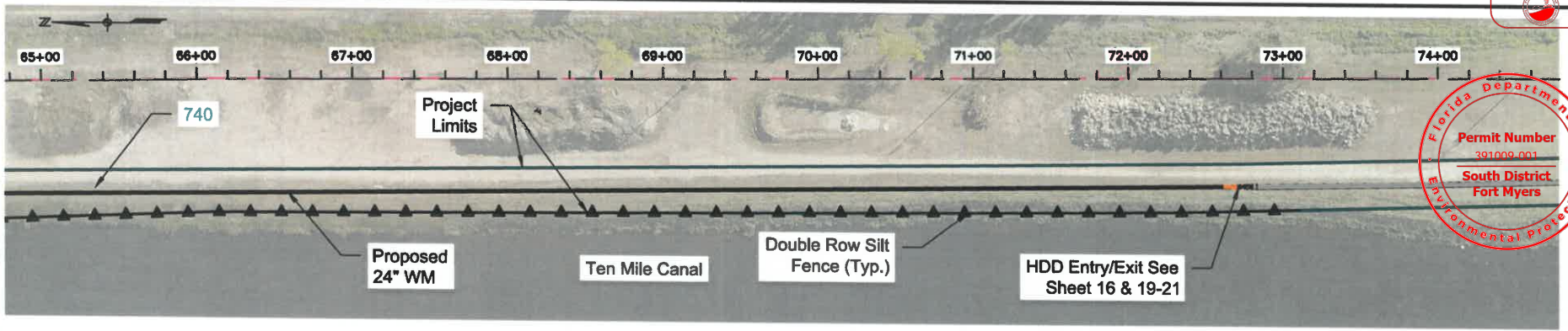
FLUCFCS AND PLAN VIEW 4-6

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July 2020	20192277	25-45-24	1" = 100'	07

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 FLORIDA LICENSE NO. 69783
 DAVID B. TROUTEAUD, PE
 DATE _____

RSW 24" Water Transmission Line
 Lee County, Florida



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FLUCFCS AND PLAN VIEW 7-9				
DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	08

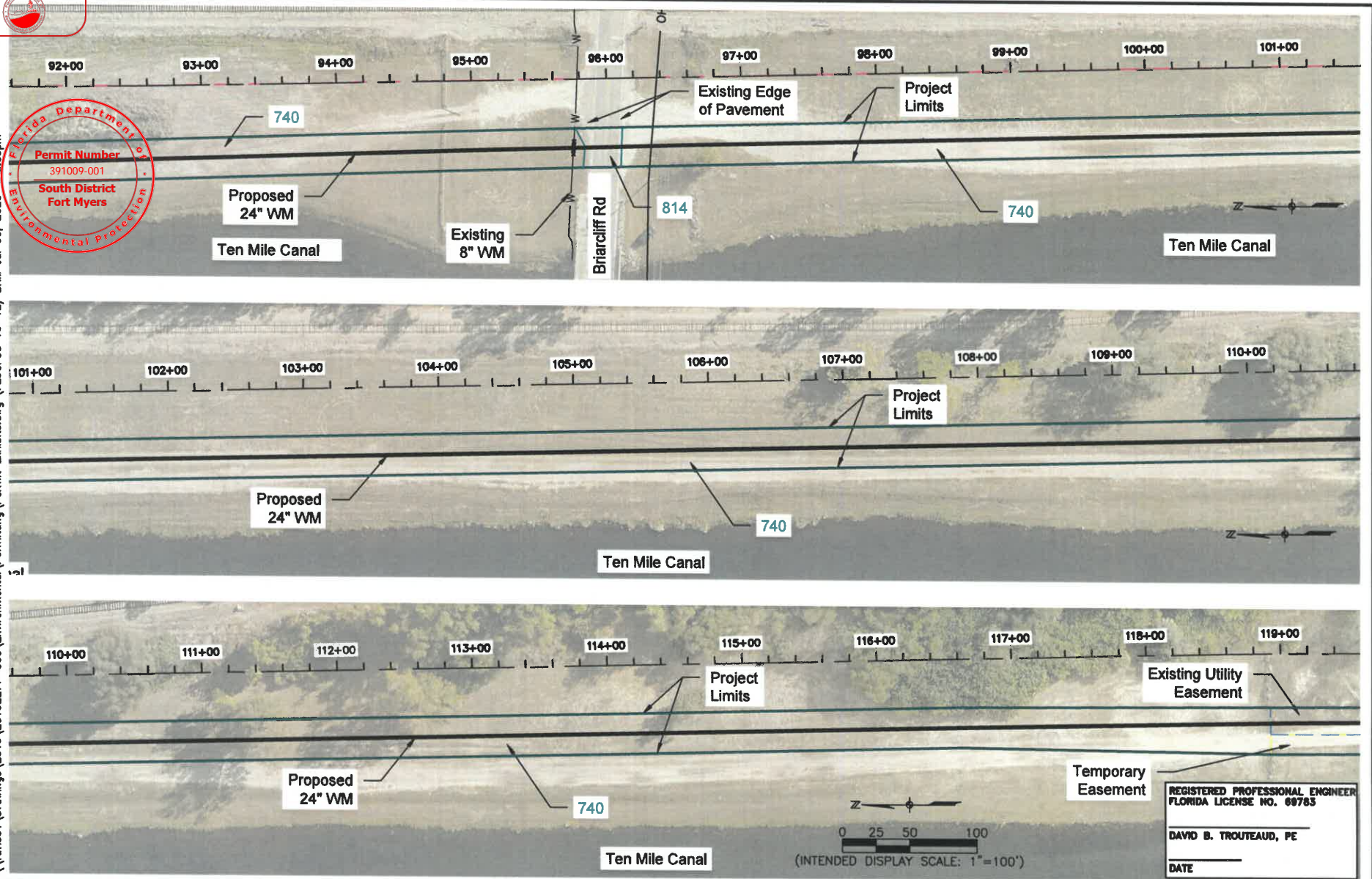
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South District



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Permit Number 391009-001
South District Fort Myers

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RSW 24" Water Transmission Line
Lee County, Florida



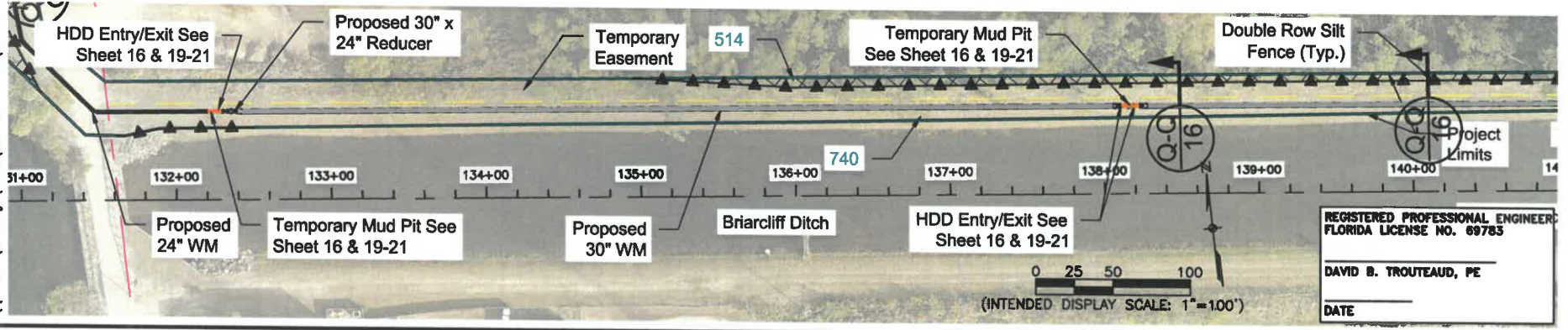
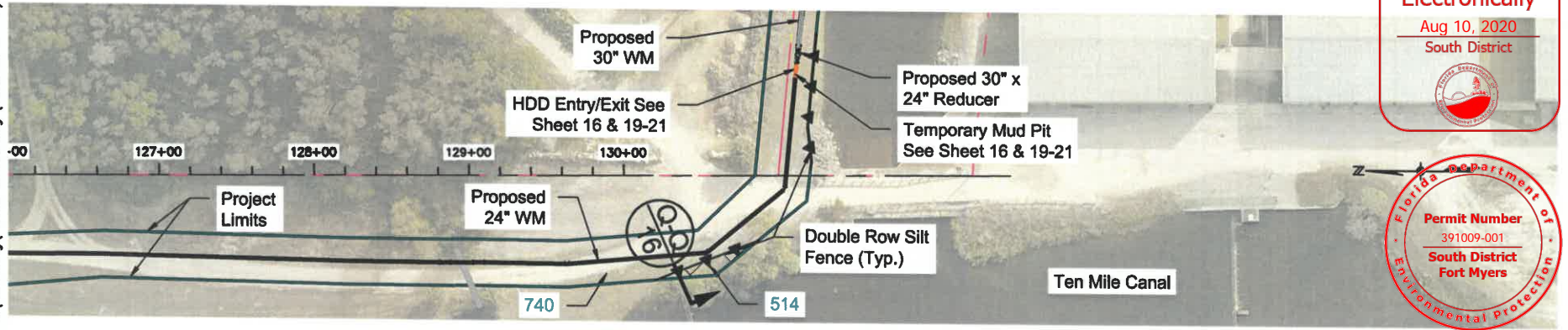
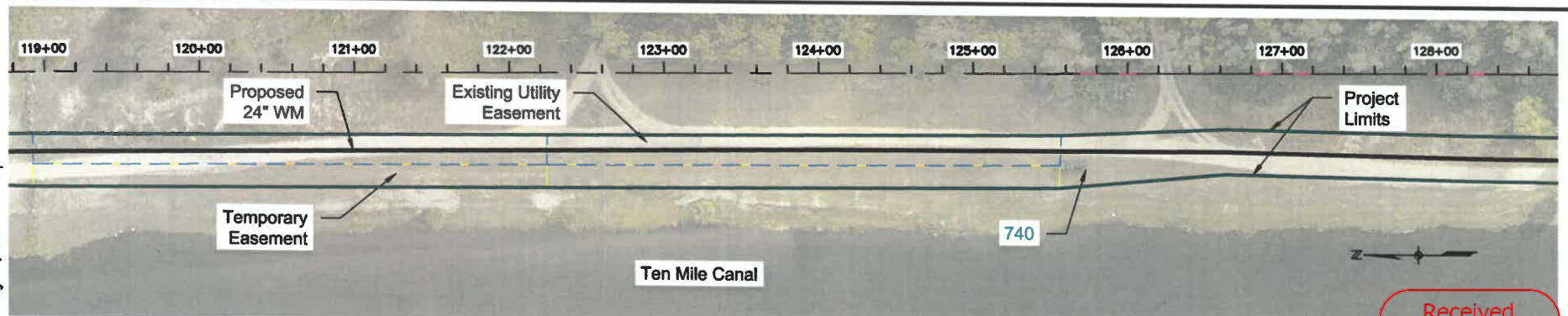
JOHNSON ENGINEERING, INC.
2122 JOHNSON STREET
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FORT MYERS, FLORIDA 33902-1550
PHONE: (239) 334-0046
FAX: (239) 334-3661
E.B. #642 & L.B. #642

FLUCFCS AND PLAN VIEW 10-12

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	09

REGISTERED PROFESSIONAL ENGINEER
FLORIDA LICENSE NO. 69783
DAVID B. TROUTEAUD, PE
DATE

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Fort Myers

REGISTERED PROFESSIONAL ENGINEER
FLORIDA LICENSE NO. 69783
DAVID B. TROUETAUD, PE
DATE

RSW 24" Water Transmission Line
Lee County, Florida

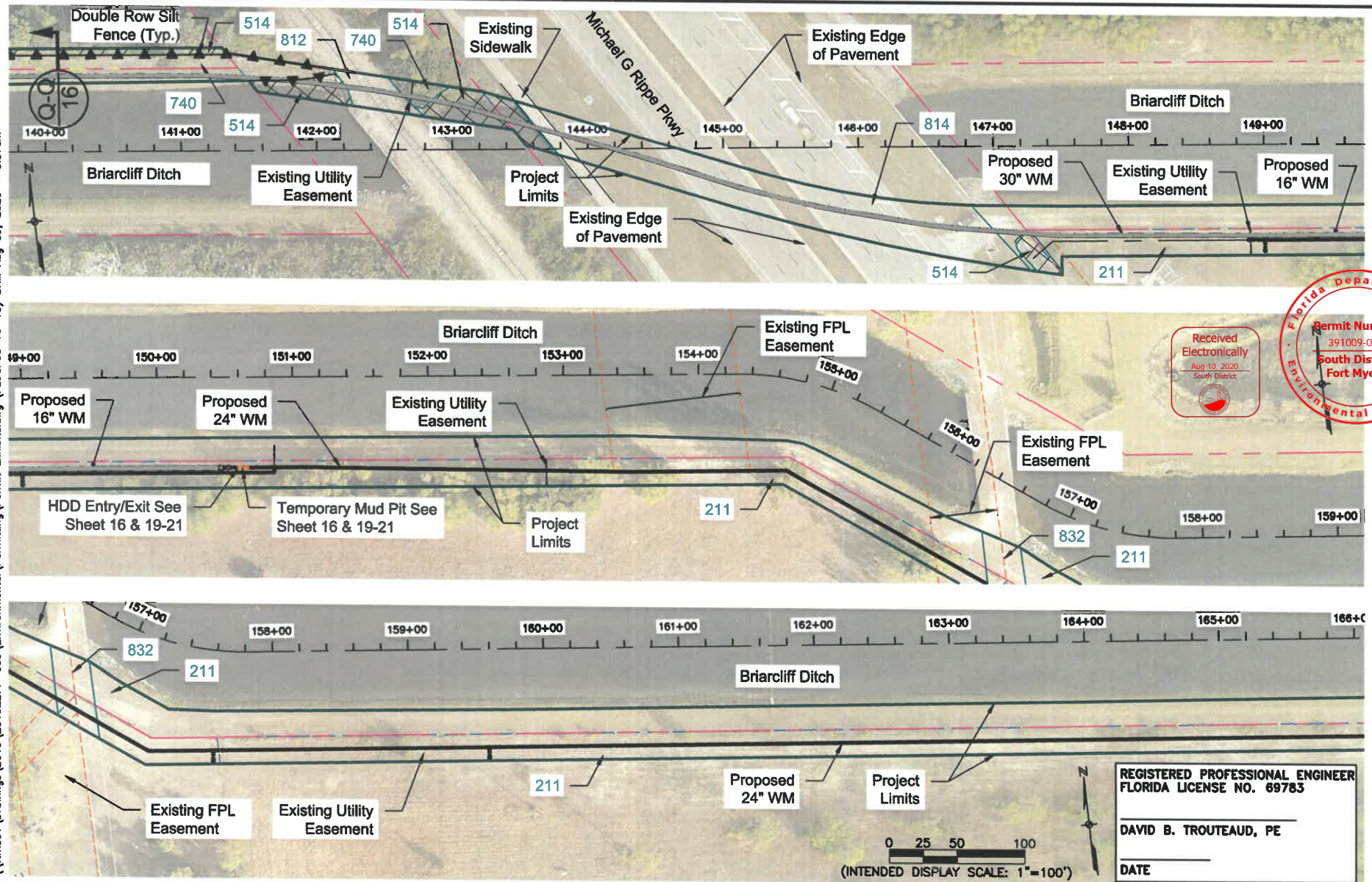


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FLUCFCS AND PLAN VIEW 13-15

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
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Permit Number 391009-001
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RSW 24" Water Transmission Line
Lee County, Florida

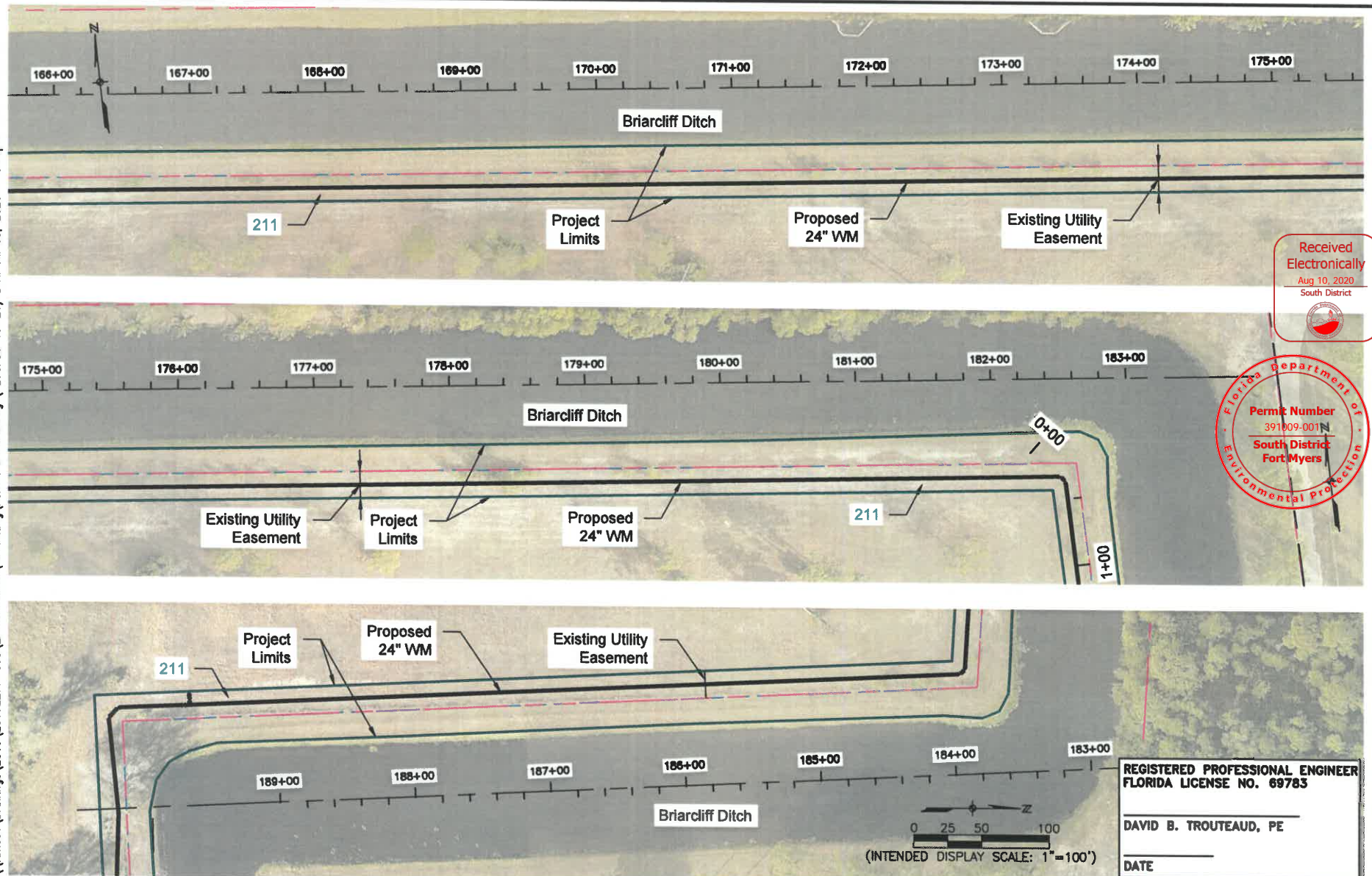


JOHNSON ENGINEERING, INC.
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FLUCFCS AND PLAN VIEW 16-18

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
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Florida Department of
 Environmental Protection
 Permit Number
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 Fort Myers

REGISTERED PROFESSIONAL ENGINEER
 FLORIDA LICENSE NO. 69785
 DAVID B. TROUTEAUD, PE
 DATE _____

RSW 24" Water Transmission Line
 Lee County, Florida

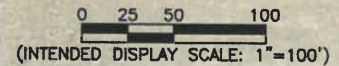
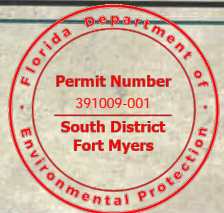
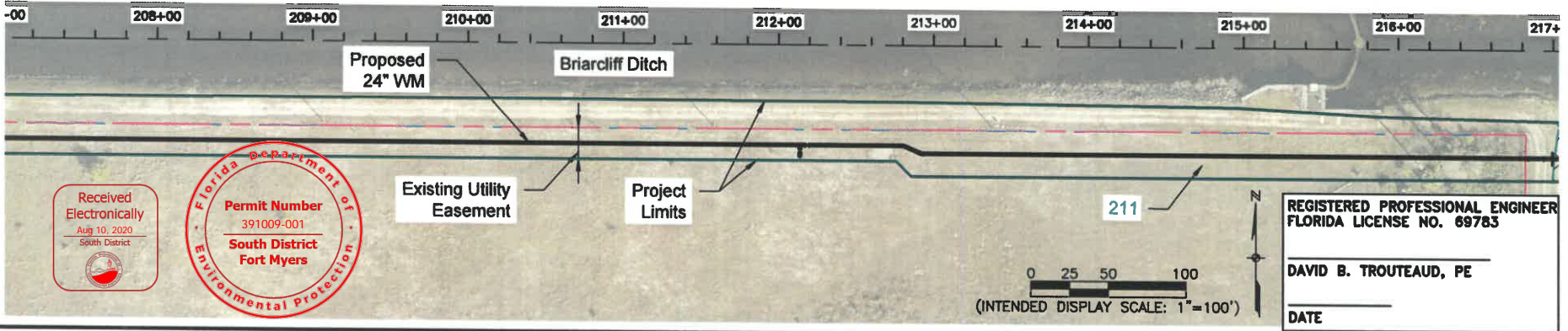
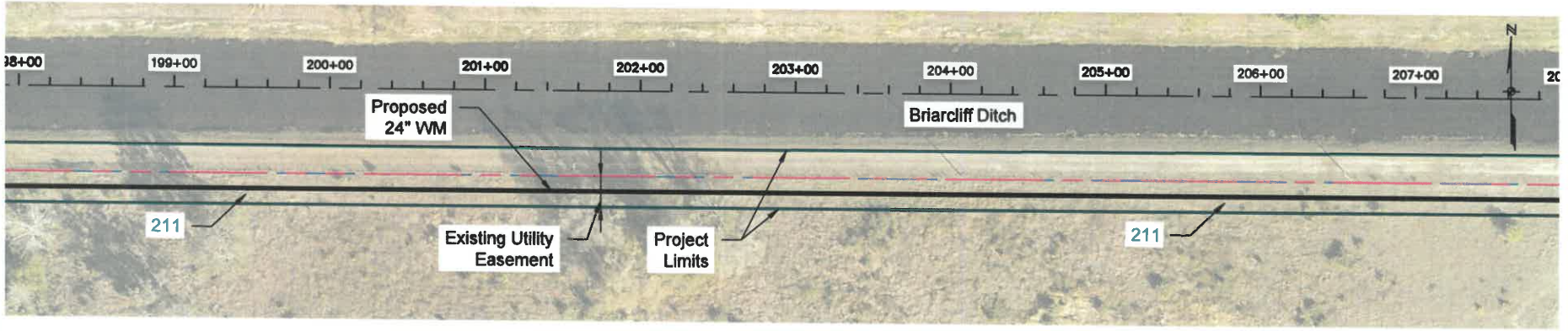
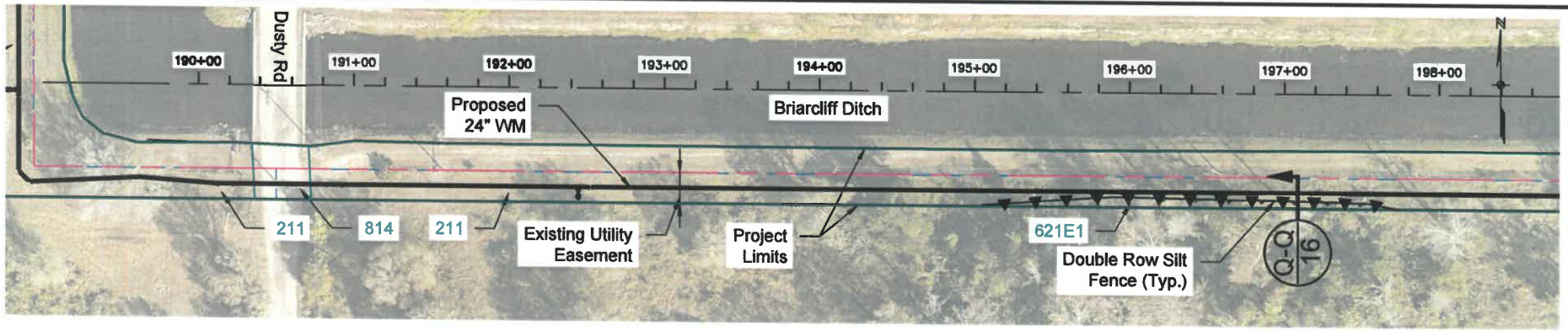


