TECHNICAL SPECIFICATIONS

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DIVISION 1

GENERAL REQUIREMENTS

SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. All of the work under this contract is located within the rights-of-way and utility easements shown on the Drawings.

B. Furnish all labor, materials, equipment, tools, services and incidentals to complete all work required by these Specifications and as shown on the Drawings.

C. Perform the work complete, in place, and ready for continuous service, and include repairs, testing, permits, cleanup, replacements and restoration required as a result of damages caused during this construction.

D. All materials, equipment, skills, tools and labor which are reasonable and properly inferable and necessary for the proper completion of the work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the CONTRACTOR whether specifically indicated in the Contract Documents or not.

E. Comply with all Municipal, County, State, Federal, and other codes which are applicable to the proposed construction work.

1.02 GENERAL DESCRIPTION OF WORK

A. The project consists of furnishing all labor, materials, equipment and all incidentals and appurtenances for the installation of new sanitary sewer facilities (piping, manholes, service laterals and clean-outs, etc.). Construction also includes clearing and grubbing, dewatering, MOT's, temporary pavement markings and signage, complying with permit conditions, testing and all restoration work for a complete and operating system.

1.03 DETAILED DESCRIPTION OF COMPONENTS

A. Furnish and install sanitary sewer system as shown on the drawings, including all pipe, fittings, structures, service laterals & clean-outs and connections to existing systems and all appurtenances.

B. Provide professional preconstruction video-audio tape of existing conditions along complete length and width of project, including but not limited to the face of the adjacent buildings.

C. Provide all required survey work for layout, construction and record data. Provide all required record drawings and other record documents.

D. Complete all permitting requirements as per the Specific Conditions of the Contract Documents.

E. All other required work whether implied or incidental to the proper completion of the project.

1.04 WORK BY OTHERS

A. The CONTRACTOR shall cooperate fully with all utility forces of the CITY, or other public or private agencies engaged in the relocation, altering, or otherwise rearranging any facilities which interfere with the progress of the work, and shall schedule the work so as to minimize interference with said relocation, altering, or rearranging of facilities.

B. The CONTRACTOR's attention is directed to the fact that work may be conducted at the site by other contractors during the performance of the Work under this Contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the Work of such other contractors, and shall cooperate fully with such contractors to provide continued safe access to their respective contracts.

1.05 PERMITS

A. The OWNER has obtained permits for the design and construction of these facilities from the following agencies:

1. Broward County Health Department – Wastewater Collection / Transmission System Permit

B. Pursuant to the Public Bid Disclosure Act, the permits and fees which the CONTRACTOR must apply for, obtain and pay prior to or during this project are as follows:

1. Permits as listed in the project Special Instructions.

2. Other permits may also be required for the Work from local, County, State or Federal authorities.

3. All associate permit fees shall be included in Bid Item Number 1, Site Mobilization.

1.06 CONTRACTOR'S USE OF PREMISES

A. CONTRACTOR shall limit the use of the premises for his Work and for storage to allow for:

1. Work by other contractors.
2. OWNER occupancy.
3. Public use.

B. Coordinate use of premises with other contractors, the OWNER, and the ENGINEER. All conflicts over the use of the premises shall be resolved without additional cost to the OWNER.

C. CONTRACTOR shall assume full responsibility for security of all his and his subcontractors materials and equipment stored on the site.

D. If directed by the OWNER or ENGINEER, move any stored items which interfere with operation of OWNER or other contractors.

E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

1.07 CONTRACTOR FURNISHED MATERIAL AND EQUIPMENT

A. All equipment, materials, instruments or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents and shall be the products of reliable manufacturers who, unless otherwise specified, have been regularly engaged in the manufacture of such material and equipment for at least five (5) years. Procedures and additional requirements regarding manufacturer's experience and substitutions are included in Section 01300 – Submittals.

1.08 OWNER OCCUPANCY

A. Coordinate all construction operations with OWNER and ENGINEER to minimize conflict and to facilitate OWNER usage.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 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 part of the Contract.

1.02 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, 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.

The City does not pay for items ordered and/or stored on site. Payment for pay items are paid once the item is installed, measured in place, completed and accepted.

B. It is intended that all mobilization, insurance, bond, license and other miscellaneous administrative costs, and all other costs to the Contractor not specifically identified in the following item description be distributed among and included in the unit prices stated. No additional payment shall be made for transportation, communications, office maintenance, project signs, and other incidental work or services, and no further payment shall be made for remobilization unless all of the work is suspended by the Engineer for a period in excess of three months and through no fault to the Contractor.

C. The CONTRACTOR's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in Bid Schedule for various appurtenant items of work.

D. All required manufacturer testing and certification shall be included in the unit prices shown in the Proposal and Contract. Density testing required for compacted backfilling, and concrete strength and materials testing required at the time of construction shall be arranged for by Contractor and paid for by the City. Water

quality monitoring testing required for the dewatering permit shall be arranged for by the Contractor and paid for by the Contractor.

PART 2 - MATERIALS

Not used.

PART 3 - EXECUTION

GENERAL CONDITIONS

2.01 SITE MOBILIZATION/DEMOBILIZATION – Bid Item No. 1

A. Payment for mobilization/demobilization, bonds and insurance, scheduling and temporary facilities, utilities, permits (SFWMD dewatering, FDEP water main clearances, City permits, etc.) and all other activities necessary will be made at the Contract Lump Sum (LS) price bid for the item, which price shall be full compensation for all materials, labor, equipment, tools, and all other incidentals necessary to complete this item.

B. This also includes coordination between the Contractor and FPL in regards to any power poles that may need to be temporarily secured during construction. The City shall pay FPL for services on a case by case basis. If however, due to the Contractor's failure to complete the work within the agreed upon period of time, any additional costs for FPL's extended time for their service, including any stand-by time or remobilization shall be paid for by the Contractor.

C. **Payment item for site mobilization/demobilization shall not exceed five (5%) of the contract price. Should the bid price for mobilization/demobilization exceed 5% of the Contract amount any amount over the 5% will be paid with the Contractor's final payment application.**

2.02 MAINTENANCE OF TRAFFIC - Bid Item No. 2

A. The quantity of traffic control to be considered for payment shall be equivalent to the percentage of the project determined by the Engineer to be complete as of the date of the pay request submitted. The percent completion of the project shall be based on the percent of the total project actually constructed and not on the percent of the Contract price completed.

B. Payment for traffic control shall be made on the basis of a percentage (as determined in 'A' above) of the Lump Sum (LS) Price. The contract unit price shall include compensation for required labor, materials, and equipment necessary to keep

roadways and property accesses in service during construction activities in accordance with the Contract Documents.

C. A detailed MOT plan will need to be provided by the Contractor.

D. This item includes maintenance of traffic plan, traffic control, flagman, detour signs, barricades, advance warning arrow panels, temporary signage, **construction and removal of temporary access driveways to residential homes, commercial material for driveway maintenance**, etc. in order to provide safety and traffic access in accordance with local and state requirements.

E. This item also includes furnishing and installing material (temporary pavement or asphalt millings) for temporary roadways for local resident access and emergency vehicle access during the duration of the construction, and for providing all restoration due to the construction of the temporary roadways.

F. Refer to Specification Section 01570.

2.03 AS-BUILT RECORD DRAWINGS - BID ITEM NO. 3

A. Payment for this item shall be on a Lump Sum (LS) Basis. One set of full size design drawings on reproducible material and an electronic file of the design drawings on compact disk will be furnished to the Contractor by the City. The Contractor shall maintain full size (22" x 34") field drawings to reflect the "as-built" items of work as the work progresses.

B. The signed and sealed As-Built drawings prepared by professional surveyor are required to be submitted with each pay request. Partial payment will be made for this item based upon the percentage of work completed. All survey work shall be performed by an independent third party surveyor, licensed to practice in the State of Florida. The surveyor shall be retained by the Contractor and approved by the Engineer.

C. Upon completion of the work, the contractor shall prepare a record set of "as-built" drawings on full size, reproducible material and an electronic file in AutoCAD 2009 or latest version. No payment will be made for final "as-built" drawings until both the reproducible and electronic files are received and accepted by the City. **The As-built data shall be in State Plane Coordinates and NAVD 88.**

D. This item does not include surveying work required for layout and alignment of utility and paving improvements.

E. All survey work shall be performed by an independent third party surveyor, licensed to practice in the State of Florida. The surveyor shall be retained by the Contractor and approved by the City.

2.04 PROFESSIONAL VIDEO OF CONSTRUCTION SITE – Bid Item No. 4

A. Payment for Audio-Video of the entire project site, including roadways, sidewalk, outside face of houses and buildings (front), driveways, walls, fences, landscaping, etc. will be made at the Contract Lump Sum (LS) price bid for this item.

B. **A professional Video Taping Company must be used for this work.**

C. Refer to Specification Section 01381.

2.05 NPDES PERMIT/EROSION PROTECTION MEASURES - Bid Item No. 5

A. Payment for Contractor required NPDES Permit application (Notice of Intent and Notice of Termination), reporting by a person holding a certification as an FDEP NPDES Construction Site Inspector, and associated erosion protection measures including turbidity abatement for dewatering procedures will be made at the Contract Lump Sum (LS) Price Bid for this item. The percent completion of the project shall be based on the percent of the total project actually constructed and not on the percent of the Contract price completed.

B. Refer to Specification Section 01658.

C. This item includes all silt fencing required, as well as protection of existing drainage inlets.

ROADWAY

2.06 OPEN CUT PAVEMENT TRENCH REPAIR – Bid Item No. 6

A. Measurement of this item shall be a count of the Linear Feet (LF) of length of pavement removed for installation of the proposed underground utilities. **No measurement of width shall be made for this item.** The contract unit price shall include all labor, materials, and equipment necessary to construct the trench repair in accordance with the plans and specifications. This pay item also includes providing a temporary asphalt concrete patch until replaced with permanent asphalt concrete patch. Also included in this item is all restoration work (sod, driveways, etc.) that is required due to removing the pavement trench section.

B. Payment shall be made at the Contract unit price for the length of asphalt pavement to be repaired in the section of road that shall be milled and overlayed only. **Payment shall not be made for asphalt restoration on that section of road to be entirely rebuilt.**

C. The contract unit price shall include all labor, materials, and equipment necessary to prepare the sub-base, install the baserock and asphalt concrete in accordance with the plans and specifications.

D. Refer to "Surface Restoration Details" on Drawing D-1.

2.07 5' WIDE CONCRETE SIDEWALK (4" THICK) – Bid Item No. 7

A. Payment for furnishing and installing concrete sidewalk, 4 inches thick, shall be made at the contract unit price per Linear Feet (LF) of 5' wide concrete sidewalk installed and accepted. The contract unit price shall include full compensation for all labor, materials, and equipment necessary to install the concrete sidewalk in accordance with FDOT Standards and with the plans and specifications. Also included in this item is all restoration work (sod, driveways, etc.) that is required due to the removal/installation of new sidewalk.

B. Refer to "Sidewalk Construction Details" on Drawing D-1.

2.08 PAVEMENT MARKINGS – Bid Item No. 8

A. The Lump Sum (LS) price bid for pavement markings (symbols & RPM's) shall include all labor, material, and equipment required to construct 50 linear feet of double yellow striping, and amber/amber reflective pavement markers (RPM's) at 20 feet on center as shown on the detail drawings. All pavement marking shall be thermoplastic. The unit price shall include all materials, equipment, preparation, and other miscellaneous work required to complete the work as shown on the plans in accordance with Florida Department of Transportation, Section 711.

B. This item also includes providing temporary painted striping during curing periods of asphalt and between the initial and final lifts of asphalt.

SEWER

2.09 SANITARY SEWER PIPE - Bid Item No. 9, 10 and 11

A. The quantity of PVC SDR 35 sanitary sewer pipe (color green) shall be the Linear Feet (LF) measured of the completed sewers, taken along a horizontal projection of the centerline of the sewers from centerline to centerline of the manholes. Depths of sewers shall be measured from the manhole rim to the invert of the sewer.

B. Payment for furnishing and installing PVC SDR 35 sanitary sewer pipe of the various sizes and depths shall be made at the Contractor's unit price per linear foot of the pipe and shall include all necessary labor and materials for furnishing and laying of the pipe, unloading, stringing, excavation of any type including rock, excavation and removal of muck, sheeting, shoring, backfilling, complying with the State of Florida

Trench Safety Act, pipe location tape, testing, fittings, plugs, tees, wyes, bends, transition connections, existing utility protection, and clean-up. This includes all restoration (sod, irrigation repair, maintenance of balance of irrigation zones, etc.) to complete the work.

C. In areas of deep trench where dewatering and maintenance of vehicular traffic is required, the Contractor shall bench down the sides of the trench in order to cover the dewatering well point heads with temporary steel plating. This will be paid for under this Bid Item.

D. The unit price bid per foot shall also include the cost for soft-digs to verify location (horizontal & vertical) of all utility crossings, including paralleling of utilities, prior to construction of the proposed force main.

2.10 SANITARY MANHOLES W/COATINGS - BID ITEM NO. 12, 13 AND 14

A. Payment for installing sanitary manholes (per vertical foot measured from finished manhole rim to lowest invert of manhole), shall be made at the Contractor's unit price per each (EA) structure installed and accepted. The Contract Unit Price shall include compensation for labor, material and equipment, and all excavation of any type including rock and/or muck, shoring, bedding material, backfill, monolithic bases, barrel sections, cones, frames and covers, invert channels and benches, drop connections, masonry work, **coatings,** concrete reinforcing, clean-up necessary to install the sanitary manholes in accordance with the plans and specifications.

B. Refer to Sanitary Manhole Details on Drawing D-4.

C. The unit price bid per foot shall also include the cost for soft-digs to verify location (horizontal & vertical) of all utility crossings, including paralleling of utilities, prior to construction of the proposed force main.

2.11 6-INCH PVC SEWER LATERALS (SHORT OR LONG) - Bid Item No. 15 and 16

A. The number of single sewer laterals (short or long) with temporary plugs at right-of-way line will be determined by the count of units installed and accepted.

B. Payment for furnishing and installing 6" sewer lateral services will be made at the Contractor's unit price for each (EA) sewer lateral connection installed and accepted. The Contract Unit Price will include compensation for labor, material and equipment, required to install the new sewer service and connection from the proposed sanitary sewer to the right-of-way line, all in accordance with the plans and specifications. Payment will also include full compensation for providing all excavation of any type including rock and/or muck, sheeting, shoring, backfilling, temporary plugs, EMS marker, fittings, existing utility protection, and other appurtenances necessary to complete the sewer lateral service installation. This item

includes all restoration (sod, re-establishing swales, irrigation repair, maintenance of balance of irrigation zones, etc.) to complete the work.

C. Refer to Sewer Lateral Details on Drawing D-3.

D. The unit price bid per foot shall also include the cost for soft-digs to verify location (horizontal & vertical) of all utility crossings, including paralleling of utilities, prior to construction of the proposed force main.

2.12 PLUG WEST INVERT @ EXISTING SANITARY MH (STA. 25+18) – BID ITEM NO. 17

A. The Contract Unit Price (EA) for this item shall be full compensation for plugging the west invert of the existing sanitary manhole at Station 25+18 including all appurtenant and miscellaneous items of work required.

B. Refer to Drawing C-4.

C. Contractor shall maintain service during plugging. Refer to Bid Item No. 22 for By-pass pumping.

2.13 CORE NEW INVERT INTO EXIST. SANITARY MH (STA. 25+18) – BID ITEM NO. 18

A. The Contract Unit Price (EA) for this item shall be full compensation for coring existing sanitary manhole and installation of gravity sewer main connection to the existing sanitary manhole including all appurtenant and miscellaneous items of work required.

B. Contractor shall maintain service during connection. Refer to Bid Item No. 22 for By-pass pumping.

2.14 COAT INSIDE OF EXISTING SANITARY MH @ STA. 25+18 – BID ITEM NO. 19

A. The Contract Unit Price (EA) for this item shall be full compensation for coating the inside of the existing sanitary manhole at Station 25+18 including cleaning and surface preparation of the manhole and applying sewpercoat and all appurtenant and miscellaneous items of work required.

B. Contractor shall maintain service during coating operation. Refer to Bid Item No. 22 for By-pass pumping.

MISCELLANEOUS

2.15 REMOVE EXISTING 8" SANITARY SEWER & REMOVE CAP – BID ITEM NO. 20

A. Payment for removal of existing 8" sanitary sewer and cap shall be determined by the number of Linear Feet (LF) of pipe removed. Payment under this item shall be made at the contract unit price and shall include full compensation for properly restraining, capping, cutting, providing VAC trucks for sewage removal, removing, hauling away, legally disposing of removed pipe from locations as indicated on the plans.

2.16 DEWATERING – BID ITEM NO. 21

A. Payment for this item shall be made at the Lump Sum (LS) basis and shall be paid in increments in proportion for the sewer work completed. The Contractor's lump sum price shall include full compensation for providing a complete dewatering operation for the installation of the sanitary sewer system. This item includes all labor, equipment and materials for stilling basin, pump noise mitigation, providing and maintaining floating turbidity barriers at all storm sewer outfalls and other required dewatering appurtenances. Dewatering pumps shall have mitigation measures to reduce the noise lever to less than 60 dBA measured at the base of residential or commercial structures.

B. Refer to Specification Section 02140.

C. This pay item includes submitting and securing the dewatering permit from South Florida Water Management District. This includes the permit fee.

2.17 BY-PASS PUMPING – BID ITEM NO. 22

A. The Lump Sum (LS) bid for this item shall be full compensation for the furnishing temporary bypass pumping so that the proposed work can be completed, including all appurtenant and miscellaneous items of work required.

B. Bid Item includes advance notification of shut down to all affected businesses and residents, coordination and scheduling of the operation with City personnel to effect shut down, flow transfer, power to operate the bypass pump, plans for emergency operation, cutting and plugging of existing mains, bypass pumping and any other operations required to provide temporary wastewater service.

C. Bid item also includes a Vac Truck to be on standby during bypass pumping operations.

D. **Contractor shall have available on-site during by-pass pumping operations, a backup emergency standby pump with power of the same pumping and operational capacity as the by-pass pump.**

2.18 FLOWABLE FILL (100 PSI DIGGABLE) – BID ITEM NO. 23

A. Payment for this item shall be made at the Contract unit price per Cubic Yard (CY) of 100 psi FDOT diggable, flowable fill installed and accepted and shall include compensation for all labor, materials and equipment required to complete the work as indicated on the plans.

B. **This pay item is only for placing flowable fill between piping that does not meet separation requirements.** It is not for trench repair, backfill, etc.

2.19 RELOCATE EXISTING 8" WATER MAIN @ STA. 14+94 – BID ITEM NO. 24

A. Payment for raising water main as shown on C-2 shall be made at the Contract Lump Sum (LS) price bid for this item. The Contractor's unit price shall include full compensation for providing all excavation, dewatering, backfilling, restraints, all fittings, testing and all other appurtenances required to complete construction of raising the water main.

B. The pay item also includes furnishing and installing the 8" line stop. **The Contractor shall field verify that the existing water main is 8" diameter prior to submitting the shop drawing for the line stop.**

2.20 INDEMINIFICATION – BID ITEM NO. 25

A. Payment for this item is included in accordance with the General Conditions and shall be made at the Contract Lump Sum (LS) price bid for this item.

END OF SECTION

SECTION 01027
APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements governing the Contractor's Applications for Payment.

1.02 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

a. Contractor's Construction Schedule.

b. Application for Payment forms, including Continuation Sheets.

c. Final list of subcontractors.

d. Schedule of allowances.

e. Schedule of alternates.

f. List of products.

g. List of principal suppliers and fabricators.

h. Schedule of submittals.

2. Submit the Schedule of Values to the Engineer at the earliest possible date but no later than 7 days before the date scheduled for submittal of the initial Applications for Payment.

3. Subschedules: Where Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.

b. Name of the Engineer.

c. Project number.

d. Contractor's name and address.

e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

a. Related Specification Section or Division.

b. Description of Work.

c. Name of subcontractor.

d. Name of manufacturer or fabricator.

e. Name of supplier.

f. Change Orders (numbers) that affect value.

g. Dollar value of both labor and materials.

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.

4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.

8. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.03 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Engineer and paid for by the Owner. The initial

Application for Payment and the final Application for Payment involve additional requirements.

B. Payment-Application Times: Each progress-payment date is indicated in the Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment-Application Times: The date for each progress payment is the 15th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days prior to the date for each progress payment.

D. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Applications for Payment. Percent of work complete indicated on the Application for Payment shall be consistent with the work indicated on the Record Documents as complete as of the date of the application. AIA Forms are included at the end of this Section.

E. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Engineer will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

F. Transmittal: Submit 4 signed and notarized original copies of each Application for Payment to the Engineer by a method ensuring receipt within 24 hours. One copy shall be complete, including waivers of lien and similar attachments, when required.

G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous application.

1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.

2. When an application shows completion of an item, submit final or full waivers for such items.

3. Waiver Forms: Submit executed waivers of lien on forms in conformance with Florida Statute FS 713.20.

4. Waiver Forms: Submit waivers of lien on forms which comply with State statutes, and executed in a manner, acceptable to the Owner.

H. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following:

1. Final list of subcontractors.
2. List of principal suppliers and fabricators.
3. Schedule of Values.
4. Contractor's Construction Schedule (preliminary if not final).
5. Schedule of principal products.
6. Schedule of unit prices.
7. Submittal Schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from governing authorities for performance of the Work.
12. Initial progress report.
13. Report of preconstruction meeting.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Record Documents.
17. Data needed to acquire the Owner's insurance.
18. Initial settlement survey and damage report, if required.

I. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:

1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Final Project Inspection.
3. Ensure that unsettled claims will be settled.
4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
5. Transmittal of required Project construction records to the Owner.
6. Proof that taxes, fees, and similar obligations were paid.
7. Removal of temporary facilities and services.

8. Removal of surplus materials, rubbish, and similar elements.
9. Record Documents - Drawings and Specifications with Contractor's Endorsement.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01045
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall be responsible for all cutting, fitting and patching, including related 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 requirement 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.

1.02 RELATED REQUIREMENTS

A. Section 01010: Summary of Work

B. Section 02220: Trenching, Backfilling and Compacting

C. Section 02661: Water Main and Appurtenances

D. Section 02720: Stormwater System

E. Section 02730: Sanitary Sewer System

1.03 SUBMITTALS

A. Submit a written request to Engineer well in advance of executing and 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.
3. Integrity or effectiveness of weather-exposed or moisture-resistant element 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 Project.

2. Description of affected work.

3. The necessity for cutting, alteration or excavation.

4. Effect on work of Owner or any separate contractor, or on structural or weatherproof integrity of Project.

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. Alternative 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 Engineer designating the date and the time the Work will be uncovered.

PART 2 - PRODUCTS

2.01 MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of Project, 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 work.

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

3.02 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity of 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.

3.03 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 fittings 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 or 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.

END OF SECTION

SECTION 01050
FIELD ENGINEERING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section covers all work required for the verification of preconstruction conditions, layout of proposed utility improvements, quality control and data gathering for the preparation of post-construction record drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01720 – Project Record Documents.

1.03 SUBMITTALS

A. Submit name, address and telephone number of Florida Registered Land Surveyor before starting work.

B. Submit copies of all post-construction record drawings and certificate signed by the approved Florida Registered Land Surveyor indicating that the elevations and locations of the work are as the work was constructed.

1.04 DEFINITIONS

A. Location: "As-Built" location station, offset distance and direction relative to the existing construction baseline.

B. Elevation: "As-Built" elevation relative to the National Geodetic Vertical Datum of 1988 (NAVD 88).

C. Major Deflection: Change in horizontal or vertical alignment greater than 12-inches accomplished without the use of fittings.

1.05 QUALITY ASSURANCE

A. Land surveyor employed shall be registered in the State of Florida and acceptable to the ENGINEER.

B. Where applicable, employ a professional engineer of the discipline required for specific source on project, licensed in the State of Florida.