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FLUCFCS AND PLAN VIEW 19-21

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	12

\\fms01\Drawings\2019\20192277-000\Environmental\Permitting\Permit Exhibits.dwg (FLUCFCS 22-24) BKM Jul 30, 2020 - 5:07pm



REGISTERED PROFESSIONAL ENGINEER
FLORIDA LICENSE NO. 69783
DAVID B. TROUETAUD, PE
DATE _____

RSW 24" Water Transmission Line
Lee County, Florida

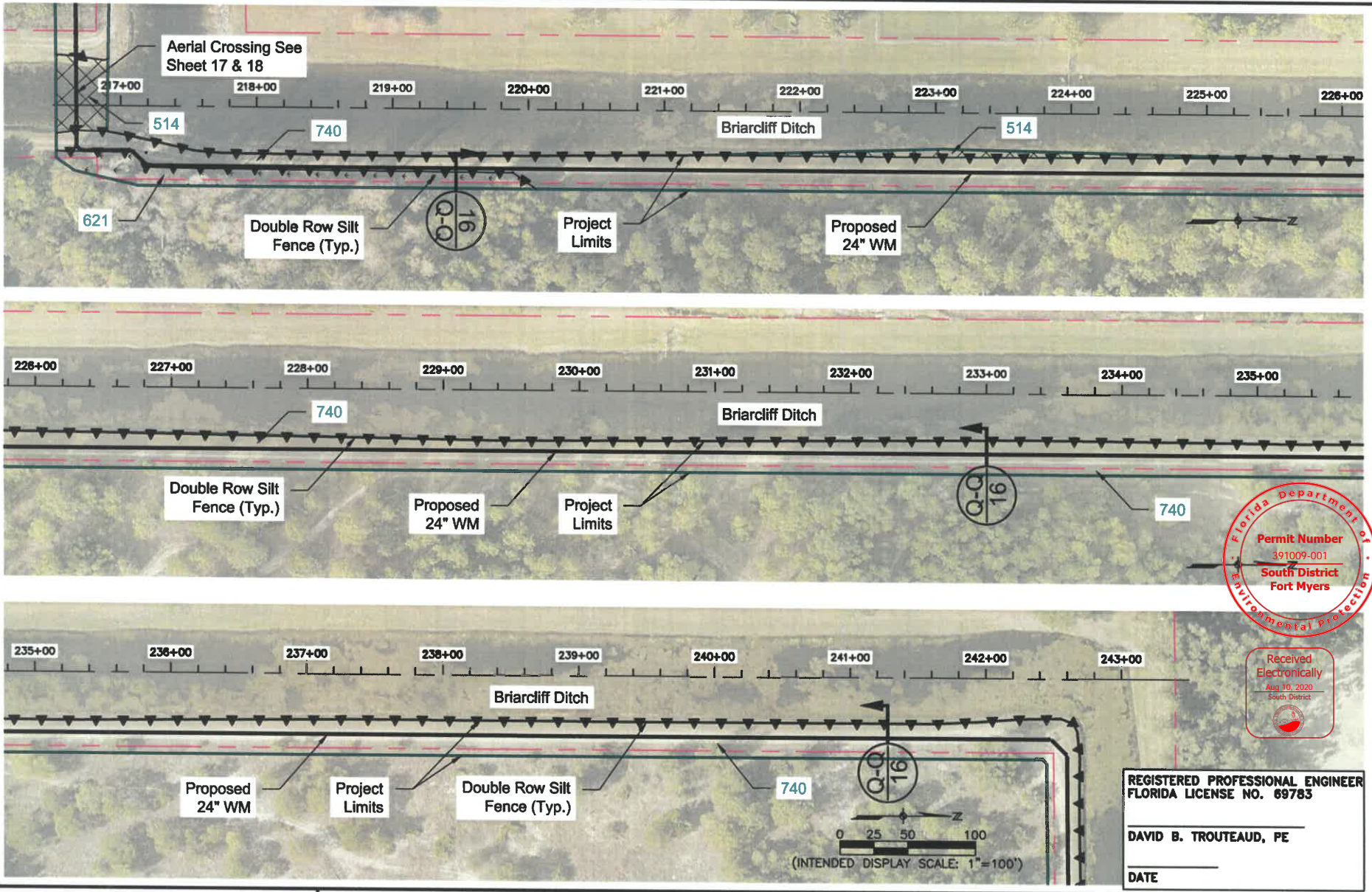


JOHNSON ENGINEERING, INC.
2122 JOHNSON STREET
P.O. BOX 1550
FORT MYERS, FLORIDA 33902-1550
PHONE: (239) 334-0046
FAX: (239) 334-3661
E.B. #642 & L.B. #642

FLUCFCS AND PLAN VIEW 22-24

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	13

\\fms01\Drawings\2019\20192277-000\Environmental\Permitting\Permit Exhibits.dwg (FLUCFCS 25-27) BKM Aug 04, 2020 - 4:25pm



Florida Department of
Permit Number
 391009-001
South District
 Fort Myers
 Environmental Protection

Received
 Electronically
 Aug 10, 2020
 South District

REGISTERED PROFESSIONAL ENGINEER
 FLORIDA LICENSE NO. 69783
 DAVID B. TROUTEAUD, PE
 DATE _____

RSW 24" Water Transmission Line
 Lee County, Florida

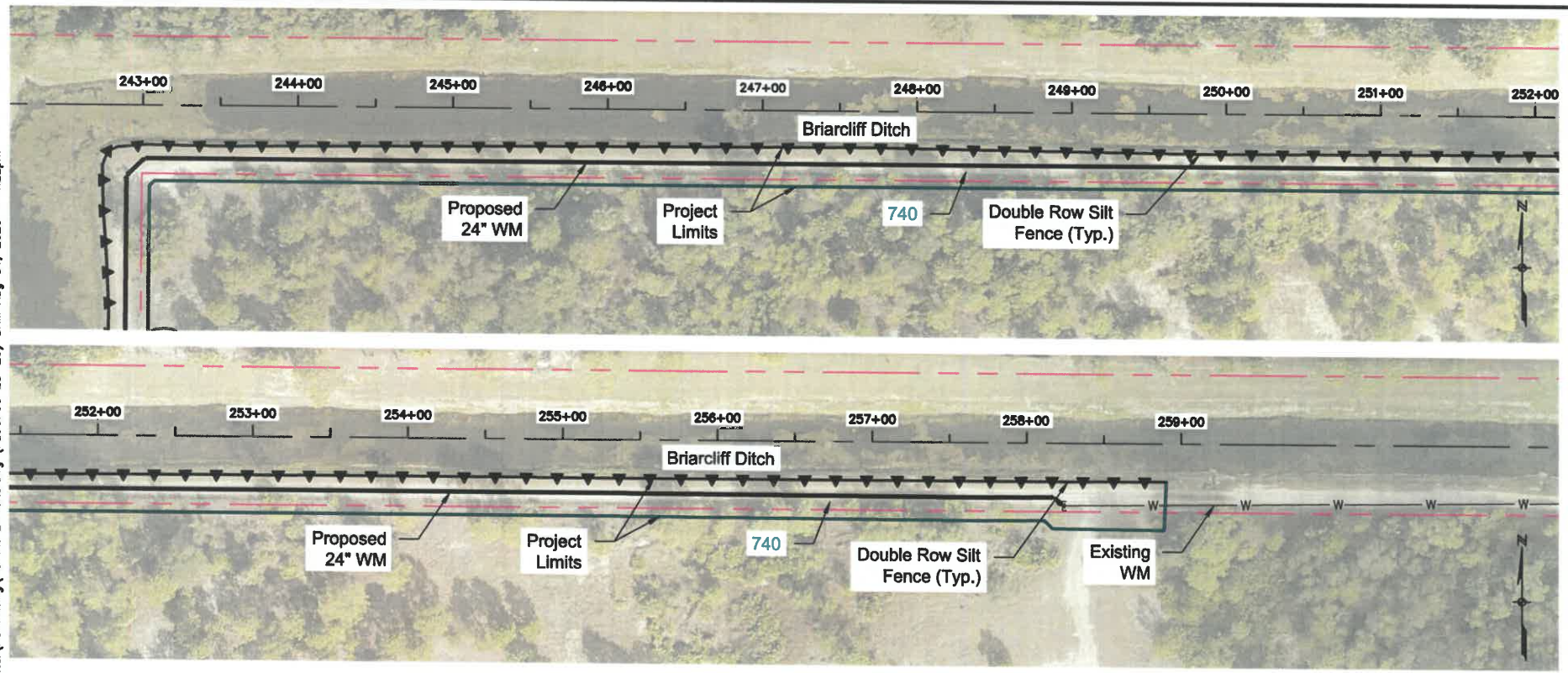


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FLUCFCS AND PLAN VIEW 25-27

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	14

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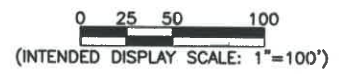


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Aug 10, 2020
South District



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Environmental Protection

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391009-001
South District
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FLORIDA LICENSE NO. 69783

DAVID B. TROUETAUD, PE

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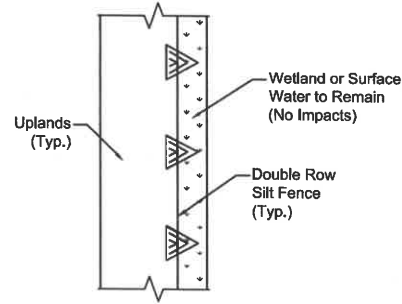
RSW 24" Water Transmission Line
Lee County, Florida

JOHNSON
ENGINEERING

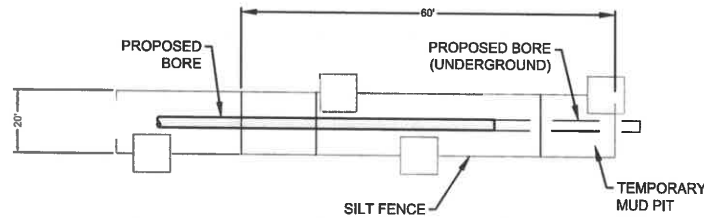
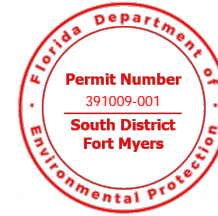
JOHNSON ENGINEERING, INC.
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FLUCFCS AND PLAN VIEW 28-29				
DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	15

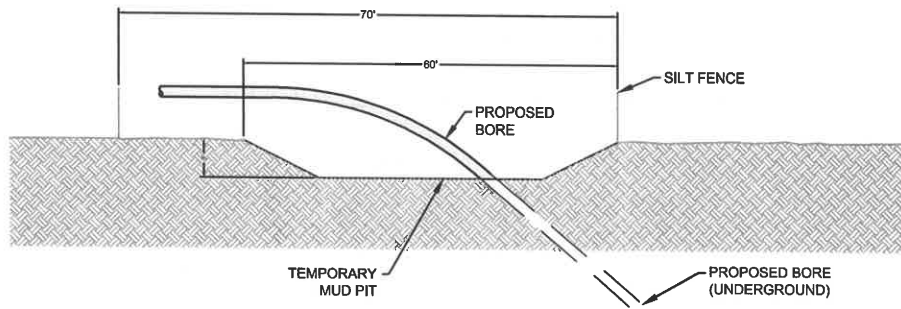
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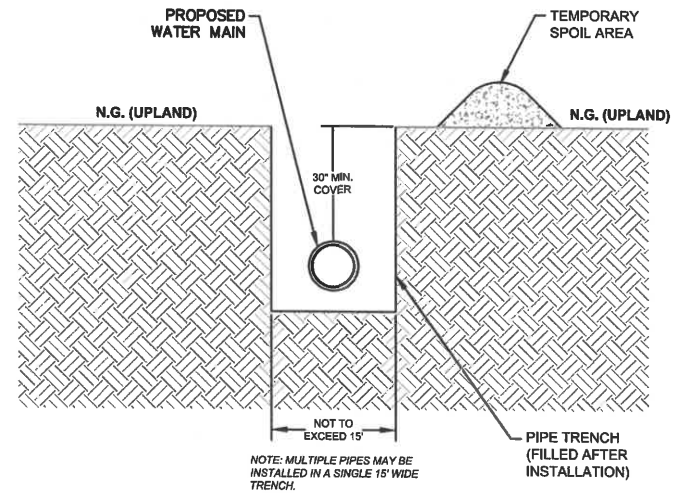
Typical Section Q-Q
N.T.S.



TYPICAL TEMPORARY MUD PIT PLAN VIEW



TYPICAL TEMPORARY MUD PIT PROFILE VIEW



SECTION A-A
TYPICAL TRENCH SECTION

REGISTERED PROFESSIONAL ENGINEER
FLORIDA LICENSE NO. 69783

DAVID B. TROUETAUD, PE

DATE

RSW 24" Water Transmission Line
Lee County, Florida

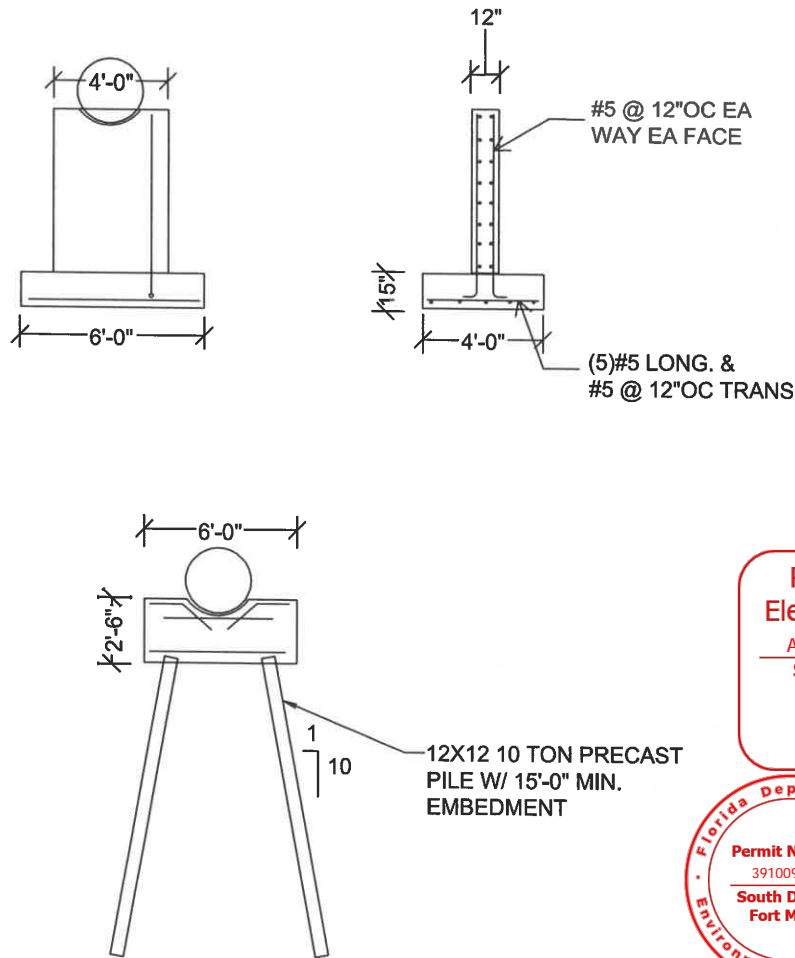


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MUD PIT, TRENCH, & SILT FENCE DETAILS

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	NTS	16

\\fms01\Drawings\2019\20192277-000\Environmental\Permitting\Permit Exhibits.dwg (Pipe Support Detail) BKM Jul 31, 2020 - 12:58pm



PIPE SUPPORT DETAIL (1 OF 2)

NTS

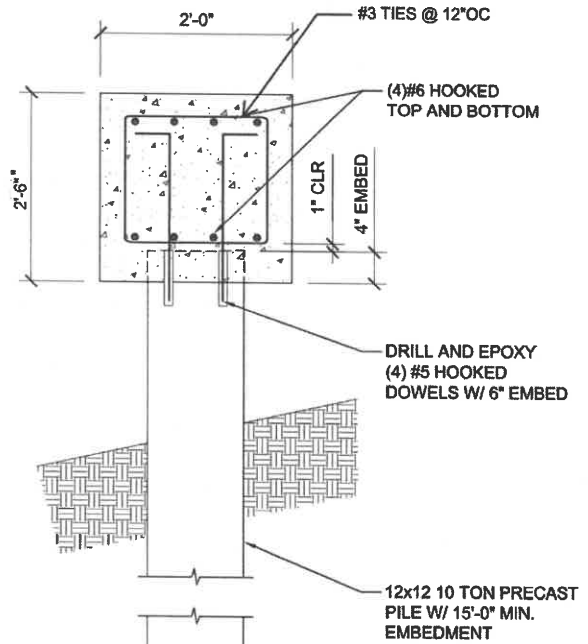
Received Electronically
Aug 10, 2020
South District

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Permit Number 391009-001
South District Fort Myers

THIS DRAWING CONTAINS DETAILS DESIGNED BY, STANDARD TO, AND FURNISHED BY SELECT STRUCTURAL
SND DETAILS WERE NOT DESIGNED BY JOHNSON ENGINEERING.

PIPE SUPPORT DETAIL (2 OF 2)

NTS



RSW 24" Water Transmission Line
Lee County, Florida

JOHNSON
ENGINEERING

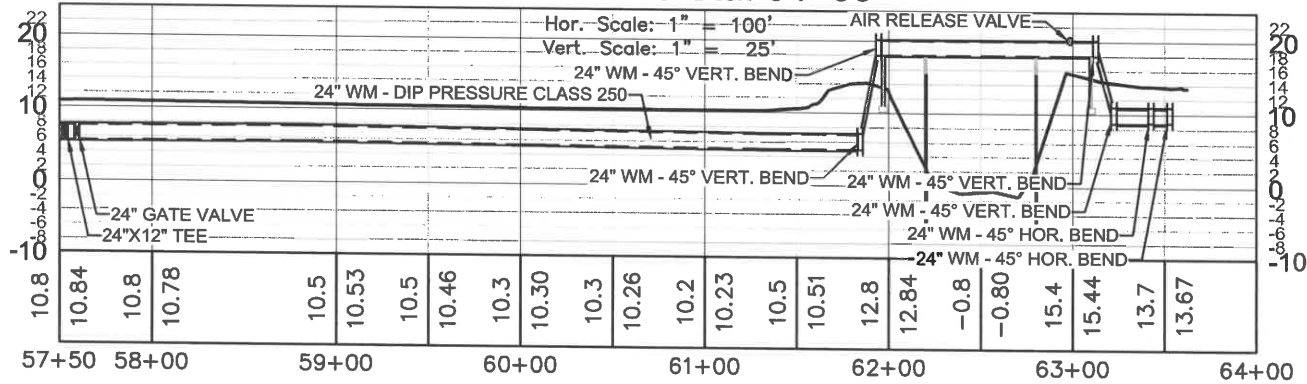
JOHNSON ENGINEERING, INC.
2122 JOHNSON STREET
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FORT MYERS, FLORIDA 33902-1550
PHONE: (239) 334-0046
FAX: (239) 334-3661
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PIPE SUPPORT DETAIL

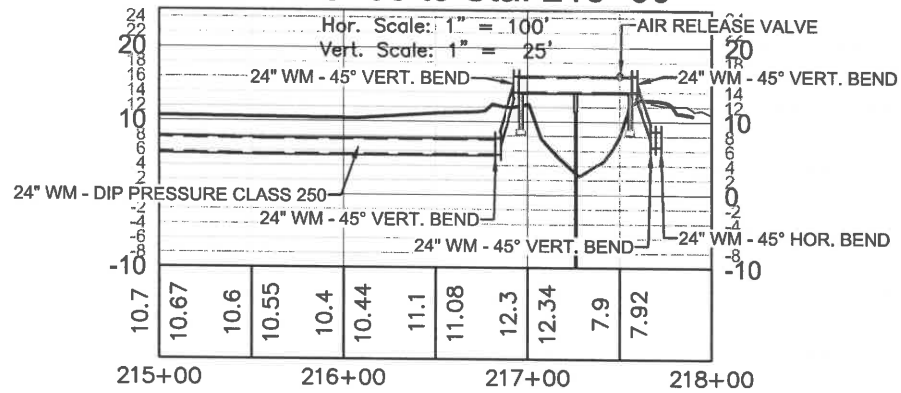
DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	NTS	17

\\fms01\Drawings\2019\20192277-000\Environmental\Permitting\Permit Exhibits.dwg (Aerial Flyover Profiles) BKM Jul 31, 2020 - 2:06pm

Profile View of Alignment C Sta: 57+50 to Sta: 64+00



Profile View of Alignment G Sta: 215+00 to Sta: 218+00



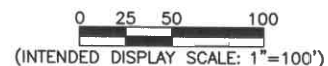
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Permit Number
391009-001
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Fort Myers

REGISTERED PROFESSIONAL ENGINEER
FLORIDA LICENSE NO. 69783

DAVID B. TROUTEAUD, PE

DATE



RSW 24" Water Transmission Line
Lee County, Florida



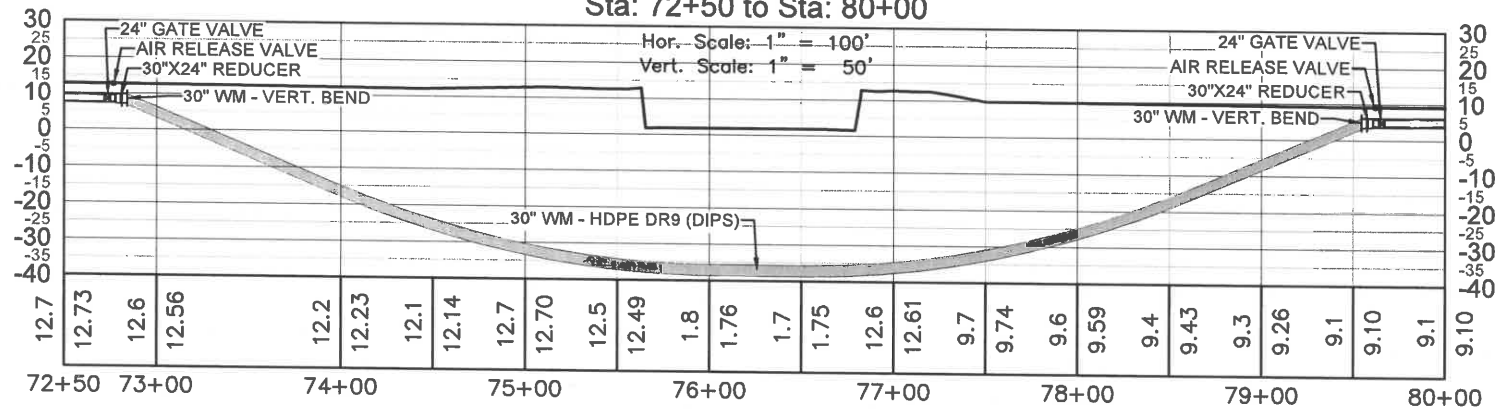
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FAX: (239) 334-3661
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AERIAL CROSSING PROFILES

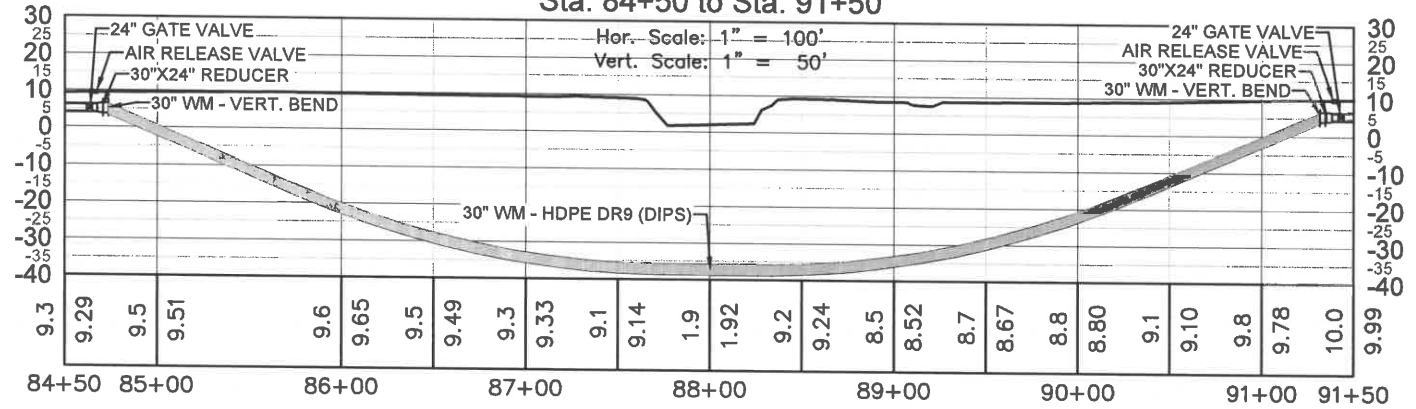
DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	18

\\fms01\Drawings\2019\20192277-000\Environmental\Permitting\Permit Exhibits.dwg (Directional Drill Profiles 1) BKM Jul 30, 2020 - 5:10pm

Profile View of Alignment D
Sta: 72+50 to Sta: 80+00



Profile View of Alignment D
Sta: 84+50 to Sta: 91+50



REGISTERED PROFESSIONAL ENGINEER
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DATE



RSW 24" Water Transmission Line
Lee County, Florida



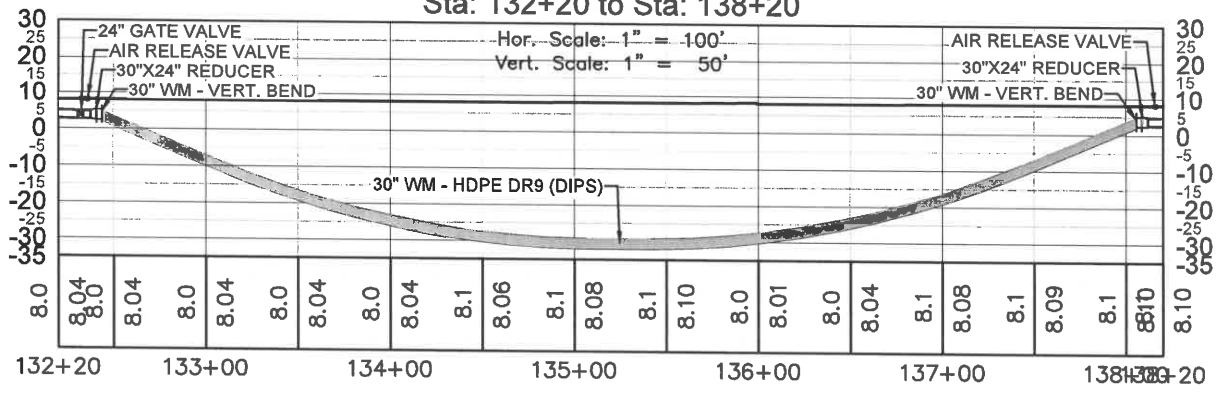
JOHNSON ENGINEERING, INC.
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PHONE: (239) 334-0046
FAX: (239) 334-3661
E.B. #642 & L.B. #642

DIRECTIONAL DRILL PROFILES 1

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	19

\\fms01\Drawings\2019\20192277-000\Environmental\Permitting\Permit Exhibits.dwg (Directional Drill Profiles 2) BKM Jul 30, 2020 - 5:10pm

Profile View of Alignment E Sta: 132+20 to Sta: 138+20



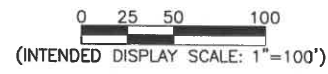
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DAVID B. TROUETAUD, PE
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RSW 24" Water Transmission Line
Lee County, Florida



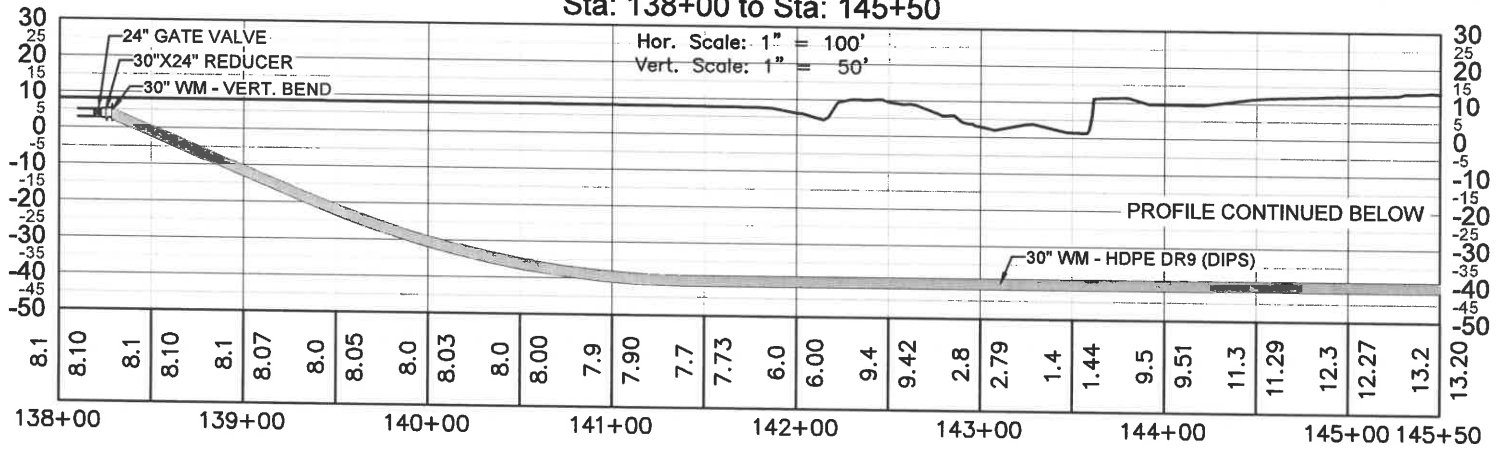
JOHNSON ENGINEERING, INC.
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FORT MYERS, FLORIDA 33902-1550
PHONE: (239) 334-0046
FAX: (239) 334-3661
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DIRECTIONAL DRILL PROFILES 2

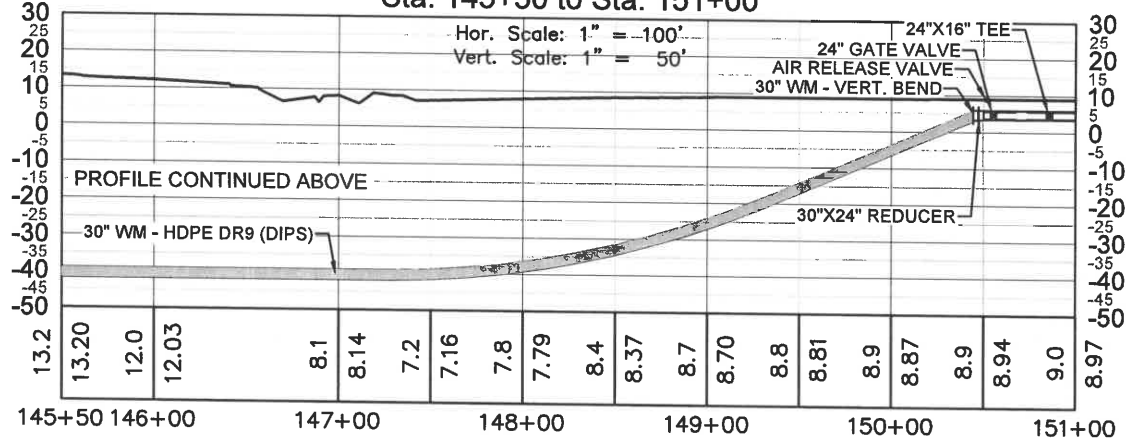
DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	20

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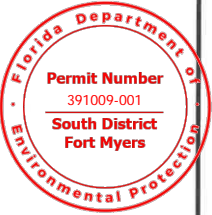
**Profile View of Alignment E
Sta: 138+00 to Sta: 145+50**



**Profile View of Alignment E
Sta: 145+50 to Sta: 151+00**



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Electronically
Aug 10, 2020
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REGISTERED PROFESSIONAL ENGINEER
FLORIDA LICENSE NO. 69783

DAVID B. TROUTEAUD, PE

DATE



RSW 24" Water Transmission Line
Lee County, Florida



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E.B. #642 & L.B. #642

DIRECTIONAL DRILL PROFILES 3

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 2020	20192277	25-45-24	1" = 100'	21

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 for stormwater management systems under 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) The 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; and it does not authorize any violation of any other applicable federal, state, local, or special district laws (including, but not limited to, those governing the “take” of listed species).

(3) The 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) The general permit is not transferable to a new third party. To be used by a different permittee, a new notice to use a general permit must be submitted in accordance with rule 62-330.402, F.A.C. Activities constructed in accordance with the terms and conditions of a general permit are automatically authorized to be operated and maintained by the permittee and subsequent owners in accordance with subsection 62-330.340(1), F.A.C. Any person holding the general permit, persons working under the general permit, and owners of land while work is conducted under 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 general permit.

(9) The permittee shall maintain any permitted project or activity in accordance with the plans submitted to the Agency and authorized in the general permit.

(10) A permittee’s right to conduct a specific activity under the 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 <https://www.flrules.org/Gateway/reference.asp?No=Ref-04227>, 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 http://publicfiles.dep.state.fl.us/DEAR/Stormwater_Training_Docs/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 four 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 as soon as practicable after equipment has completed passage through, or work has been completed, at any location along the alignment of the project, but in no case longer than seven days after equipment has completed work or passage through that location; 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 the 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; or
- (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.
- (16) If prehistoric or historic artifacts, such as pottery or ceramics, projectile points, stone tools, dugout canoes, metal implements, historic building materials, or any other physical remains that could be associated with Native American, early European, or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the vicinity of the discovery. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance Review Section (DHR), at (850)245-6333, as well as the appropriate permitting agency office. Project activities 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 the proper authorities notified 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 shut down 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 onsite 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, 6-1-18.

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 30 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.

(i) Utilities must be located a minimum of 14 feet below the authorized depth of a federal navigation channel.

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, 6-1-18.

62-330.455 General Permit for the Construction of Aerial Pipeline, Cable, and Conduit Crossings of Certain Waters.

(1) A general permit is granted to construct an aerial or piling-supported pipeline, cable, or conduit crossing of a waterbody having a width of no greater than 25 feet, provided:

(a) The crossing is not located in, on, or over Class I waters, Class II waters, or waters approved, conditionally approved, restricted, or conditionally restricted by the Department of Agriculture and Consumer Services for shellfish harvesting if the pipeline or conduit conveys petroleum, domestic wastewater, phosphate matrix slurry, phosphatic clay or sand tailings, recirculated water from beneficiation processes, or other substances which, if leaked, could contaminate drinking water supplies or result in closure of shellfish harvesting waters;

(b) No pipeline, cable, or conduit shall be lower than existing crossings of the waterbody;

(c) Work to install the aerial crossing shall be restricted to a width of no more than thirty feet on each side of the crossing alignment. In cases where multiple pipes, cables or conduits are to be installed along the same alignment the thirty-foot width shall commence from the outermost pipes, cables or conduits. For the purposes of this general permit, no more than three pipes shall be placed along a given alignment, and in no case shall the total disturbance area exceed 75 feet in width; and,

(d) The Agency shall be notified within 24 hours of any leak or failure of any of the pipes associated with the aerial crossing.

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 62-341.455, Amended 10-1-13.

UTILITY PERMIT

PERMIT NO: 2020-H-192-00159

STATE ROAD INFORMATION

County: Lee	Section: 12120110	State Road No: 739	Beginning Mile Post: 1.419	Ending Mile Post: 1.441
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APPLICANT INFORMATION

The Utility Agency Owner (UAO) shall be identified in this Applicant Information Box. When the UAO is a City or County and desires to have the Utility Builder make a joint permit applicant, as prescribed in Section 2.1(4) of the 2017 Utility Accommodation Manual (UAM), the Utility Builder shall also be identified in this Applicant Information Box. A Utility Builder alone cannot apply for a utility permit without the City or County adding them as a joint applicant.

Utility Agency/Owner (UAO)		Utility Builder (only applicable when the UAO is a City or County)	
Name:	<u>Lee County Utilities</u>	Name:	_____
Contact Person:	<u>Lee County Utilities</u>	Contact Person:	_____
Address:	<u>1500 Monroe Street, 3rd Floor</u>	Address:	_____
City:	<u>Fort Myers</u>	City:	_____
State:	<u>Florida</u>	State:	_____
Zip:	<u>33901</u>	Zip:	_____
Telephone:	<u>2395338181</u>	Telephone:	_____
Email:	<u>NBeals@leegov.com</u>	Email:	_____

WORK DESCRIPTION

The Applicant(s) requests permission from the Florida Department of Transportation (FDOT) to construct, operate, and maintain the utilities as described below and as depicted in the incorporated documentation.

Installation of 24" water transmission main within existing easements and ROW's to provide a secondary way to send water to south and west Lee County.

Utility Work No: _____

Additional sheets are attached and are incorporated into this permit Yes No

For FDEP certification, the FDOT agency report is attached in accordance with UAM Section 2.4.1 (13) Yes No

TRAFFIC CONTROL (TCP)

The TCP will comply with the following 600 series index(es) 600, 611

A TCP has been attached and incorporated into this permit application in compliance with UAM Section 2.4.2.

MOT Technician's contact information (may be supplied at the two (2) business day notification to FDOT):

Name: TBD Telephone: _____ Email: _____

COMMENCEMENT OF WORK

The UAO and/or Utility Builder shall commence actual construction in good faith within sixty (60) calendar days after approval of the permit application. If the beginning date is more than sixty (60) calendar days from the date of approval, the UAO and/or Utility Builder must review the permit with the FDOT Approving Engineer listed to make sure no changes have occurred to the transportation facility that would affect the permit's continued approval. The UAO and/or Utility Builder shall make good faith efforts to expedite the work and complete the work within the calendar days indicated.

Anticipated Start Date: 5/1/2021

Calendar days needed to completed: 365

Approved
2020-H-192-00159
Brian Deboy
8/5/2020

Florida Department of Transportation
UTILITY PERMIT

PERMIT NO: 2020-H-192-00159

APPLICANT SIGNATURE

By the below signature(s) the UAO and/or Utility Builder agree(s) to construct, operate, and maintain the work as noted in the above Work Description, shown in plans and incorporated documents, in compliance with the UAM, all instructions noted in the FDOT Special Instructions Box, and special instructions incorporated into this permit. The UAO and/or Utility Builder declares, the location of all existing utilities that it owns or has an interest in, both aerial and underground, are accurately shown on the plans of the work areas. In accordance with UAM Section 2.8, the UAO and/or Utility Builder further declares that a letter of notification was delivered to the owners of other facilities within the work areas and that those listed below are the only facility owners known to be involved or potentially impacted by the proposed work.

Date Notified:	Name of other facility owners (attach additional sheets if necessary).
<u>7/10/2020</u>	<u>FP&L</u>
<u>7/10/2020</u>	<u>Summit Broadband</u>
<u>7/10/2020</u>	<u>AT&T</u>
<u>7/13/2020</u>	<u>Crown Castle</u>
<u>7/15/2020</u>	<u>Comcast</u>

Utility Agency/Owner

Utility Builder (when applicable)

Signature: NATHAN BEALS (digital signature) Date: 7/15/2020
 Name (printed): NATHAN BEALS
 Title: _____

Signature: _____ Date: _____
 Name (printed): _____
 Title: _____

FDOT PROJECT INFORMATION

Pursuant to UAM Section 2.1(10), the utility work is within FDOT projects listed below and must have a Utility Work Schedule for each project approved prior to commencement of work within the FDOT project limits:

**There are NO FDOT constructions (proposed or underway).
This work is NOT related to an approved Utility Work Schedule.**

FDOT SPECIAL INSTRUCTIONS

In accordance with UAM Section 2.7, FDOT incorporates the below and attached special instructions into this permit.

1. This project falls within the limits of the Lee County Advanced Traffic Management System (ATMS). The Lee County ATMS is owned by the FDOT while the County operates and maintains the system as part of the Traffic Signal Maintenance and Compensation Agreement. The ATMS infrastructure within this project's limits includes underground fiber-optic communication infrastructure along SR 739. Please contact Tom Marquardt with Lee County Traffic at (239) 533-... (see special instructions cont. page)

Additional FDOT Special Instructions are attached and incorporated into this permit. Yes No

PERMIT APPROVAL

By signature below, FDOT gives permission to the UAO and/or Utility Builder to construct, operate, and maintain the utilities indicated in this Utility Permit in compliance with the UAM, all incorporated documents, and special instructions. Any changes to the approved work must be approved by the FDOT's Approving Engineer and attached and incorporated into this permit in accordance with UAM Section 2.11.

Approving Engineer: Brian Deboy (digital signature) Date: 8/5/2020
 Name: Brian Deboy
 Title: MAINTENANCE MANAGER/PERMITS

Notification of Utility Work to be provided to: Telephone (239) 985-7856 ext. _____ or Email: carlos.bessa@dot.state.fl.us

An FDOT Representative is required to be present on the worksite prior to commencement of work. Yes No

Rep. Name: Carlos Bessa Telephone 2399857856 Email: carlos.bessa@dot.state.fl.us

Approved
2020-H-192-00159
Brian Deboy
8/5/2020

Florida Department of Transportation
UTILITY PERMIT

PERMIT NO: 2020-H-192-00159

CERTIFICATION

I, the undersigned UAO and/or Utility Builder, hereby CERTIFY that the utilities were constructed and inspected in compliance with the UAM all incorporated documents, and special instructions. Pursuant to UAM Section 2.11, all changes have been approved by the FDOT's Approving Engineer and incorporated into this permit along with all other material certifications, test results, bore logs, approved plans changes, as-built plans or other required documentation.

I also CERTIFY that work began on _____ and was completed on _____ and that the area was left in as good or better condition than when the work began.

Utility Agency/Owner

Utility Builder (when applicable)

Signature: _____ Date _____

Signature: _____ Date _____

Name (printed): _____

Name (printed): _____

Title: _____

Title: _____

FINAL INSPECTION OF WORK

The work was inspected and found to be in non-compliance as noted below:

All issues of non-compliance listed above have been brought into compliance and/or FDOT has no outstanding issues that need to be addressed by the UAO and/or Utility Builder. However, this final inspection does not release the UAO and/or Utility Builder of their continuing responsibilities pursuant to Rule 14-46.001, the UAM, all incorporated documents, and special instructions.

FDOT Inspector: _____ Date: _____

Name: _____

Title: _____

Approved
2020-H-192-00159
Brian Deboy
8/5/2020

PERMIT NO.: 2020-H-192-00159

STATE ROAD INFORMATION:

NAME OF OTHER FACILITY OWNERS / DATE NOTIFIED:
Facility Name: TECO Peoples Gas, Date Notified: 7/15/2020

FDOT PROJECT INFORMATION:
There are NO FDOT constructions (proposed or underway).
This work is NOT related to an approved Utility Work Schedule.

THE WORK WAS INSPECTED AND FOUND TO BE IN NON-COMPLIANCE AS NOTED BELOW:

Approved
2020-H-192-00159
Brian Deboy
8/5/2020

The complete special instructions could not fit in the space allotted on Page 2 of the Utility Permit so they are displayed below.

Special FDOT Instructions

1. This project falls within the limits of the Lee County Advanced Traffic Management System (ATMS). The Lee County ATMS is owned by the FDOT while the County operates and maintains the system as part of the Traffic Signal Maintenance and Compensation Agreement. The ATMS infrastructure within this project's limits includes underground fiber-optic communication infrastructure along SR 739. Please contact Tom Marquardt with Lee County Traffic at (239) 533-8530 or tmarquardt@leegov.com to confirm the location of the existing ATMS infrastructure. Any impacts to the ATMS infrastructure shall be addressed within this design project.
2. Based on the permit plans, it appears this project will be installing underground infrastructure near the existing ATMS infrastructure. It is the responsibility of this project's contractor to avoid conflicts with the existing underground ATMS infrastructure by, at minimum, locating the facilities prior to installing the new underground infrastructure. Any impacts to the existing ATMS infrastructure that were not identified in this review are the responsibility of the permittee to resolve within this project.
3. No lane Closures Between 6:00 am – 7:00 pm
4. A copy of the permit and a set of plans shall be on the job site at all times.
5. Submit a bore log within 30 calendar days of completing work.
6. The Permittee must schedule an FDOT inspector to be on-site at least 2 business days in advance before starting a directional bore.
7. The Permittee will remove all locate flags when underground operations are complete.
8. All lane closures must comply with the FDOT District 1 lane closure policy.
9. All disturbed areas shall be restored to the same or better condition as prior to construction.
10. Any changes to this approved permit must be approved in advance by the FDOT utility office.