1.06 PROJECT RECORD DOCUMENTS DATA

A. Maintain a complete and accurate log of control and survey data for project record documents as project progresses.

B. Upon completion of the project or other intervals as requested by ENGINEER, submit certified "as-built" site survey data of the project improvements. Scale shall be same as ENGINEER's drawings and may be used as a base for surveyor's field data (redline markups).

C. The following data (as applicable to project) shall be provided as a minimum:

1. Location and elevation of all pressure pipe fittings and valves.
2. Locations and elevations as required to define major horizontal/vertical pipe deflections/conflicts. Data shall include beginning and end of deflection/conflicts, all changes in elevations and alignment and the location and elevation of subject conflict item.
3. Locations of all fire hydrant assemblies, valves and single and double water services. When locating fire hydrant assemblies, locate centerline of the hydrant tee and center of fire hydrant unless assembly differs from that shown in standard details, then define completely, as if installation were a water main.
4. Location and elevation of all connections to existing systems.
5. Locations and elevations at appropriate intervals along centerline of pressure pipe to limit distance between data points to no more than 100 feet.
6. Locations, invert(s) and rim/grate elevations of all new storm sewer catch basins. Location to be center of catch basin. Length and diameter of storm pipe between catch basins.
7. Locations, invert(s) and rim elevations of all new sanitary sewer manholes. Location to be center of manhole. Indicate whether manhole is a drop manhole.
8. Locations of all single and double sanitary laterals and cleanouts.
9. Cross sections of all repaved roadways at maximum 100 foot intervals.
10. Locations and elevations as required to describe all other improvements.

D. Submit final record drawings prior to final pay application at completion of project as specified in Section 01700 – Contract Closeout.

E. Record Drawings shall be prepared and submitted as specified in Section 01720 – Project Record Documents.

F. Provide in tabular form, based on the obtained applicable field data, the final "As-Built" quantities for the project. "As-Built" quantities shall be referenced to the

bid items and their units of measure as indicated in the CONTRACTOR's Bid Proposal.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify locations of survey control points prior to starting work. Promptly notify ENGINEER of any discrepancies discovered.

3.02 SURVEY REFERENCE POINTS

A. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Make no changes without prior written notice to ENGINEER.

B. Promptly report to ENGINEER the loss or destruction of any reference point or relocation required because of changes in grades or other reasons. Replace dislocated survey control points based on original survey control.

C. Provide affidavit from approved Florida Registered Surveyor that all survey control points were re-established following completion of construction.

3.03 SURVEY REQUIREMENTS

A. ENGINEER will furnish CONTRACTOR with horizontal and vertical control information. Responsibility for construction of the Work to correct dimensions, alignment and grade shall be CONTRACTOR's. Additional control points, as applicable, shall be provided for and established by surveyor.

B. Establish and define all baselines. Provide necessary stationing along baseline. All ends and intersections of baselines shall be tied to a minimum of two permanent features.

C. Establish locations of right-of-way lines and property lines as applicable and locations and elevations of proposed improvements. Locate and lay out by instrumentation and similar appropriate means:

1. All utility improvements including locations and elevation.
2. Major pipeline deflections/conflicts.
3. The locations and elevations as applicable to fire hydrants, manholes, inlets, valves, fitting, services and connections to existing utilities.

4. Alignment and cross section of roadway, driveway and sidewalk restorations. As applicable, roadways, driveways and sidewalks shall be reconstructed to existing horizontal and vertical dimensions, unless shown otherwise.

D. Periodically verify layouts by same means indicated above.

E. In the event that pipe or other mechanical feature cannot be left exposed for surveyor to obtain "as-built" information, CONTRACTOR shall place PVC pipe at 100 foot intervals, at all major changes in horizontal or vertical alignment and at all locations required that will be buried. PVC pipe shall be of a diameter suitable for the insertion of a surveyor's rod and shall extend from finish grade to the top center of pipe, fitting, location, etc.

F. PVC pipe for survey data shall be removed by CONTRACTOR after survey data has been obtained.

G. As-built information of all utilities installed within the limits of pavement must be obtained prior to initial backfilling of trench.

3.04 SURVEYS FOR MEASUREMENT AND PAYMENT

A. Final project record drawings with "as-built" information of the installed utility systems and all bid quantities shall be submitted and approved by ENGINEER prior to application for final payment.

B. "As-Built" quantity data shall be presented in tabular form and reference the individual bid items and their respective units of measure as given in the CONTRACTOR's Bid Proposal.

C. "As-Built" information shall be used by CONTRACTOR to prepare his final statement of accounts as specified in Section 01700 – Contract Closeout.

D. Current "as-built" information shall be available for ENGINEER's use for evaluation of partial pay requests.

END OF SECTION

SECTION 01090
REFERENCE STANDARDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Abbreviations and acronyms used in Contract Documents to identify reference standards.

1.02 QUALITY ASSURANCE

A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.

B. Publication Date: The publication in effect on the date of issue of the Contract Documents, except when a specified publication date is specified.

1.03 ABBREVIATIONS, NAMES AND ADDRESSES OF ORGANIZATIONS

A. Obtain copies of referenced standards direct from the publication source when needed for proper performance of the Work, or when required for submittal by the Contract Documents.

AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, D.C. 20001
ACI	American Concrete Institute Box 19150 Redford Station Detroit, MI 48219
AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, N.Y. 10020
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, D.C. 20036

ANSI	American National Standards Institute 1430 Broadway New York, N.Y. 10018
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, N.Y. 10017
ASTM	American Society of Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
CRSI	Concrete Reinforcing Steel Institute 180 North LaSalle Street, Suite #2110 Chicago, IL 60601
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, D.C. 20407
MIL	Military Specification Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
NEMA	National Electrical Manufacturer's Association 2101 "L" Street, N.W. Washington, D.C. 20037
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 20076

PCI	Prestressed Concrete Institute 20 North Wacker Drive Chicago, IL 60606
PS	Product Standard U.S. Department of Commerce Washington, D.C. 20203
UL	Underwriter's Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062

B. When no reference is made to a code, standard, or specification, the standard specifications of the ASTM, the ANSI, the ASME, the IEEE, or the NEMA shall govern.

C. Contractor shall, when required, furnish evidence satisfactory to the Engineer that materials and methods are in accordance with such standards where so specified.

D. In the event any questions arise as to the application of these standards or codes, copies shall be supplied on site by the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01153
CHANGE ORDER PROCEDURES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Promptly implement change order procedures.

1. Provide full written data required to evaluate changes.
2. Maintain detailed records of work done on time and material/force account basis.
3. Provide full documentation to Engineer on request.

B. Designate in writing the member of Contractor's organization:

1. Who is authorized to accept changes in the Work.
2. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the Work.

C. Owner will designate in writing the person who is authorized to execute Change Orders.

1.02 RELATED REQUIREMENTS

A. Agreement: The amounts of established unit prices.

B. General conditions and Supplementary Conditions.

C. Conditions of the Contract:

1. Methods of determining cost or credit to Owner resulting from changes in Work made on a time and material basis.
2. Contractor's claims for the additional cost.

D. Section 01020: Allowances.

E. Section 01027: Application for Payment.

F. Section 01310: Construction Schedules.

G. Section 01630: Substitutions and Product Options.

H. Section 01700: Project Closeout.

1.03 DEFINITIONS

A. Change Order: See General Conditions and Supplementary Conditions.

B. Construction Change Authorization: A written order to the Contractor, signed by Owner and Engineer, which amends the Contract Documents as described, and authorizes Contractor to proceed with a change which affects the Contract Sum or the Contract Time, for inclusion in a subsequent Change Order.

C. Field Order: A written order, instructions, or interpretations, signed by Engineer making minor changes in the Work not involving a change in Contract Sum or Contract Time.

1.04 PRELIMINARY PROCEDURES

A. Owner or Engineer may initiate changes by submitting a Proposal Request to Contractor. Request will include:

1. Detailed description of the Change, products, and location of the change in the Project.
2. Supplementary or revised Drawings and Specifications.
3. The projected time span for making the change, and a specific statement as to whether overtime work is, or is not, authorized.
4. A specific period of time during which the requested price will be considered valid.
5. Such request is for information only, and is not an instruction to execute the changes, nor to stop Work in progress.

B. Contractor may initiate changes by submitting a written notice to Engineer, containing:

1. Description of the proposed changes.
2. Statement of the reason for making the changes.
3. Statement of the effect on the Contract Sum and the Contract Time.
4. Statement of the effect on the work of separate contractors.
5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.05 CONSTRUCTION-CHANGE AUTHORIZATION

A. In lieu of Proposal Request, Engineer may issue a construction change authorization for Contractor to proceed with a change for subsequent inclusion in a Change Order.

B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designate the method of determining any change in the Contract Sum and any change in Contract Time.

C. Owner and Engineer will sign and date the Construction Change Authorization as authorization for the Contractor to proceed with the changes.

D. Contractor shall sign and date the Construction Change Authorization to indicate agreement with the terms therein.

1.06 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow Engineer to evaluate the quotation.

B. On request provide additional data to support time and cost computations:

1. Labor required.
2. Equipment required.
3. Products required.
   a. Recommended sources of purchase and unit cost.
   b. Quantities required.
4. Taxes, insurance and bonds.
5. Credit for work deleted from Contract, similarly documented.
6. Overhead and profit.
7. Justification for any change in Contract Time.

C. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information:

1. Name of Owner's authorized agent who ordered the work, and date of the order.
2. Dates and times work was performed, and by whom.
3. Time record, summary of hours worked, and hourly rates paid.
4. Receipts and invoices for:
   a. Equipment used, listing dates and times of use.
   b. Products used, listing of quantities.
   c. Subcontractors.

D. Document requests for substitutions for Products as specified in Section 01630.

1.07 PREPARATION OF CHANGE ORDERS

A. Engineer will prepare each Change Order.

B. Owner's Form, per example provided by the Engineer.

C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contact Time.

1.08 LUMP-SUM/FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either;

1. Engineer's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
2. Contractor's Proposal for a change, as recommended by Engineer.

B. Owner and Engineer will sign and date the Change Order as authorization for the Contractor to proceed with the changes.

C. Contractor shall sign and date the Change Order to indicate agreement with the terms therein.

1.09 UNIT PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:

1. Engineer's definition of the scope of the required changes.
2. Contractor's Proposal for a change, as recommended by Engineer.
3. Survey of completed work.

B. The amounts of the unit prices to be:

1. Those stated in the Agreement.
2. Those mutually agreed upon between Owner and Contractor.

C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:

1. Owner and Engineer will sign and date the Change Order as authorization for Contractor to proceed with the changes.
2. Contractor shall sign and date the Change Order to indicate agreement with the terms herein.

D. When quantities of the items cannot be determined prior to start of the work:

1. Engineer or Owner will issue a construction change authorization directing Contractor to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.
2. At completion of the change, Engineer will determine the cost of such work based on the unit process and quantities used.
   a. Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.
3. Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
4. Owner and Contractor will sign and date the Change Order to indicate their agreement with the terms therein.

1.10 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/ CONSTRUCTION CHANGE AUTHORIZATION

A. Engineer and Owner will issue a Construction Change Authorization directing Contractor to proceed with the changes.

B. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this Section.

C. Engineer will determine the allowable cost for such work, as provided in General Conditions and Supplementary Conditions.

D. Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.

E. Owner and Contractor will sign and date the Change Order to indicate their agreement therewith.

1.11 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract sum.

B. Periodically revise the Construction Schedule to reflect each change in Contract Time.

1. Revise subschedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01200
PROJECT MEETINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The ENGINEER shall schedule and administer preconstruction meeting, periodic progress meetings, and specially called meetings throughout progress of the Work. ENGINEER shall also:

1. Prepare agenda for meetings.
2. Make physical arrangements for meetings.
3. Preside at meetings.
4. Prepare and distribute minutes of meeting.

B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

C. The CONTRACTOR shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01050: Field Engineering.

B. Section 01720: Project Record Documents.

1.03 PRE-CONSTRUCTION MEETING

A. Schedule a preconstruction meeting within 20 days after effective date of the agreement.

B. Location: A central site, convenient for all parties, designated by the ENGINEER.

C. Attendance:

1. Owner's Representative.
2. Engineer and his professional consultants.
3. Resident Project Representative.

4. Contractor's Superintendent.

5. Major Subcontractors.

6. Major Suppliers

7. Utilities

8. Others as Appropriate and approved by the Owner.

D. Suggested Agenda:

1. Distribution and discussion of:

   a. List of major subcontractors and suppliers.

   b. Projected Construction Schedules.

2. Critical work sequencing.

3. Major equipment deliveries and priorities.

4. Project Coordination.

   a. Designation of responsible personnel.

5. Procedures and processing of:

   a. Field orders.

   b. Requests for Information (RFI).

   c. Requests for Proposal (RFP).

   d. Submittals

   e. Change Orders.

   f. Applications for Payment.

6. Adequacy of distribution of Contract Documents.

7. Procedures for maintaining Record Documents.

8. Use of premises.

   a. Office, work and storage areas.

   b. Owner's requirements.

9. Construction facilities, controls and construction aids.

10. Temporary utilities.

11. Safety and first-aid procedures.

12. Security procedures.

13. Housekeeping procedures.

14. Miscellaneous.

1.04 PROGRESS MEETINGS

A. ENGINEER will schedule and administer Project meetings throughout progress of the Work at maximum bi-weekly intervals, specially called meetings and pre-installation conferences.

B. ENGINEER will make physical arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within two days to Owner, participants, and those affected by decisions made at meetings.

C. Location of the meetings: Project field office of the Contractor or other site directed by the Engineer.

D. Attendance:

1. Engineer, and his professional consultants as needed.

2. Subcontractors as appropriate to the agenda.

3. Suppliers as appropriate to the agenda.

4. Others as appropriate.

E. Suggested Agenda:

1. Review, approval of minutes of previous meeting.

2. Review of Work progress since previous meeting.

3. Field observations, problems, conflicts.

4. Problems which impede Construction Schedule.

5. Review of off-site fabrication, delivery schedules.

6. Corrective measures and procedures to regain projected schedule.

7. Revisions to Construction Schedule.

8. Progress, schedule, during succeeding work period.

9. Coordination of schedules.

10. Review of submittal schedules; expedite as required.

11. Maintenance of quality standards.

12. Pending changes and substitutions.

13. Review proposed changes for:

    a. Effect on Construction Schedule and on completion date.

    b. Effect on other contracts relating to the project.

14. Review of record drawings.

15. Construction Schedule

16. Other business.

F. The CONTRACTOR is to attend progress meetings and is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of the work, etc.

G. The CONTRACTOR is to provide a current submittal log at each progress meeting in accordance with the General Conditions.

H. The CONTRACTOR shall provide an updated project schedule at each progress meeting in accordance with the General Conditions and Section 01300 – Submittals.

1.05 PRE-INSTALLATION CONFERENCES

A. When required in individual Specification Section, a pre-installation conference will be arranged prior to commencing work of the Section.

B. Require attendance of entities directly affecting, or affected by, work of the Section.

C. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.06 MONTHLY PAY APPLICATION MEETING

A. Monthly site meeting will be held to verify the quantities requested for payment on the CONTRACTOR's current pay request.

B. A monthly date for this meeting shall be determined at the preconstruction conference. This date may be revised from time to time as requested and approved by all parties.

C. Representatives of CONTRACTOR, OWNER and ENGINEER shall attend. Representatives shall be qualified and authorized to act on behalf of the entity represented.

D. At the meeting, the CONTRACTOR shall present for ENGINEER's review current record drawings prepared as specified in Section 01050 – Field Engineering. Application for payment shall reflect quantities as indicated on record drawings.

E. Applications for payment presented with incomplete record drawings will not be accepted.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section covers the work required to prepare and submit construction progress schedules, proposed products list, shop drawings, product data, samples, manufacturers' instructions and manufacturers; certificates, complete, all in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. GENERAL CONDITIONS

B. Special Conditions.

C. Section 01700 – Project Closeout.

D. Section 01720 – Project Record Documents.

E. Individual Specification Sections: Additional specific requirements for submitted data.

1.03 SUBMITTAL PROCEDURES

A. Transmit each submittal with ENGINEER accepted form.

B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.

C. Identify Project, CONTRACTOR, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.

D. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the ENGINEER and shall bear the CONTRACTOR's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the CONTRACTOR for resubmission.

E. Schedule submittals to expedite the Project, and deliver to ENGINEER at Mathews Consulting, 477 S. Rosemary Ave., Suite 330, West Palm Beach, FL 33401 and allow 7-14 working days for review.

F. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, describe such variations in the letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. Failure to describe such variations does not relieve the CONTRACTOR of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed.

G. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:
   1. Number and title of drawing.
   2. Date of drawing or revision.
   3. Name of project building or facility.
   4. Name of CONTRACTOR and subcontractor submitting drawing.
   5. Clear identification of contents and location of the work.
   6. Specification title and number.
   7. Specification Section.
   8. Applicable Drawing Number.

H. Revise and resubmit submittals as required; identify all changes made since previous submittal.

I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

J. Requirements in this Section are in addition to any specific requirements for submittals specified in other Divisions and Sections of these Contract Documents.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in triplicate within 15 days after date established in the Notice to Proceed for ENGINEER review.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit computer generated network analysis diagram using the critical path method, generally as outlined in Associated General Contractors of America (AGC) publication "The Use of CPM in Construction – A Manual for General Contractors and the Construction Industry".

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by OWNER and under Allowances.

1.05 PROPOSED PRODUCTS LIST

A. Within 30 days after date established in the Notice to Proceed, submit a complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 SHOP DRAWINGS

A. Submit the number of opaque reproductions which CONTRACTOR requires, plus three copies, which will be retained by ENGINEER (maximum of eight).

B. After review, distribute in accordance with Article on Procedures above and for Record Documents described in Section 01720 – Project Record Documents.

C. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean, in addition to the definition in Section 00700 – GENERAL CONDITIONS, CONTRACTOR's drawing plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.

D. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size finish and all other pertinent data.

E. For all mechanical and electrical equipment furnished, provide a list including the equipment name, address, telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.

F. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the ENGINEER along with the

required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and has been in operation for a period of at least one (1) year.

G. **Only the ENGINEER will utilize the color "red" in marking Shop Drawing submittals. The Contractor shall utilize the color “green”.**

H. After two (2) reviews of the same shop drawing, the Contractor shall be subject to reimbursement of Engineering Fees for additional review time.

1.07 PRODUCT DATA

A. Submit eight (8) copies of each shop drawing submittal.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.

C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01720 - Project Record Documents.

1.08 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Submit samples of finishes in custom colors selected, textures, and patterns for ENGINEER's selection.

C. Include identification on each sample, with full Project information.

D. Submit the number or samples specified in individual specification Section; one of which will be retained by ENGINEER.

E. Samples not destroyed in testing shall be sent to the ENGINEER or stored at the site of the work. Accepted samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in the work shall match the accepted samples. Samples which failed testing or are not accepted will be returned to the CONTRACTOR at his expense, if so requested at time of submission.

1.09 MANUFACTURE'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

B. Identify conflicts between manufacturer's instructions and Contract Documents.

1.10 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturer's certificate to ENGINEER for review, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310
CPM CONSTRUCTION SCHEDULE REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL

A. This section covers the requirements for submittal of a critical path method (CPM) construction schedule and an associated schedule of values.

B. Development of the schedule, the cost loading of the schedule, monthly payment requisitions, and project status reporting requirements of the contract shall employ computerized CPM scheduling. The CPM schedule shall be cost loaded based on the schedule of values or unit bid prices or combination thereof.

1.02 INITIAL SCHEDULE SUBMITTALS

A. Submit two short-term schedule documents at the preconstruction conference and as described in the subsection on "Submittals" which shall serve as the Contractor's plan of operation for the initial 60-day period of the contract time and to identify the manner in which the Contractor intends to complete all work within the contract time. Submit (1) a 60-day narrative plan of operation, describing in detail narrative how contract operations will be conducted, and (2) a project overview bar-chart type plan for all work as indicated below.

1. 60-Day Narrative Plan of Operation: During the initial 60 days of the contract time, conduct contract operations in accordance with the 60-day detail narrative and bar chart plan of operation. The bar chart shall show the accomplishment of the Contractor's early activities (mobilization items, permits, submittals necessary for early material and equipment procurement, submittals necessary for long lead equipment procurement, CPM submittals, initial site work, and other submittals and activities required in the first 60 days).

2. Comprehensive Project Overview Bar Chart: The comprehensive overview bar chart shall indicate the major components of the project work and the sequence relations between major components and subdivisions of major components. The overview bar chart shall indicate the relationships and time frames in which the various components of the work will be substantially complete and placed into service in order to meet the project milestones. Sufficient detail shall be included for the identification of subdivisions of major components into such activities as potholing, excavation, bedding and pipe installation, backfilling, surface restoration, tunneling, structures, relocations, improvements, and other important work for each major facility within the overall project scope. Indicate planned durations and start dates for each work item subdivision.

Plot each major component and subdivision component on time scale sheets not to exceed 24 inches by 36 inches in size. Do not use more than four sheets to represent this overview information.

B. The Owner's Representative and the Contractor shall meet to review and discuss the narrative 60-day plan of operations and project overview bar chart within 5 days after they have been submitted to the Owner's Representative. The Owner's Representative's review and comment on the schedules shall be limited to contract conformance (with the sequencing and interim duration requirements). Make corrections to the schedules necessary to comply with the contract requirements, and adjust the schedules to incorporate any missing information requested by the Owner's Representative.

C. Satisfactory incorporation of the Owner's Representative's comments shall be a condition for progress payments.

1.03 CPM PROGRAM

A. Use PRIMAVERA P-6, or an equivalent computer software for the CPM schedule, as approved by the Owner's Representative. If software other than one of the programs named above is used, provide licensed copy and training to Owner's Representative.

1.04 SUBMITTALS

A. Within three calendar days of the Notice to Proceed, submit a written statement of CPM capability, verifying that the Contractor has qualified in-house personnel capable of using the CPM technique or that the Contractor employs a qualified CPM consultant. The statement shall identify the individuals who will perform the CPM scheduling and provide those individuals' detailed resumes. Capability shall be verified by detailed description of construction projects and references on which the individuals have successfully applied computerized CPM and shall include at least three projects of similar nature, scope, and value not less than one-half the total bid price of this project. The statement shall also provide the contact persons for the referenced projects with current telephone and address information.

B. Submit an initial schedule within ten days of the date of Notice to Proceed. If revisions are required to this initially submitted schedule, resubmit a revised schedule within five calendar days after the Contractor receives the returned copy.

C. Submit graphic network diagram and tabulated schedules within 30 days of the Notice to Proceed.

D. Within 10 days after the conclusion of Owner's Representative's review, revise the network diagram and resubmit the network diagram and a tabulated schedule produced therefrom. The revised network diagram and tabulated schedule will be

reviewed and accepted or rejected by Owner's Representative within 15 days after receipt. The network diagram and tabulated schedule when accepted by Owner's Representative shall constitute the project work schedule unless a revised schedule is required due to substantial changes in the work or a change in contract time, delinquency by Contractor requiring a recovery schedule, or as otherwise provided herein below. Activities not occurring as scheduled are delinquent if they begin after early start or they finish after early finish.

E. Submit a copy of the schedule, clearly showing progress made and actual "S" curves, on a monthly basis along with the Application for Payment.

F. Schedule submittals to the Owner's Representative shall include eight hard copies and one electronic copy of a CPM-type construction schedule, generally as outlined in the Associated General Contractors publication The Use of CPM in Construction.

G. Submit a preliminary schedule of values for the major components of the work within three days of the Notice to Proceed.

H. Prepare and submit a detailed schedule of values to the Owner's Representative within 30 days from the date of Notice to Proceed.

1.05 PROJECT INFORMATION

A. Each network diagram and report tabulation shall be prefaced with the following summary data:

1. Project name.
2. Contractor.
3. Type of tabulation (initial or updated).
4. Project duration.
5. Project contract completion date.
6. Projected completion date.
7. Variance analysis per activity.