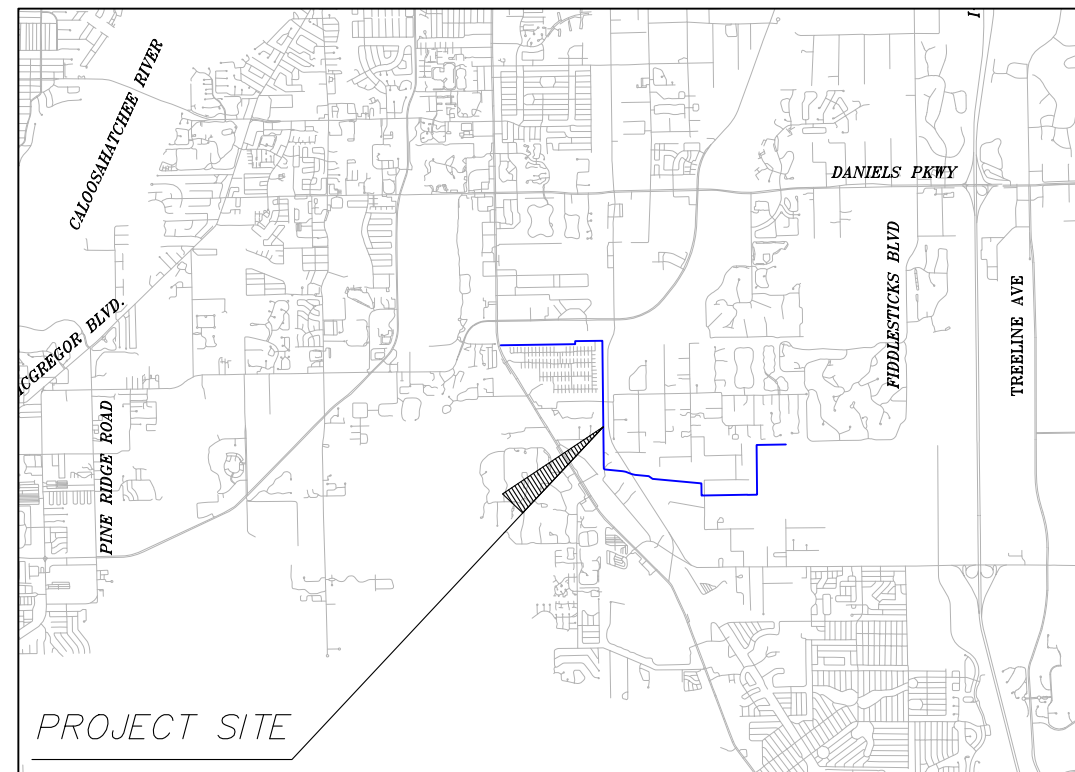
Approved
2020-H-192-00159
Brian Deboy
8/5/2020



RSW 24" WATER TRANSMISSION LINE BEN HILL - TREELINE

FOR
LEE COUNTY UTILITIES
LOCATED IN
SECTIONS 25 & 35, TOWNSHIP 45 SOUTH, RANGE 24 EAST
LEE COUNTY, FLORIDA
JULY 27, 2020

Sheet List Table	
Sheet Number	Sheet Title
01	Cover
02	Notes & Legends
03	Key Map
04	Sta 141+50 to 147+00
05	Directional Drill Profiles

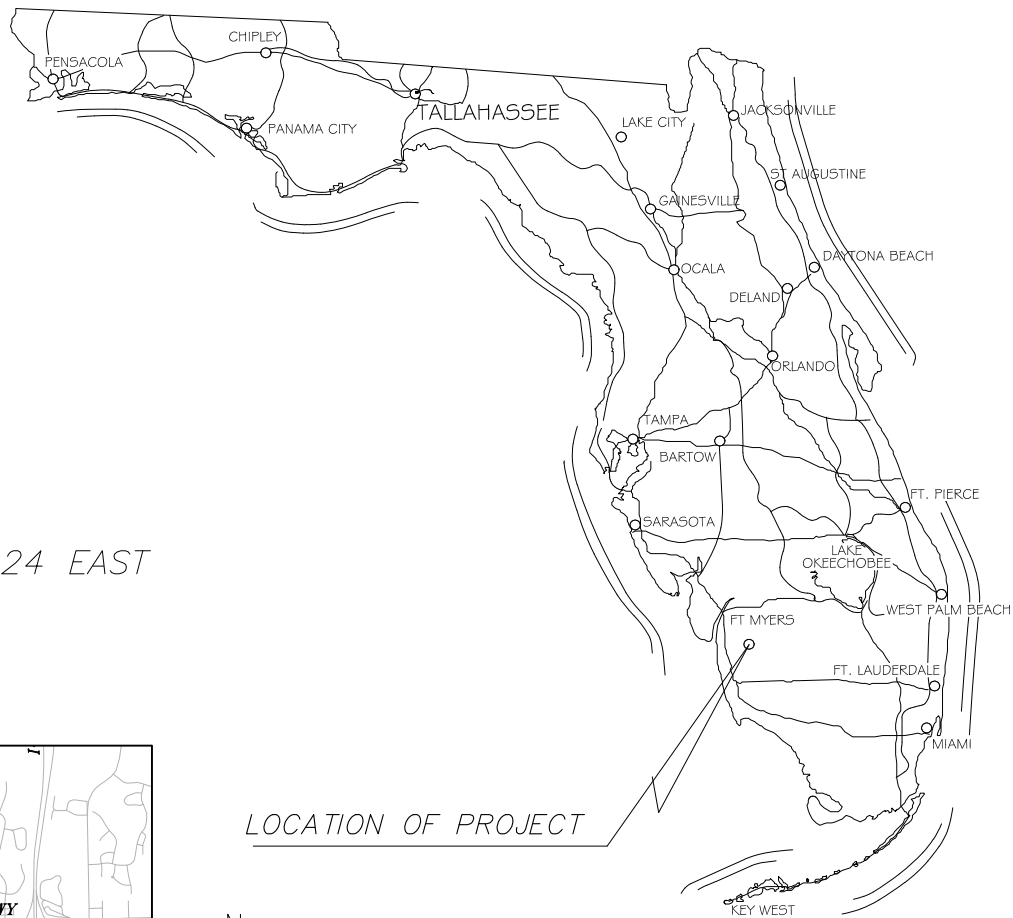


LOCATION MAP
N.T.S.

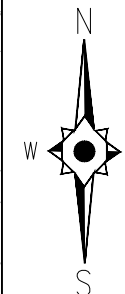
LEE COUNTY BOARD OF COUNTY COMMISSIONERS:
DISTRICT 1: JOHN E. MANNING
DISTRICT 2: CECIL L. PENDERGRASS
DISTRICT 3: RAY SANDELLI
DISTRICT 4: BRIAN HAMMAN
DISTRICT 5: FRANK MANN

For Information Regarding
This Project, Contact:
DAVID BRICE TROUTEAUD, PE

DAVID BRICE TROUTEAUD, PE
FL License No. 69783



LOCATION OF PROJECT



THIS IS TO CERTIFY THAT THESE PLANS AND ASSOCIATED CONSTRUCTION PROJECTS ARE IN SUBSTANTIAL COMPLIANCE WITH THE LEE COUNTY LAND DEVELOPMENT CODE:

DATE: David Brice Trouteaud, P.E. 69783
DESIGN ENGINEER FL LIC #

DEVELOPMENT ORDER APPROVED:
PUBLIC WORKS ADMINISTRATION

DATE: PAM KEYES, P.E.
DIRECTOR OF PUBLIC WORKS

Permit Plans

DESIGN CONSULTANT



2122 JOHNSON STREET
P.O. BOX 1550
FORT MYERS, FLORIDA 33902-1550
PHONE (239) 334-0046
FAX (239) 334-3661
E.B. #642 & L.B. #642

JOHNSON
ENGINEERING

2122 JOHNSON STREET
P.O. BOX 1550
FORT MYERS, FLORIDA 33902-1550
PHONE (239) 334-0046
FAX (239) 334-3661
E.B. #642 & L.B. #642



RSW 24" WATER TRANSMISSION LINE
BEN HILL - TREELINE
Lee County, Florida

NO.	REVISIONS DESCRIPTION	DATE

DATE: JULY 27, 2020
PROJECT NO. 20192277-000
FILE NO. 25-45-24
SCALE: AS SHOWN

Permit Plans
Cover

Approved
8/5/2020
SHEET NUMBER
01

LEE COUNTY UTILITIES STANDARD PLAN NOTES

- ALL WORK SHALL CONFORM TO LATEST REVISION OF THE LCU DESIGN MANUAL WHICH IS AVAILABLE ON OUR WEB-PAGE VIA THE FOLLOWING LINK:
[HTTPS://WWW.LEE.GOV/UTILITIES/DESIGN-MANUAL](https://www.lee.gov/utilities/design-manual)
- ALL REGULATORY AND PERMITTING AGENCIES' REQUIREMENTS SHALL BE COMPLIED WITH AS WELL.
- ANY QUANTITIES SHOWN ON PLANS ARE NOT VERIFIED BY LCU.
- THE INFORMATION PROVIDED IN THESE PLANS IS SOLELY TO ASSIST THE CONTRACTOR IN ASSESSING THE NATURE AND EXTENT OF CONDITIONS THAT MAY BE ENCOUNTERED DURING THE COURSE OF WORK. ALL CONTRACTORS ARE DIRECTED, PRIOR TO BIDDING, TO CONDUCT WHATEVER INVESTIGATIONS THEY MAY DEEM NECESSARY TO ARRIVE AT THEIR OWN CONCLUSION REGARDING THE ACTUAL CONDITIONS THAT WILL BE ENCOUNTERED, AND UPON WHICH THEIR BIDS WILL BE BASED.
- ALL CONSTRUCTION WORK PERFORMED MUST BE DONE BY A CONTRACTOR LICENSED IN THE STATE OF FLORIDA TO DO THE WORK INTENDED
- A PRE-CONSTRUCTION MEETING IS REQUIRED BEFORE WORK MAY BEGIN. REQUIRED ATTENDEES INCLUDE BUT ARE NOT LIMITED TO; THE ENGINEER OF RECORD OR HIS DESIGNEE, THE UNDERGROUND CONTRACTOR, THE LCU PROJECT MANAGER, AND THE LCU INSPECTOR ASSIGNED TO THE PROJECT. LCU IS TO BE NOTIFIED TWO (2) WORKING DAYS PRIOR TO THE PRE-CONSTRUCTION MEETING.
- ONE COPY OF THE LCU APPROVED/STAMPED CONSTRUCTION PLANS, ALL CONTRACT DOCUMENTS, REFERENCE DOCUMENTS AND TECHNICAL DOCUMENTS SUBMITTED MUST BE KEPT AT THE SITE AND MAINTAINED IN GOOD ORDER.
- ALL WORK AND MATERIALS, WHICH DO NOT CONFORM TO LCU SPECIFICATIONS, ARE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
- ANY WORK PERFORMED WITHOUT THE KNOWLEDGE OF LCU IS SUBJECT TO RE-EXCAVATION, REMOVAL AND REPLACEMENT OF SAME TO BE DONE AT THE CONTRACTOR'S EXPENSE.
- LCU INSPECTION STAFF IS TO BE PRESENT FOR ALL HOT TAPS, PRESSURE TESTS, LIFT STATION START-UPS AND FOR ANY NECESSARY INSPECTION. THE CONTRACTOR IS TO PROVIDE A MINIMUM OF TWO (2) WORKING DAYS NOTICE PRIOR TO SCHEDULING ANY OF THE ABOVE WITH THE EXCEPTION OF THE LIFT STATION START-UP WHICH REQUIRES ONE-WEEK NOTICE.
- TRAFFIC MUST BE MAINTAINED AT ALL TIMES AS PER LEE COUNTY DEPARTMENT OF TRANSPORTATION (LCDOT) AND PER FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.
- THE CONTRACTOR IS TO UNCOVER ALL EXISTING LINES BEING TIED INTO AND VERIFY GRADES BEFORE BEGINNING CONSTRUCTION.
- LOCATIONS, ELEVATIONS, AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS, BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. LCU WILL NOT GUARANTEE ANY LOCATIONS AS SHOWN ON THESE PLANS OR THOSE OMITTED FROM THESE PLANS.
- THE CONTRACTOR SHALL VERIFY ALL UTILITIES AND PROVIDE AT LEAST TWO (2) WORKING DAYS NOTICE TO THE INDIVIDUAL UTILITY COMPANIES, FDOT AND LCDOT PRIOR TO CONSTRUCTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND TAKE ALL POSSIBLE PRECAUTIONS TO AVOID ANY DAMAGE TO ALL UNDERGROUND PIPELINES, TELEPHONE, CABLE TV, ELECTRIC LINES/CONDUITS AND STRUCTURES IN ADVANCE OF ANY CONSTRUCTION. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT MAY OCCUR DUE TO HIS FAILURE TO EXACTLY LOCATE AND PROTECT EXISTING UTILITIES AND STRUCTURES.
- ANYTHING NOT SHOWN ON THESE DRAWINGS SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND SHALL NOT CONSTITUTE AN EXTRA, UNLESS APPROVED BY THE ENGINEER OF RECORD.
- THE CONTRACTOR SHALL CONTACT THE ENGINEER AND LCU IMMEDIATELY CONCERNING ANY CONFLICTS WITH LCU UTILITIES/STRUCTURES ARISING DURING CONSTRUCTION OF ANY FACILITIES SHOWN ON THESE DRAWINGS.
- THE CONTRACTOR SHALL VERIFY ALL QUANTITIES SHOWN ON THE PLANS. IF ANY DISCREPANCIES IN QUANTITIES ARE FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD AND LCU.
- THE CONTRACTOR SHALL REPLACE ALL PAVEMENT, CURBS, DRIVEWAYS, SIDEWALKS, FENCES, ETC., WITH THE SAME TYPE OF MATERIAL THAT WAS REMOVED DURING CONSTRUCTION OR AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL RESTORE ALL AREAS AFFECTED BY THE CONSTRUCTION TO ITS ORIGINAL CONDITION, OR BETTER.
- WITHIN THE FDOT AND LCDOT RIGHT-OF-WAY, ALL DISTURBED AREAS SHALL RECEIVE GRASSING (SEEDING) OR SODDING MATERIALS IN ACCORDANCE WITH FDOT SPECIFICATIONS. THOSE AREAS THAT ARE CLASSIFIED AS DRAINAGE DITCHES SHALL RECEIVE FULL SOLID SOD.
- ALL FRAMES, COVERS VALVE BOXES, METER BOXES AND MANHOLES SHALL BE ADJUSTED TO FINISHED GRADE UPON COMPLETION OF PAVING OR RELATED CONSTRUCTION. ALL VALVE PADS SHALL BE POURED IN PLACE. NO PRE-FORMED VALVE PADS WILL BE ALLOWED.
- APPROPRIATE TURBIDITY CONTROL DEVICES (E.G. SILT FENCES, HAY BALES) WILL BE UTILIZED DURING ALL PHASES OF INSTALLATION AND GRADING. CONTRACTOR IS RESPONSIBLE FOR SUBMITTING THE NOTICE OF INTENT AND NOTICE OF TERMINATION TO THE EPA IN COMPLIANCE WITH LEE COUNTY'S NPDES PERMIT.
- CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND MAINTAINING AN EFFECTIVE STORM WATER POLLUTION PREVENTION PLAN.
- LCU REQUIRES 30" OF COVER FOR ALL UNDERGROUND PIPING EXCEPT UNDER PAVEMENT, WHERE 36" OF COVER IS REQUIRED. IF LCU REQUIRED COVER CANNOT BE MAINTAINED, THE CONTRACTOR SHALL PROVIDE OTHER METHODS OF CONSTRUCTION OR PIPE PROTECTION, WHICH SHALL FIRST BE APPROVED BY LCU AND THE ENGINEER, AT NO ADDITIONAL COST TO THE COUNTY. IF STATE AGENCIES REQUIRE ADDITIONAL COVER, MEETING THE REQUIREMENTS SHALL BE DONE AT NO ADDITIONAL COST TO THE COUNTY.
- LCU REQUIRES THERE TO BE A MINIMUM OF TEN (10) FEET HORIZONTAL AND 18" VERTICAL SEPARATION BETWEEN POTABLE WATER & SANITARY SEWER MAINS. LCU ALSO REQUIRES MINIMUM OF TEN (10) FEET HORIZONTAL SEPARATION BETWEEN OTHER PUBLIC AND/OR PRIVATE UTILITIES, STRUCTURE(S), BUILDING(S), WALL(S), FOUNTAIN(S), FENCE(S) AND LCU INFRASTRUCTURE UNLESS SPECIFICALLY APPROVED BY LCU.
- LCU REQUIRES THERE TO BE A MINIMUM OF FIVE (5) FEET HORIZONTAL SEPARATION BETWEEN LCU INFRASTRUCTURE AND DRAINAGE INFRASTRUCTURE, MITERED END SECTIONS, INLETS, ETC. LCU ALSO REQUIRES MINIMUM OF FIVE (5) FEET HORIZONTAL SEPARATION BETWEEN LCU INFRASTRUCTURE AND ALL NEW LIGHT POLE FOUNDATIONS.
- THE ROOT BALL OF PALM TREES SHALL BE A MINIMUM OF FIVE (5) FEET AND THE ROOT BALL OF SHADE TREES SHALL BE A MINIMUM OF TEN (10) FEET FROM ANY EXISTING OR PROPOSED LCU OWNED AND MAINTAINED PIPE/INFRASTRUCTURE.
- AS THE WORK PROGRESSES THE CONTRACTOR SHALL RECORD ALL CHANGES AND DEVIATIONS FROM THE LCU STAMPED/APPROVED CONSTRUCTION PLANS. IN ADDITION, HE SHALL RECORD THE EXACT LOCATION OF ALL CHANGES IN VERTICAL AND HORIZONTAL ALIGNMENT WITH COORDINATES WITH RESPECT TO THE NAVD 1988 STATE PLANE FLORIDA WEST COORDINATE SYSTEM AS WELL AS ALL REQUIREMENTS SET FORTH IN THE LCU DESIGN MANUAL. THIS INFORMATION IS TO BE FORWARDED TO THE ENGINEER OF RECORD WHO PREPARED, SIGNED AND SEALED THE APPROVED CONSTRUCTION PLANS SO THAT HE CAN PREPARE 'RECORD DRAWINGS' PER THE REQUIREMENTS SET FORTH IN THE LCU DESIGN MANUAL.

DATUM NOTES:

- ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- HORIZONTAL DATA IS BASED ON STATE PLANE COORDINATES FOR THE WEST ZONE OF FLORIDA.

FIELD SURVEY NOTE

- TOPOGRAPHIC FIELD DATA WAS COLLECTED JANUARY 15th TO FEBRUARY 12th, 2020.
- TOPOGRAPHIC FIELD DATA AND S.U.E. DATA WAS COLLECTED OCTOBER 27th, 2008 TO APRIL 13th, 2009.

NOTICE TO ALL CONTRACTORS

IT'S THE LAW IN FLORIDA
2 BUSINESS DAYS BEFORE YOU DIG
CALL SUNSHINE 1-800-432-4770
STATE, COUNTIES & CITIES ARE "NOT" PART OF THE ONE CALL SYSTEM. THEY MUST BE CALLED INDIVIDUALLY.

STATE OF FLORIDA DOT
ALL INTERSTATE RIGHT-OF-WAY
HIGHMAST LIGHTING
7-DAY NOTICE REQUIRED
239-656-7811
239-656-7742 FAX



JOHNSON ENGINEERING

2122 JOHNSON STREET
P.O. BOX 1550
FORT MYERS, FLORIDA 33902-1550
PHONE (239) 334-0046
FAX (239) 334-3661
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DAVID BRICE TROUTEAUX, PE
FL License No. 69783



RSW 24" WATER TRANSMISSION LINE
BEN HILL - TREETLINE
Lee County, Florida

ABBREVIATIONS

- ABD = ABANDONED
- AE = ACCESS EASEMENT
- ALT = ALTERNATE
- ARV = AIR RELEASE VALVE
- ASPH = ASPHALT
- BLDG = BUILDING
- CATV = CABLE TELEVISION
- CB = CATCH BASIN
- CMP = CORRUGATED METAL PIPE
- CO = CLEANOUT
- DE = DRAINAGE EASEMENT
- DIP = DUCTILE IRON PIPE
- EOP = EDGE OF PAVEMENT
- ERCP = ELLIPTICAL REINFORCED CONCRETE PIPE
- EX = EXISTING
- FE = FLARED END SECTION
- FH = FIRE HYDRANT
- FLG = FLANGED
- FM = FORCE MAIN
- FO = FIBER OPTIC
- GV = GATE VALVE
- HDPE = HIGH DENSITY POLY ETHYLENE
- ICV = IRRIGATION CONTROL VALVE
- INV = INVERT
- IRR = IRRIGATION
- MH = MANHOLE
- ME = MITERED END SECTION
- MJ = MECHANICAL JOINT
- NIC = NOT INCLUDED
- OC = ON CENTER
- PAVT = PAVEMENT
- PKWY = PARKWAY
- PS = PUMP STATION
- PV = PLUG VALVE
- PVC = POLYVINYL CHLORIDE
- RCP = REINFORCED CONCRETE PIPE
- RD = ROAD
- REQ = REQUIRED
- R/W = RIGHT-OF-WAY
- RU = REUSE MAIN
- SAN = SANITARY
- SD = STORM DRAIN
- SPEC = SPECIFICATION
- SS = SANITARY SEWER
- ST = STREET
- STA = STATION
- STD = STANDARD
- STM = STORM SEWER
- TEL = TELEPHONE
- TYP = TYPICAL
- UE = UTILITY EASEMENT
- WM = WATER MAIN
- VLV = CONC. VALVE VAULT

LEGEND

- EX XX" FM = EXISTING FORCE MAIN & PIPE SIZE
- XX" FM = PROPOSED FORCE MAIN & PIPE SIZE
- EX XX" WM = EXISTING POTABLE WATER MAIN & SIZE
- XX" WM = PROPOSED WATER MAIN & PIPE SIZE
- XX" SS = PROPOSED SANITARY SEWER MAIN & SIZE
- EX XX" SS = EXISTING SANITARY SEWER MAIN & SIZE
- XX" RCWM = PROPOSED RECLAIMED WATER MAIN & SIZE
- EX XX" RCWM = EXISTING RECLAIMED WATER MAIN & SIZE
- [Symbol] = PROPOSED PLUG VALVE
- [Symbol] = EX PLUG VALVE
- [Symbol] = EXISTING FIRE HYDRANT
- [Symbol] = PROPOSED AUTOMATIC AIR RELEASE VALVE
- [Symbol] = PROPOSED REDUCER
- [Symbol] = EXISTING SANITARY MANHOLE
- [Symbol] = EXISTING PUMP STATION
- [Symbol] = PROPOSED PLUG
- [Symbol] = SOIL BORING
- [Symbol] = CATCH BASIN
- [Symbol] = WOOD POWER POLE
- [Symbol] = CONCRETE POWER POLE
- [Symbol] = EXISTING WATER METER
- [Symbol] = EXISTING CLEANOUT
- [Symbol] = UNDERGROUND ELECTRIC
- [Symbol] = UNDERGROUND GAS MAIN
- [Symbol] = OVERHEAD POWER LINES
- [Symbol] = STREET SIGN
- [Symbol] = ELECTRIC SERVICE BOX
- [Symbol] = GUY ANCHOR
- [Symbol] = SEWER VALVE
- [Symbol] = WOOD POWER POLE
- [Symbol] = PROPOSED CONSTRUCTION SIGN
- [Symbol] = PROPOSED SIDEWALK
- [Symbol] = EXISTING SAN. SEWER AND WATER MAIN OUTSIDE OF PAVEMENT TO BE GROUDED AND ABANDONED
- [Symbol] = EXISTING SAN. SEWER AND WATER MAIN UNDER PAVEMENT TO BE REMOVED
- [Symbol] = PROPOSED JACK AND BORE
- [Symbol] = TEMPORARY BLOW-OFF
- [Symbol] = FLOW ARROW
- [Symbol] = PROPOSED UTILITY ROLLODOWN
- [Symbol] = EXISTING MH TO BE REHABBED

NO.	REVISIONS DESCRIPTION	DATE

DATE: JULY 27, 2020
PROJECT NO. 20192277-000
FILE NO. 25-45-24
SCALE: AS SHOWN

Permit Plans
Notes & Legends
Approved
2020-H-192-00159
Brian Deboy
8/5/2020
SHEET NUMBER 02

NO.	DESCRIPTION	DATE

DATE:	JULY 27, 2020
PROJECT NO.:	20192277-000
FILE NO.:	25-45-24
SCALE:	AS SHOWN

Permit Plans
Key Map

Approved
2020-07-15
192-00159

SHEET NUMBER

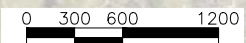
03

SUPPLEMENTAL NOTES:

- PHASING** - THE CONTRACTOR SHALL CONSTRUCT THE PROJECT IN PHASES AS SHOWN. THE PROJECT SHALL START ON THE WEST SIDE (NEAR US-41) AND WORK TOWARDS THE EAST. A PHASE IS CONSIDERED COMPLETED ONCE A PARTIAL CLEARANCE THROUGH FLORIDA DEPARTMENT OF HEALTH IS ACCEPTED AND A PRELIMINARY WALK THROUGH PERFORMED BY LCU AND ENGINEER. A 30 DAY OVERLAP OF PHASES IS THE MAXIMUM AMOUNT OF TIME ALLOWED.
- FENCING** - THE RELOCATION OF EACH FENCE WILL REQUIRE COORDINATION WITH THE LAND OWNERS. A SECURE FENCE IS REQUIRED AT ALL TIMES, UNLESS SPECIFICALLY NOTED. THE TEMPORARY AND PERMANENT LOCATIONS OF THE FENCE ARE SHOWN ON THE PLANS.
- ACCESS** - ACCESS TO THE PROJECT FOR EACH PHASE IS SHOWN ON THE PLANS. AWARDED CONTRACTOR WILL COORDINATE ACCESS TO LOCKED GATES WITH LEE COUNTY DOT.
- TREE REMOVAL** - CONTRACTOR SHALL AVOID TREES ALONG THE ROUTE WITHIN REASON. LCU, ENGINEER AND CONTRACTOR TO REVIEW EACH PHASE WITH THE AWARDED CONTRACTOR TO MINIMIZE TREE REMOVAL.
- PRESSURE TESTING** - MAXIMUM DISTANCE OF PRESSURE TESTING SHALL BE 2,000 LINEAR FEET FOR EACH SECTION.
- QUALITY CONTROL TESTING FOR THE DIRECTIONAL DRILL SHALL CONSIST OF BUTT FUSION TESTING:** ON EVERY DAY BUTT FUSIONS ARE TO BE MADE, THE FIRST FUSION OF THE DAY SHALL BE A TRIAL FUSION, THE TRIAL FUSION SHALL BE ALLOWED TO COOL COMPLETELY, THEN FUSION TEST STRAPS SHALL BE CUT THE TEST STRAP SHALL BE 12 INCHES (MIN) OR 30 TIMES THE WALL THICKNESS IN LENGTH WITH THE FUSION IN THE CENTER, AND 1 INCH (MIN) OR 1.5 TIMES THE WALL THICKNESS IN WIDTH. BEND THE TEST STRAP UNTIL THE ENDS OF THE STRAP TOUCH. IF THE FUSION FAILS AT THE JOINT, A NEW TRIAL FUSION SHALL BE MADE, COOLED COMPLETELY, AND TESTED. BUTT FUSION OF PIPE TO BE INSTALLED SHALL NOT COMMENCE UNTIL A TRIAL FUSION HAS PASSED THE BENT STRAP TEST. PERFORM ALL BUTT FUSION JOINTS IN THE PRESENCE OF THE COUNTY, ENGINEER OR HIS REPRESENTATIVE. RECORD THE TEMPERATURE AND CORRESPONDING TIME FOR EACH FUSION JOINT.
- A LEE COUNTY RIGHT OF WAY (ROW) PERMIT WILL BE REQUIRED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES WITHIN THE COUNTY ROW. THE ROW PERMIT APPLICATION WILL REQUIRE THE LEE COUNTY DEVELOPMENT ORDER APPROVED STAMPED SET OF PLANS.

NATURAL RESOURCE COMMENTS:

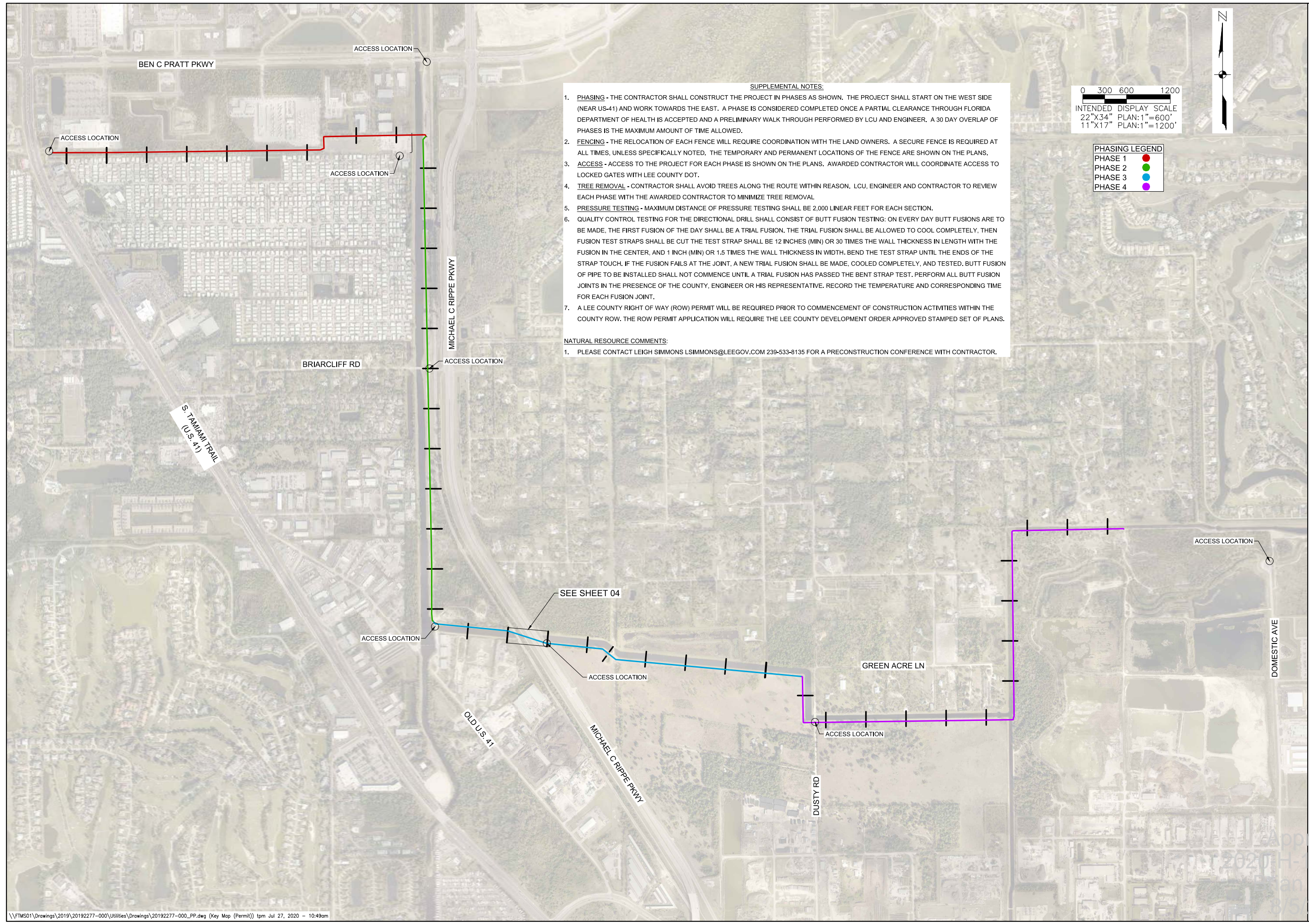
- PLEASE CONTACT LEIGH SIMMONS LSIMMONS@LEE.GOV.COM 239-533-8135 FOR A PRECONSTRUCTION CONFERENCE WITH CONTRACTOR.



INTENDED DISPLAY SCALE
22"X34" PLAN: 1"=600'
11"X17" PLAN: 1"=1200'

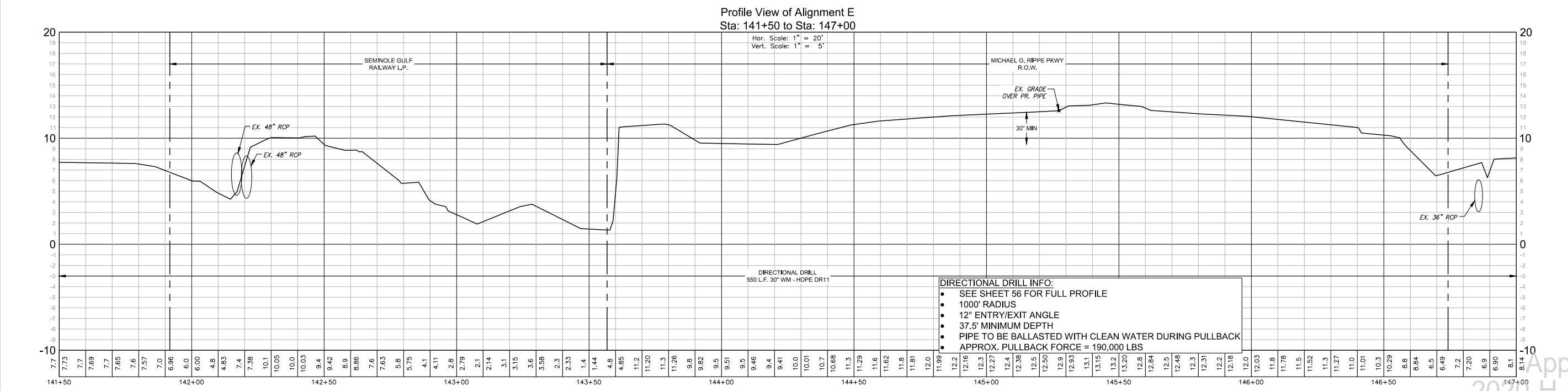
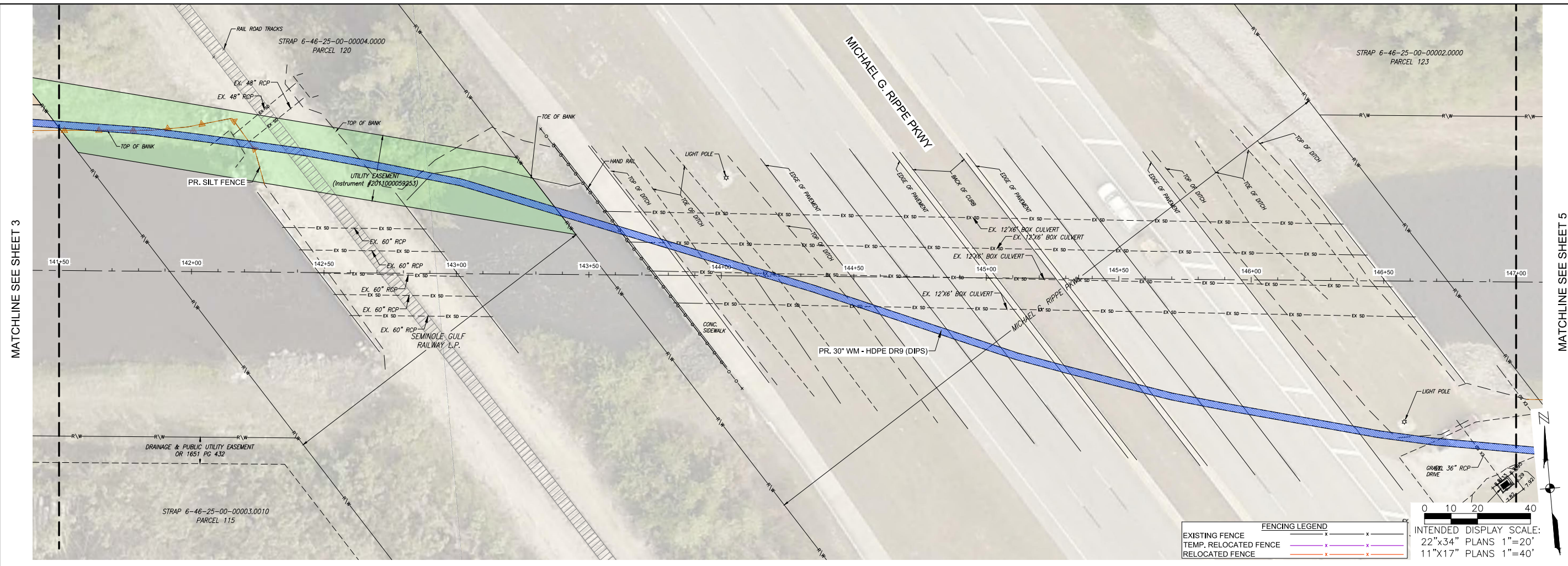
PHASING LEGEND

PHASE 1	●
PHASE 2	●
PHASE 3	●
PHASE 4	●



NO.	DESCRIPTION	DATE

Permit Plans
 #####
 Sta 141+50 to 147+00
 SHEET NUMBER
04

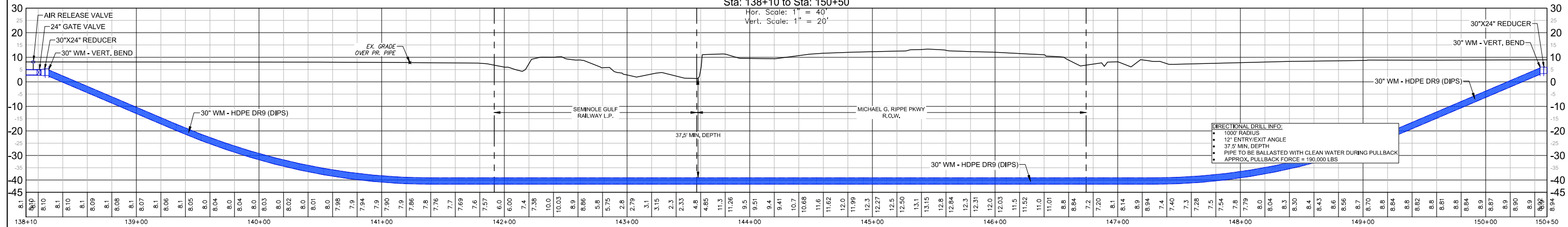


Approved
 2020-H-192-00159
 Brian Deboy
 8/5/2020

0 20 40 80
 INTENDED DISPLAY SCALE:
 22"x34" PLANS 1"=40'
 11"x17" PLANS 1"=80'

Profile View of Alignment E
 Sta: 138+10 to Sta: 150+50

Hor. Scale: 1" = 40'
 Vert. Scale: 1" = 20'



DIRECTIONAL DRILL INFO:
 • 1000' RADIUS
 • 12° ENTRY/EXIT ANGLE
 • 37.5' MIN. DEPTH
 • PIPE TO BE BALLASTED WITH CLEAN WATER DURING PULLBACK
 • APPROX. PULLBACK FORCE = 190,000 LBS

\\FTMS01\Drawings\2019\20192277-000\Utilities\Drawings\20192277-000_PP.dwg (Directional Drill Profiles) tpm Jul 27, 2020 - 10:50am

REVISIONS	



RSW 24" WATER TRANSMISSION LINE
 BEN HILL - TREELINE
 Lee County, Florida



JOHNSON ENGINEERING, INC.
 2122 JOHNSON STREET
 P.O. BOX 1550
 FORT MYERS, FLORIDA 33902-1550
 PHONE: (239) 334-0046
 FAX: (239) 334-3661
 E.B. #642 & L.B. #642

DAVID BRICE TROTEAUD, PE
 FL License No. 69783

Approved
 2020-H-192-00159
 Directional Drill Profiles
 Brian Deboy
 8/3/2020

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
July 27, 2020	20192277-000	25-45-24	As Shown	05

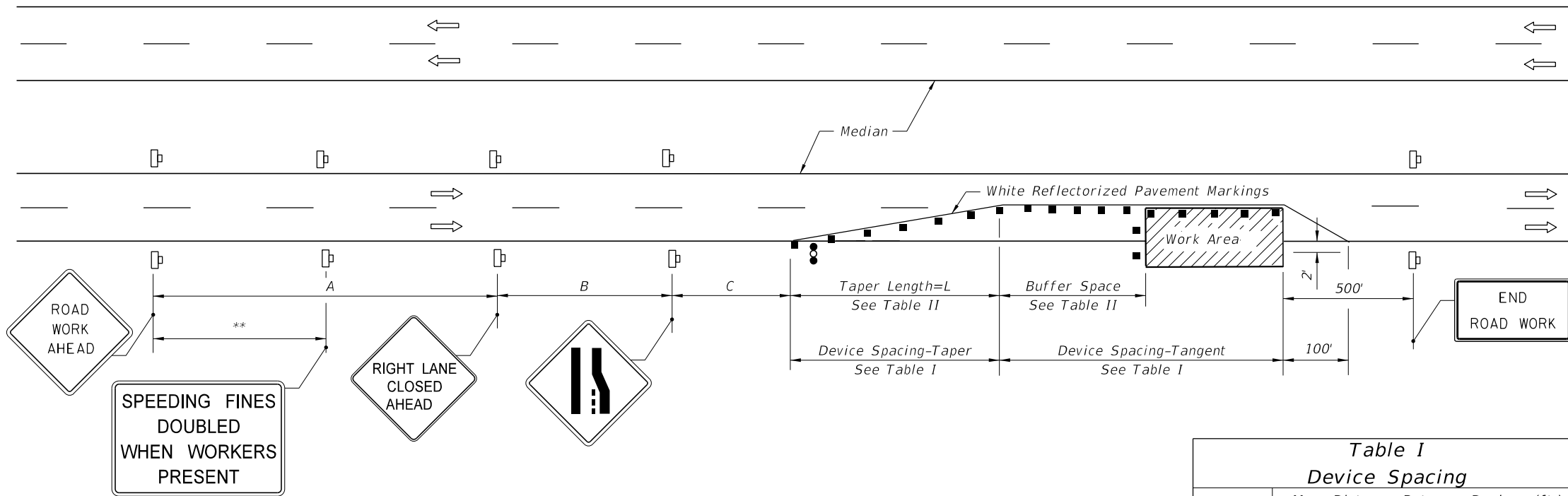


Table II
Buffer Space and Taper Length

Speed (mph)	Buffer Space (ft.)	Taper Length (12' Lateral Transition)	
		L (ft.)	Notes (Merge)
25	155	125	$L = \frac{WS^2}{60}$
30	200	180	
35	250	245	
40	305	320	$L = WS$
45	360	540	
50	425	600	
55	495	660	
60	570	720	
65	645	780	
70	730	840	

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in notes column. Where:

L = Length of taper in feet
W = Width of lateral transition in feet
S = Posted speed limit (mph)

Table I
Device Spacing

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

DURATION NOTES

- Temporary white edgeline may be omitted for work operations less than 3 consecutive calendar days.
- For work operations up to approximately 15 minutes, signs, channelizing devices, arrow board, and buffer space may be omitted if all of the following conditions are met:
 - Speed limit is 45 mph or less.
 - No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space and the taper length combined.
 - Volume and complexity of the roadway has been considered.
 - The closed lane is occupied by a class 5 or larger, medium duty truck(s) with a minimum gross weight vehicle rating (GWVR) of 16,001 lb with high-intensity, rotating, flashing, oscillating, or strobe lights mounted above the cab height and operating.
- For work operations up to 60 minutes, arrow board and buffer space may be omitted if conditions a, b, and c in DURATION NOTE 2 are met, and vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF TRAVEL WAY.

DISTANCE BETWEEN SIGNS

Speed	Spacing (ft.)		
	A	B	C
40 mph or less	200	200	200
45 mph	350	350	350
50 mph	500	500	500
*55 mph or greater	2640	1640	1000

* The ROAD WORK 1 MILE sign may be used as an alternate to the ROAD WORK AHEAD sign and the RIGHT LANE CLOSED 1/2 MILE sign may be used as an alternate to the RIGHT LANE CLOSED AHEAD sign.

** 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

GENERAL NOTES

- Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
- On undivided highways the median signs as shown are to be omitted.
- When work is performed in the median lane on divided highways, the channelizing device plan is inverted and left lane closed and lane ends signs substituted for the right lane closed and lane end signs.

The same applies to undivided highways with the following exceptions:

- Work shall be confined within one median lane.
- Additional barricades, cones, or drums shall be placed along the centerline abutting the work area and across the trailing end of the work area.