1.06 GRAPHIC NETWORK DIAGRAM AND TABULATED SCHEDULES

A. The completed schedule shall include a graphic network and tabulated schedules with the graphic network displayed on a sheet with a minimum size of 11 inches by 17 inches and a maximum size of 24 inches by 36 inches. The graphic network shall be the precedence diagram method (PDM). It may be divided into two or more sheets, if necessary, provided that all sheets are properly referenced. Notation on each activity arrow shall include a brief work description and an estimate of the time duration of the work. Show a calendar along the full length of

each sheet. Plot each activity so that the beginning and completion dates can be readily determined by comparison to the calendar scale. Show activities using symbols and/or color that clearly designate whether it is a critical path or noncritical activity. Noncritical path activities shall show estimated work time and free float time.

B. Float Time:

1. Definition: Unless otherwise provided herein, float as referenced in these documents is total float. Total float is the period of time measured by the number of working days each noncritical path activity may be delayed before it and its succeeding activities become part of the critical path. If a noncritical path activity is delayed beyond its float period, that activity then becomes part of the critical path and controls the end date of the project. Thus, the delay of the noncritical path activity beyond its float period will cause delay to the project itself.

2. Float Ownership: Neither the Owner nor the Contractor owns the float time. The project owns the float time. As such, liability for delay of the project completion date rests with the party actually causing delay to the project completion date. For example, if Party A uses some but not all of the float time and Party B later uses the remainder of the float time as well as additional time beyond the float time, Party B shall be liable for the costs associated with the time that represents a delay to the project's completion date. Party A would not be responsible for any costs since it did not consume all of the float time and additional float time remained; therefore, the project's completion date was unaffected.

C. Display time at the top of the schedule, reading left to right, with no greater than weekly divisions.

D. The schedule shall indicate dates for important activities including:

1. A logical succession of work from start to finish. This logical succession, when accepted, is the Contractor's work plan and is only designated as early start to accommodate standard computerized systems.

2. Detailed definition of each activity.

3. A logical flow of work crews/equipment (crews are to be defined by labor category and labor hours; equipment by type and hours).

4. Shop drawing submittals and reviews.

5. Decisions.

6. Product procurement and delivery.

7. Beginning and completion of each element of construction.

8. Critical coordination dates.

9. Submittal of record drawings and equipment manuals.

10. Cleanup, final inspection, etc.

11. Any project milestones or phases of work that affect important dates, such as other parallel contracts.

E. Submit:

1. Activity sort by early start, organized by related elements.

2. Activity sort by float, organized by related elements.

3. Activity sort by predecessor/successor.

4. Narrative description of the logic and reasoning of the schedule.

5. Resource allocation by activity.

6. List of cost-loaded activities that identifies specific cost amount for each activity in the CPM schedule.

F. Show constraints between interrelated activities.

G. The initial schedule shall include the following minimum data for each activity:

1. Activity numbers.

2. Estimated duration.

3. Activity description.

4. Early start date (calendar dated).

5. Early finish date (calendar dated).

6. Status (whether critical).

7. Float.

8. Cost of activity.

9. Other resources including equipment hours by type, labor by craft or crew, and materials by units.

H. Where float time exists in activities, show the activities with early start/early finish times.

I. The schedule shall include a title block with the project title, the Contractor's business name, the date of submittal or revision, and the signature of the Contractor's authorized representative attesting to his review and accuracy of the submittal.

J. The duration indicated for each activity shall be in calendar days and shall represent the single best time considering the scope of the work and resources planned for the activity including time for inclement weather. Except for certain nonlabor activities, such as curing concrete or delivering materials, activity

durations shall not exceed 14 days, be less than one day, or exceed $50,000 in value unless otherwise accepted by the Owner's Representative.

1.07 CONSTRUCTION SCHEDULE PROGRESS

A. If the Contractor's progress has fallen behind the accepted construction schedule, the Contractor shall take such steps as may be required, including increasing the number of personnel, shifts, overtime operations, days of work, and amount of construction equipment until such time as the work is back on schedule. Increased costs of any accelerated work program shall be paid for by the Contractor. Submit such recovery schedule within 10 days upon written request by Owner's Representative.

1.08 ACCEPTANCE

A. The finalized schedule will be acceptable to the Owner's Representative when it provides an orderly progression of the Work to completion in accordance with the contract requirements, adequately defines the Contractor's work plan, provides a workable arrangement for processing the submittals in accordance with the project specification requirements, and properly allocates resources (labor, equipment, and costs) to each activity (free of unbalances in resources). When the network diagram and tabulated schedule have been accepted, submit to Owner's Representative eight copies of the timescaled network diagram; eight copies of a computerized, tabulated schedule in which the activities have been sequenced by activity numbers; and eight copies of all reports required by this specification.

B. Also submit a 700MB CD that contains all of the schedule submittal information. The disk shall contain data compatible with the specified CPM program to generate network diagrams and schedule reports identical to the hard copies submitted.

C. Review of the Contractor's project schedule is for conformance to the requirements of the contract documents only. Review by the Owner's Representative of the Contractor's project schedule does not relieve the Contractor of any of its responsibility whatsoever for the accuracy or feasibility of the project schedule, or of the Contractor's ability to meet the interim milestone date(s) and the contract completion date, nor does such review and acceptance imply or expressly warrant, acknowledge, or admit the reasonableness of the logic, durations, labor, or equipment loading of the Contractor's project schedule.

1.09 REVISIONS OR UPDATES TO CONSTRUCTION SCHEDULE

A. Submit a revised or updated construction schedule by the third working day of each month. The data date shall be the 25th of the preceding month. Revise or update the schedule upon the occurrence of any of the following:

1. When delay in completion of any activity or group of activities indicates an overrun of the contract time or control point requirement by 10 working days or 10% of the remaining duration, whichever is less.
2. Delays in submittals, deliveries, or work stoppage are encountered which make replanning or rescheduling of the work necessary.
3. The schedule does not represent the actual prosecution and progress of the project as being performed in the field and progress for any activity is five working days behind the current schedule.
4. The Contractor will be performing work at an earlier date than is shown on the schedule and the work will require additional inspection and/or testing personnel.

B. In the event of any change to the contract, submit a time analysis of the effect on the critical path. If the Contractor maintains there is no impact, submit a statement to that effect.

C. The cost of revisions to the construction schedule resulting from Owner-initiated contract changes shall be included in the cost for the change in the work and shall be paid as part of the total cost of the change through the contract allowable percentages for changed work.

D. The cost of revisions to the construction schedule not resulting from authorized changes in the work shall be the responsibility of the Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01370
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit to the Engineer a Schedule of Values allocated to the various portions of the Work, within ten days after award of contract.

B. Upon the request of the Engineer, support the values with data which will substantiate their correctness.

C. The Schedule of Values, unless objected to by the Engineer, shall be used only as the basis for the Contractor's Applications for Payment.

D. Related Requirements in Other Parts of the Contract Documents.

1. Agreement
2. General Conditions
3. Supplementary Conditions

1.02 RELATED REQUIREMENTS

A. Section 01020: Allowances

B. Section 01027: Applications for Payment

C. Section 01600: Materials, Equipment and Products

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on 8-1/2-inch X 11-inch white paper; Contractor's standard forms and automated printout will be considered for approval by Engineer upon Contractors request. Identify schedule with:

1. Title of Project, location and (City, County, Owner) Project Number.
2. Engineer and Engineer's Project number.
3. Name and Address of Contractor.
4. Date of Submission.

B. Schedule shall list the installed value of the component parts of the Work, in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Follow the table of contents of these Specifications as the format for listing component items.

1. Identify each line item with the number and title of the respective major section of the specifications.

D. For each major line item list sub-values of:

1. Major products or operations under the item.
2. Contract conditions, such as: bonds, insurance premiums, job mobilization, construction facilities and temporary controls.

E. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
2. For items on which progress payments will be requested for stored materials, break down the value into:
   a. The cost of the materials, delivered and unloaded, with taxes paid.
   b. The total installed value.

F. The sum of all values listed in the schedule shall equal the total Contract Sum.

1.04 SUBSCHEDULE OF UNIT MATERIAL VALUES

A. Submit a subschedule of unit costs and quantities for:

1. Products specified under a unit cost allowance in Section 01020.
2. Products on which progress payments will be requested for stored products.

B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item it the Schedule of Values.

C. The unit quantity for bulk materials shall include an allowance for normal waste.

D. The unit values for the materials shall be broken down into:

1. Cost of the material, delivered and unloaded at the site, with taxes paid.
2. Installation costs, including Contractor's overhead and profit.

E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01381
AUDIO/VIDEO PRECONSTRUCTION RECORD

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall provide a continuous color audio/video DVD of the entire length of the proposed project prior to construction. The Contractor shall furnish to the Engineer and the Owner two (2) copies each of the DVD, which becomes a project record document.

1.02 RELATED REQUIREMENTS

A. None

1.03 SCHEDULE REQUIRED

A. Video recordings shall not be made more than 30 days prior to construction. No construction shall begin prior to review and approval of the DVD's by the Engineer and the Owner. DVD's not conforming to the Specifications shall be resubmitted at no additional charge.

1.04 PROFESSIONAL VIDEOGRAPHERS

A. The Contractor shall engage the services of a professional videographer. The color audio-visual tapes shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business of pre-construction color audio-visual tape documentation.

PART 2 - PRODUCTS

A. The finished product shall be a bright, sharp, clear picture free of distortion.

B. The video shall be of the DVD format. DVD's shall be color and compatible with any standard compact disc player.

PART 3 - EXECUTION

A. The video recording shall show all surface features located within the construction zone. These features shall include, but not be limited to, roadways, sidewalks, **outside of houses (front & sides), driveways,** culverts, walls, fences and landscaping.

B. DVD's shall be labeled and identified by project title and project number.

C. **Coverage shall begin at the lowest station number and be continuous until the highest station number is reached.**

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section covers the work as required to provide and/or coordinate:

1. Quality assurance and control of installation.
2. References
3. Field samples.
4. Inspection and testing laboratory services.
5. Manufacturers' field services and reports.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. GENERAL CONDITIONS

1.03 REFERENCES

A. Conform to reference standard by date of current issue on date for receiving bids.

B. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturer's instruction conflict with Contract Documents, request clarification from ENGINEER before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by Professional Audio/Visual Company qualified to produce workmanship of specified quality.

F. Secure Product in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.05 FIELD SAMPLES

A. Install field samples at the site as required by individual specification Sections for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by ENGINEER.

1.06 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and place equipment into operation as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in triplicate within 30 days of observation to ENGINEER for review.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01410
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Owner will employ the services of an independent Testing Laboratory to perform specified testing. The Owner shall pay the costs of all testing laboratory services.

1. The Contractor shall cooperate with the laboratory to facilitate the execution of its required services.

1.02 RELATED REQUIREMENTS

A. Section 02140: Dewatering

B. Section 02220: Trenching, Backfilling and Compacting

C. Section 02235: Limerock Base, Primed

D. Section 02574: Pavement Removal and Replacement

E. Section 02661: Water Main and Appurtenances

F. Section 02720: Storm Water System

G. Section 02730: Sanitary Sewer System

1.03 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. The Laboratory is not authorized to:

1. Release, revoke alter or enlarge on requirements of the Contract Documents.

2. Approve or accept any portion of the Work.

3. Perform any duties of the Contractor.

1.04 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel and/or the Engineer. Provide access to the Work or manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix to be used for concrete and other mixes which require control by the testing laboratory.

D. Furnish copies of test reports as required.

E. Furnish incidental labor and facilities:

1. To provide access to Work to be tested.

2. To obtain and handle samples at the project site to be tested.

3. To facilitate inspections and tests.

4. For storage and curing of test samples.

F. Notify the laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests:

1. When tests or inspections cannot be performed after such notice, reimburse the Owner for laboratory personnel and travel expenses incurred due to the Contractor's negligence.

G. Make arrangements with the laboratory and pay for additional samples and tests required for the Contractor's convenience.

H. Immediately cease dewatering efforts if instructed to do so by the Owner.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PAYMENT

A. Testing of materials and products will be performed by an independent testing laboratory appointed and paid for by the Owner. Testing will be performed to least encumber the performance of the Work.

B. Owner will authorize the cost of one (1) series of tests, only on the area or item being evaluated. The Contractor shall pay for the costs of additional testing as required due to improper performance of the Work.

C. When the Work of this Contract or portions thereof is completed, notify the Engineer so that arrangements can be made with the laboratory to perform or witness the tests. Do not proceed with additional portions of Work until test results have been verified.

END OF SECTION

SECTION 01500
CONSTRUCTION CONSIDERATIONS

PART 1 - GENERAL

1.01 HYDRAULIC UPLIFT ON STRUCTURES

A. The Contractor shall be completely responsible for any pipelines, valve vaults, or similar structures that may become buoyant during the construction operations due to the ground water or floods and before the structure is put into operation. Should there be any possibility of buoyance of a structure, the Contractor shall take the necessary steps to prevent its buoyance. Damage to any structures due to floating or flooding shall be repaired or the structures replaced at the Contractor's expense.

1.02 RELOCATIONS

A. The Contractor shall be responsible for the relocation of structures, including but not limited to, light poles, sign poles, fences, piping, conduits and drains that interfere with the positioning of the Work as set out on the Drawings. The cost of all such relocations shall be included in the bid for the project and shall not result in any additional cost to the Owner.

1.03 SUBSURFACE INVESTIGATIONS

A. The Contractor shall be responsible for having determined to his satisfaction, prior to his bid, the nature and location of the work, the conformation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the groundwater condition, the character of equipment and facilities required preliminary to and during the performance of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract. The prices established for the work to be done shall reflect all costs pertaining to the work. Any claims for extras based on the substrata or groundwater table conditions will be disallowed.

1.04 OBSTRUCTIONS

A. All water pipes, storm drains, sanitary sewers, force mains, gas, or other pipe, telephone or power cables or conduits and all other obstructions, whether or not shown, shall be temporarily supported across utility line excavations. The Contractor shall be responsible for any damage to any such pipes, conduits, or structures. Approximate locations of known water, sanitary, raw water, drainage,

power and telephone installations along route of sanitary sewer, storm and water main pipeline or in the vicinity of new work are shown, but must be verified in the field by the Contractor before beginning any excavation. The Contractor shall uncover these pipes, ducts, cables, etc., carefully, by hand if necessary, prior to installing new pipeline. Any discrepancies or differences found shall be brought to the attention of the Engineer in order that necessary changes may be made to permit installation of new work. These conditions are supplemental to general requirements elsewhere in the Contract Documents.

1.05 SITE CONDITIONS

A. The Contractor acknowledges that he has investigated prior to bidding and satisfied himself as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, canal stages, tides, water tables or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. The Contractor further acknowledges that he has satisfied himself as to the character, quality of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, or any contiguous site, as well as from information presented by the Drawings and Specifications made a part of this Contract, or any other information made available to him prior to receipt of Bids. Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficult or cost of successfully performing the work. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Owner.

1.06 PROTECTION OF PROPERTY

A. The Contractor shall protect all property that may be affected by his work or operations. The location and extent of underground and covered facilities are not guaranteed and the Contractor is cautioned to proceed with care in order to prevent the undermining or damage to existing structures, piping, or facilities.

B. When City water is being used, the supply source shall be protected against contamination in accordance with existing codes and regulations. The City water used by the Contractor shall be metered and all water used shall be paid for by the Contractor.

C. In the event any of the Contractor's activities were to disrupt or endanger any facilities, he shall at his own expense make all necessary repairs or replacements necessary to correct the situation to the satisfaction of the Engineer. Such work shall progress continuously to completion on a 24-hour per day, seven workday

basis. The Contractor shall be responsible for the services of repair crews on call 24 hours per day for emergencies that arise involving work under this Contract.

1.07 WORK ADJACENT TO FLORIDA POWER AND LIGHT CORPORATION (FP&L) FACILITIES

A. The attention of the Contractor is drawn to existing FP&L overhead and underground facilities are located in the construction area. The Contractor shall protect all existing power transmission and distribution facilities throughout the period of construction and shall contact the offices of FP&L at least 72 hours prior to the start of any construction.

B. It is full and complete responsibility of the Contractor to determine the exact location of all overhead and underground power transmission and distribution facilities in the area of the Works whether or not they are indicated on the Drawings.

1.08 WORK ADJACENT TO BELLSOUTH TELEPHONE COMPANY OR AT&T TELECOMMUNICATIONS FACILITIES

A. The attention of the Contractor is drawn to the existing overhead and underground telecommunications facilities are located in the construction area. The Contractor shall protect all existing telecommunications facilities throughout the construction of the project and shall contact the appropriate telecommunications offices at least 72 hours prior to the start of construction.

B. It is full and complete responsibility of the Contractor to determine the exact location of all overhead and underground telecommunications facilities in the area of the Works whether or not they are indicated on the Drawings.

1.09 WORK ADJACENT TO TECO GAS COMPANY FACILITIES

A. The attention of the Contractor is drawn to the existing underground natural gas lines are located in the construction area. The Contractor shall protect all existing natural gas pipelines throughout the construction of the project and shall contact the appropriate natural gas offices at least 72 hours prior to the start of construction.

B. It is full and complete responsibility of the Contractor to determine the exact location of all underground natural gas lines in the area of the Works whether or not they are indicated on the Drawings.

1.10 WORK ADJACENT TO CABLE TV (CATV) FACILITIES

A. The attention of the Contractor is drawn to the existing overhead and buried CATV lines are located in the construction area. The Contractor shall protect all existing overhead and buried CATV throughout the construction of the project and shall contact the appropriate cable TV offices at least 72 hours prior to the start of construction.

B. It is full and complete responsibility of the Contractor to determine the exact location of all overhead and underground CATV in the area of the Works whether or not they are indicated on the Drawings.

1.11 RESIDENT NOTIFICATIONS

A. The Contractor will be responsible for preparation and distribution of informational flyers to affected residents on a periodic basis. The flyers shall include notification of construction schedules with regards to road closures or detours, utility service interruptions, etc.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01505
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.

B. Temporary Controls: Enclosures and fencing, protection of the Work, road closings, traffic control, temporary bypass sanitary pumping, confined space entry requirements and water control.

C. Construction Facilities: Access roads, parking, progress cleaning, and temporary buildings.

D. Some of the items specified herein are not specifically required for the project. However, these items may be provided as required for the convenience of the CONTRACTOR or as required for proper completion of the Work.

1.02 TEMPORARY ELECTRICITY (AS APPLICABLE)

A. Temporary electrical power service for bypass pumping and general construction purposes, as required, will be available at or near the site. Determine the type and amount available and arrange for obtaining temporary electric power service from the local electric utility company and pay for all costs for services and for power used.

B. Install circuit and branch wiring, with area distribution boxes located so that power is available throughout the construction area by the use of construction-type power cords.

C. Temporary electric power installations shall meet construction safety requirements of OSHA, State and other governing agencies.

1.03 TEMPORARY LIGHTING (AS APPLICABLE)

A. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

B. Maintain lighting and provide routine repairs.

1.04 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.05 CONFINED SPACE ENTRY REQUIREMENTS

A. CONTRACTOR shall obtain all entry permits and provide all equipment and procedures as required to meet confined space entry requirements in accordance with the following legal authorities:

1. Occupational Safety and Health Act (OSHA), Title 29 CFR 1910.146 "Permit Required Confined Spaces".

2. Florida Statute - Chapter 38 T-20 Section .035. "Hazardous Atmospheres in Confined Spaces".

1.06 TEMPORARY WATER SERVICE (AS APPLICABLE)

A. Provide and maintain suitable quality water service, as required, for construction operations.

B. All CITY water used must be metered by the CITY, and the CONTRACTOR will be charged for the water usage and any applicable deposits or fee.

C. Extend branch piping with outlets located so water is available by hoses with threaded connections.

D. The CONTRACTOR shall contact the City of Pompano Beach Public Works Department for instruction on how to obtain a temporary hydrant water service.

1.07 TEMPORARY SANITARY FACILITIES

A. Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed in a fiberglass or other approved non-absorbent shell.

1.08 TEMPORARY CONSTRUCTION FENCING

A. Construction Fence: Commercial grade chain link fence or bright orange-colored, high density, polyethylene safety fence. Minimum fence height shall be 4 feet.

B. Provide construction fence to secure entire construction area at all times when CONTRACTOR's personnel are not present.

1.09 WATER/EROSION CONTROL

A. Grade sites to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment, as applicable.

B. Protect sites from puddling or running water. Provide water barriers as required to protect sites from soil erosion.

1.10 SILTATION CONTROL

A. Provisions shall be made for the prevention of siltation of the canal waterways where affected by the Work.

B. The CONTRACTOR shall take all necessary precautions including but not limited to silt barriers and screens.

1.11 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification Sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

C. Prohibit traffic from landscaped areas.

1.12 ACCESS ROADS

A. Temporary rock access drives or roadways shall be provided for all residences that are affected by the work for a period greater than 8 hours.

B. Temporary rock access drives or roadways shall be provided for all businesses affected by the work unless other written arrangements are made with business owner.

C. Provide copy of all written arrangements to ENGINEER.

D. Construct and maintain temporary roads accessing public thoroughfares to serve construction areas, as applicable.

E. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.

F. Provide and maintain access to fire hydrants, free of obstructions.

1.13 CONSTRUCTION/EXCAVATION DEWATERING

A. CONTRACTOR shall investigate and provide adequate dewatering systems as required to dewater his excavations for pipe laying and similar operations.

B. CONTRACTOR shall be responsible for providing all equipment and accessories including but not limited to: well points, pumps, header and discharge piping, drainage gravel, floating silt barriers, erosion control and point jetting equipment.

C. Where required, CONTRACTOR shall pre-dig excavations for placement of drainage gravel and use of portable trash pumps.

D. As required, CONTRACTOR shall contact all applicable regulatory authorities to determine permitting requirements, if any, related to construction dewatering. CONTRACTOR shall apply for and obtain all required permits.

E. All dewatering plans shall be submitted to ENGINEER in accordance with Section 01300 - Submittals. Plans must be approved by ENGINEER minimum of two (2) weeks prior to implementation.

F. All costs associated with dewatering shall be appropriately apportioned in the bid.

G. **Provide adequate noise attenuation enclosure around all engine generator pumping equipment and comply with City's Noise Ordinance.**

1.14 FIRE EXTINGUISHERS

A. Provide portable UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide portable UL- rated Class ABC dry chemical extinguishers or a combination of NFPA recommended Classes for the exposure. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

1.15 PROTECTION OF EXISTING STRUCTURES

A. CONTRACTOR shall provide screens or other such means to prevent splatter of concrete, paint or other such substance from staining or damaging the nearby existing structures, equipment or vehicles.

B. CONTRACTOR shall be responsible for cleaning and repairing all damages caused by overspray.

1.16 FUEL STORAGE

A. All fuel or other such regulated substances stored on site by CONTRACTOR shall be done so in accordance with the rules and regulations of the City of Pompano Beach.

1.17 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain sites in a clean and orderly condition.

B. Remove waste materials, debris, and rubbish from sites weekly and dispose of at an approved site.

1.18 REMOVAL OF TEMPORARY UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Final Inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS (NOT USED).

PART 3 - EXECUTION

3.01 NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION SITES

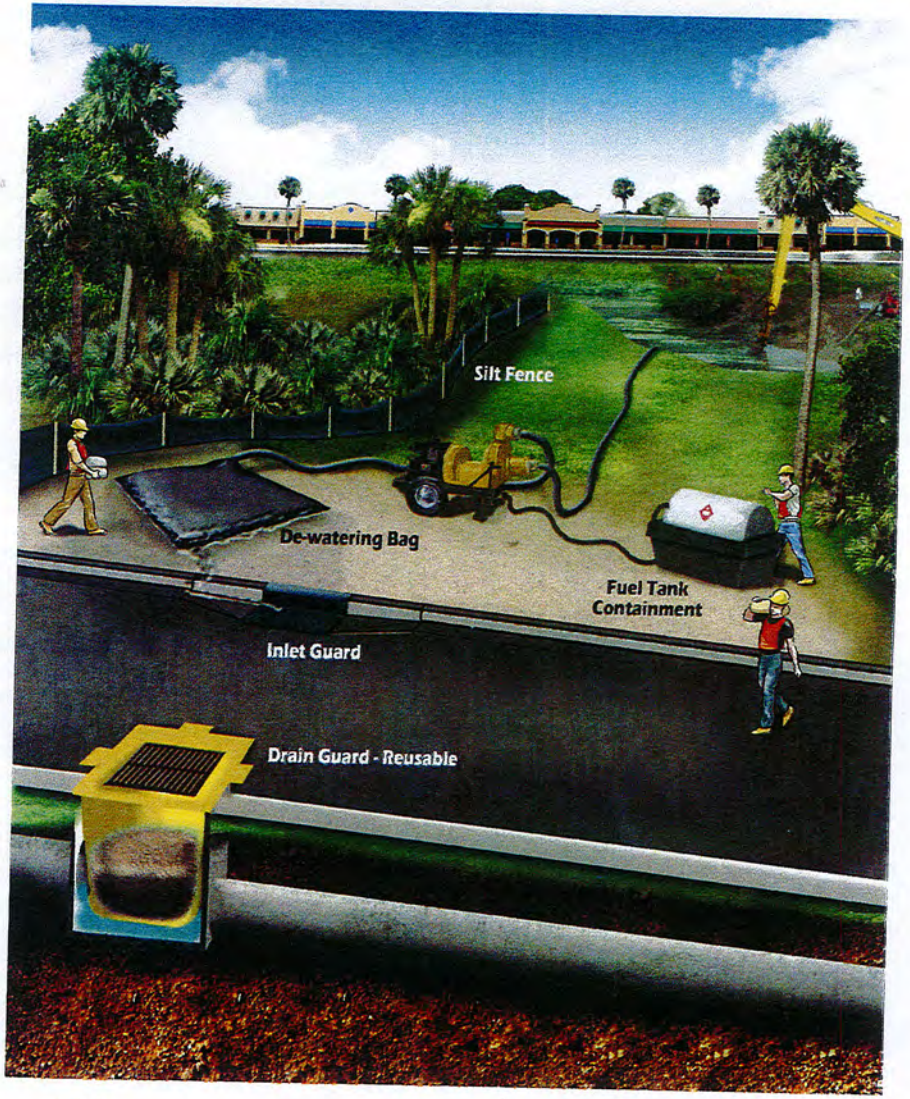
A. The Contractor shall comply with Stormwater Discharge Regulations and Amendments to the Clean Water Act (33 USC 1251 et seg). On September 16, 1992, the State of Florida certified the general permit for stormwater discharges from construction sites for use in Florida. Under these regulations, construction projects that disturb more than one acre must have and comply with a stormwater pollution prevention plan. For this project, this plan is comprised of this Section, Section 02220 Trenching, Backfilling and Compacting and the Florida Department of Environmental Protection.

B. The contractor shall ensure that all employees and subcontractors implement the specified erosion control practices to properly manage stormwater.

C. Comply with the City of Pompano *Site Operator Reference Guide*, copy included following this section.

END OF SECTION

Construction Site Best Management Practices (BMPs)



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Florida's Warmest Welcome

Site Operator Reference Guide

Construction Site Best Management Practices (BMPs)

ɔrmwater pollution is a major detriment to water quality and fish bitat. When stormwater runoff is mixed with contaminants and litter becomes sediment laden, it creates stormwater pollution.

costs money and takes time to replace vegetation, clean sediment-ɔgged storm drains, replace poorly installed BMPs, and mitigate mage to wetlands, downstream property, or to natural resources.

ɔncompliance with City, State, and Federal regulations could result a stop work order until deficiencies or noncompliant activities on e are corrected; resulting in project delays and extra incurred costs r rescheduling work. Damage to wetlands, turbidity violations, and her activities resulting in environmental damages could result in ıes and further project delays. It benefits the site operator to ensure ur site complies with all regulations to protect our waterways.

'eventing soil erosion, sedimentation, and runoff of other ıllutants like concrete wastes, paint wash water and trash is an ıportant responsibility of all construction sites.

How do Construction Activities Affect You the Site Operator (Contractor)?

The City of Pompano Beach Stormwater Permit requires the City to implement a construction runoff program to ensure that pollution controls are in place on construction sites.

Pompano Beach Municipal Code § 53.16 (Discharges into the Municipal Stormwater Management System Ordinance) prohibits discharges at work sites from flowing into storm drains and polluting neighborhood lakes, canals, and the ocean. To stay in compliance with the law and to keep your project on schedule, make sure the appropriate BMPs are in place and functioning. Sites must be inspected and BMPs maintained with inspection reports filed on site.

Stormwater Pollution Prevention Plan (SWPPP)

A stormwater pollution prevention plan (SWPPP) is an essential requirement for the Florida Department of Environmental Protection (FDEP) Generic Permit for Stormwater discharge from Large and Small Construction Activities. A SWPPP identifies all possible sources of pollution which may reasonably be expected to affect the quality of stormwater discharges to the City's stormwater system or to surface waters of the State from the construction site.

Your construction site is required to have a completed and approved SWPPP from the City of Pompano Beach before construction begins. Prior to clearing and grading, the site operator (contractor) should ensure that all subcontractors have reviewed the SWPPP and understand the site conditions before construction begins.

After the SWPPP is approved and construction commences, operators (contractor) need to ensure the plan continues to be in place. Inspections of the site and stormwater BMPs should occur, at a minimum, weekly by the site operator and within 24 hours after EACH rain event of .50" or greater.

Stormwa Pollution Prevention Plans (SWPPPs) can provic guidance for field activities, but even the best plans cannot compensate for field personnel who don't know the basics of controlling stormwater pollution. SWPPPs and field activities to control erosion, sedimentation, and other runoff pollutants should focus on the following common sense principles:

- Ensure that the Generic Permit Notice of Intent (NOI) is signed and posted at the construction site.
- The list of contractor and subcontractors responsible for implementation of the erosion control measures is filed with the SWPPP.
- Fit the project to the site by retaining the existing drainage system (if it is stable), minimizing clearing and grading, and maximizing infiltration of precipitation.
- Minimize the amount of bare soil exposed and the duration of exposure by phasing the project, limiting clearing and grading to what can be handled during a three week period, and seeding or mulching promptly.
- Before clearing and grading begins, install silt fences, storm drain inlet protection, sediment traps/basins, and other BMPs. Construct to final grade quickly, then seed or mulch.
- Maintain BMPs until the grass is established and the ditches are stable. Address ruts and washouts immediately. Keep potential pollutants from the elements, clean up spills promptly, be diligent about allowing only stormwater to enter the storm drainage system.

Tips for SWPPP Compliance

The creation of a site map is a crucial element to preparing an effecti SWPPP. The site map is an assessment process that serves as a guide f selecting appropriate and effective Best Management Practices (BMPs). A evaluation of the drainage patterns on site should be conducted, noting t slope after major grading deficiencies. To ensure that sediment and erosic control devices are effective, areas of soil disturbances should be noted c the site map.

Areas such as wetlands that should not be disturbed should be labeled c the site map with an outline surrounding the perimeter. The locations all structural and non-structural controls should also be clearly labeled c the map. Soil disturbances or other areas on site that require stabilizatic practices should be indicated on the site map.

The locations of all wetlands and surface waters are necessary and shou be appropriately labeled. Any locations on the construction site where the is a potential stormwater discharge to the MS4 or surface water needs to b noted on the map. There are other elements of site assessment that are usefu to include on the site map, however, the above items are the **minimu requirements that must be included.**

The SWPPP is not a static document and may require amendment. If ther is a change in design, construction, operation, or maintenance, which ha a significant effect on the potential for discharge, the SWPPP should b amended to reflect the proper BMPs to prevent noncompliance.

If during weekly inspections or as a result of an inspection after a rain ever a deficiency in the plan is noted, the SWPPP should be modified with description of the activities completed to correct the problem. If a BMP wa modified or a new BMP installed the amended SWPPP should include tha information.

New contractors to the site, who are responsible for implementing an part of the SWPPP should be included in the plan via an amendment. An amendment to the plan should be accompanied by a signed and date notation and filed on site with the original SWPPP.

Construction Sites – A Threat to Water Quality, Examples of What Not to Do....

Construction BMPs can pose a threat to water quality when improperly installed or maintenance is neglected. Turbidity violations can result in low dissolved oxygen which can cause fish kills. Sedimentation run offs into water ways can smother vegetation negatively effecting aquatic habitat. Uncontained spills can enter surface waters and pose a threat to human health. The following photos are results of failed construction BMPs that can adversely impact water quality.

Never hose down dirty pavement or surfaces where materials have spilled. Use dry cleanup methods (absorbent materials such as kitty litter, sawdust, or cornmeal sweep) whenever possible. Do not use the street to stockpile dirt, sand, and other construction materials that can contribute to stormwater pollution. Do not wash paint brushes and spray guns into storm drain or street. They should be cleaned over a drum and the drum disposed of properly.

Best Management Practices (BMPs) for Construction Sites

DON'Ts

- Do not leave storm drain inlets unprotected at any time.
  - Drain guards, gutter buddies and other inlet protection should be inspected weekly to insure proper fit.
  - The site operator is responsible to insure all contractors are aware of storm drain locations to help prevent pollutant from entering the MS4 system.
- Do not wash out concrete chutes into the streets or storm drains.
- Do not throw trash or food waste on the ground, dispose in a trash can with cover.
- Don't allow vehicles exiting construction sites to track dirt and mud onto the street.
- Never clean trash receptacles by hosing it down on site.
- Do not erect construction BMPs without implementing daily inspections and periodic maintenance to ensure they are operating correctly. Inspection reports should be kept on site.

Best Management Practices (BMPs) for Construction Sites

DO's

- Acceptable perimeter controls include gravel bags, silt fences, and straw wattles (weighted down) and must be used to surround the entire site.
  - Differentiate perimeter controls between wetlands and uplands by installing yellow staked turbidity barriers at wetland lines and black silt fences at upland areas.
- Building Materials/Staging Areas must be stored on site at all times and should be covered when not in use to prevent runoff from wind and rain.
- Dumpsters should be covered with a rollback tarp.
  - Perimeter controls around dumpster areas should be provided if pollutants are leaking or discharging from the dumpster.
- Clean up leaks and spills immediately. This prevents contaminated soil or residue on paved surfaces from blowing or washing off into storm drains.
- Paint and stucco stored on site must be covered and contained.
- Dirt and Grading
  - Mounds of dirt or gravel should be stored on site and sprayed daily with water to prevent excess dust and be covered to prevent runoff during a storm.
  - Sites must have adequate tracking control to prevent transport from the site.

For more information about BMPs for construction activities or additional brochures, call:

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City of Pompano Beach
Building Inspections Department
(954) 786-4670

- To Report a Clogged Catch Basin
  (954) 786-4637
- To Report Illegal Dumping or an Illicit Discharge
  (954) 786-4724 or (954) 519-1499
- City of Pompano Engineering Division
  Stormwater Inspections
  (954) 786-4506

100 West Atlantic Blvd.
Pompano Beach, FL 33060 | www.pompanobeachfl.gov

Certification of Compliance with Minimum Requirements

The following is intended as an attachment for construction and grading plans and represents, the minimum standards of good housekeeping which must be implemented on all construction sites regardless of size.

- Eroded sediments and other pollutants must be retained on site and may not be transported from the site via sheetflow, swales, area drains, natural drainage courses or wind.
- Stockpiles of earth and other construction materials must be prevented from being transported off site by wind or water.
- Fuels, oils, solvents and other toxic materials must be stored in accordance with manufacturer specifications and are not to contaminate soil or surface waters. Spills must be cleaned immediately and disposed of properly. Spills may not be washed off site into storm drain system.
- Non-stormwater runoff from equipment and vehicle wash outs and any other activity shall be contained on site.
- Excess or waste concrete should never be washed in a manner that allows for materials to leave the site.
- Trash and all construction waste must be deposited into covered receptacles to prevent contamination of rainwater and dispersal by wind.
- Sediments and other materials may not be tracked off site by construction traffic. The entrance roadways must be stabilized to inhibit sediments from being deposited into the public right of ways. Depositions must be swept immediately and not be allowed into the storm drain system or surface waters.

Other:

As the project owner or authorized agent of owner, I have read and understand that the requirements listed above are necessary to preserve permit compliance and to control stormwater pollution from negatively affecting waterways, and I certify that the site will comply with these requirements.

Print Name	Company
Signature	Date

Certification of Compliance w
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affecting waterways, and I certify that the site will comply with the
requirements.

Print Name	Company
Signature	Date

1

Contractor's Certification

As a Contractor, Site Superintendent, Owner or Operator of this Construction Site, I certify that I have received and reviewed the Construction Best Management Practices (BMPs) and agree to implement all site controls applicable to this construction site to effectively minimize the negative impacts of this project's stormwater runoff.

_____
Print Name

_____
Company Name

_____
Signature

_____
Phone Number

_____
Date

City of Pompano Beach
Building Permit #_____

SECTION 01530
PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

B. The Contractor shall verify the exact locations and depths of all utilities shown, and the Contractor shall make exploratory excavations of all utilities that may interfere with the Work.

C. All such exploratory excavations shall be performed as soon as practicable after award of the Contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's work.

D. When such exploratory excavations show the utility location as shown to be in error, the Contractor shall so notify the Engineer.

E. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

1.02 RIGHTS-OF-WAY

A. The Contractor shall not do any Work that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; any fence; or any other structure, nor shall the Contractor enter upon the rights-of-way involved until notified by the Engineer that the Owner has secured authority therefor from the proper party.

B. After authority has been obtained, the Contractor shall give said party due notice of its intention to begin work, if required by said party, and shall remove, shore, support, or otherwise protect such pipeline, transmission line, ditch, fence, or structure, or replace the same.

C. When two or more contracts are being executed at one time on the same or adjacent land in such manner that work on one Contract may interfere with that on another, the Owner shall determine the sequence and order of the Work.

D. When the limits of one Contract are the necessary or convenient means of access for the execution of another Contract, such privilege of access or any other reasonable privilege may be granted by the Owner to the Contractor so desiring, to the extent, amount, in the manner, and at the times permitted.

E. No such decision as to the method or time of conducting the Work or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the Work.

1.03 PROTECTION OF STREET OR ROADWAY MARKERS

A. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization.

B. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced.

C. All survey markers or points disturbed by the Contractor shall be accurately replaced after all street or roadway re-surfacing has been completed.

1.04 RESTORATION OF PAVEMENT

A. General:

1. All paved areas including asphaltic concrete cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific re-surfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit.

2. All temporary and permanent pavement shall conform to the requirements of the affected pavement owner.

3. All pavements subject to partial removal shall be neatly saw-cut in straight lines.

B. Temporary Re-surfacing:

1. Wherever required by the public authorities having jurisdiction, the Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with final restoration.

C. Permanent Re-surfacing:

1. To obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement.

2. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines.

3. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

D. Restoration of Sidewalks or Private Driveways:

1. Wherever sidewalks or private roads have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of time is so fixed, the Contractor shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

1.05 EXISTING UTILITIES AND IMPROVEMENTS

A. General:

1. The Contractor shall protect all underground utilities and other improvements that may be impaired during construction operations.

2. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations.

3. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be deemed necessary.

4. The Contractor shall notify the City immediately in the event of a utility line break.

B. Utilities to be Moved:

1. In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon

request of the Contractor, be notified by the Owner to move such property within a specified reasonable time.

2. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

C. Temporary Removal and/or Relocation:

1. Where the proper completion of the Work requires the temporary removal and/or relocation of an existing utility or other improvement which is indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the owner of the facility.

2. In all cases of such temporary removal or relocation, restoration to the former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

D. The right is reserved to the Owner and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.

E. Existing utility lines that are indicated or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, **the City shall be notified immediately** shall be immediately repaired or replaced by the Contractor.

F. Underground Utilities Not Indicated:

1. In the event that the Contractor damages any existing utility lines that are not indicated or the locations of which are not made known to the Contractor prior to excavation, a written report thereof shall be made immediately to the Engineer.

2. If directed by the Engineer, repairs shall be made by the Contractor under the provisions for changes and extra work contained in the General Conditions.

G. All costs of locating, repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment

on the project which was actually working on that portion of the work interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the provisions for changes and extra work contained in the General Conditions.

H. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill.

I. Maintaining Service:

1. All oil and gasoline pipelines, power, and telephone or the communication cable ducts, gas mains, water mains, irrigation lines, sewer lines, storm drainage, poles, and overhead power and communication wires and cables encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner(s) of said pipelines, ducts, main, irrigation lines, sewers, storm drains, poles, wires or cables.

2. The Contractor shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

3. Contractor shall replace all damaged irrigation piping, heads and control lines in kind. Zones to be capped off at construction line. If this results in discontinuance of service on private property, the contractor shall provide for irrigation service to this area(s). Refer to Specification Section 02661, Part 10 for additional information and requirements.

1.06 TREES WITHIN ROAD RIGHTS-OF-WAY AND PROJECT LIMITS

A. General:

1. The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or Owner.

2. All existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the jurisdictional agency and/or the Owner.

B. Trimming:

1. Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to the trunk or large branch.

2. Spikes shall not be used for climbing live trees.

3. All cuts over 1-1/2" in diameter shall be coated with an asphaltic emulsion material.

C. Replacement:

1. The Contractor shall immediately notify the jurisdictional agency and/or the Owner if any tree is damaged by the Contractor's operations.

2. If, in the opinion of said agency or the Owner, the damage is such that replacement is necessary, the Contractor shall replace the tree at its own expense.

3. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the Contractor shall pay to the owner of said tree a compensatory payment acceptable to the tree owner, subject to the approval of the jurisdictional agency or Owner.

4. The size of the trees shall be not less than 1-inch diameter, nor less than six feet high.

1.07 NOTIFICATION BY THE CONTRACTOR

A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three days nor more than seven days prior to excavation so that a representative of said owners or agencies can be present during such work if they so desire.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01570
TRAFFIC CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow around the construction area.

B. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

1.02 REFERENCES

Traffic regulation shall be in accordance with F.D.O.T. Roadway and Traffic Design Standards Series 600, latest Edition, Manual on Uniform Traffic Control Devices, latest Ed., and FDOT Standard Specifications, latest Ed.

1.03 TRAFFIC CONTROL PLAN

A. The Contractor is to prepare a traffic control plan and/or policy statement for each phase of construction. This plan is to be presented to the City Engineer at or before the pre-construction meeting.

B. All proposed traffic control plans and policy statements shall be complete and in compliance with Section 1.02.

1.04 TRAFFIC SIGNALS AND SIGNS

A. Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under Contractor's control, or affected by Contractor's operations.

B. Provide traffic control and direction signs, post mounted, at all areas required by Section 1.02.

C. Traffic Signals - Construction requiring traffic signal modification shall be reported to the City Engineer at least 72 hours prior to the commencement of such activities. All excavation work within 30 feet of any traffic signal shall be reported to the City Engineer at least 72 hours prior to its commencement.

D. All existing traffic signs shall remain visible throughout construction activities unless superseded by required construction signing.

1.05 FLAGMEN

Provide qualified and suitably equipped flagmen when construction operations encroach on traffic lanes, as required for regulation of traffic (See Section 1.02).

1.06 FLARES AND LIGHTS

A. Provide lights as required by Section 1.02.

1. To clearly delineate traffic lanes and to guide traffic as required in Section 1.02
2. For use by flagmen in directing traffic.

B. Provide illumination of critical traffic and parking areas as required in Section 1.02.

1.07 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.

B. Monitor parking of construction personnel's private vehicles.

1. Maintain free vehicular access to and through parking areas and driveways.
2. Prohibit parking on or adjacent to access roads, or in non-designated areas.

1.08 CONSTRUCTION VEHICLES

A. All slow moving construction vehicles shall have a slow moving sign visible from the rear of the vehicle.

B. All vehicles used for construction activities shall have audible back-up warning devices.

1.09 ROAD CLOSINGS AND TRAFFIC CONTROL

A. CONTRACTOR shall be responsible for preparation of FDOT traffic control plans. A minimum of six (6) copies of all traffic plans shall be submitted to ENGINEER in accordance with the General Conditions. All traffic plans shall contain the following information:

1. All applicable street names.

2. All detour routes.

3. All required construction and detour signage, including Variable Message Boards and Specialty Signage.

4. All flag man locations.

5. Locations of all street and lane closings.

6. As applicable, time, day and date street or lane will be closed and time, day and date street or lane will be reopened to traffic.

7. The following statement shall be included on all traffic plans: "This plan meets all applicable requirements of the Manual of Uniform Traffic Control Devices".

B. Traffic plans must be approved by ENGINEER a minimum of two (2) weeks prior to beginning of work in area covered by Traffic Plan. Traffic plans must also be approved by City of Pompano Beach Traffic Engineer, two (2) weeks prior to beginning work in affected areas, where applicable.

C. All businesses and homeowners affected by road closures shall be notified a minimum of one (1) week in advance of closing. CONTRACTOR to submit notification flyers for approval of format.

D. Provisions must always be maintained for local residential and business traffic. Specifically, but not limited to:

1. **Access shall be provided to each residence at the end of the day. In areas of construction within deep trench, a temporary compacted rock driveway access can be provided to groupings of residences in order to provide access at the end of the day.**

E. Approved maintenance of traffic plans shall be submitted to Local, Police, Fire Department and Emergency Medical Services (EMS) by OWNER.

PART 2 - PRODUCTS

A. All traffic control devices shall meet or exceed FDOT certification standards and the Manual of Uniform Traffic Control Devices.

B. All traffic signs shall have high intensity face material.

PART 3 - EXECUTION

A. Upon notification by the owner either verbally or in writing, the contractor shall correct any noted deficiencies within one hour.

B. Inspection of all traffic control items shall be accomplished at least twice per day. One of these inspections shall be at the end of the work day or at night.

END OF SECTION

SECTION 01600
MATERIAL EQUIPMENT AND PRODUCTS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Workmanship.

B. Manufacturer's Instructions.

C. Transportation and Handling.

D. Storage and Protection.

E. Substitutions and Product Options.

1.02 RELATED REQUIREMENTS

A. Section 01010: Summary of Work.

B. Section 01700: Project Close-out.

1.03 SUBMITTALS

A. The Contractor shall submit the following:

1. Assembly instructions for parts shipped unassembled.

2. Manufacturer’s instructions for unloading, handling, storage, and protection prior to installation, with each shipment of each product type.

3. Copy of manufacturer’s notice of shipment for products critical to the project schedule.

4. Documentation of products in storage, submitted with each progress payment request.

5. Written agreement with property owner or lessee for storage of products, if offsite storage is necessary.

1.04 MATERIAL, EQUIPMENT AND PRODUCTS

A. Comply with these Specifications and referenced standards as a minimum.

B. Components required to be supplied in quantity within a Specification Section shall be the same, and shall be interchangeable.

1.05 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances of specified requirements indicate more rigid standards or more precise workmanship.

B. Perform work by persons qualified to produce workmanship of the specified quality.

C. Secure in places with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

1.06 MANUFACTURER'S INSTRUCTIONS

A. When work is specified to comply with manufacturer's instructions, submit copies as specified in Section 01300. Distribute copies to subcontractors involved and maintain one (1) set in the field office.

B. Perform work in accordance with details of instructions and specified requirements. Should a conflict exist between the Specifications and the instructions, consult with the Engineer.

1.07 PREPARATION FOR SHIPMENT

A. When practical, products shall be factory assembled.

1. Furnish assembly instructions for parts and products that are shipped unassembled.

2. Mark or tag the separate parts and assemblies for field assembly.

3. Cover machined and unpainted parts that may be damaged by the elements with a strippable protective coating.

B. Package or crate products to provide protection from damage during shipping, handling, and storage.

1. Mark or tag the outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of project and Contractor, equipment number, and approximate weight.

C. Mark spare parts and special tools to identify the associated products by name, equipment, and part number.

D. Package parts for protection against damage from the elements during shipping, handling, and storage.

E. Ship in boxes or containers marked to indicate the contents as stated above.

F. Deliver spare parts and special tools before the associated equipment is scheduled for the initial test run.

G. The Contractor shall request a minimum 7-day advance notice of shipment from manufacturer's.

H. Where specified for specific products, factory test results shall be reviewed and accepted before such products are shipped.

1.08 TRANSPORTATION AND HANDLING

A. Provide equipment and personnel necessary to handle products by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.

C. Handle products by methods to prevent bending or stressing.

D. Lift heavy components only at designated lifting points.

1.09 RECEIVING, INSPECTION AND UNLOADING

A. All Owner furnished items, if applicable, will be picked up by the Contractor at the locations specified by the Owner, and unloaded at the job site.

B. The Contractor shall record the receipt of products at the jobsite.

C. Upon receipt of products at the jobsite, the Contractor shall inspect for completeness and evidence of damage during shipment.

1. The Owner, Engineer and manufacturer's representative may be present for inspection.

2. Should there appear to be any damage, notify the Engineer immediately and inform the manufacturer and the transportation company.

3. Expedite replacement of damaged, incomplete, or lost items.

D. After completion of inspection, unload products per the manufacturer's instructions.

E. Do not unload damaged or incomplete products to be returned to the manufacturer for replacement, except as necessary to expedite return shipment.

F. The Contractor shall certify that the materials and quantity received are suitable for installation in accordance with these Contract Documents.

G. The Contractor shall assume full responsibility for the storage and control of all Owner supplied materials.

1.10 STORAGE, PROTECTION AND MAINTENANCE

A. Store in accordance with the manufacturer's instructions, with seals and labels intact and legible.

B. For exterior storage of fabricated products and equipment, place on supports above ground.

C. Cover products and equipment subject to deterioration with impervious sheet covering and provide adequate ventilation to avoid condensation.

D. Store loose granular materials on solid surfaces in a well-drained area. Prevent mixing with foreign matter.

E. Store items subject to damage by the elements, vandalism, or theft in secure areas.

F. Provide environmentally controlled storage facilities for items requiring environmental control for protection.

G. Arrange storage to provide access for inspection and inventory control by the Engineer. Periodically inspect to assure products, equipment and materials are undamaged and are maintained under the manufacturer's recommended conditions.

H. After installation, provide coverings to protect products and equipment from damage, traffic and construction operations. Remove when no longer needed.

I. During such periods of time as are designated by the U.S. Weather Bureau as being a hurricane warning or hurricane alert, construction materials or equipment shall be secured against displacement by wind forces.

J. Materials found unfit for use shall not be incorporated in the Work and shall be immediately removed from the construction or storage site.

K. Delivered materials shall be stored in a manner acceptable to the Engineer before any payment for same will be made.

L. The Contractor shall document products in storage to facilitate inspection and to estimate progress payments for products delivered but not installed in the work.

END OF SECTION

SECTION 01630
SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Furnish and install Products specified, under options and conditions for substitutions stated in this Section.

1.02 RELATED REQUIREMENTS

A. Information for Bidders and General Conditions.

B. Section 01300: Submittals.

C. Section 01700: Contract Closeout.

1.03 PRODUCTS LIST

A. Within 30 days after award of Contract, submit to Engineer five copies of complete list of major Products which are proposed for installation.

B. Tabulate Products by specification section number and title.

C. For products specified only by reference standards, list for each such Product:

1. Name and address of manufacturer.
2. Trade Name.
3. Model or catalog designation.
4. Manufacturer's data:
   a. Reference standards.
   b. Performance test data.

1.04 CONTRACTOR'S OPTIONS

A. For Products specified only by reference standard, select product meeting that standard, by any manufacturer.

B. For products specified by naming several products or manufacturers, select any one or those products and manufacturers names which complies with Specifications.

C. For products specified by naming only one or more products or manufacturers and stating "or equal", submit a request as for substitutions, for any product or manufacturer which is not specifically named.

D. Approval will only be provided for one specific manufacturer of a particular product. No mixed shipments of materials with different manufacturer's will be allowed.

1.05 SUBSTITUTIONS

A. Within a period of 30 days after award of Contract, Engineer will consider formal requests from the Contractor for substitution of products in place of those specified:

After the end of that period, the request will be considered only in case of product unavailability or other conditions beyond the control of the Contractor.

B. Submit a separate request for each substitution. Support each request with:

1. Complete data substantiating compliance of the proposed substitution with requirements stated in the Contract Documents:
   a. Product identification, including manufacturer's name and address.
   b. Manufacturer's literature; identify:
      1) Product description.
      2) Reference standards.
      3) Performance and test data.
   c. Samples, as applicable.
   d. Name and address of similar projects on which product has been used, and the date of each installation
2. Itemized comparison of the proposed substitution with product specified; List significant variations.
3. Data relating to changes in the construction schedule.
4. Any effect of the substitution on separate contracts.
5. List of changes required in other work or products.
6. Accurate cost data comparing proposed substitution with product specified.
7. Designation of required license fees or royalties.
8. Designation of availability of maintenance services, and sources of replacement materials.

C. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on Shop Drawings or product data submittals without a formal request from Contractor.
2. They are requested directly by a subcontractor or supplier.
3. No Data relating to changes in construction schedule.
4. Any effect of substitution on separate contracts.
5. List of changes required in other work or products.
6. Accurate cost data comparing proposed substitution with product specified.

7. Designation of required license fees or royalties.
8. Designation of availability of maintenance services, sources of replacement materials.
9. Acceptance will require substantial revision of Contract Documents.

D. Substitute products shall not be ordered or installed without written acceptance of Engineer.

E. Engineer will determine the acceptability of proposed substitutions.

1.06 CONTRACTOR'S REPRESENTATION

A. In making formal request for substitution Contractor represents that:

1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.
2. He will provide the same warranties or bonds for substitution as for product specified.
3. He will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.
4. He waives claims for additional costs caused by substitution which may subsequently become apparent.
5. Cost data is complete and includes related costs under his Contract, but not:
   a. Costs under separate contracts.
   b. Engineer's costs of redesign or revision of Contract Documents.

1.07 ENGINEER DUTIES

A. Review Contractor's requests for substitutions with reasonable promptness.

B. Notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01658
TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide erosion control measures on the project and in areas outside the right-of-way where work is accomplished in conjunction with the project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the project right-of-way and damage to work on the project. Construct and maintain temporary erosion control features or, where practical, construct and maintain permanent erosion control features as shown in the plans or as may be directed by the Owner.

1.02 GENERAL

A. Coordinate the installation of temporary erosion control features with the construction of the permanent erosion control features to the extent necessary to ensure economical, effective, and continuous control of erosion and water pollution throughout the life of the Contract.

B. Contractor or his subcontractor must employ a person who holds a certification as a Florida Department of Environmental Protection NPDES Construction Site Inspector.

C. Due to unanticipated conditions, the Owner may direct the use of control features or methods other than those included in the original Contract.

1.03 CONTROL OF CONTRACTOR'S OPERATIONS WHICH MAY RESULT IN WATER POLLUTION.

A. Prevent pollution of streams, canals, lakes, reservoirs, and other water impoundments with fuels, oils, bitumens, calcium chloride, or other harmful materials. Also, conduct and schedule operations to avoid or otherwise minimize pollution or siltation of such water impoundments, and to avoid interference with movement of migratory fish. Do not dump any residue from dust collectors or washers into any live stream.

B. Restrict construction operations in rivers, streams, lakes, tidal waters, reservoirs, canals, and other water impoundments to those areas where it is necessary to perform filling or excavation to accomplish the work shown in the plans and to those areas which must be entered to construct temporary or permanent structures.

As soon as conditions permit, promptly clear rivers, streams, and impoundments of all obstructions placed therein or caused by construction operations.

C. Except as necessary for construction, do not deposit excavated material in rivers, streams, canals, or impoundments, or in a position close enough thereto, to be washed away by high water or runoff.

D. Where pumps are used to remove highly turbid waters from enclosed construction areas such as cofferdams or forms, treat the water by one or more of the following methods prior to discharge into State waters: pumping into grassed swales or appropriate vegetated areas or sediment basins, or confined by an appropriate enclosure such as turbidity barriers when other methods are not considered appropriate.

E. Do not disturb lands or waters outside the limits of construction as staked, except as authorized by the Owner.

F. Obtain the Owner's approval for the location of, and method of operation in, borrow pits, material pits, and disposal areas furnished for waste material from the project (other than commercially operated sources) such that erosion during and after completion of the work will not result in probability of detrimental siltation or water pollution.

PART 2 - PRODUCTS

2.01 MATERIALS FOR TEMPORARY EROSION CONTROL.

A. The Owner will not require testing of materials used in construction of temporary erosion control features other than as provided for geotextile fabric in 985-3 unless such material is to be incorporated into the completed project. When no testing is required, the Owner will base acceptance on visual inspection.

B. The Contractor may use new or used materials for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed project, subject to the approval of the Owner.

2.02 PRECONSTRUCTION REQUIREMENTS.

A. At the Preconstruction Conference, provide to the Owner an Erosion Control Plan meeting the requirements or special conditions of all permits authorizing project construction. If no permits are required or the approved permits do not contain special conditions or specifically address erosion and water pollution, the project Erosion Control Plan will be governed by Section 3.02 herein, and FDOT Section 104.

B. The Contractor will be required to sign the City's "Site Operator Reference Guide for Construction BMPs."

C. Ensure the Erosion Control Plan includes procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-storm water discharges, such as contaminated groundwater or accidental spills. Do not begin any soil disturbing activities until Owner's direction.

D. Failure to sign any required documents or certification statements will be considered a default of the Contract. Any soil disturbing activities performed without the required signed documents or certification statements may be considered a violation of the DEP Generic Permit.

E. When the SWPPP is required, prepare the Erosion Control Plan in accordance with the planned sequence of operations and present in a format acceptable to the Owner. The Erosion Control Plan shall describe, but not be limited to, the following items or activities:

1. For each phase of construction operations or activities, supply the following information:

   a. Locations of all erosion control devices

   b. Types of all erosion control devices

   c. Estimated time erosion control devices will be in operation

   d. Monitoring schedules for maintenance of erosion control devices

   e. Methods of maintaining erosion control devices

   f. Containment or removal methods for pollutants or hazardous wastes

2. The name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.

3. Do not begin construction activities until after the Owner has received the Erosion Control Plan.

F. Comply with the approved Erosion Control Plan.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. **Limitation of Exposure of Erodible Earth:** The Owner may limit the surface areas of unprotected erodible earth exposed by the construction operation and

may direct the Contractor to provide erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal, or other water impoundments or to prevent detrimental effects on property outside the project right-of-way or damage to the project. Limit the area in which excavation and filling operations are being performed so that it does not exceed the capacity to keep the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.

Do not allow the surface area of erodible earth that clearing and grubbing operations or excavation and filling operations expose to exceed 750,000 sq ft without specific prior approval by the Engineer. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.

The Engineer may increase or decrease the amount of surface area the Contractor may expose at any one time.

B. **Incorporation of Erosion Control Features:** Incorporate permanent erosion control features into the project at the earliest practical time. Use approved temporary erosion control features to correct conditions that develop during construction which were not foreseen at the time of design, to control erosion prior to the time it is practical to construct permanent control features, or to provide immediate temporary control of erosion that develops during normal construction operations, which are not associated with permanent erosion control features on the project. The Owner may authorize temporary erosion control features when Topsoil is specified in the Contract and the limited availability of that material from the grading operations will prevent scheduled progress of the work or damage the permanent erosion control features.

C. **Scheduling of Successive Operations:** Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposure of uncompleted construction to the elements is as short as practicable.

Schedule and perform clearing and grubbing so that grading operations can follow immediately thereafter. Schedule and perform grading operations so that permanent erosion control features can follow immediately thereafter if conditions on the project permit.

D. **Details for Temporary Erosion Control Features:**

1. **General:** Use temporary erosion and water pollution control features that consist of, but are not limited to, temporary grassing, temporary sodding, temporary mulching, sandbagging, slope drains, sediment basins, sediment checks, berms, baled hay or straw, floating turbidity barrier, staked turbidity barrier and silt fence. For design details for some of these items, refer to the Water Quality Section of the FDOT Design Standards.

2. **Temporary Grassing:** The Owner may designate certain areas of grassing constructed in accordance with Section 570 as temporary erosion control features. The Owner may direct the Contractor to omit permanent type grass seed from grassing and reduce the specified rate of spread for fertilizer used in conjunction with grassing operations when such work is designated as a temporary erosion control feature.

3. **Temporary Sod:** Furnish and place sod in accordance with Section 575 within areas designated by the Owner to temporarily control erosion. If the Owner determines that the sod will be of a temporary nature, he may not require fertilizer and lime. Keep the sod in a moist condition in order to ensure growth. The Contractor will pay for all required watering.

4. **Temporary Mulching:** Furnish and apply a 2 to 4 inch thick blanket of straw or hay mulch to designated areas, then mix or force the mulch into the top 2 inches of the soil in order to temporarily control erosion. Use only undecayed straw or hay which can readily be cut into the soil and which otherwise complies with 981-3. The Contractor may substitute other measures for temporary erosion control, such as hydromulching, chemical adhesive soil stabilizers, etc., for mulching with straw or hay, if approved by the Owner. When beginning permanent grassing operations, plow under temporary mulch materials in conjunction with preparation of the ground.

5. **Sandbagging:** Furnish and place sandbags in configurations to control erosion and siltation.

6. **Slope Drains:** Construct slope drains in accordance with the details shown in the plans, the Design Standards, or as may be approved as suitable to adequately perform the intended function.

7. **Sediment Basins:** Construct sediment basins in accordance with the details shown in the plans, the Design Standards, or as may be approved as suitable to adequately perform the intended function. Clean out sediment basins as necessary in accordance with the plans or as directed.

8. **Berms:** Construct temporary earth berms to divert the flow of water from an erodible surface.

9. **Baled Hay or Straw:** Provide bales having minimum dimensions of 14 by 18 by 36 inches at the time of placement. Construct Baled Hay or Straw dams according to details shown in the plans, as directed by the Owner or as shown in the FDOT Design Standards to protect against downstream accumulations of sediment.

   Use natural baled hay or straw meeting the requirements of 981-3 or synthetic hay bales may be used as an alternative to natural baled hay or straw. Synthetic hay bales should be interlocking, have pre-made stake holes, are

made of synthetic fibers (polypropylene, nylon, polyester) that meet the Environmental Protection Agency's TCLP standards, and produced into a filter medium with needle-punched fibers. Use synthetic hay bales listed on the Qualified Products List. Wash out and remove sediment deposits when the deposits reach 1/2 the height of the reusable synthetic hay bale or as directed by the Owner. Dispose of the washout in accordance with 104-3 or in an area approved by the Owner. Synthetic hay bales that have had sediment deposits removed may be reinstalled on the project as approved by the Owner.

10. Temporary Silt Fences:

a. **General:** Furnish, install, maintain, and remove temporary silt fences, in accordance with the manufacturer's directions, these Specifications, the details as shown on the plans, and the FDOT Design Standards.

b. **Materials and Installation:** Use a geotextile fabric made from woven or nonwoven fabric, meeting the physical requirements of Section 985 according to those applications for erosion control.

Choose the type and size of posts, wire mesh reinforcement (if required), and method of installation. Do not use products which have a separate layer of plastic mesh or netting. Provide a durable and effective temporary silt fence that controls sediment comparable to the Design Standards, Index No. 102.

Install all sediment control devices in a timely manner to ensure the control of sediment and the protection of lakes, streams, gulf or ocean waters, or any wetlands associated therewith and to any adjacent property outside the right-of-way as required.

At sites where exposure to such sensitive areas is prevalent, complete the installation of any sediment control device prior to the commencement of any earthwork.

After installation of sediment control devices, repair portions of any devices damaged at no expense to the Owner.

Erect temporary silt fence at upland locations across ditchlines and at temporary locations shown on the plans or approved by the Engineer where continuous construction activities change the natural contour and drainage runoff. Do not attach temporary silt fence to existing trees unless approved by the Owner.

c. **Inspection and Maintenance:** Inspect all temporary silt fences immediately after each rainfall and at least daily during prolonged rainfall. Immediately correct any deficiencies. In addition, make a daily review of the location of silt fences in areas where

construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, install additional silt fences as directed by the Engineer.

Remove sediment deposits when the deposit reaches approximately 1/2 of the volume capacity of the temporary silt fence or as directed by the Engineer. Dress any sediment deposits remaining in place after the temporary silt fence is no longer required to conform with the finished grade, and prepare and seed them in accordance with Section 570.

11. **Floating Turbidity Barriers and Staked Turbidity Barriers:** Install, maintain, and remove turbidity barriers to contain turbidity that may occur as the result of dredging, filling, or other construction activities which may cause turbidity to occur in the waters of the State. The Contractor may need to deploy turbidity barriers around isolated areas of concern such as seagrass beds, coral communities, etc. both within as well as outside the right-of-way limits. The Owner will identify such areas. Place the barriers prior to the commencement of any work that could impact the area of concern. Install the barriers in accordance with the details shown in the plans or as approved by the Owner. Ensure that the type barrier used and the deployment and maintenance of the barrier will minimize dispersion of turbid waters from the construction site. The Owner may approve alternate methods or materials.

    Operate turbidity barriers in such a manner to avoid or minimize the degradation of the water quality of the surrounding waters.

12. **Rock Bags:** Furnish and place rock bags to control erosion and siltation. Place the bags as shown in the plans, the FDOT Design Standards or as directed by the Owner. Use a fabric material with openings that are clearly visible to minimize clogging yet small enough to prevent rock loss. Use material of sufficient strength to allow removing and relocating bags without breakage. The bag size when filled with rocks shall be approximately 12 by 12 by 4 inch. Use No. 4 or No. 5 coarse aggregate rock.

13. Artificial Coverings:

    a. General: Install artificial coverings in locations where temporary protection from erosion is needed. Two situations occur that require artificial coverings. The two situations have differing material requirements, which are described below.

        1) Use artificial coverings composed of natural or synthetic fiber mats, plastic sheeting, or netting as protection against erosion, when directed by the Owner, during temporary pauses in construction caused by inclement weather or

other circumstances. Remove the material when construction resumes.

2) Use artificial coverings as erosion control blankets, at locations shown in the plans, to facilitate plant growth while permanent grassing is being established. For the purpose described, use non-toxic, biodegradable, natural or synthetic woven fiber mats. Install in accordance with 571-3 as for plastic erosion mat. Install erosion control blankets capable of sustaining a maximum design velocity of 6.5 ft/sec as determined from tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the Owner. Furnish to the Owner, two certified copies of manufacturers test reports showing that the erosion control blankets meet the requirements of this Specification. Certification must be attested, by a person having legal authority to bind the manufacturing company. Also, furnish two 4 by 8 inch samples for product identification. The manufacturers test records shall be made available to the Owner upon request. Leave the material in place, as installed, to biodegrade.

E. **Removal of Temporary Erosion Control Features:** In general, remove or incorporate into the soil any temporary erosion control features existing at the time of construction of the permanent erosion control features in an area of the project in such a manner that no detrimental effect will result. The Engineer may direct that temporary features be left in place.

3.02 INSPECTIONS AND REPORTING

A. The Contractor's certified NPDES Construction Site Inspector shall complete the required NPDES construction site inspection reports and provide them to the Owner. Reports shall be done on a weekly basis, at a minimum.

3.03 MAINTENANCE OF EROSION CONTROL FEATURES.

A. **General:** Provide routine maintenance of permanent and temporary erosion control features, at no expense to the Owner, until the project is complete and accepted. If reconstruction of such erosion control features is necessary due to the Contractor’s negligence or carelessness or, in the case of temporary erosion control features, failure by the Contractor to install permanent erosion control features as scheduled, the Contractor shall replace such erosion control features at no expense to the Owner.

Inspect all erosion control features at least once every seven calendar days and within 24 hours of the end of a storm of 0.50 inch or greater. Maintain all erosion control features as required in the Stormwater Pollution Prevention Plan, Contractor’s

Erosion Control plan and as specified in the State of Florida Department of Environmental Protection Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

B. **Mowing:** The Owner may direct mowing of areas within the limits of the project, in addition to and apart from those areas specified in Section 580. Mow these designated areas within seven days of receiving such order. Remove and properly dispose of all litter and debris prior to the mowing operation. Use conventional and specialized equipment along with hand labor to mow the entire area including slopes, wet areas, intersections, overpasses and around all appurtenances. Mow all areas to obtain a uniform height of 6 inches, unless directed otherwise by the Owner.

3.04 PROTECTION DURING SUSPENSION OF CONTRACT TIME.

A. If it is necessary to suspend the construction operations for any appreciable length of time, shape the top of the earthwork in such a manner to permit runoff of rainwater, and construct earth berms along the top edges of embankments to intercept runoff water. Provide temporary slope drains to carry runoff from cuts and embankments that are in the vicinity of rivers, streams, canals, lakes, and impoundments. Locate slope drains at intervals of approximately 500 feet, and stabilize them by paving or by covering with waterproof materials. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation. The Owner may direct the Contractor to perform, during such suspensions of operations, any other erosion control work deemed necessary.

END OF SECTION

SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Closeout procedures, final cleaning, project record documents, system demonstration, warranties and bonds.

B. Closeout includes the general requirements near the end of the Contract Time in preparation for final acceptance, final payment, normal termination of the Contract, beneficial use by the Owner, and similar actions evidencing completion of the Work.

1.02 RELATED REQUIREMENTS

A. Section 01010: Summary of Work.

B. Section 01050: Field Engineering.

C. Section 01505: Construction Facilities and Temporary Controls.

1.03 CLOSEOUT PROCEDURES

A. Comply with procedures stated in the General Conditions of the Contract Documents for issuance of the Certificate of Substantial Completion and the Certificate of Final Completion.

B. When the Contractor considers that the Work has reached final completion, submit written certification that the Contract Documents have been reviewed, the Work has been thoroughly inspected, and that the Work is considered to be completed in accordance with the Contract Documents and is ready for inspection by the Engineer.

C. In addition to submittals required by the conditions of the Contract, provide all other submittals required by the Owner, other governing authorities or regulatory agencies, and submit to the Engineer a final statement of accounting giving the total adjusted Contract Sum, previous payments, and the sum remaining due.

D. The Engineer will issue a final change order reflecting approved adjustments to the Contract Sum not previously made by Change Order.

1.04 SUBSTANTIAL COMPLETION

A. When the Contractor considers the Work to be substantially complete, it will submit to the Engineer, or the Owner, as applicable:

1. A written notice that the Work, or a designated portion thereof, is substantially complete.

2. Special guarantees, warranties, workmanship bonds, maintenance agreements and similar documents.

3. Occupancy permits, operating certificates, test certificates and similar releases enabling the Owner's full and unrestricted use of the work and access to services and utilities.

4. Record drawings, maintenance manuals, project photographs, property survey and similar record information.

5. Tools, spare parts, extra stocks of materials and similar physical items to the Owner.

6. Certification that all site temporary facilities and services, along with construction equipment, mock-ups and similar elements have been removed from the site and that all repairs, touch-ups and restorations of marred exposed finishes have been completed.

B. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.

C. Should the Engineer determine that the Work is not substantially complete:

1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefor.

2. The Contractor will remedy the deficiencies in the Work, and send a second written notice of substantial completion to the Engineer.

3. The Engineer will then re-inspect the Work.

D. When the Engineer finds that the Work is substantially complete, it will:

1. Prepare and deliver to the Owner a tentative Certificate of Substantial Completion, with a tentative list of items to be completed or corrected before final payment.

2. After consideration of any objections made by the Owner as provided in the General Conditions, and when the Engineer considers the Work substantially complete, it will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.05 FINAL SUBMITTALS

A. The following submittals, as applicable, are required prior to finalizing the Contract:

1. Final shop drawings.

2. Record drawings.

B. All guarantees, bonds, certifications, licenses, and affidavits required for work and equipment must be filed with the Engineer.

1.06 RELEASE OF LIENS OR CLAIMS

A. Satisfactory evidence of release or waiver of all liens or claims must be submitted to the Owner prior to finalizing the Contract.