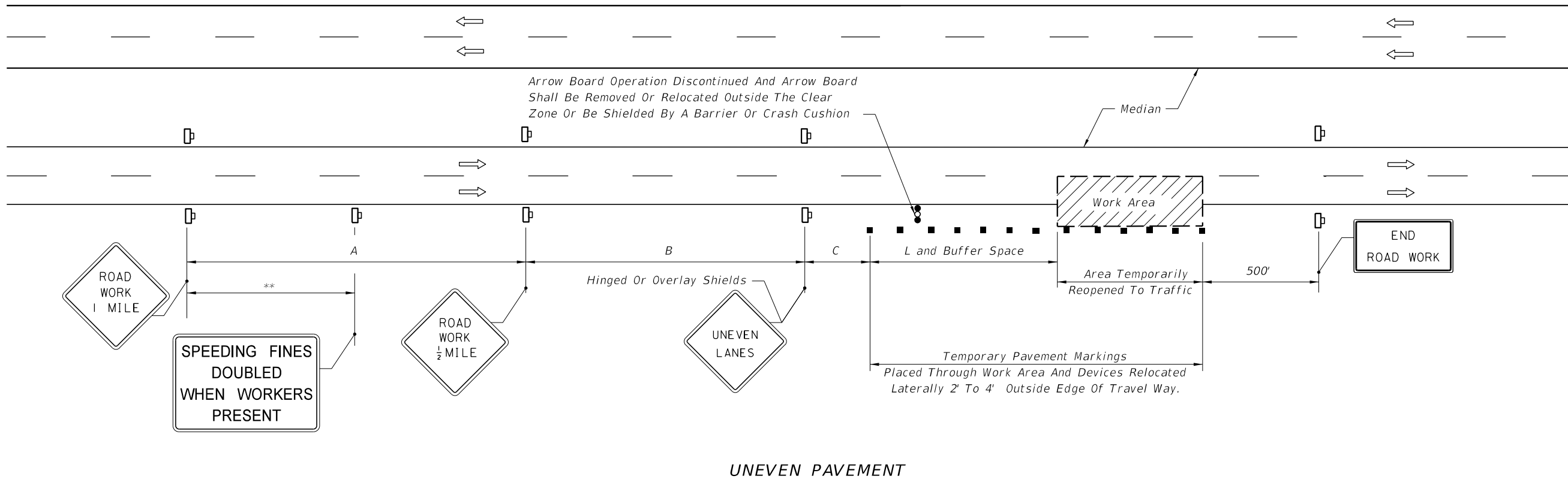
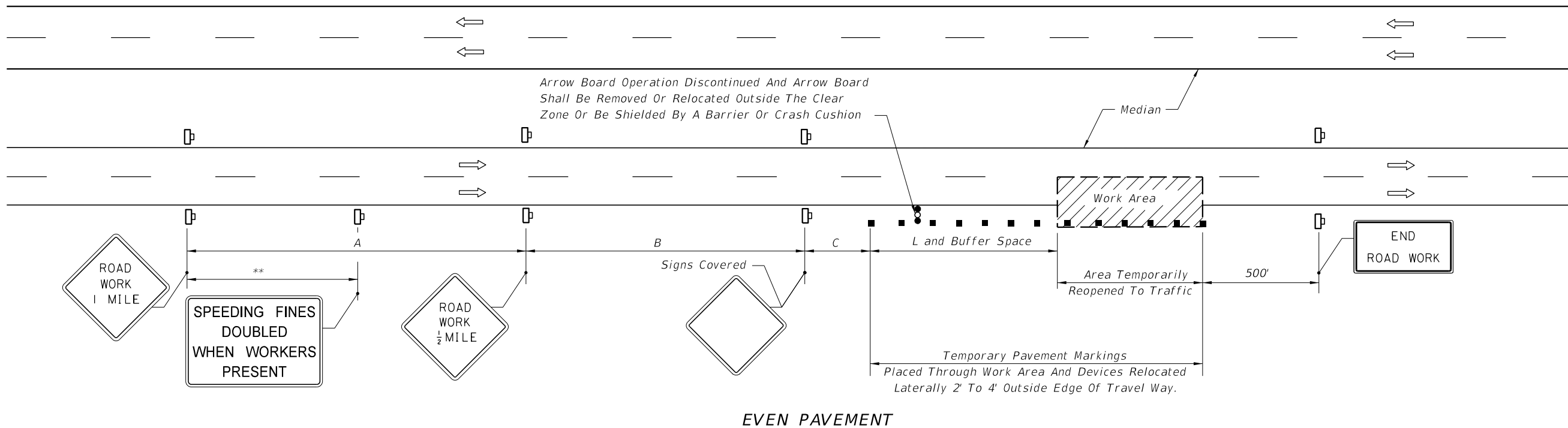
When work on undivided highways occurs across the centerline so as to encroach on both median lanes, the inverted plan is applied to the approach of both roadways.

- Signs and traffic control devices are to be modified in accordance with INTERMITTENT WORK STOPPAGE details (sheet 2 of 2) when no work is being performed and the highway is open to traffic.
- The two channelizing devices directly in front of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index 102-612 for shoulder taper formulas.
- When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- This TCZ plan does not apply when work is being performed in the middle lane(s) of a six or more lane highway. See Index 102-614.
- For general TCZ requirements and additional information, refer to Index 102-600.

SYMBOLS

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Advance Warning Arrow Board

9/18/2018 10:33:02 AM

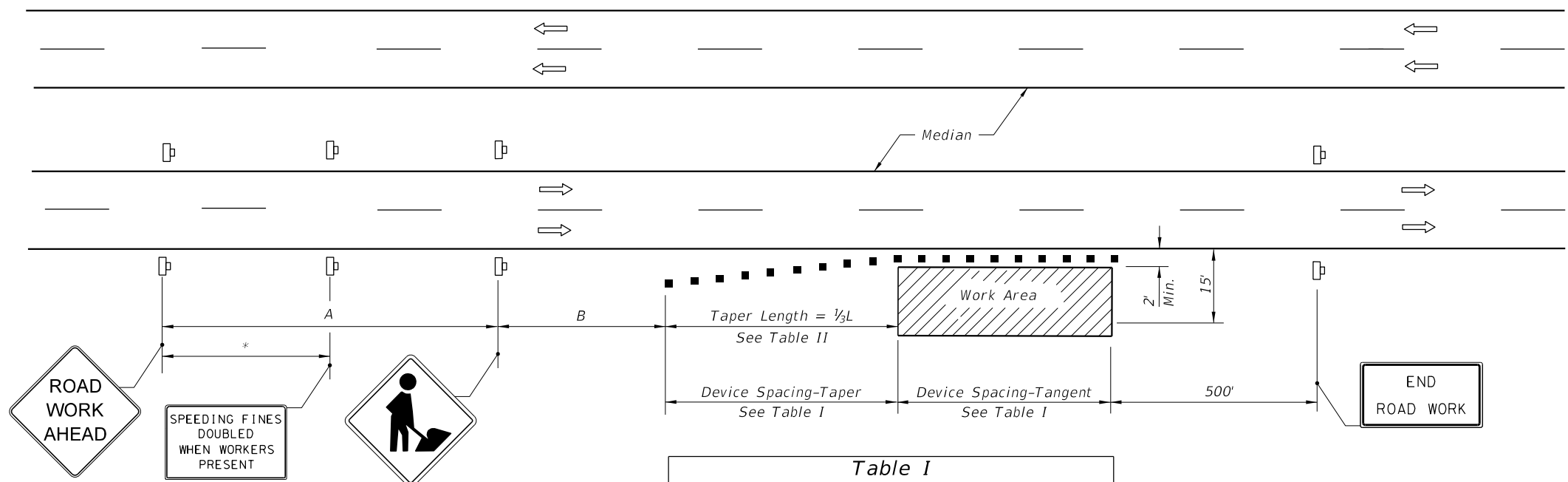


INTERMITTENT WORK STOPPAGE - LANE REOPENED TO TRAFFIC

Approved
 2020-H-192-00159
 Brian Deboy
 8/5/2020
 INDEX SHEET
 102-613 2 of 2

9/18/2018 10:33:03 AM

LAST REVISION 11/01/17	DESCRIPTION:	 FY 2019-20 STANDARD PLANS	MULTILANE, WORK WITHIN TRAVEL WAY MEDIAN OR OUTSIDE LANE	INDEX SHEET 102-613 2 of 2
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Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350
50 mph or greater	500	500

* 250' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Speed (mph)	1/3 L (ft.)			Notes
	8' Shldr.	10' Shldr.	12' Shldr.	
25	28	35	42	$L = \frac{WS^2}{60}$
30	40	50	60	
35	55	68	82	
40	72	90	107	L=WS
45	120	150	180	
50	133	167	200	
55	147	183	220	
60	160	200	240	
65	173	217	260	
70	187	233	280	

8' minimum shoulder width.

1/3 L = Length of shoulder taper in feet

W = Width of total shoulder in feet (combined paved and unpaved width)

S = Posted speed limit (mph)

GENERAL NOTES

- When a high volume of work vehicles are entering and leaving the Work Area at speeds slower than 10 MPH below the posted speed, place an M0T-5-06 sign in the ROAD WORK AHEAD sign location and shift the ROAD WORK AHEAD sign upstream 500 ft.
- This TCZ plan also applies to work performed in the median more than 2' but less than 15' from the edge of travelway.
- When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
- WORKERS signs to be removed or fully covered when no work is being performed.
- SHOULDER WORK sign may be used as an alternate to the WORKER symbol sign.
- When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- For general TCZ requirements and additional information, refer to Index 102-600.

DURATION NOTES

- Signs and channelizing devices may be omitted if all of the following conditions are met:
 - Work operations are 60 minutes or less.
 - Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

SYMBOLS

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Lane Identification + Direction of Traffic

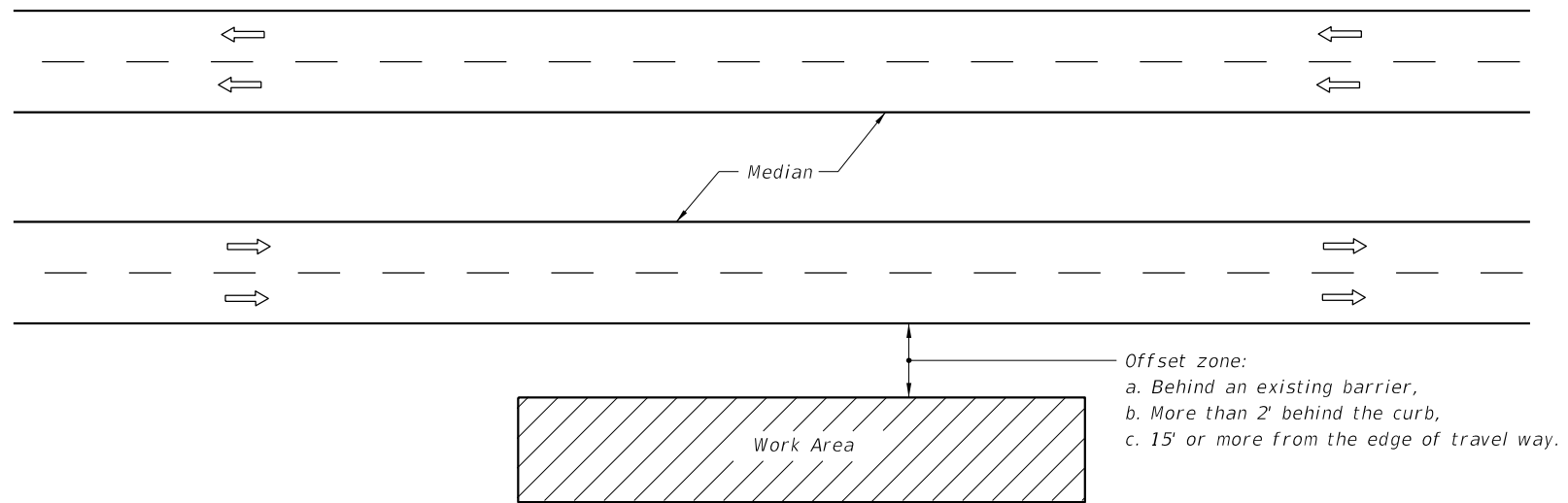
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.

Approved
2020-H-192-00159
Brian Deboy
8/5/2020
INDEX SHEET
102-612 1 of 1

9/18/2018 10:32:16 AM

9/18/2018 10:28:31 AM



GENERAL NOTES

1. If the work operation (excluding establishing and terminating the work area), requires that two or more work vehicles cross the offset zone in any one hour, traffic control will be in accordance with Index 102-612.
2. No special signing is required.
3. This index also applies when work is being performed on a multilane undivided highway.
4. This index also applies to work performed in the median behind an existing barrier or more than 15' from the edge of travel way, both roadways. Work performed in the median behind curb and gutter shall be in accordance with Index 102-612.
5. When a side road intersects the highway within the work area, additional traffic control devices shall be placed in accordance with other applicable TCZ Indexes.
6. When construction activities encroach on a sidewalk, refer to Index 102-660.
7. For general TCZ requirements and additional information, refer to Index 102-600.

SYMBOLS

- Work Area
- Lane Identification + Direction of Traffic

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE BEHIND AN EXISTING BARRIER, MORE THAN 2' BEHIND THE CURB, OR 15' OR MORE FROM THE EDGE OF TRAVEL WAY.

Approved
 2020-H-192-00159
 Brian Deboy
 8/5/2020
 INDEX SHEET
 102-611 1 of 1

LAST REVISION 11/01/17	DESCRIPTION:		FY 2019-20 STANDARD PLANS	MULTILANE, WORK OUTSIDE SHOULDER	INDEX 102-611	SHEET 1 of 1
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**LICENSE AGREEMENT FOR UNDERGROUND
POTABLE WATER MAIN PIPE INSTALLATION AND OCCUPATION
BRIARCLIFF CANAL, FORT MYERS, FLORIDA**

THIS LICENSE AGREEMENT, made this ____ day of _____, 20____ ("Agreement"), between **SEMINOLE GULF RAILWAY, LP**, a limited partnership under the laws of the State of Delaware, whose mailing address is 4110 Center Pointe Drive, Suite 207, Fort Myers, Florida, 33916, hereinafter referred to as "**SGLR**" and the **LEE COUNTY UTILITIES** a division of the Lee County Department of Public Utilities, whose mailing address is PO Box 398, 1500 Monroe Street, Fort Myers, Florida, 33902-3098 hereinafter referred to as the "**LEE COUNTY UTILITIES**".

WITNESSETH:

WHEREAS, SGLR owns the track and other rail facilities ("**Rail Facilities**") comprising a line of railroad lying generally between Bradenton and Venice, Florida; and

WHEREAS, LEE COUNTY UTILITIES has applied to SGLR for License and permission to lay, maintain and use, One (1) 30" HDPE (DIPS) DR9 Potable Water Main Pipe which will cross the right of way and track of SGLR near Briarcliff Road in Fort Myers, Florida, at approximately RR MP AX 974.63, at approximately a 43 degree angle to the track, as per Utility Easement Instrument #2011000059253 which is attached. To the knowledge of LEE COUNTY UTILITIES and SGLR said utility is to be installed in accordance with said Utility Easement; and

WHEREAS, SGLR is willing to accord to LEE COUNTY UTILITIES the License and permission so applied for, but only upon and subject to the terms, conditions and limitations set forth in this Agreement.

NOW, THEREFORE, in consideration of the foregoing and other good and valuable consideration, intending to be legally bound, the parties do hereby agree as follows:

1. SGLR, insofar as it has the legal right to do so and in consideration of the covenants and conditions hereinafter stated on the part of LEE COUNTY UTILITIES to be kept and performed, hereby grants to LEE COUNTY UTILITIES, as a license, the right to construct, use, maintain, repair, renew, and ultimately remove the Utility across and under the said tracks, right-of-way and property of SGLR at the location aforesaid, and as shown in detail in Utility Instrument #2011000059253.

2. LEE COUNTY UTILITIES represents and warrants that it is duly authorized in accordance with the laws of the State of Florida to enter into this Agreement and to be bound by the covenants and conditions contained herein. This Agreement shall be governed by the laws of the State of Florida.

3. (a) The Utility shall be located, constructed and maintained in exact accordance with Utility Instrument #2011000059253, and no departure shall at any time be made therefrom except upon permission in writing granted by SGLR; provided, however, that if any governmental or regulatory body having jurisdiction in the premises has regulated the manner and means of construction, maintenance, repair, alteration, renewal, relocation or removal thereof, then LEE COUNTY UTILITIES shall comply therewith

after prior notice to SGLR as to any required departure from Utility Instrument #2011000059253. Supervision over the location of the construction work, inspection of the construction, maintenance, repair, alteration, renewal, relocation and removal of the Utility shall be subject to the approval of SGLR. The Utility shall not be installed until the method of installation, the scheduling of installation, and all related matters have been approved in writing by SGLR.

(b) LEE COUNTY UTILITIES shall, at its sole cost and expense, erect and maintain thereafter signs warning of the buried Utility. The signs shall be prominently located inside of the right-of-way line on both sides of track and shall be appropriately worded to convey the location and type of utility installed.

(c) The construction, maintenance, repair, renewal, alteration, or removal of the Utility shall be done under such conditions, including access to the site, as will be satisfactory to SGLR, and as will not interfere with the proper and safe use, operation and enjoyment of the property of SGLR or its successors or assigns.

(d) LEE COUNTY UTILITIES, when performing any work in connection with the Utility, shall request SGLR to furnish, at LEE COUNTY UTILITIES'S own cost and expense, any necessary inspectors, flagmen or watchmen for the protection of any person or property, including persons not parties hereto and their property. SGLR shall be notified at least fourteen (14) days in advance of the performance of any work on the Utility, excepting emergency repairs in which case LEE COUNTY UTILITIES shall notify SGLR as soon as reasonably possible.

(e) In addition to, but not in limitation of any of the foregoing provisions, if at any time SGLR should deem it necessary to place inspectors, flagmen or watchmen or any other persons to protect any persons or property during the construction, maintenance, repair, alteration, renewal or removal of the Utility, SGLR shall have the right to place such inspectors, flagmen, watchmen, or other persons at the sole cost and expense of LEE COUNTY UTILITIES. Upon receipt of a bill from SGLR, LEE COUNTY UTILITIES shall promptly pay SGLR the full cost and expense of employing such persons. The furnishing or failure to furnish inspectors, flagmen, watchmen or other person by SGLR under this paragraph, however, shall not release LEE COUNTY UTILITIES from any and all other liabilities assumed by LEE COUNTY UTILITIES under the terms of this Agreement, including its obligations under Section 8 hereof.

4. If LEE COUNTY UTILITIES desires or is required, as herein provided, to revise, renew, add to or alter the Utility in any manner whatsoever, it shall submit plans to SGLR who shall review them at LEE COUNTY UTILITIES'S cost. LEE COUNTY UTILITIES'S plans shall comply with Chapter 1, Part 5 - Pipelines of the American Railway Engineering Association Manual for Railway Engineering, LEE COUNTY UTILITIES shall obtain written approval thereof before any work or alteration of the Utility is performed. SGLR reserves the right to make adjustments in charges in connection with any such work and those charges shall be consistent with those customary in the industry for similar services.

5. LEE COUNTY UTILITIES shall at all times be obligated to perform such maintenance or renewal of the Utility as may be required for the safe operation and maintenance of the properties of SGLR and its lessees and shall, upon notice in writing from SGLR requiring it so to do, promptly make such repairs and renewals thereto as may be required by SGLR. However, if necessary to protect the property, traffic, patrons or employees of SGLR, or any other person, from damage or injury, SGLR may with or without notice to LEE COUNTY UTILITIES at any time make such repairs and renewals thereto and furnish such material therefor as it deems adequate and necessary, all at the sole cost and expense of LEE COUNTY UTILITIES. LEE COUNTY UTILITIES shall promptly reimburse any costs incurred by SGLR pursuant to this Section to SGLR upon demand.

6. SGLR's right of supervision over the location of the construction work and inspection of the Utility from time to time thereafter, and SGLR's right to approve or disapprove of any contemplated work on the Utility, shall extend for such distance on each side of the Utility as may, in SGLR's judgment, be necessary to support and sustain the tracks and roadbed of SGLR.

7. LEE COUNTY UTILITIES shall comply with all Federal, State and local laws, now or hereinafter enacted, and shall assume all costs, expense and responsibility in connection therewith, without any liability whatsoever on the part of SGLR.

8. (a) It is understood between the parties hereto that the installation and existence of the Utility involves some risk, and LEE COUNTY UTILITIES as part of the consideration for this Agreement, hereby releases and waives any right to ask for or demand damages from SGLR for or on account of loss of or injury to the Utility or other property or facilities of LEE COUNTY UTILITIES, that is over, under, upon or in the property or facilities of SGLR, including the loss of or interference with service provided by or through the Utility or use thereof and whether attributable to the fault, failure or negligence of SGLR. LEE COUNTY UTILITIES agrees it will exercise its privileges hereunder at its own sole risk. LEE COUNTY UTILITIES agrees to reimburse SGLR for all cost and reasonable expenses for any damage to SGLR's land or facilities resulting from LEE COUNTY UTILITIES'S use of the Utility.

(b) In conformance with Section 725.06 Florida Statutes, to the extent it applies to this Agreement, the specific consideration given for the promises of the LEE COUNTY UTILITIES set forth in this agreement is the right granted to LEE COUNTY UTILITIES to continue to use the Utility, together with One Dollar (\$1.00) in hand paid by SGLR to LEE COUNTY UTILITIES, receipt whereof is hereby acknowledged and the adequacy of which LEE COUNTY UTILITIES accepts as completely fulfilling the obligations of SGLR under the requirements of Section 725.06 Florida Statutes.

(c) LEE COUNTY UTILITIES agrees to indemnify, defend and save harmless SGLR and their respective officers, directors, agents and employees (hereinafter referred to as SGLR Entities), from all liability, loss, cost, expense, including attorneys' fees, cause of action, suits, claims, demands or judgements of any nature whatsoever including, without limitation, those related to Hazardous Materials which may be sustained by any SGLR Entity by reason of the death of or injury to any person or damage to any property arising out of or resulting from the use, repair, renewal or removal of the Utility by LEE COUNTY UTILITIES, its contractors, agents or employees, whether any such liability, loss, cost or expense is based on tort, contract, equitable theory or any other grounds. If a claim is made or an action is brought against either party to this Agreement and for which the other party may be responsible hereunder in whole or in part, such other party shall be notified. If the LEE COUNTY UTILITIES fails or refuses to timely defend an action brought against the SGLR Entities which the LEE COUNTY UTILITIES is obligated to defend pursuant to this agreement, the SGLR Entities may defend the cause at the expense of the LEE COUNTY UTILITIES upon notice to the LEE COUNTY UTILITIES that such action is being taken.

(d) LEE COUNTY UTILITIES has inspected the Premises and decided that the Premises are suitable for the uses LEE COUNTY UTILITIES contemplates. LEE COUNTY UTILITIES assumes all risk of entry on to Premises. LEE COUNTY UTILITIES hereby releases SGLR Entities from any responsibilities for LEE COUNTY UTILITIES' losses or damages related to the condition of the Premises, and LEE COUNTY UTILITIES covenants and agrees that it will not assert or bring, nor cause any third-party to assert or bring, any claim, demand, lawsuit or cause of action (whether by way of original claim, cross claim, counterclaim, contribution claim, indemnification claim, third-party claim or any other claim) against SGLR Entities, including, without limitation, claims for response action, response costs, assessments, containment, removal and remedial costs, governmental oversight charges, including any overhead or response actions

incurred or assessed by DEP, fines or penalties, permit and annual compliance fees, reasonable attorney and expert fees, natural resource damages, property damages relating to, or arising from, the condition of the property.

(e) LEE COUNTY UTILITIES shall require any of its third party contractors performing work, related to this License, and working on the premises, sign Exhibit "C" herein and furnish the original to SGLR prior to the commencement of any work, and provide AAR Form railroad protective public liability insurance providing for a limit of not less than Two Million Dollars (\$2,000,000) with respect to damages arising out of bodily injury to or death of one person, and, subject to that limit for each person, a total limit of Six Million Dollars (\$6,000,000) for all damages arising out of bodily injury to or death of two or more persons in any one accident and for property damage for any one accident and for the duration of this Agreement comprehensive general public liability and property damage coverage as per Insurance Service Office form CG001 with broad form endorsement or equivalent with a limit of not less than Five Million Dollars (\$5,000,000) combined single limit. Coverage is to include underground work and contractual liability with Insurance Service Office endorsement CG2417 or provide equivalent coverage. In no event shall there be any subrogation against SGLR. The AAR Form Policy shall be issued in the name of SGLR and the original of that policy shall be in the hands of SGLR prior to the commencement of any work. SGLR shall be named as additional insured on all other policies.

9. Assignment of this Agreement by the LEE COUNTY UTILITIES to any other entity shall only be done with the approval of SGLR. SGLR will cooperate with the licensee should the LEE COUNTY UTILITIES request assignment of the Agreement. Any assignment will in no event place SGLR in any different position than the terms of this Agreement provide. In particular, without limiting the foregoing, any successor to LEE COUNTY UTILITIES shall undertake all of the obligations of this Agreement. Any and all expense associated with assignment of this Agreement to any other entity at any time will be borne by the LEE COUNTY UTILITIES. Upon assignment, the LEE COUNTY UTILITIES shall be released from all continuing obligation and liabilities of this Agreement, except any obligations or liabilities arising out of acts occurring prior to the date and time of any assignment.

10. All costs and expenses in connection with the construction, maintenance, repair, alteration, renewal, relocation or removal of the Utility shall be borne by LEE COUNTY UTILITIES, and in the event of work being performed or materials furnished by SGLR pursuant to this Agreement, LEE COUNTY UTILITIES agrees to pay to SGLR the actual cost of material plus the current applicable overhead percentages for storage, handling, transportation, purchasing and other related material, management expenses and the actual cost of labor plus the current applicable overhead percentages as developed and published by SGLR for fringe benefits, payroll taxes, administration, supervision, use of tools, machinery and other equipment, supplies, employers' liability insurance, public liability insurance, and other insurance, taxes and all other indirect expenses. In the alternative SGLR may choose to bill at the "AAR Labor Rate" then in effect. It is to be understood that the aforementioned material and labor overhead charges are to be applied at the rates which are effective at the time of the performance of any work by employees or contractors of SGLR.

11. (a) LEE COUNTY UTILITIES, shall, at its sole cost and expense within thirty (30) days of written request from SGLR, or within such additional period as may be necessary to enable LEE COUNTY UTILITIES, exercising due diligence, to procure all necessary governmental permits, change the location of the Utility insofar as it is located over, upon or in the Property or Rail Facilities of SGLR to another location to permit and accommodate changes of grade or alignment and improvement in or additions to the Property or Rail Facilities of SGLR upon land now or hereafter owned or used by SGLR. Said construction shall at all times comply with the terms and conditions of this Agreement with respect to the original construction except

as to location of the Utility. In the event of the lease, sale or disposal of the Property or Rail Facilities or any part thereof affected by this License, then LEE COUNTY UTILITIES shall make such adjustments or relocations in the portion of the Utility over, upon, or in the Property and Rail Facilities of SGLR as may be required by SGLR or any of its grantees. If LEE COUNTY UTILITIES shall fail or refuse to comply therewith, then SGLR may make such repairs or adjustments or changes in location and provide necessary material therefore, at the sole cost and expense of LEE COUNTY UTILITIES.

(b) SGLR reserves the right at any time, if it so desires, to construct an additional track or tracks across the Utility; in such event, LEE COUNTY UTILITIES, at its sole cost and expense, shall relocate or encase the Utility as directed by SGLR to avoid interference with the new track alignment.

12. LEE COUNTY UTILITIES will be responsible for any settlement caused to the roadbed, right-of-way and/or tracks, facilities and appurtenances of SGLR arising solely from or as a result of the installation of the Utility, and LEE COUNTY UTILITIES agrees to pay SGLR upon receipt of a proper invoice, the full cost and reasonable expense of repairing or restoring SGLR's facilities.

13. Upon the removal or abandonment of the Utility, all the rights of LEE COUNTY UTILITIES hereunder shall cease and terminate, and this instrument shall thereupon become and be null and void, without any liability on the part of either party to the other party except only as to any charges and liability accrued prior thereto, and the obligation of LEE COUNTY UTILITIES at SGLR's request to remove its Utility from SGLR's property. All property of SGLR shall be restored in good condition and to the satisfaction of SGLR. If LEE COUNTY UTILITIES fails or refuses to remove their Utility and appurtenances under the foregoing conditions, SGLR may do so at the cost and expense of LEE COUNTY UTILITIES, and SGLR shall not be liable in any manner to LEE COUNTY UTILITIES for said removal.

14. As part of the consideration of this Agreement, LEE COUNTY UTILITIES covenants and agrees that no assessments, taxes or charges of any kind shall be made against SGLR or its property by reason of the construction of the Utility of LEE COUNTY UTILITIES, LEE COUNTY UTILITIES further covenants and agrees to pay SGLR promptly upon bills rendered therefore the full amount of any assessments, taxes or charges of any kind which may be levied, charged, assessed or imposed against SGLR or its respective property by reason of this license or the construction or maintenance of the Utility.

15. This Agreement may terminate if LEE COUNTY UTILITIES is in default of any of the provisions of this Agreement. In the event LEE COUNTY UTILITIES is in default of any of the provisions herein, SGLR shall give LEE COUNTY UTILITIES notice thereof and a reasonable opportunity to cure the default. If after a reasonable time LEE COUNTY UTILITIES fails to cure the default, or take reasonable steps to cure the default, SGLR shall give LEE COUNTY UTILITIES written notice of its intent to terminate this Agreement 30 days following receipt of the written notice and this Agreement, and all rights and obligations herein, shall terminate except for the provisions of Paragraph 12.

16. The License conferred hereby shall only be for the benefit of LEE COUNTY UTILITIES and their grantees, successors, and assigns.

17. LEE COUNTY UTILITIES understands that this Agreement does not allow LEE COUNTY UTILITIES to install or permit the installation of any other utility within the limits of the crossing.

18. In consideration of the License hereby granted, LEE COUNTY UTILITIES shall pay SGLR, prior to the execution of this Agreement, a fee of Six Thousand One Hundred Dollars (\$6,100) to cover SGLR's legal and administrative costs in preparing and reviewing this Agreement ("Preparation Fee"), receipt

of which is hereby acknowledged. LEE COUNTY UTILITIES shall pay SGLR upon execution of this agreement for the installation of the utility a minimum charge of Seventeen Thousand Two Hundred Dollars (\$17,200) for inspection services and flag protection for ten (10) man days at eight (8) hours per day, Monday through Friday, 8am to 4pm. Any additional days needed will be billed to LEE COUNTY UTILITIES at the rate of \$1,720.00 per day. All inspection and flagging services required by LEE COUNTY UTILITIES outside the Monday through Friday 8am to 5pm window are deemed overtime and will be billed at a rate of \$258.00 per hour, above and beyond the minimum above. LEE COUNTY UTILITIES will also install a 12" water main stub out reduced and metered to 2" for the use of SGLR on a parcel owned by SGLR 1150' south of center line of Briarcliff Road.

19. The terms of this Agreement shall be binding and effective upon the parties hereto, and unless and until terminated, as hereinbefore provided, this Agreement shall inure to the benefit of and be binding upon the parties hereto their successors and assigns provided, however, that this Agreement may not be assigned without the prior written consent of SGLR.

20. Any correspondence in connection with the contents of this Agreement should be addressed.

If to SGLR:

**Seminole Gulf Railway, LP
4110 Center Pointe Drive, Suite 207
Fort Myers, Florida 33916
Attn: Real Estate Administration
Phone: 239/275-6060
Fax: 239/275-0581**

If to LEE COUNTY UTILITIES:

**Lee County Utilities
PO Box 398
1500 Monroe Street
Fort Myers, FL 33902-0398
Phone: 239/533-8181**

SIGNATURES ON NEXT PAGE

IN WITNESS WHEREOF, the parties hereto have executed these presents in duplicate the day and year first above written.

LEE COUNTY UTILITIES

ATTEST:

By: _____

By: _____

Name: _____

Name: _____

Title: _____

Title: _____

Date: _____

APPROVED AS TO FORM:

By: _____

County Attorney

SEMINOLE GULF RAILWAY, LP

By it's General Partner

SEMINOLE GULF RAILWAY, Inc.

By: _____

G. Bruce Fay
President

Witness: _____

Name: _____

Date: _____

Witness: _____

Name: _____

EXHIBIT "C"
RELEASE AND INDEMNIFICATION

FOR VALUE RECEIVED, and in consideration of being authorized by Seminole Gulf Railway LP, a Delaware limited partnership ("SGLR") to enter upon the property of SGLR in the performance of the contract between the undersigned contractor _____, whose address is _____ (the "CONTRACTOR") and Lee County Utilities ("LEE COUNTY UTILITIES), which is a division of Lee County Department of Public Utilities of the State of Florida, with respect to the construction and maintenance and the usual appurtenances thereto which traverses the railroad lines of SGLR (the "Utility") pursuant to the Agreement attached hereto as Exhibit "A" (the "Agreement"), the undersigned, intending to be legally bound, agree as follows:

1. CONTRACTOR will comply with all the obligations of LEE COUNTY UTILITIES with respect to construction and maintenance of the Utility under the Agreement, including, without limitation, the provisions of Paragraph 3 thereof.

2. CONTRACTOR acknowledges and appreciates the risks and danger assumed and attendant upon the exercise of the permission granted hereunder, and assumes all risk of injury (including death) to itself, its officers, employees and agents, or to its property, occurring or arising while or resulting from being upon or about the property of SGLR, regardless of SGLR's fault or negligence.

3. CONTRACTOR, for itself and for its successors and assigns, agrees to release, indemnify, defend and save harmless SGLR and its respective officers, employees, agents, successors and assigns, from and against all damages, losses, claims, demands, suits, costs or expenses, including counsel fees, which SGLR may suffer or sustain, or be subject to, directly or indirectly, for personal injury, death or property damage suffered by anyone whomsoever (including SGLR and CONTRACTOR) and arising out of or caused either wholly or in part by the work performed on SGLR's property by the undersigned, regardless of the fault, failure or negligence of SGLR except for gross negligence.

4. In conformance with Section 725.06 Florida Statutes, to the extent it applies to this indemnity, the specific consideration given for the promises of the CONTRACTOR set forth in this Release and Indemnification is the right granted CONTRACTOR to perform work on SGLR's property, together with One Dollar (\$1.00) in hand paid by SGLR to CONTRACTOR, receipt whereof is hereby acknowledged, and the adequacy of which CONTRACTOR accepts as completely fulfilling the obligations of SGLR under the requirements of Section 725.06 Florida Statutes.

5. CONTRACTOR agrees to obtain the insurance specified in paragraph 8(d) of the Agreement. If any such insurance shall be provided on a claims-made basis, then in addition to the coverage requirements specified in paragraph 8(d) of the Agreement, CONTRACTOR agrees to make every effort to maintain similar insurance for at least two years following completion of the construction or maintenance of the Utility. If the insurance is terminated for any reason, CONTRACTOR agrees to purchase an extended reporting provision of at least two years to report claims arising from work performed in connection with construction of the Utility.

6. CONTRACTOR is responsible for the provision and maintenance of all appropriate insurance.

IN WITNESS WHEREOF, the undersigned has caused these presents to be executed this ___ day of _____, 20__.

ATTEST:

Title: _____

CONTRACTOR:

By: _____

Title: _____

INSTRUMENT PREPARED BY:
John J. Renner
Lee County Attorney's Office
P. O. Box 398
Fort Myers, FL 33902

PIPELINE INSTALLATION AND OCCUPATION EASEMENT AGREEMENT

THIS EASEMENT AGREEMENT made and entered into this 1 day of March, 2011, by and between CSX TRANSPORTATION, INC.. ("CSXT"), SEMINOLE GULF RAILWAY ("SGLR") and LEE COUNTY, a political subdivision of the State of Florida, whose mailing address is P.O. Box 398, Fort Myers, Florida ("County").

WHEREAS, CSXT is the fee simple owner of the land and the right-of-way; and SGLR pursuant to a Lease Agreement dated November 13, 1987 (the "Lease Agreement") is the owner of a leasehold interest in the real property and sole and exclusive owner of the track, bridges, and other improvements and facilities (the "Rail Facilities") comprising a line of railroad, at Briarcliff Road, at approximately railroad Milepost AX974.63 in Fort Myers, Lee County, Florida; and

WHEREAS, SGLR's Rail Facilities occupy land and right of way owned by CSX Transportation, Inc. ("CSXT"), and leased to SGLR pursuant to a Lease Agreement, dated November 13, 1987 (the "Lease Agreement"); and

WHEREAS, County seeks the right to install, maintain and use a 30" O.D. Fusion Welded IPS HDPE DRILL Potable Water Main (the "Improvements") which will enter the right-of-way of the Arcadia to Vanderbilt Beach line at approximately Railroad Milepost AX 974.63, at or near Fort Myers FL. Said pipe to be installed in accordance with the plans and specifications set forth in the Plan of RSW24" Water Transmission Line Project No. 7193, and all drawings attached thereto (the "Plan"), submitted by County and approved by CSXT and SGLR, marked as Exhibit A attached hereto and made a part of this Agreement, and

WHEREAS, the easement area necessary for the County's use is described in Exhibit "B"; and

WHEREAS, CSXT and SGLR are willing to grant County a permanent utility easement for the construction and maintenance of the Improvements upon the terms and conditions set forth in this Agreement; and

WHEREAS, nothing contained herein shall be construed to modify the Lease Agreement. All terms and conditions set forth in the Lease Agreement remain in full force and effect.

NOW, THEREFORE, in consideration of the foregoing and other good and valuable consideration, and intending to be legally bound, the parties agree as follows:

1. CSXT and SGLR, for and in consideration of the covenants and agreements to be kept and performed by County as hereinafter expressed, hereby grants to County a perpetual utility easement within the limits described in the attached Exhibit "B", for constructing, improving, replacing, renewing, and maintaining the Improvements.

2. (a) The Improvements will be located, constructed and maintained in exact accordance with the Plan, and no departure may at any time be made therefrom except upon permission in writing granted by CSXT and SGLR; provided, however, that if any governmental or regulatory body having jurisdiction in the premises has regulated the manner and means of construction, maintenance, repair, alteration, renewal, relocation or removal thereof, then County will comply therewith after prior written notice to CSXT and SGLR from County as to any required departure from the Plan. Supervision over the location of the construction work, inspection of the construction, maintenance, repair, alteration, renewal, relocation and removal of the Improvements will be subject to the approval of CSXT and SGLR. The Improvements may not be constructed until the method of construction, the scheduling of construction, and all related matters have been approved in writing by CSXT and SGLR, which approval will not be unreasonably withheld.

(b) The construction, maintenance, repair, renewal, alteration, or removal of the Improvements will be done under such conditions, including access to the site, as will be satisfactory to CSXT and SGLR, and as will not interfere with the property and the safe use, operation and enjoyment of the property of CSXT and SGLR or its successors or assigns.

(c) County, when performing any work in connection with the Improvements within or near CSXT and SGLR's right of way, will request CSXT and SGLR to furnish, at County's own cost and expense, any necessary engineers, inspectors, flagmen or watchmen for the protection of any person or property, including persons not parties hereto and their property, except for emergency situations where as much reasonable notice will be given as possible. CSXT and SGLR will be notified at least three (3) days in advance of the performance of any work on the Improvements. CSXT and SGLR will provide a good faith estimate of CSXT and SGLR's costs for necessary services prior to commencement of any work.

(d) In addition to, but not in limitation of any of the foregoing provisions, if at any time CSXT and SGLR deem it necessary to place engineers, inspectors, flagmen or watchmen or other persons to protect any persons or CSXT and SGLR property during the construction, maintenance, repair, alteration, renewal or removal of the Improvements or any portion thereof, CSXT and SGLR have the right to place such engineers, inspectors, flagmen, watchmen, or other persons at the sole cost and expense of County per the mutually agreed rate. Upon receipt of a bill from CSXT and SGLR, County will promptly pay CSXT and SGLR the full cost and expense of such person(s) including but not limited to such materials, equipment, vehicles, engineering or other expenses as may be reasonably required. The furnishing or failure to furnish engineers, inspectors, flagmen, watchmen or other persons by CSXT and SGLR under this paragraph, however, does not release County from any and all other liabilities assumed by County under the terms of this Agreement, including its obligations under Paragraph 4 hereof.

3. CSXT and SGLR will not at any time or in any manner incur or be assessed with any cost or expense related to the cost of construction of any improvements constructed now or at any time in the future in connection with or related to the Improvements.

4. CSXT and SGLR reserve the right at any time if it so desires, to construct an additional track or tracks or to remove (abandon) any trackage. In such event CSXT and SGLR will have the right, upon 30 days written notice to County, to request, County, at its entire cost and expense, to re-locate to the extent necessary any portion of the Improvements that cross over or under CSXT and SGLR or materially interferes with the construction or removal of the tracks. Upon completion of the construction or removal, County will, at County's entire cost and expense, restore the Improvements to their original state prior to such work, subject to any modifications in the design of the Improvements necessary as a result of said change in CSXT and SGLR's trackage. Notwithstanding the foregoing, CSXT and SGLR understand and agree that County will at all times be provided the ability to avoid disruption in the potable water delivery afforded by the Improvements.

5. (a) County agrees to release, indemnify, protect and save harmless CSXT and SGLR, their respective successors and assigns, subject to the limitations as set out in Section 768.28, Florida Statutes, from any and all costs or expenses, including attorneys' fees, resulting from any and all loss of life or property or injury or damage to the person or property of any person, firm or corporation (including the parties hereto, CSXT and SGLR, and their respective officers, agents or employees) arising during the construction, operation, alteration, reconstruction, maintenance or removal of the Improvements, that are attributable to the negligent acts or failures to act by Lee County, its employees, agents, or designers.

(b) County also agrees to release, indemnify, protect and save harmless CSXT and SGLR, and their respective successors and assigns, subject to the limitations as set out in Section 768.28, Florida Statutes, from all costs or expenses, including attorneys' fees, resulting from any and all loss of life or property, or injury or damage to the person or property of any person, firm or corporation (including the parties hereto, CSXT and SGLR, and the respective officers, agents and employees), and from and against any and all claims, demands, liabilities or actions for such loss, injury or damage, caused by or growing out of (i) any improper or faulty construction or design of the Improvements, and (ii) the presence, use or misuse of the Improvements, and (iii) any change in the flow and/or drainage of water in and through the area resulting from the construction of the Improvements.

(c) County agrees it will exercise its easement rights hereunder at its own sole risk and agrees to indemnify and save harmless CSXT and SGLR, their respective parents, subsidiaries, affiliates, and their respective officers, directors, agents and employees (hereinafter referred to as "CSXT and SGLR ENTITIES"), subject to the

limitations as set out in Section 768.28, Florida Statutes, from all liability, loss, cost and expense, including attorney's fees, which may be sustained by CSXT and SGLR ENTITIES by reason of the death of, or injury to, any person or damage to any property arising out of or in connection with the herein described purposes by County, its contractors, agent or employees; and County agrees to defend at its sole cost and expense and at no cost and expense to CSXT and SGLR ENTITIES any and all suits or action instituted against CSXT and SGLR ENTITIES, for the imposition of such liability, loss, cost and expense. County's obligation to indemnify CSXT and SGLR ENTITIES is subject to the limitation set forth in Section 768.28(5) Florida Statutes. County's obligation will extend up to but not exceed the limits of that section. Notwithstanding any provision contained herein, County agrees to reimburse CSXT and SGLR ENTITIES for all cost and expenses for any damage, including settlement, to SGLR's land and/or facilities resulting from County's installation or use of the Improvements.

(d) Any contractors employed by County to perform any work on the land area relating to the easement granted hereunder will be required by County to sign the indemnification agreement attached hereto as Exhibit "C", and to provide the following insurance:

(i) Contractor employed by the County must agree to carry, with respect to the operations it or any of its subcontractors performs on or about the right-of-way of the CSX Transportation, Inc. and Seminole Gulf Railway, the following insurance coverage: Railroad Protective liability insurance with per occurrence limit of not less than Two Million Dollars (\$2,000,000) and aggregate limit of not less than Six Million Dollars (\$ 6,000,000) written on the ISO form. The policy is to name the CSX Transportation, Inc. and Seminole Gulf Railway LP, and CSX Transportation, Inc. as the named insured(s).

(ii) Commercial General Liability Coverage using form CG0001 10-01 without modification. A combined single limit of \$5,000,000 per occurrence and \$5,000,000 Aggregate is required. (This requirement may be met with an umbrella or excess general liability policy if the general liability policy limit alone is not sufficient) the CSX Transportation, Inc. and Seminole Gulf Railway LP must be named as additional insureds using forms CG2010 (7-04) and CG2037 (7-04). Copies of additional insured endorsements naming the CSX Transportation, Inc. and Seminole Gulf Railway LP as additional insureds must be attached to the certificate of insurance. Blanket additional insured endorsements are not acceptable.

(iii) Auto liability with a combined single limit of not less than One Million Dollars (\$1,000,000). CSX Transportation, Inc. and Seminole Gulf Railway LP must be included as named additional insureds.

(iv) Workers compensation and employers liability with standard limits of liability. The policy is to contain a waiver of subrogation in favor of the CSX Transportation, Inc. and Seminole Gulf Railway.

Such policies of insurance must be endorsed to provide thirty (30) days' notice to each name insured by the insurance company before any reduction to or cancellation of the policies. CSX Transportation, Inc. and Seminole Gulf Railway LP must be furnished with a certificate of insurance for the coverage provided for herein indicating conformance to the foregoing, prior to the commencement of any work on Railroad property.

(e) Lee County is currently self-insured. If at time relevant to activity or use of the easement area Lee County fails to maintain its formal self-insured status, the County will obtain insurance coverage as outlined in paragraph 5(d) above.

6. The sole responsibility for protection of the Improvements from the standpoint of safety and the duty of otherwise policing the Improvements rests exclusively on County at all times and under all circumstances. County will take or cause to be taken such precautionary measures as may be necessary to avoid injury to or death of persons or damage to or destruction of property at the Improvements.

7. If County desires or is required, as herein provided, to revise, renew, add to or alter the Improvements in any manner whatsoever, it will submit plans to CSXT and SGLR for review and written approval thereof before any work or alteration of the Improvements is performed. CSXT and SGLR agree to review and respond within 30

days of receipt. CSXT and SGLR reserves the right to charge the County in connection with any such review work, and those charges will be consistent with those customary in the industry for similar services, and disclosed in advance to County.

8. County is at all times obligated to perform maintenance on or repair of the Improvements as may be required for the safe operation and maintenance of the properties of CSXT and SGLR and will, upon notice in writing from CSXT and SGLR requiring it so to do, promptly make repairs thereto as may be reasonably required by CSXT and SGLR. However, if necessary to protect the property, traffic, patrons or employees of CSXT and SGLR, or any other person, from damage or injury, CSXT and SGLR may with notice to county or without notice to county in the event of an emergency, make such repairs and renewals within the easement area as CSXT and SGLR deem adequate and necessary, all at the sole cost and expense of County. Any costs incurred by CSXT and SGLR pursuant to this Section will be promptly reimbursed to CSXT and SGLR by County upon written demand.

9. CSXT and SGLR's right of supervision over the location of the construction work and inspection of the Improvements from time to time thereafter, and CSXT and SGLR's right to approve or disapprove of any contemplated work on the Improvements, extends for such distance on each side of the Rail Facilities as may, in CSXT and SGLR's judgment, be necessary to support and sustain the Rail Facilities, bridges, roadbed, and property of CSXT and SGLR.

10. County will be responsible for any settlement or other damage caused to the roadbed, bridges, right-of-way and/or tracks, facilities, trestles, appurtenances or property of CSXT and/or SGLR arising solely from or as a result of the installation of the Improvements within the easement area, and County agrees to pay CSXT and SGLR on demand the full cost and expense of repairing or restoring said property.

(a) County has paid a fee of Four Thousand Two Hundred and Fifty Dollars (\$4,250.00) receipt of which is hereby acknowledged, to cover CSXT and SGLR's legal and administrative costs in preparing and reviewing this Easement Agreement.