1.07 FINAL INSPECTION

A. When the Contractor considers the Work complete, it will submit written certification that:

1. The Contract Documents have been reviewed.

2. The Work has been inspected for compliance with the Contract Document.

3. The Work has been completed in accordance with the Contract Documents.

4. The Work is in every way completed and ready for final inspection.

B. The Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should the Engineer consider that the Work is incomplete or defective:

1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.

2. The Contractor will take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.

3. The Engineer will re-inspect the work.

4. When the Engineer finds that the Work is acceptable under the Contract Documents, it shall request the Contractor to make close-out submittals.

1.08 REINSPECTION FEES

A. Should the Engineer perform re-inspections due to the failure of the Work to comply with the claims of status of completion made by the Contractor:

1. The Owner will compensate the Engineer for such additional services.

2. The Owner will deduct the costs of such additional compensation from the final payment to the Contractor.

1.09 CONTRACTOR'S CLOSE-OUT SUBMITTALS TO THE ENGINEER

A. Project record drawings in accordance with Section 01720.

B. Contractor's affidavit of payment of debts and claims:

1. Contractor's release or waiver of liens.

C. Separate releases or waivers of liens for subcontractors, suppliers and others that have filed lien rights against property of the Owner in accordance with Section 713.06 Florida Statutes, together with a list of those parties.

D. Final payment request with Consent of Surety for Final Payment and the Contractor's Certification of Final Completion.

E. Certified copy of the Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.

1.10 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Engineer. The statement will reflect all approved adjustments to the Contract Sum, including:

1. The original Contract Sum.

2. Additions and deductions resulting from:

a. Approved Change Orders.
b. Allowances.
c. Unit Prices.
d. Deductions for uncorrected Work.
e. Deductions for liquidated damages.
f. Deductions for re-inspection payments.
g. Deductions for re-testing due to failed tests.
h. Other adjustments.

3. Total Contract Sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

B. The Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Order.

1.11 FINAL CLEANING

A. Perform prior to final inspection.

B. Clean the site, sweep paved areas, rake clean other surfaces.

C. Remove waste and surplus materials, rubbish and construction facilities from the project site and dispose of in a lawful manner.

D. Remove stains, petrochemical spills and other foreign deposits.

E. Except as otherwise indicated or requested by the Owner, remove temporary protection devices and facilities installed during the course of the Work to protect previously completed Work during the remainder of the construction period.

F. Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at the site or bury debris or excess materials, or discharge volatile or other harmful or dangerous materials into the environment.

G. Where extra materials of value remain after completion of the Work, dispose of or store such materials for use by the Owner as indicated in these Specifications.

1.12 PROJECT RECORD DOCUMENTS

A. Store documents separate from those used for construction.

B. Keep documents current. Do not permanently conceal any work until required information has been recorded.

C. At Contract closeout, submit documents with transmittal letter containing date, project title, Contractor's name and address, list of documents and signature of Contractor.

D. Drawings legibly marked to record actual construction and showing:

1. Horizontal and vertical locations of underground utilities and appurtenances.

2. Field changes of dimension and detail.

3. Changes made by approved Field Order or by approved Change Order.

4. Details not shown on original Contract Drawings.

E. Specifications and Addenda with each Section legibly marked to record:

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

2. Changes made by approved Field Order or by approved Change Order.

1.13 WARRANTIES AND BONDS

A. Provide duplicate, signed, notarized originals. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.

B. Submit material prior to final application for payment. For equipment put into use with Owner's permission during construction, submit within 10 days after first operation. For items of Work delayed materially beyond the date of Substantial Completion, provide updated submittals within 10 days after acceptance, listing the date of acceptance as the start of the warranty period.

1.14 FINAL APPLICATION FOR PAYMENT

A. A. The Contractor will submit the Final Application for Payment in accordance with the procedures and requirements stated in the General Conditions.

1.15 FINAL CERTIFICATE FOR PAYMENT

A. The Engineer will process the Final Application for Payment in accordance with the provisions of the General Conditions.

1.16 POST-CONSTRUCTION INSPECTION

A. Prior to expiration of one year from the date of Substantial Completion, the Engineer will make a visual inspection of the Project in company with the Owner and the Contractor to determine whether correction of Work is required, in accordance with the provisions of the General Conditions.

B. The Engineer will promptly notify the Contractor, in writing, of any observed defects or deficiencies in the work.

C. The Contractor shall immediately undertake all work required to remedy defects and repair the work to the satisfaction of the Engineer and the Owner.

PART 2 - PRODUCTS

2.01 ACCESSORIES

A. Furnish to the Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation.

B. Accessory items include, but are not limited to, adequate oil and grease as required for first lubrication of equipment (after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other items as required for initial operation.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Maintain at the site of the OWNER a record copy of:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other modifications to the Contract.
5. Approved Shop Drawings, Product Data and Samples.
6. Field Test Records.

1.02 RELATED REQUIREMENTS

A. All applicable sections of the Specifications.

B. Conditions of the Contract.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

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

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

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

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

D. Make documents and samples available at all times for inspection by OWNER's Representative.

1.04 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by OWNER's Representative.

1.05 RECORDING

A. Label each document, "PROJECT RECORD" in neat large printed letters, or by rubber stamp.

B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

C. Drawings: Legibly mark to record actual construction (hard copy):

1. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structures.

3. Field changes of dimension and detail.

4. Changes made by Field Order or by Change Order.

5. Details not on original Contract Drawings.

D. Specifications and Addenda; legibly mark each Section to record:

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

2. Changes made by Field Order or by Change Order.

1.06 AS-BUILT PLANS (RECORD DRAWINGS

A. The CONTRACTOR shall maintain full size (22"x34") field drawings to reflect the "as-built" items of work as the work progresses. Upon completion of the work, the CONTRACTOR shall prepare a record set of "as-built" drawings on full-size, reproducible material and an electronic file in ACAD 2012 Format or Latest Version. One set of full size design drawings on reproducible material will be furnished to the CONTRACTOR by the design ENGINEER at the current square foot price. An electronic file of the design drawings on a compact disk will be furnished to the CONTRACTOR by the design ENGINEER at no additional cost. No additional payment will be made for those "as-built" drawings.

B. The cost of maintaining record changes, and preparation of the Record Drawings shall be included in the unit prices bid for the affected items. Upon completion of the work the CONTRACTOR shall furnish the ENGINEER the reproducible "as-built" Drawings and the electronic files. The completed Record drawings shall be delivered to the Engineer at least 48 hours prior to final inspection of the work. **The Final inspection will not be conducted unless the Record Drawings are in the possession of the ENGINEER.**

C. The completed (or final) record drawings shall be certified by a Professional Land surveyor registered in the State of Florida. This certification shall consist of the surveyor's embossed seal bearing his registration number, the surveyor's signature and date on each sheet of the drawing set. In addition, the key sheet, cover sheet or first sheet of the plans set shall list the business address and telephone number of the surveyor.

D. Representative items of work that should be shown on the record drawings as verified, changed or added are shown below:

1. Plans:

   a. Structure types, location with grade of rim and flow-line elevations.

   b. Storm and sanitary sewer type, length, size and elevations.

   c. Utility type, length, size and elevation in conflict structures.

   d. All maintenance access structures, valves and hydrants within right-of way.

   e. Spot (critical) elevations at plateaued intersections, P.C., P.T., midpoint of all intersections, pavement highs and lows.

   f. Sewer laterals shall be stationed between maintenance access structures.

   g. Drainage structure location & type with grate and invert elevation.

2. <u>Pavement Marking and Signing Plans:</u> Sign location where installed if different from plans.

3. <u>Water and Sewer Plans</u>: Location (horizontal and vertical) of all pipe lines, structures, fittings, valves and appurtenances and water/sanitary/storm sewer pipe crossings.

E. The CONTRACTOR shall submit three sets of progress record drawings with each application for payment. These drawings shall accurately depict the work completed and for which payment is being requested.

F. As-built drawings shall include the following criteria at a minimum.

1. As-builts of water lines shall include the following information:

    a. Top of pipe elevations and horizontal location every 100 lf.

    b. Locations and elevations of all fittings including bends, tees, gate valves, double detector check valves, fire hydrant, etc.

    c. All tie-ins to existing lines shall be as-built.

    d. The ends of all water services at the buildings or homes shall be as-built or where the water service terminates.

2. As-builts of all gravity sanitary sewer lines include the following information:

    a. Rims, inverts and length of piping between structures as well as slopes.

    b. The stub ends of all sewer laterals shall be located and if there are any cleanouts installed on the sewer laterals then the invert elevation of these cleanouts need to be obtained.

    c. Lift station as-builts shall consist of top of wet well elevation, invert elevation of the incoming line, bottom of the wet well and as-builts of the compound area.

3. Force main as-builts shall be prepared the same as the water line as-builts.

4. As-builts of all drainage lines shall include the following information:

    a. Rims, inverts and length of piping between structures and weir elevations if applicable.

    b. The size of the piping shall be verified by the survey crew at the time of as-built.

5. All as-builts for parking lot, roadways and swales areas shall consist of the following:

    a. Pavement elevations at all high and low points, and at enough intermediate point's to confirm slope consistency and every 50' for roadways.

    b. Pavement as-builts shall be taken at all locations where there is a finish grade elevation shown on the design plans.

    c. All catch basin and manhole rim elevations shall be shown.

    d. Elevations around island areas will also be required.

    e. As-builts shall be taken on all paved and unpaved swales prior to placement of asphalt and/or topsoil/sod, at enough intermediate points to confirm slope consistency and conformance to the plan details.

6. Lake and canal bank as-builts shall include a key sheet of the lake for the location of cross sections. Lake and canal bank cross sections shall be plotted at a minimum of every 100 lf, unless otherwise specified. As builts shall consist of the location and elevation of the top of bank, edge of water and the deep cut line, with the distance between each shown on the drawing.

7. Retention area as-built elevations shall be taken at the bottom of the retention area and at the top of bank. If there are contours indicated on the design plans, then they shall be as-built as well

8. If a change is made via field order or deviation to any structure, pipeline, etc., a new location shall be noted on the as-builts. The ENGINEER may request additional as-built information to verify horizontal or vertical locations.

1.07 SUBMITTAL

A. At Contract closeout, deliver Record Documents to OWNER's Representative, or presentation to the OWNER.

B. A complete set of "As-Built" Drawings shall be prepared and delivered to the OWNER's Representative for the OWNER. Work shall be performed by a Registered Professional Land Surveyor and shall include, but not be limited to the following:

1. Valve boxes, splice boxes, pull boxes, al underground utilities-waterlines, electrical runs, irrigation system, storm drainage pipe and structures, finished necessary grades, benches, curbs, fences walls signs, light fixtures and other items as necessary.

C. Accompany submittal with transmittal letter in duplicate, containing:

1. Date

2. Project title and number

3. CONTRACTOR's name and address

4. Title and number of each Record Document

5. Signature of CONTRACTOR or his authorized representative

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 01740
WARRANTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.02 DEFINITIONS

A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.03 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, Contractor shall reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner

has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

F. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.04 SUBMITTALS

A. Submit written warranties to the Engineer prior to the date certified for Final Completion. The Engineer's Certificate of Final Completion designates a commencement date for warranties for the Work. Submit written warranties upon request of the Engineer.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Engineer, for approval prior to final execution.

C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence.

D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 ½ x 11-inch paper.

E. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.

F. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION

DIVISION 2

SITE WORK

SECTION 02010
SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.01 RESPONSIBILITY

A. Subsurface explorations have been made and copies of the results are included herein for information only. Data on indicated subsurface conditions is not intended as representative or a warranty of accuracy or continuity between soil borings. It is expressly understood that Owner and Engineer will not be responsible for interpretations or conclusions drawn by Contractor from the soils investigation report. Data is made available only for convenience of Contractor. No claim for extra compensation or for extension of time will be allowed on account of subsurface conditions inconsistent with the data shown. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Data in the soft-dig reports was used for the basis of design and is available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity of pot-hole locations. The Owner and Engineer will not be responsible for interpretations or conclusions drawn from this data by Contractor. The Contractor is required to provide pot-holing in order to field verify location of all utility crossings, including paralleling of utilities, prior to construction of the proposed work.

PART 2 - PRODUCTS

2.01 SOIL BORINGS

A. Copies of the following are included herein:

1. Soil boring data.

2.02 SOFT DIG REPORTS

A. Copies of the following are included herein:

1. Test hole reports.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SOFT DIG DATA

TEST HOLE INVENTORY

PROJECT: CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM
CLIENT: MATHEWS CONSULTING

PROJECT MANAGER: KELSEY FLANIGAN
PROJECT NO.: PF05615

DATE: 12-18-2015

* NO SURVEY REQUIRED
* SPECIFIC TEST HOLE NOTES FOLLOWING INVENTORY

NOTE: INDIVIDUAL TEST HOLE MARKERS INCLUDE: PK NAIL, HUB & TACK, CHIS "X", STEEL PIN OR SPIKE.
THESE ARE SET OVER THE CROWN OR EDGE OF THE UTILITY FOUND. (SEE COLUMN LABELED TEST HOLE MARKER OR NOTES.)

LEGEND	H/T	HUB & TACK TEST HOLE MARKER
	PK	PK NAIL TEST HOLE MARKER
	X	CHIS "X" TEST HOLES MARKER
	DBC	DIRECT BURIED CABLE
	RCP	REINFORCED CONCRETE PIPE
	SPK	SPIKE TEST HOLE MARKER
	STL PN	STEEL PIN TEST HOLE MARKER
UTILITY COMPANIES	WATER	CITY OF POMPANO BEACH
	SANITARY	CITY OF POMPANO BEACH
	TELEPHONE	ATT
	FIBER OPTIC	FLORIDA POWER & LIGHT

TH#	TYPE OF UTILITY	SIZE & MATERIAL	QTY.	UTILITY DIRECTION	COVER	TOP OF UTIL ELEV	NORTHING & EASTING	SURVEY PIN ELEV	TEST HOLE MARKER
1	WATER	8" DUCTILE IRON	1	N/S	3.92	N/A	N/A	N/A	PK CROWN
2	WATER	10" DUCTILE IRON	1	E/W	2.57	N/A	N/A	N/A	H/T CROWN
3	TELEPHONE	4" PVC (GRAY)	1	E/W	3.20	N/A	N/A	N/A	SEE NOTE
4	TELEPHONE	4" ASBESTOS CEMENT	6	E/W	4.24 / 5.44	N/A	N/A	N/A	SEE NOTE
5	FIBER OPTIC	2" PLASTIC (YELLOW)	4	E/W	2.90	N/A	N/A	N/A	SEE NOTE
6	WATER	12" ASBESTOS CEMENT	1	E/W	5.25	N/A	N/A	N/A	H/T CROWN
7	TELEPHONE	4" PVC (GRAY)	8	E/W	4.05 / 5.82	N/A	N/A	N/A	H/T CROWN
8	SANITARY	SEE NOTE	1	E/W	8.15	N/A	N/A	N/A	SEE NOTE
9	WATER	10" DUCTILE IRON	1	E/W	2.55	N/A	N/A	N/A	H/T CROWN
10	TELEPHONE	1.5" DBC	1	E/W	2.85	N/A	N/A	N/A	H/T CROWN

TEST HOLE NOTES

TEST HOLE # 3	TELEPHONE	NOTE: TEST HOLE ALSO REVEALED UNKNOWN UTILITY, RUNNING EAST-WEST, 5.20' NORTH OF HUB. COVER = 5.75. UNABLE TO OBTAIN SIZE AND MATERIAL DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. HUB SET OVER CROWN OF 4" TELEPHONE CONDUIT.

TEST HOLE NOTES

TEST HOLE # 4	TELEPHONE	NOTE: TOTAL WIDTH = 1.05'. HUB SET OVER CROWN OF NORTHERN MOST 4" TELEPHONE CONDUIT.
TEST HOLE # 5	FIBER OPTIC	NOTE: TOTAL WIDTH = 0.50'. HUB SET OVER CROWN OF NORTHERN MOST 2" FIBER OPTIC CONDUIT.
TEST HOLE # 7	TELEPHONE	NOTE: TOTAL WIDTH = 1.70'. POSSIBLE ADDITIONAL CONDUITS BELOW. HUB SET OVER CROWN OF NORTHERN MOST 4" TELEPHONE CONDUIT.
TEST HOLE # 8	SANITARY	NOTE: UNABLE TO OBTAIN SIZE AND MATERIAL DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. 10" PVC OBTAINED IN SANITARY MANHOLE. TEST HOLE ALSO REVEALED CAP 2.0' WEST OF HUB. HUB SET OVER TOP OF UTILITY.

InfraMap CORP

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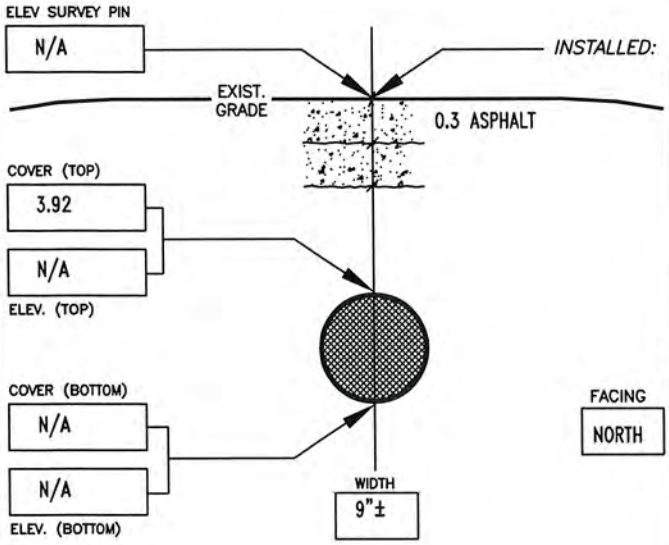
PN: PF05615 VACUUM TEST HOLE REPORT NO.: 1

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	8" WATER	SHEET #:	6 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	WATER	FORM BY:	KF ASSISTED BY: JD ER # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	FAIR DATE DUG: 12-6-15
SIZE AS FOUND:	8"	SOIL CONDITIONS:	SOFT MOIST SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: PK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

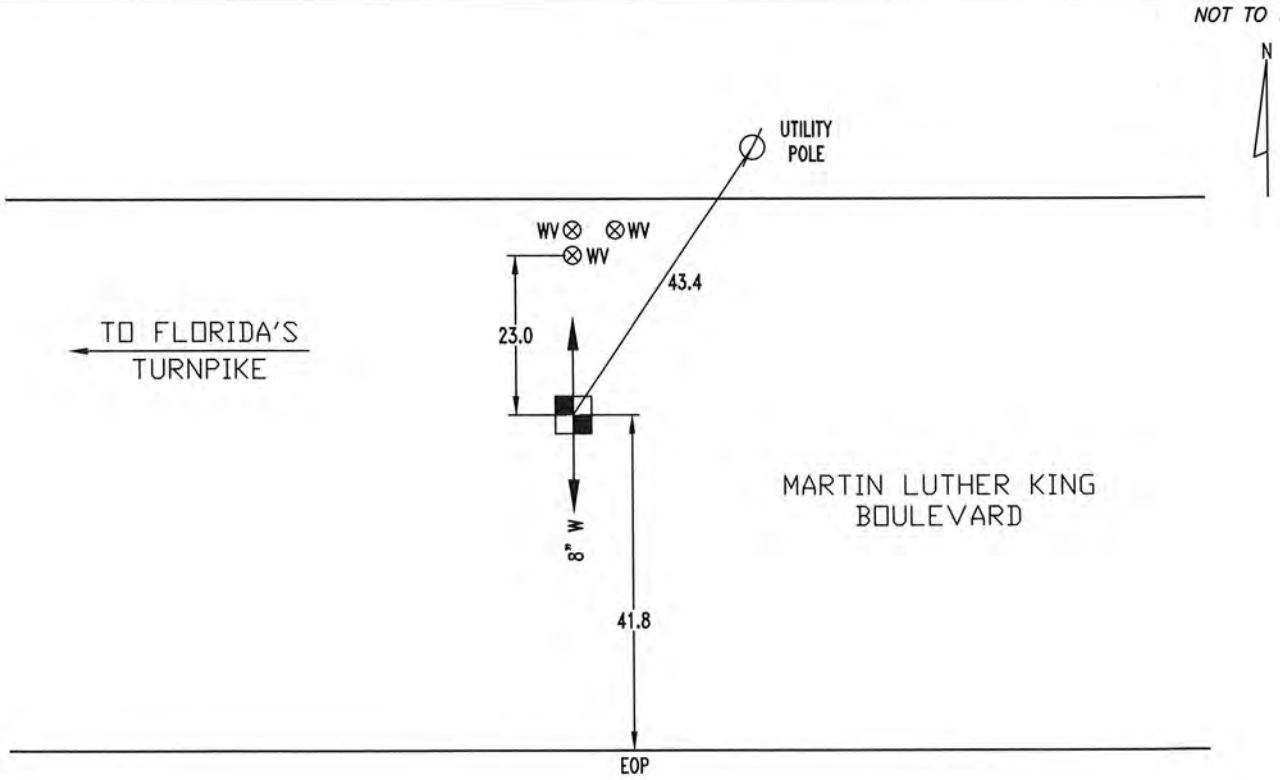
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

NOT TO SCALE



"LOCATING A BETTER WAY"
1-800-UNDER IT

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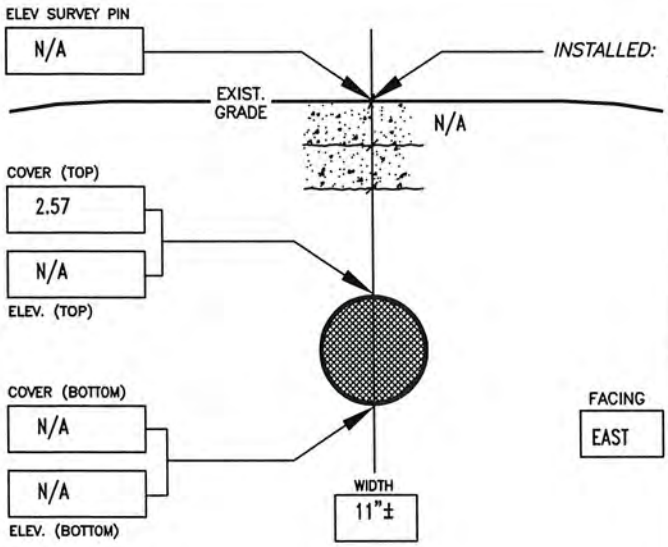
PN: PF05615 VACUUM TEST HOLE REPORT NO.: 2

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	10" WATER	SHEET #:	6 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	WATER	FORM BY:	KF ASSISTED BY: ER JD # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	N/A DATE DUG: 12-6-15
SIZE AS FOUND:	10"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

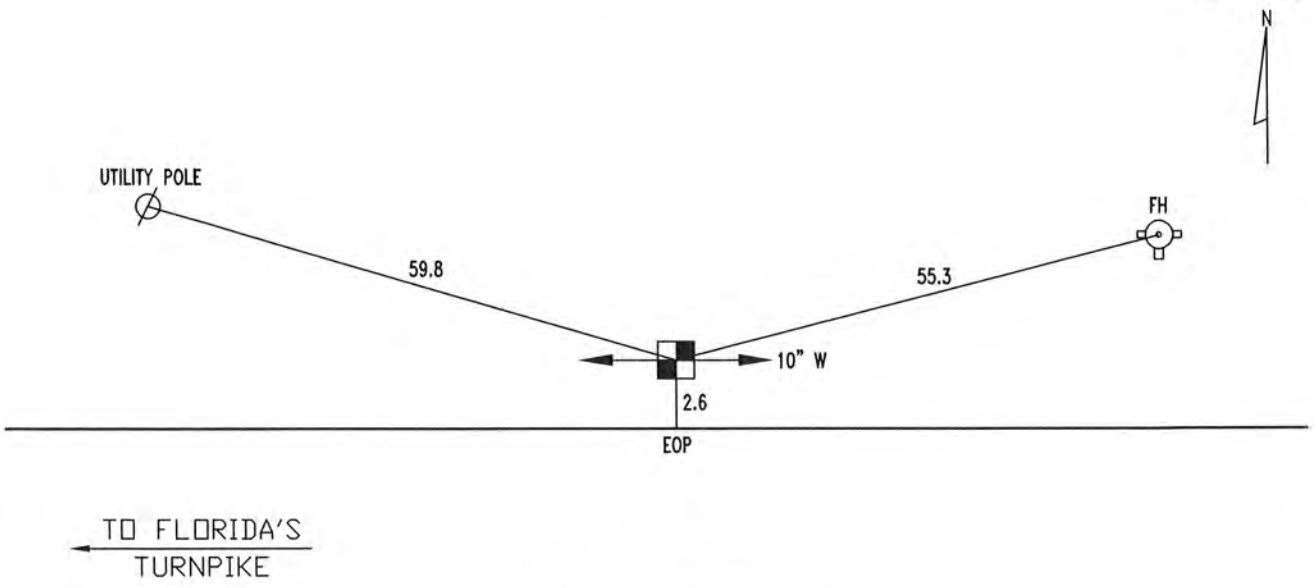
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

NOT TO SCALE



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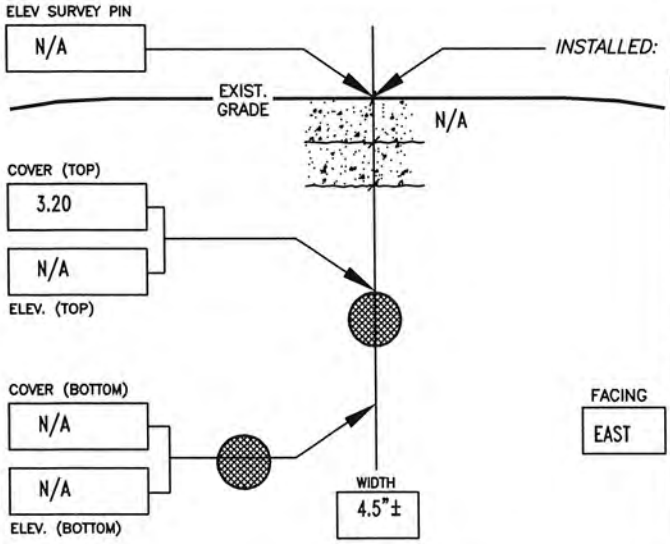
PN: PF05615 VACUUM TEST HOLE REPORT NO.: 3

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	TELEPHONE	SHEET #:	6 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	TELEPHONE (SEE NOTE)	FORM BY:	KF ASSISTED BY: JD ER # OF HOLES: 1
MATERIAL AS FOUND:	PVC (GRAY) CONDUIT	PAVING CONDITION:	N/A DATE DUG: 12-6-15
SIZE AS FOUND:	4"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	GOOD



INSTALLED: HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: ORANGE

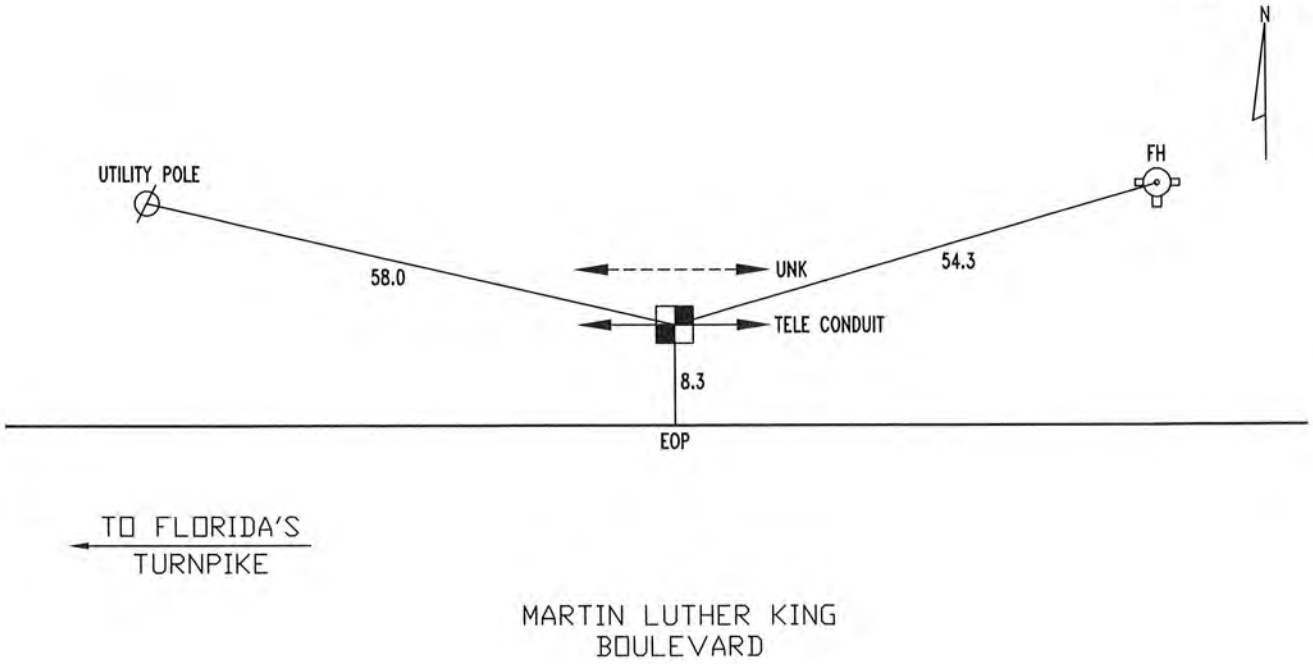
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: TEST HOLE ALSO REVEALED UNKNOWN UTILITY, RUNNING EAST-WEST, 5.20' NORTH OF HUB. COVER = 5.75. UNABLE TO OBTAIN SIZE AND MATERIAL DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. HUB SET OVER CROWN OF 4" TELEPHONE CONDUIT.

NOT TO SCALE



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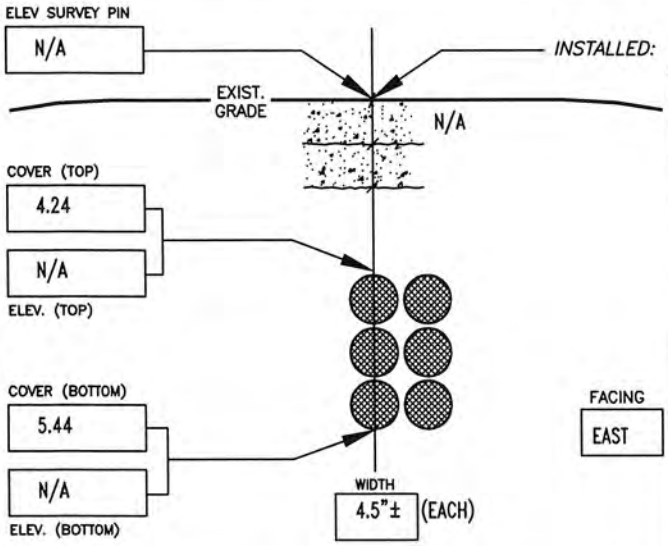
PN: PF05615 VACUUM TEST HOLE REPORT NO.: 4

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	TELEPHONE	SHEET #:	6 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	TELEPHONE	FORM BY:	KF ASSISTED BY: JD ER # OF HOLES: 1
MATERIAL AS FOUND:	ASBESTOS CEMENT CONDUITS	PAVING CONDITION:	N/A DATE DUG: 12-5-15
SIZE AS FOUND:	(6) 4"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	FAIR



INSTALLED: HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: ORANGE

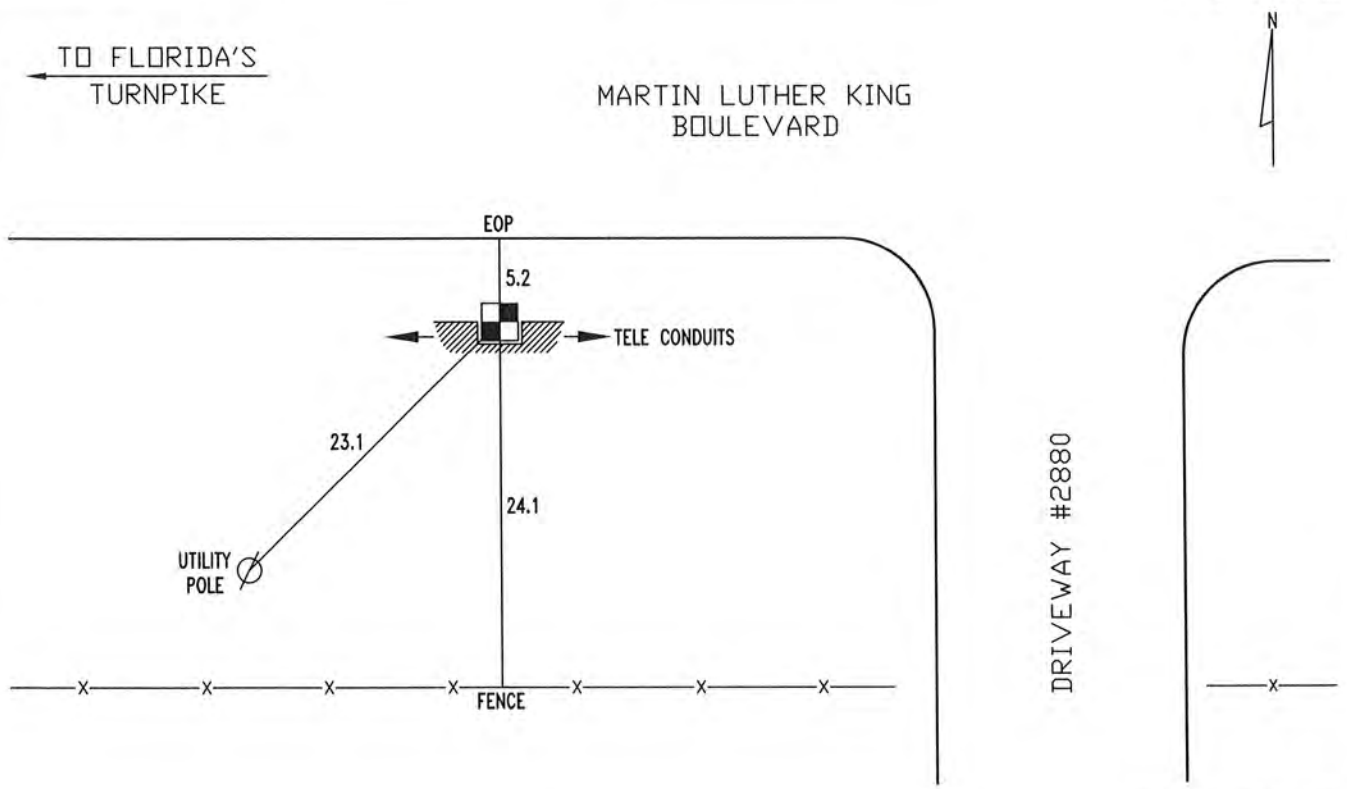
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: TOTAL WIDTH = 1.05'. HUB SET OVER CROWN OF NORTHERN MOST 4" TELEPHONE CONDUIT.

NOT TO SCALE



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PN: PF05615 VACUUM TEST HOLE REPORT NO.: 5

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	FIBER OPTIC (FLORIDA POWER & LIGHT)	SHEET #: 6 OF N/A	PROPOSED: SANITARY
UTILITY FOUND:	FIBER OPTIC (FLORIDA POWER & LIGHT)	FORM BY: KF ASSISTED BY: JD ER	# OF HOLES: 1
MATERIAL AS FOUND:	PLASTIC (YELLOW) CONDUITS	PAVING CONDITION: N/A	DATE DUG: 12-5-15
SIZE AS FOUND:	(4) 2"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	GOOD

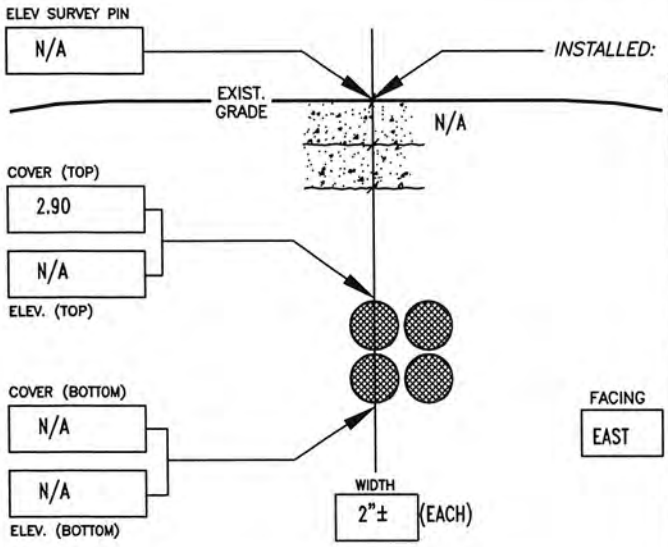
INSTALLED: HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: ORANGE

SURVEY PIN LOCATED BY: N/A

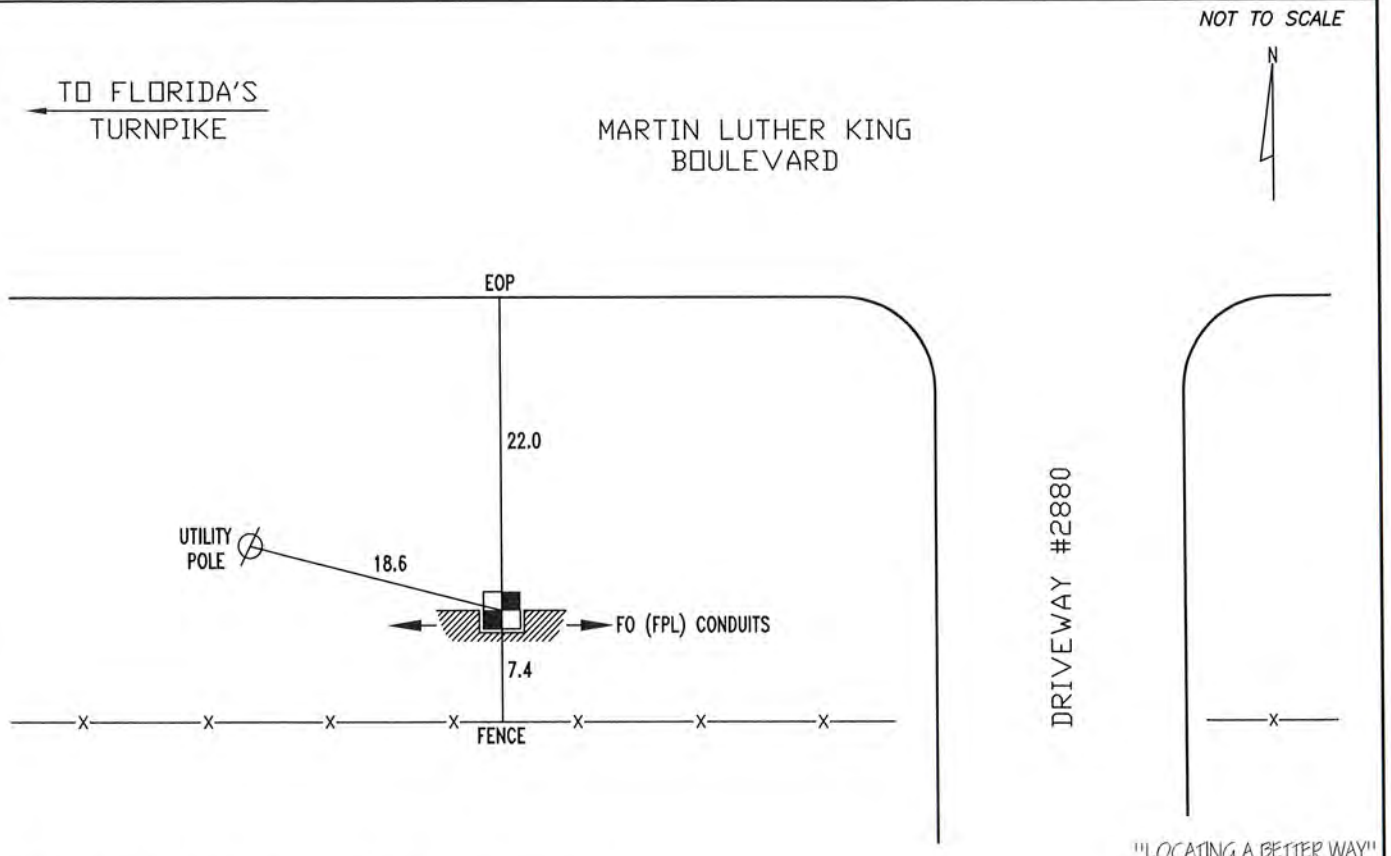
SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: TOTAL WIDTH = 0.50'. HUB SET OVER CROWN OF NORTHERN MOST 2" FIBER OPTIC CONDUIT.



NOT TO SCALE



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PN: PF05615 VACUUM TEST HOLE REPORT NO.: 6

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	12" WATER	SHEET #:	6 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	WATER	FORM BY:	KF ASSISTED BY: JD ER # OF HOLES: 1
MATERIAL AS FOUND:	ASBESTOS CEMENT	PAVING CONDITION:	N/A DATE DUG: 12-5-15
SIZE AS FOUND:	12"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	GOOD

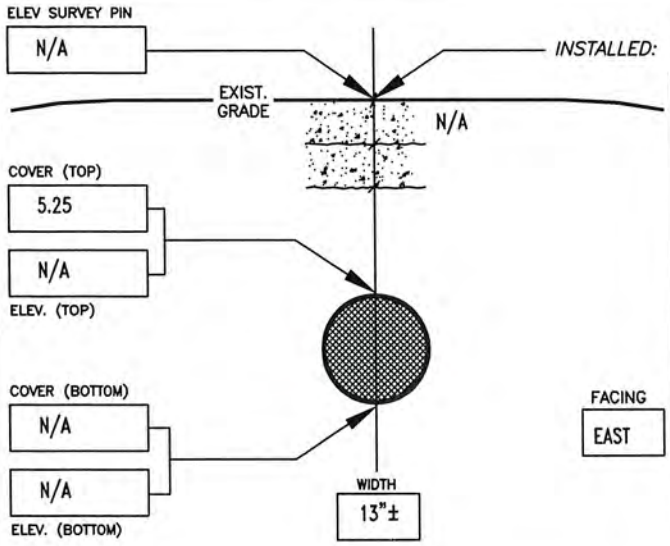
INSTALLED: HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

SURVEY PIN LOCATED BY: N/A

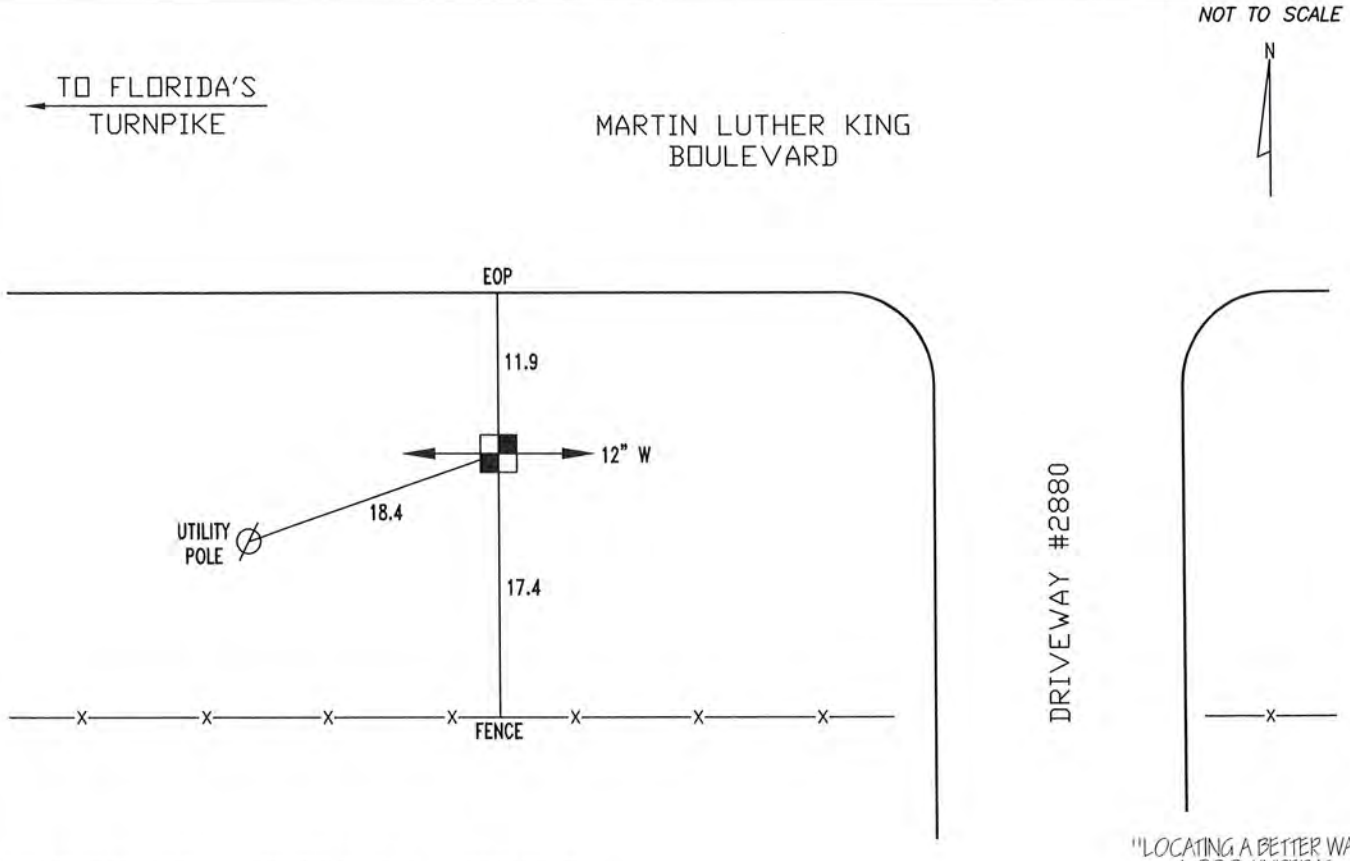
SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:



NOT TO SCALE



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PN: PF05615 VACUUM TEST HOLE REPORT NO.: 7

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	TELEPHONE	SHEET #:	6 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	TELEPHONE	FORM BY:	KF ASSISTED BY: JD ER # OF HOLES: 1
MATERIAL AS FOUND:	PVC (GRAY) CONDUITS	PAVING CONDITION:	N/A DATE DUG: 12-5-15
SIZE AS FOUND:	(8) 4"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	GOOD

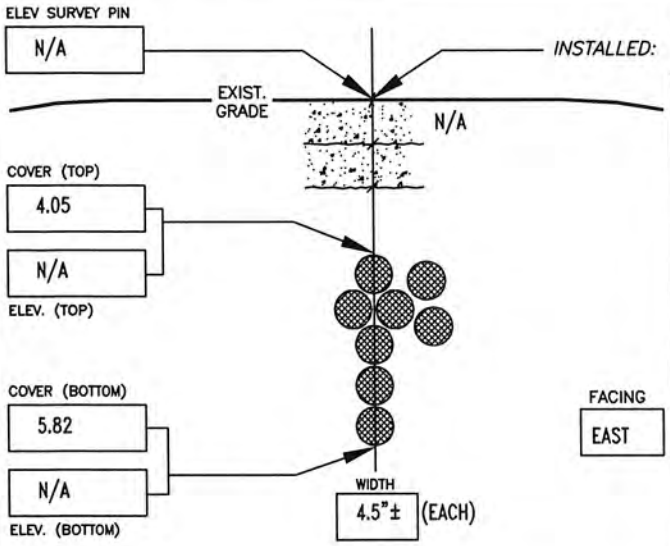
INSTALLED: HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: ORANGE

SURVEY PIN LOCATED BY: N/A

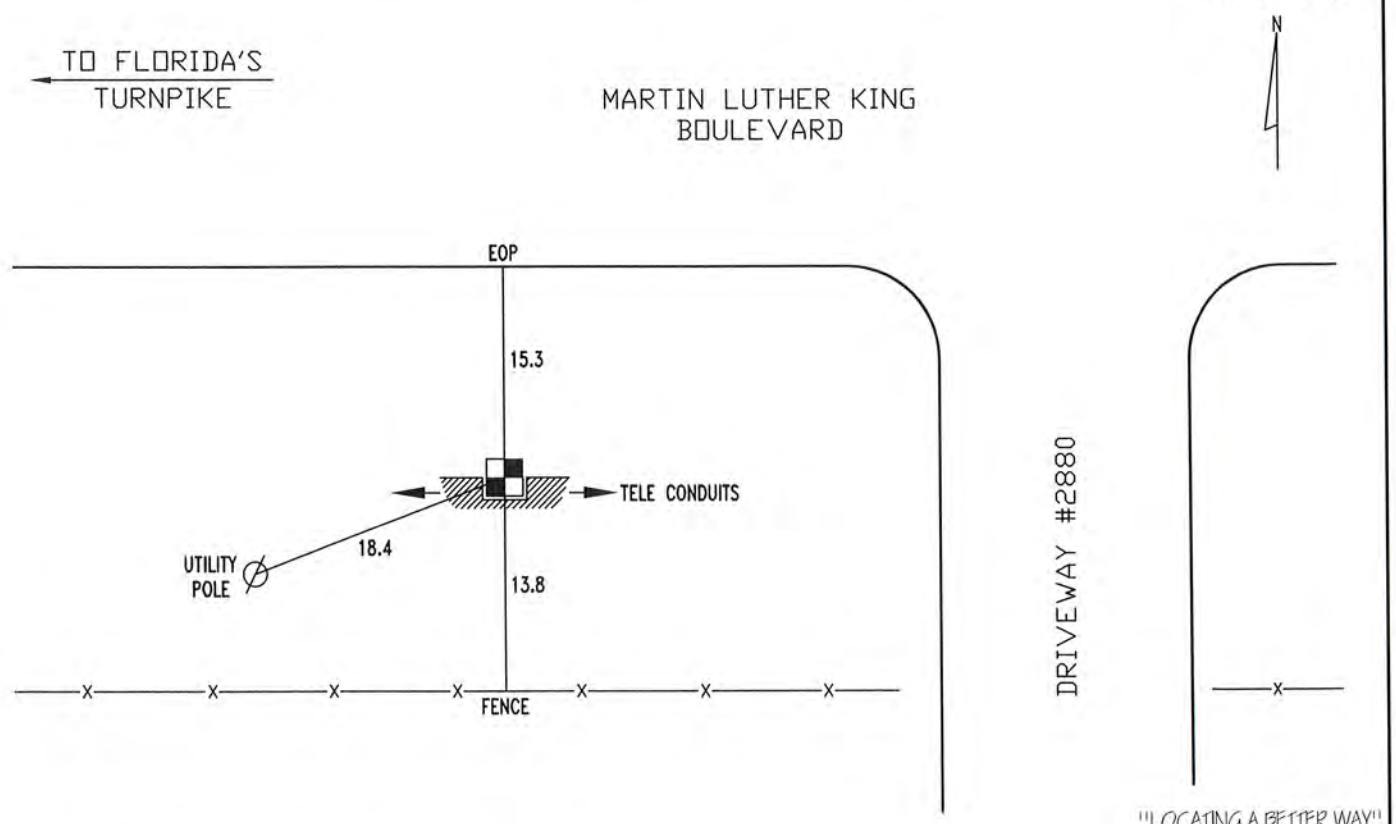
SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: TOTAL WIDTH = 1.70'. POSSIBLE ADDITIONAL CONDUITS BELOW. HUB SET OVER CROWN OF NORTHERN MOST 4" TELEPHONE CONDUIT.



NOT TO SCALE



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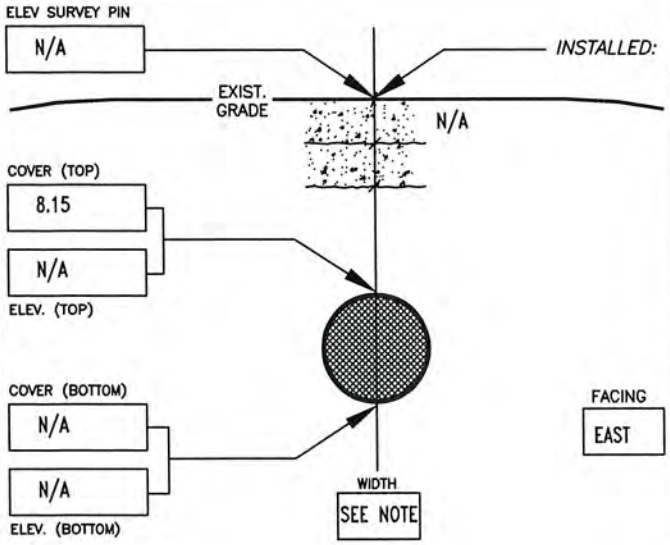
PN: PF05615 VACUUM TEST HOLE REPORT NO.: 8

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	10" SANITARY	SHEET #:	10 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	SANITARY	FORM BY:	KF ASSISTED BY: JD ER # OF HOLES: 1
MATERIAL AS FOUND:	SEE NOTE	PAVING CONDITION:	N/A DATE DUG: 12-6-15
SIZE AS FOUND:	SEE NOTE	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	SEE NOTE

INSTALLED: HUB & TACK AT: TOP OF UTILITY. MARKING TAPE: GREEN



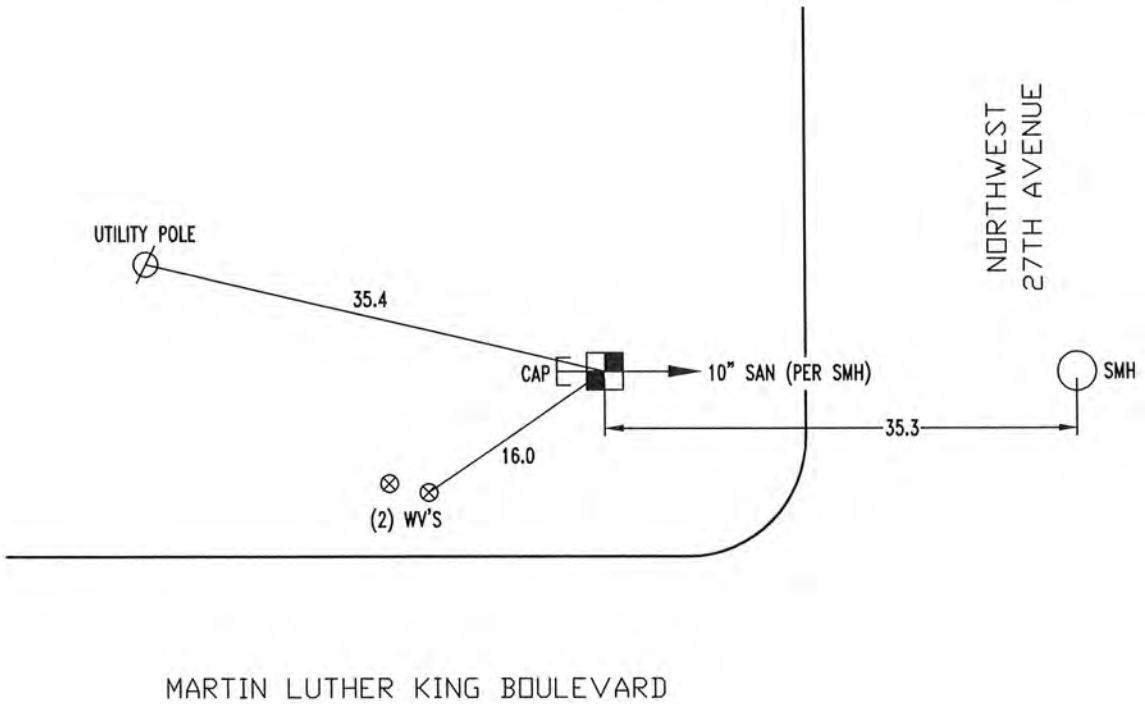
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES: UNABLE TO OBTAIN SIZE AND MATERIAL DUE TO EXCESSIVE GROUND WATER ENCOUNTERED IN TEST HOLE. 10" PVC OBTAINED IN SANITARY MANHOLE. TEST HOLE ALSO REVEALED CAP 2.0' WEST OF HUB. HUB SET OVER TOP OF UTILITY.

NOT TO SCALE



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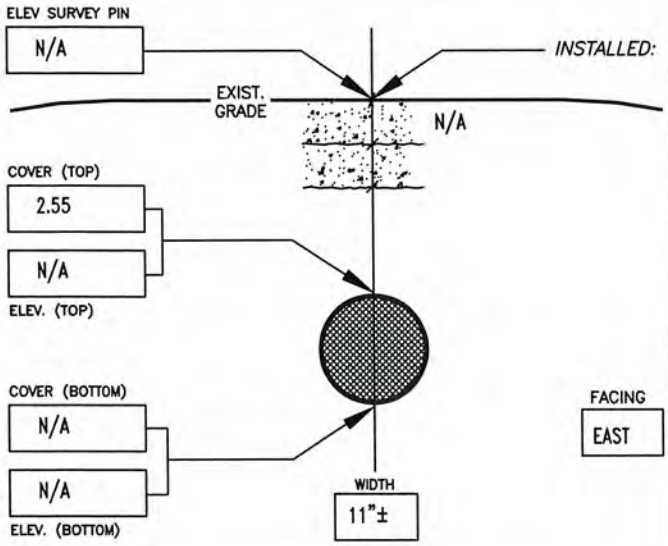
PN: PF05615 VACUUM TEST HOLE REPORT NO.: 9

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	10" WATER	SHEET #:	10 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	WATER	FORM BY:	KF ASSISTED BY: ER JD # OF HOLES: 1
MATERIAL AS FOUND:	DUCTILE IRON	PAVING CONDITION:	N/A DATE DUG: 12-6-15
SIZE AS FOUND:	10"	SOIL CONDITIONS:	SOFT WET SAND ROCKY
		UTILITY CONDITION:	POOR



INSTALLED: HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: BLUE

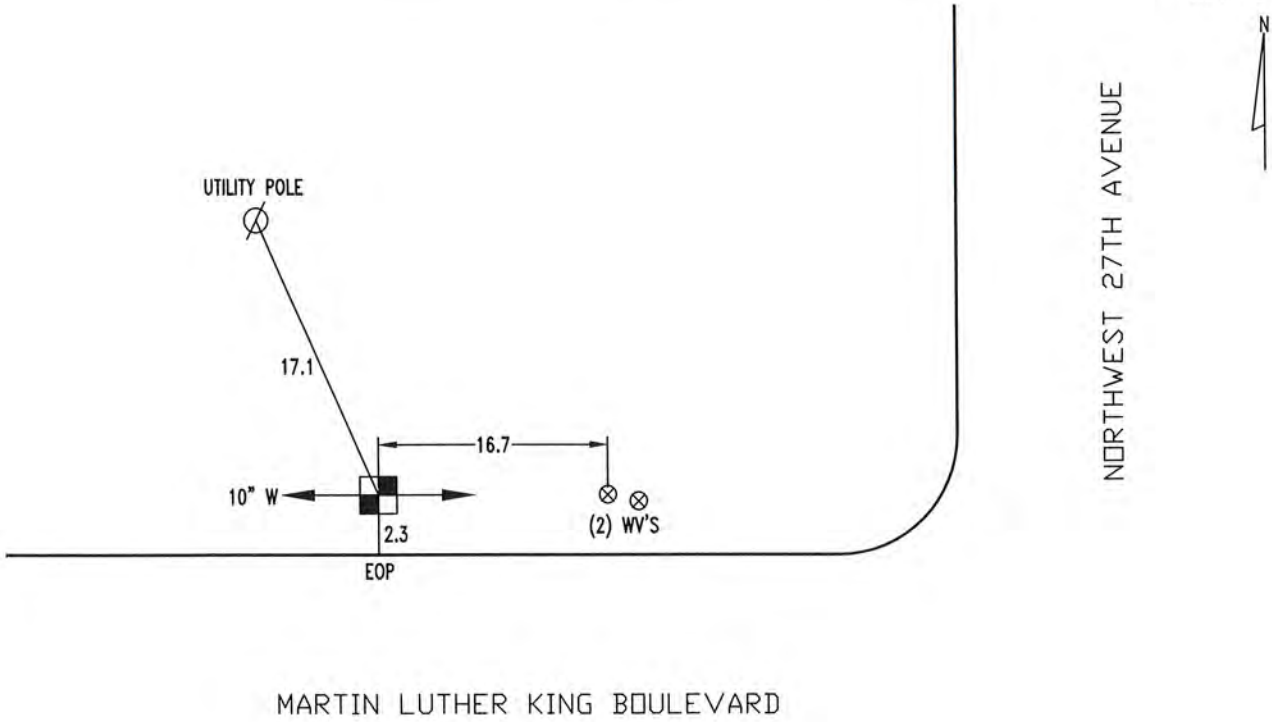
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

NOT TO SCALE



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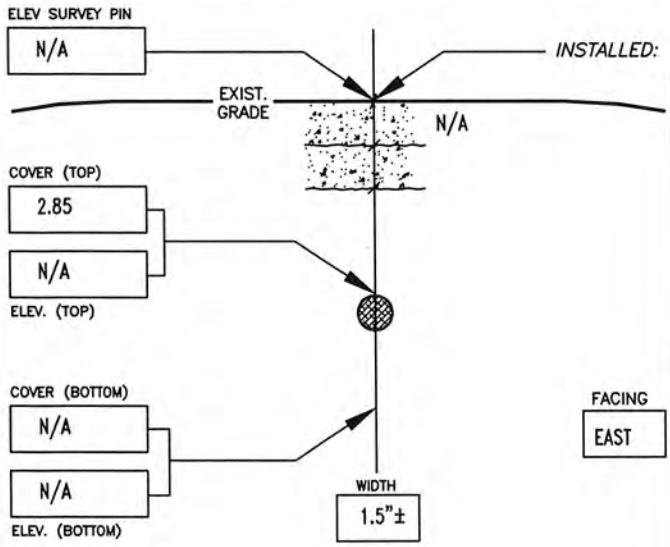
PN: PF05615 VACUUM TEST HOLE REPORT NO.: 10

PROJECT NAME:	CITY OF POMPANO BEACH AREA "D" SANITARY SEWER SYSTEM	CLIENT JOB#	15-260 WORK ORDER # N/A
LOCATE REQUESTED BY:	MATHEWS CONSULTING	PROJECT LOCATION:	POMPANO BEACH, BROWARD COUNTY, FLORIDA
UTILITY REQUESTED:	TELEPHONE	SHEET #:	10 OF N/A PROPOSED: SANITARY
UTILITY FOUND:	TELEPHONE	FORM BY:	KF ASSISTED BY: ER JD # OF HOLES: 1
MATERIAL AS FOUND:	DIRECT BURIED CABLE	PAVING CONDITION:	N/A DATE DUG: 12-6-15
SIZE AS FOUND:	1.5"	SOIL CONDITIONS:	SOFT MOIST SAND ROCKY
		UTILITY CONDITION:	GOOD



HUB & TACK AT: CROWN OF UTILITY. MARKING TAPE: ORANGE

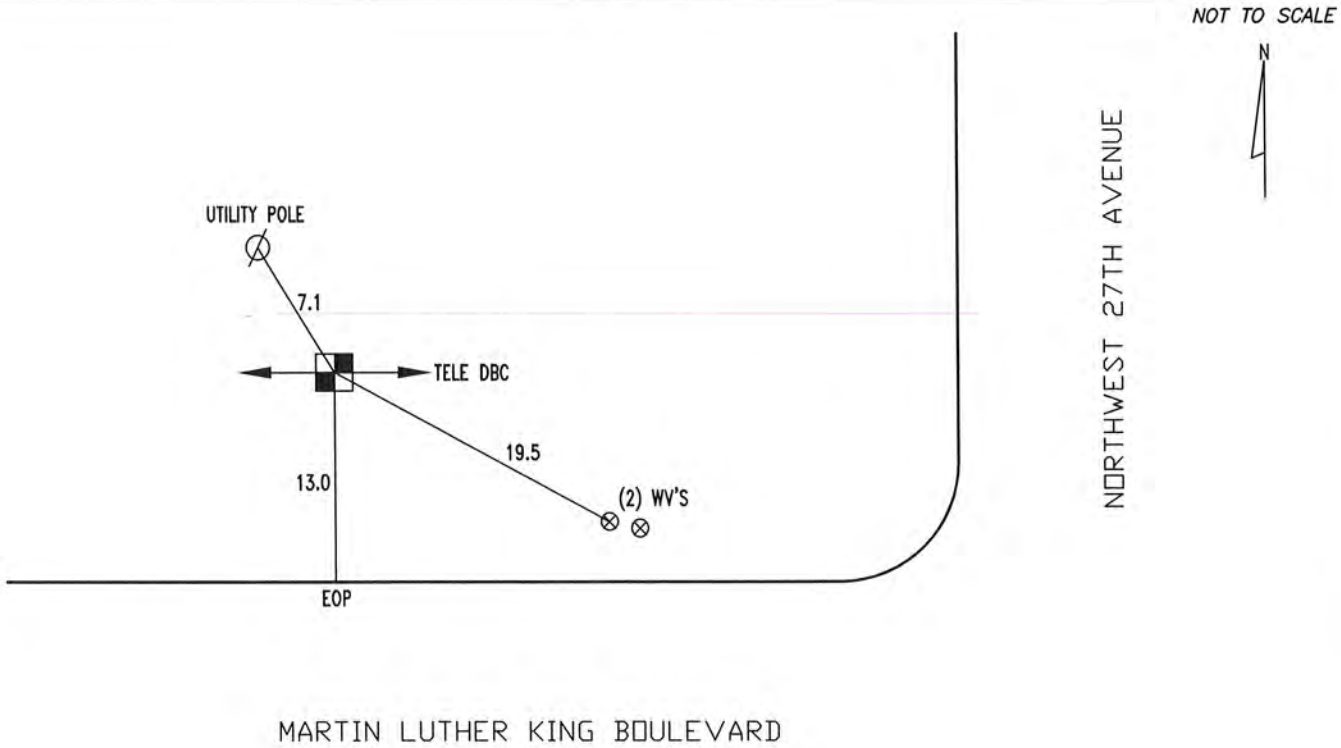
SURVEY PIN LOCATED BY: N/A

SURVEY INFO.: ALL MEASUREMENTS ON THIS FORM ARE IN ENGLISH UNITS (FEET).

NO SURVEY REQUIRED.

NOTES:

NOT TO SCALE



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SOIL BORING DATA

Geotechnical Engineering Report

AREA "D" SANITARY SEWER SYSTEM

CITY OF POMPANO BEACH, FLORIDA

December 14, 2015

Project No. HD155099

Prepared for:

Mathews Consulting, Inc.
477 S. Rosemary Avenue, Suite 330
West Palm Beach, Florida 33401

Prepared by:

Terracon Consultants, Inc.
West Palm Beach, Florida

Terracon

December 14, 2015

Mathews Consulting, Inc.
477 S. Rosemary Avenue, Suite 330
West Palm Beach, FL 33401

Attn: Mr. Dave Mathews, P.E.
Email: DMathews@mathewsconsultinginc.com

Re: Geotechnical Engineering Report
Area "D" Sanitary Sewer System
City of Pompano Beach, Florida
MC Job No. 1813

Dear Mr. Mathews:

Terracon Consultants, Inc. (Terracon) has completed geotechnical engineering services for the above referenced project. This study was performed in accordance with our Subconsultant Agreement for Professional Services dated November 30, 2015.

This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning the proposed sanitary sewer system.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Daniel J. Marieni, P.E.
Staff Engineer
FL Registration No. 78629

Kevin E. Aubry, P.E.
Geotechnical Services Manager
FL Registration No. 38175

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APPENDICES

APPENDIX A Exhibit A-1 – Boring Location Plan
Exhibit A-2 – Subsurface Profiles

EXECUTIVE SUMMARY

This Geotechnical Engineering Report was performed in accordance with our Subconsultant Agreement for Professional Services dated November 30, 2015. The attached report includes the results of Standard Penetration Test (SPT) borings drilled at the site.

The borings indicated an asphalt thickness of 2 inches thick over 10 inches of limerock base course. The borings disclosed the subsoils to generally consist of loose to medium dense sands to 15 feet below existing surface grades.

Groundwater levels were measured in the boreholes upon completion of drilling activities. The measured depths to the groundwater level ranged between approximately 5.3 and 5.7 feet below the ground surface.

Results of this study confirm that the subsurface conditions are suitable for the planned construction when viewed from a geotechnical engineering perspective. Subsurface conditions at the site are not expected to impose any severe constraints or limitations on the construction from an excavation, pipe support, pipe backfill and roadway restoration viewpoint. The subsurface profile components beneath the planned pipeline alignment consist generally of reasonably firm sands. These sands are suitable for support of the proposed piping.

The groundwater is expected to be relatively shallow, and therefore will impact excavations and underground works for the pipeline. Development of a detailed design for construction dewatering is outside the scope of this study, but will require careful planning and implementation by the contractor in order to construct the work in the dry.

This summary should be used in conjunction with the entire report for design purposes. It should be recognized that the report must be read in its entirety for a comprehensive understanding of the items contained herein. Section 7.0 should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT
AREA "D" SANITARY SEWER SYSTEM
POMPANO BEACH, FLORIDA

Project No. HD155099
December 14, 2015

1.0 INTRODUCTION

This Geotechnical Engineering Report has been prepared for the proposed sanitary sewer system that is planned at the above referenced site. This report describes the methods of study and key findings from the subsurface exploration and provides geotechnical engineering recommendations for the design of the project and related construction.

2.0 PROJECT CONSIDERATIONS

We understand that the project will consist of installation of a new sanitary sewer system (8-inch diameter PVC sanitary sewer main and manholes) along the alignment of Martin Luther King Boulevard, between Blount Road and NW 27th Avenue. The new pipeline will have invert elevations which bottom between 4 and 9 feet below surface grades. The new pipeline will be installed using conventional cut and cover methods.

Based upon topographic data shown on the 50% design plans (dated November 2015) provided by Mathews Consulting, Inc., ground surface elevations along the project alignment generally range between approximately +14 and +15 feet with respect to the North American Vertical Datum of 1988 (NAVD).

3.0 SUBSURFACE CONDITIONS

3.1 Soil Survey Maps

The U.S. Department of Agriculture – Soil Conservation Service (SCS) (now NRCS) Soil Survey of Broward County, Florida, dated 1976, was reviewed for the project area. The maps indicate the project limits to be underlain by a combination of Immokalee fine sand and Pomello fine sand. Both the Immokalee and Pomello soils are described as nearly level poorly drained deep sands that include a dark colored, weakly cemented layer below depths of 30 inches. For Immokalee fine sand, the water table is within 10 inches of the surface for 2 to 4 months and within 10 to 40 inches of the surface for the remainder of the year. For Pomello fine sand, the water table is within 24 to 40 inches for 1 to 4 months and below 40 inches for the remainder of the year.

3.2 Field Exploration

The subsurface conditions along the proposed sanitary sewer alignment were explored with two (2) Standard Penetration Test (SPT) borings drilled at the locations shown on Exhibit A-1. The borings were drilled in the existing roadway, and therefore required maintenance of traffic. The SPT borings were advanced to a nominal depth of 15 feet and were drilled utilizing a Central Mine Equipment Model 45B (CME 45B) drilling rig employing continuous sampling techniques to 10 feet below surface grades, and were sampled 5 feet on center thereafter.

Soil samples were recovered from the borings using a standard split-barrel driven with a 140-pound hammer falling 30 inches (the SPT after ASTM D 1586). The boreholes were backfilled with sand and gravel and surfaced with asphalt cold patch in order to