11. This Easement Agreement is binding upon and inures to the benefit of the parties successors and assigns upon recording in the Lee County Public Records.

12. CSXT and SGLR retain the right to grant licenses and easements over, under, across and through County's utility easement to the extent any such future occupancy does not conflict with County's use for a 18" HDP water main as shown on Exhibit "A" attached. The County shall not be entitled to any compensation for use of the easement area by additional parties. In the event of any taking or acquisition by a condemning authority of right of way, the County shall not be entitled to any compensation and hereby waives its right to make a claim for compensation or right of apportionment.

13. All notices, request, demands and other communications hereunder will be in writing and will be deemed to have been duly given if personally delivered, or if mailed, when mailed by United States, first class, certified or registered mail, postage prepaid to the other party at the following address (or at such other address as may be given in writing by any party to the other):

If to SGLR:

**Seminole Gulf Railway, L.P.
4110 Center Pointe Drive
Fort Myers, FL 33916
Attn: President**

If to CSXT:

**CSX Transportation, Inc.
Real Property, Inc.
301 W. Bay Street, Suite 800
Jacksonville, FL 32202-5184**

If to County:

**Lee County
Director of Lee County Utilities
1500 Monroe Street
Fort Myers, FL 33901**

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IN WITNESS WHEREOF, the parties hereto have executed these presents in duplicate the day and year first above written.

WITNESSES FOR CSXT:

Betty A. Jones
[Signature]

CSX TRANSPORTATION, INC.

By: [Signature]
Stephen A. Crosby, President -
CSX Real Property Inc.

WITNESSES FOR SGLR:

Joseph C. Macii
Kurt Swann

SEMINOLE GULF RAILWAY, L.P.
By it's General Partner,
SEMINOLE GULF RAILWAY, INC.

By: [Signature]
Harry E. Neeves, Vice President



ATTEST:
Charlie Green, Clerk of the
Circuit Court and Ex-Officio
Clerk of the Board of County
Commissioners of Lee County, FL

By: Marcia Wilson
Deputy Clerk

Board of County Commissioners of
LEE COUNTY, FLORIDA

By: [Signature]
Vice Chair
Lee County Board of
County Commissioners

APPROVED AS TO FORM:

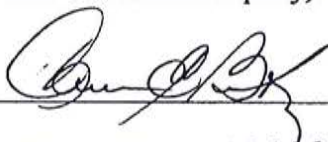
By: [Signature]
County Attorney

ACKNOWLEDGMENT OF CSX TRANSPORTATION, INC.

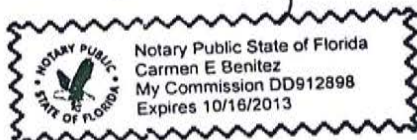
STATE OF FLORIDA

COUNTY OF DUVAL

The foregoing instrument was acknowledged before me this 8th day of FEBRUARY, 2011, by Stephen A. Crosby, who is personally known to me and who did take an oath as President-CSX Real Property, Inc., signing on behalf of CSX Transportation, Inc..



(Seal)

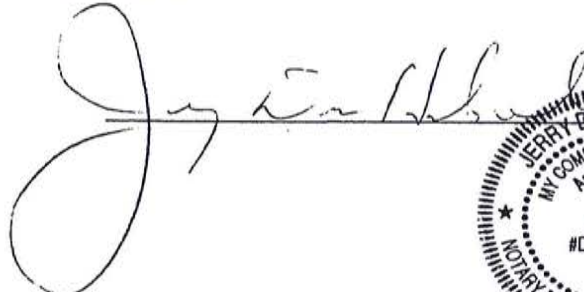
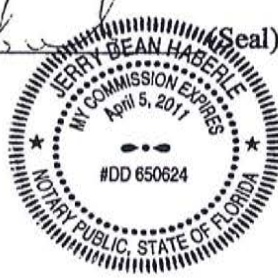


ACKNOWLEDGMENT OF SEMINOLE GULF RAILWAY, L.P.

STATE OF FLORIDA

COUNTY OF LEE

The foregoing instrument was acknowledged before me this 4 day of February, 2011, by Harry E. Neeves, who is personally known to me and who serves as Vice President of Seminole Gulf Railway, Inc., on behalf of the Corporation, in its capacity as general partner of Seminole Gulf Railway, L.P.


(Seal)


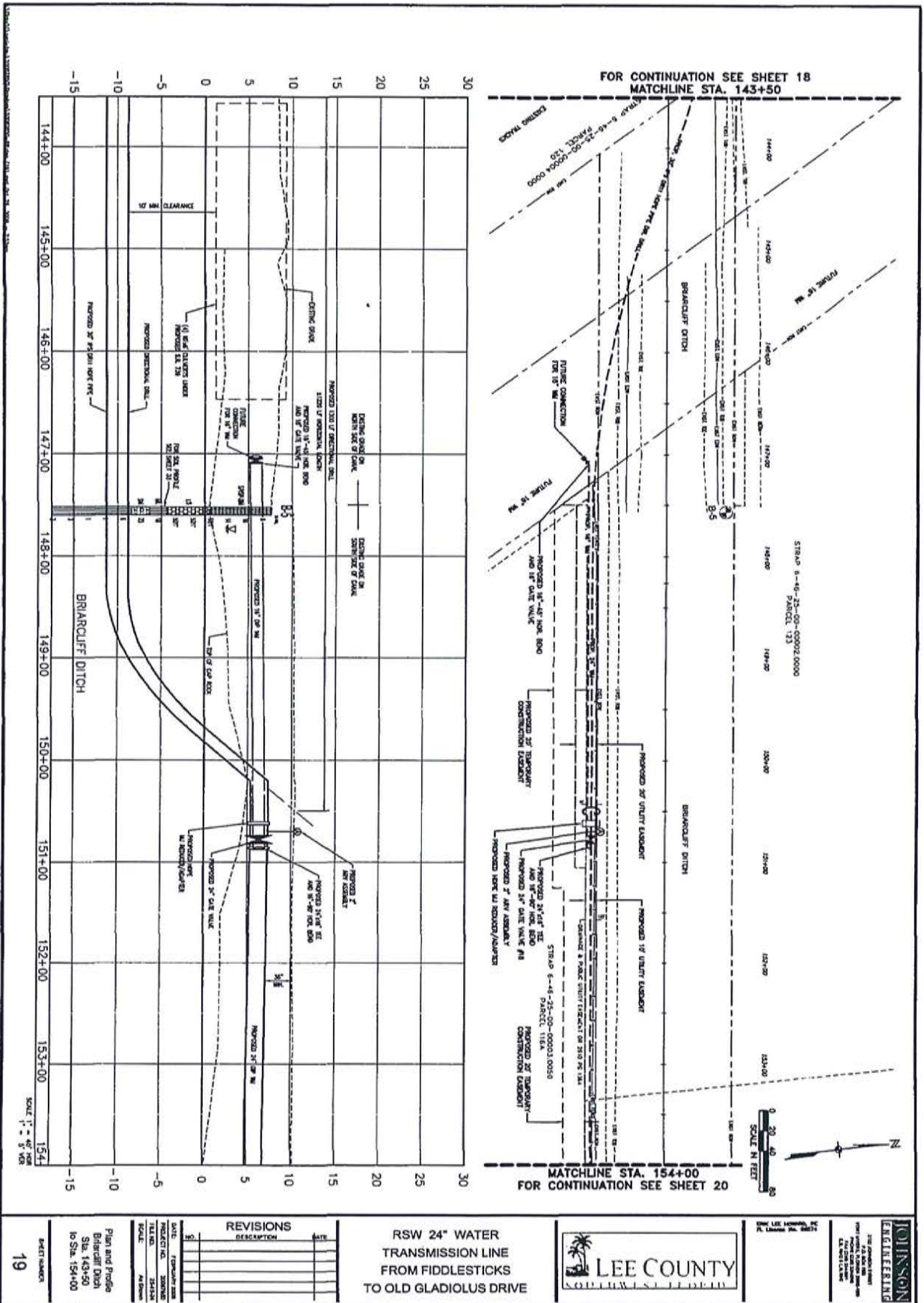


EXHIBIT "A-2"

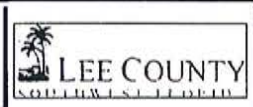
Plan and Profile
 Brarcliff Ditch
 Sta. 143+50
 to Sta. 154+00

REVISIONS

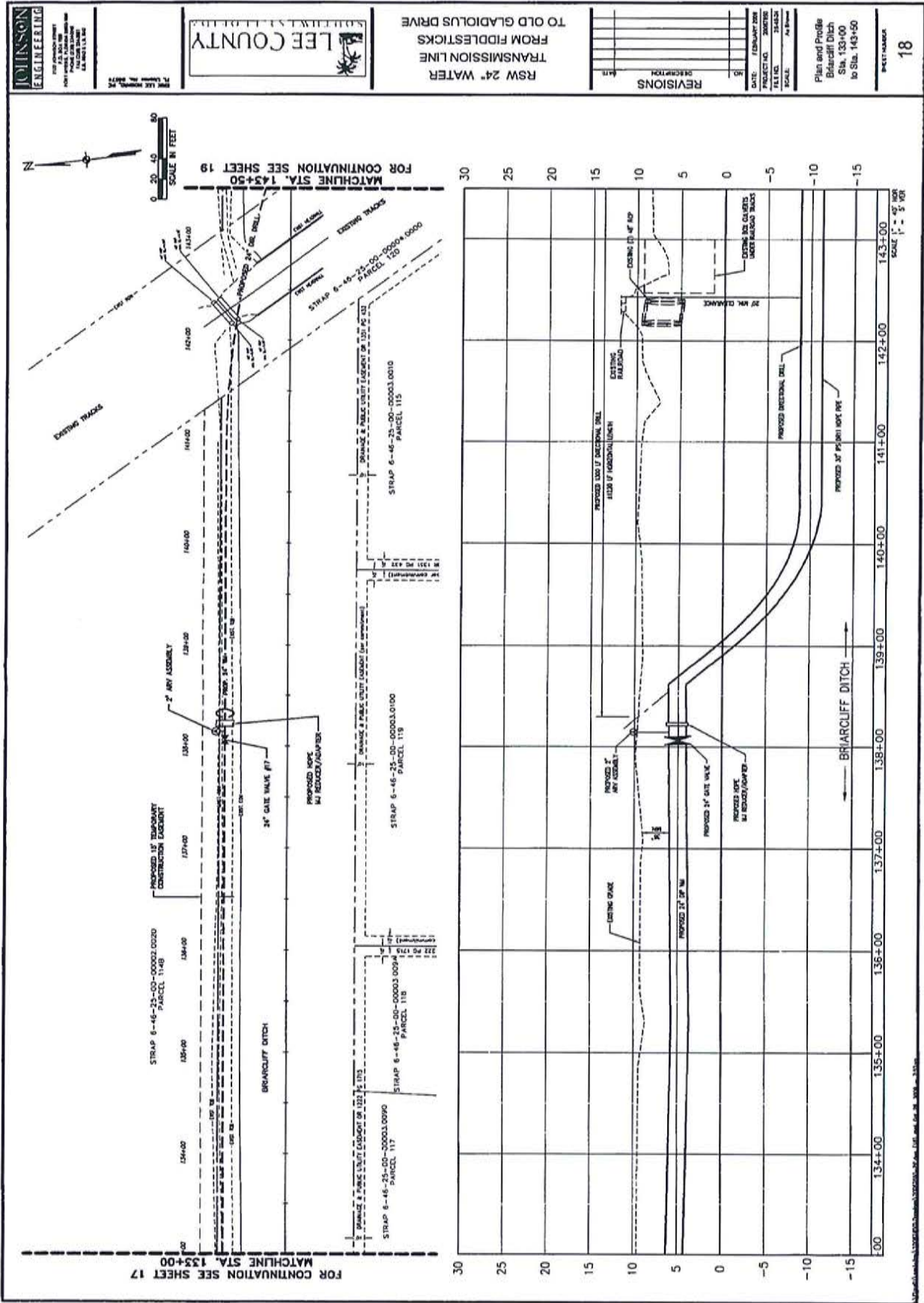
NO.	DATE	DESCRIPTION
1		
2		
3		
4		
5		

DATE: 10/20/11
 PROJECT NO.: 2011000059253
 TALKED TO: ZACHRY
 SCALE: AS SHOWN

RSW 24" WATER
 TRANSMISSION LINE
 FROM FIDDLSTICKS
 TO OLD GLADIOLUS DRIVE



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 LEWIS W. JOHNSON
 P.E.

LEE COUNTY
 SOILS & WATER DIVISION

RSW 24" WATER TRANSMISSION LINE FROM FIDDLERS DRIVE TO OLD GLADIOLUS DRIVE

REVISIONS

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMITS	FEBRUARY 2008
2	SHORTER TRACKS	APRIL 2008
3	AS SHOWN	

Plan and Profile
 Branch Cliff Ditch
 Sta. 133+00
 to Sta. 143+50

SHEET NUMBER
18

EXHIBIT "A-1"

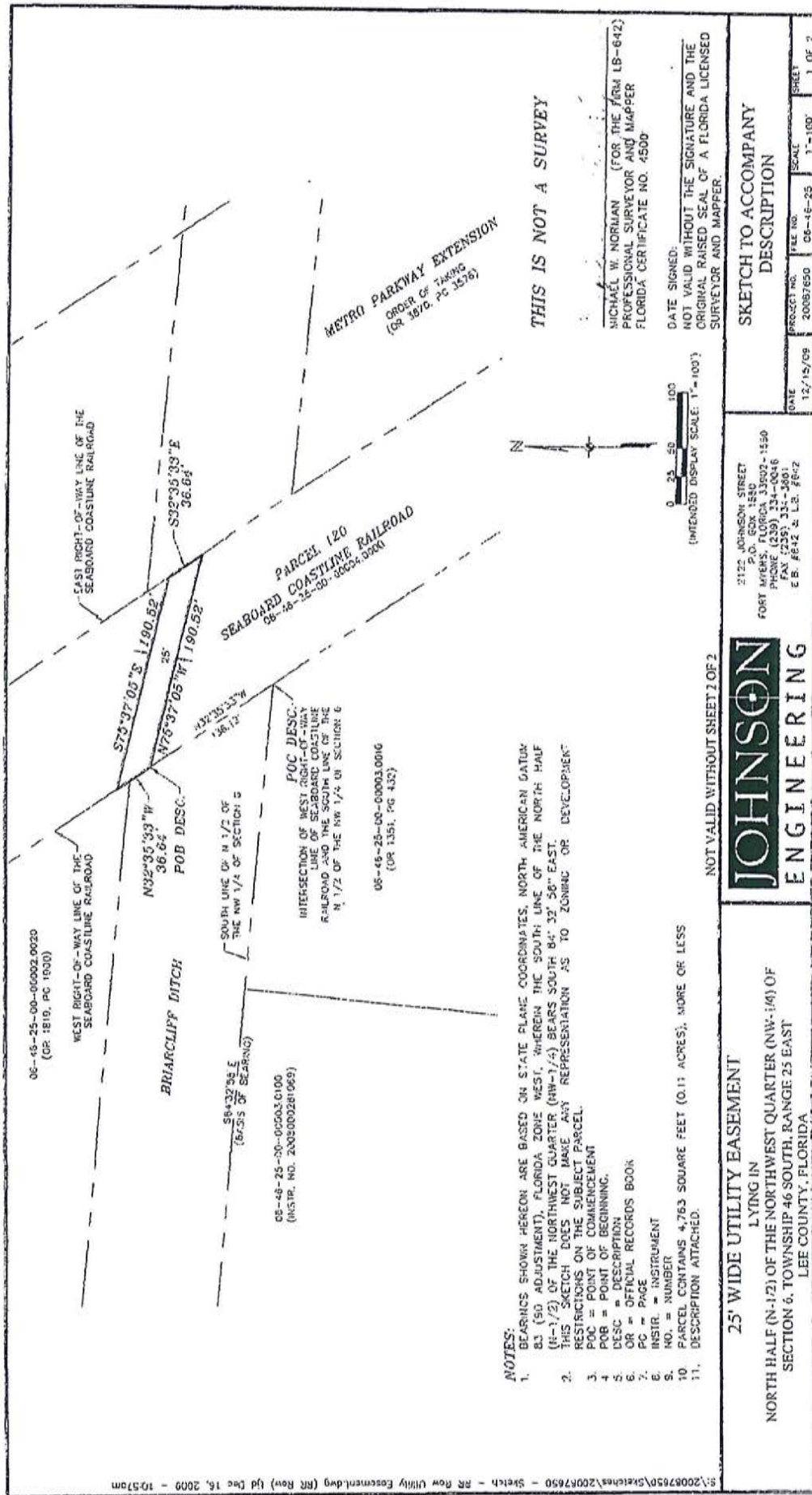


EXHIBIT "B-1"



PARCEL 120

December 16, 2009

DESCRIPTION

**25 FOOT WIDE UTILITY EASEMENT
LYING IN
NORTH HALF (N-1/2) OF THE NORTHWEST QUARTER (NW-1/4) OF
SECTION 6, TOWNSHIP 46 SOUTH, RANGE 25 EAST
LEE COUNTY, FLORIDA**

A parcel lying in the North Half (N-1/2) of the Northwest Quarter (NW-1/4) of Section 6, Township 46 South, Range 25 East, Lee County, Florida, which tract or parcel is more particularly described as follows:

Commencing at the intersection of the west right-of-way line of the Seaboard Coastline Railroad and the south line of the North Half (N-1/2) of the Northwest Quarter (NW-1/4) of said Section 6 thence North 32°35'33" West on said west right-of-way line for 136.12 feet to the Point of Beginning
From said Point of Beginning continue North 32°35'33" West on said west right-of-way line for 36.64 feet; thence South 75°37'05" East departing said west right-of-way line for 190.52 feet to an intersection with the east right-of-way line of said Railroad; thence South 32°35'33" East on said east right-of-way line for 36.64 feet; thence North 75°37'05" West departing said east right-of-way line for 190.52 feet to the Point of Beginning.
Parcel contains 4,763 square feet (0.11 acres), more or less

Bearings hereinabove mentioned are based on State Plane Coordinates, North American Datum 83 (90 Adjustment), Florida Zone West, wherein the south line of the North Half (N-1/2) of the Northwest Quarter (NW-1/4) bears South 84° 32' 58" East.

12-16-09 - 20087650 - RR Row Utility Easement

SHEET 2 OF 2
(NOT VALID WITHOUT SHEET 1 OF 2)

EXHIBIT "B-2"

EXHIBIT "C"

RELEASE AND INDEMNIFICATION

FOR VALUE RECEIVED, and in consideration of being authorized by Seminole Gulf Railway L.P., a Delaware limited partnership ("SGLR") to enter upon the property of SGLR in the performance of the contract between the undersigned contractor (the "CONTRACTOR") and Lee County, Florida ("County"), with respect to the construction of and maintenance of certain improvements and a Potable Water Pipeline ("Utility") which occupy land owned by CSXT and leased to SGLR (the "Rail Facilities") pursuant to the License Agreement attached hereto as Exhibit "A" (the "Agreement"), the undersigned, intending to be legally bound, agree as follows:

1. CONTRACTOR will comply with all the obligations of County with respect to construction of the Utility under the Agreement, including, without limitation, the provisions of Paragraph 2 thereof.

2. CONTRACTOR acknowledges and appreciates the risks and danger assumed and attendant upon the exercise of the permission granted hereunder, and assumes all risk of injury (including death) to itself, its officers, employees and agents, or to its property, occurring or arising while or resulting from being upon or about the property of SGLR, regardless of SGLR's fault or negligence.

3. CONTRACTOR, for itself and for its successors and assigns, agrees to release, indemnify, defend and save harmless SGLR and CSX Transportation, Inc. ("CSXT") and their respective officers, employees, agents, successors and assigns, from and against all damages, losses, claims, demands, suits, costs or expenses, including counsel fees, which SGLR or CSXT may suffer or sustain, or be subject to, directly or indirectly, for personal injury, death or property damage suffered by anyone whomsoever (including SGLR, CSXT and CONTRACTOR) and arising out of or caused either wholly or in part by the work performed on SGLR's property by the undersigned, regardless of the fault, failure or negligence of SGLR or CSXT.

4. In conformance with Section 725.06 Florida Statutes, to the extent it applies to this indemnity, the specific consideration given for the promises of the CONTRACTOR set forth in this Release and Indemnification is the right granted CONTRACTOR to perform work on SGLR's property, together with One Dollar (\$1.00) in hand paid by SGLR to CONTRACTOR, receipt whereof is hereby acknowledged, and the adequacy of which CONTRACTOR accepts as completely fulfilling the obligations of SGLR under the requirements of Section 725.06 Florida Statutes.

5. CONTRACTOR agrees to obtain the insurance specified in paragraph 5(d) of the Agreement. If any such insurance is to be provided on a claims-made basis, then in addition to the coverage requirements specified in paragraph 5(d) of the Agreement, CONTRACTOR agrees to make every effort to maintain similar insurance for at least two years following completion of the construction of the Utility. If the insurance is terminated for any reason, CONTRACTOR agrees to purchase an extended reporting provision of at least two years to report claims arising from work performed in connection with construction of the Utility.

IN WITNESS WHEREOF, the undersigned has caused these presents to be executed this ____ day of _____, 20____.

ATTEST:

CONTRACTOR:

BY: _____

BY: _____

TITLE: _____

TITLE: _____

**Lee County Board Of County Commissioners
Agenda Item Summary**

Blue Sheet No. 20110139

1. ACTION REQUESTED/PURPOSE:

Approve settlement in Lee County v. Seaboard Coastline Co., et al., Case No. 10CA-3081, Parcel 102, South Fort Myers Water Transmission Line Project.

2. FUNDING SOURCE:

Fund: Utilities Capital Improvements; Program: Capital Project; Project: South Fort Myers Water Transmission Line Improvements

3. WHAT ACTION ACCOMPLISHES:

Settles all claims for acquisition of easement.

4. MANAGEMENT RECOMMENDATION: Approve.

5. Departmental Category: A14B

6. Meeting Date: 3/1/2011

7. Agenda:

Administrative

8. Requirement/Purpose: *(specify)*

- Statute
- Ordinance
- Admin Code
- Other

9. Request Initiated

Commissioner: All
Department: COUNTY ATTORNEY
Division: No Divisions
By: John Renner

10. Background:

Lee County requires an easement under the railroad tracks on Crystal Drive to install a water transmission line. CSX Transportation, Inc. is the fee owner and Seminole Gulf Railway, Inc. is the long term lessee of the railroad right-of-way. Lee County was offered a license at the cost of \$73,359.00. Lee County required an easement rather than a license and eminent domain proceedings were filed. A settlement has been reached where Lee County will receive permanent utility easements for water lines across the railroad right-of-way on Crystal Drive (see Exhibit "A" attached) and Briarcliff Road (see Exhibit "B" attached) for \$29,250.00.

Funds available in string account no.: 20718448730.506820

Exhibits "A" and "B" attached.

11. Required Review:

<i>Andrea Fraser</i>	<i>Doug Meurer</i>	<i>Karen Maguire</i>	<i>Emma Wolf</i>	<i>David Harris</i>	<i>Karen Hawes</i>
COUNTY ATTORNEY	UTILITIES	COUNTY LANDS	Budget Analyst	Budget Services	County Manager

12. Commission Action: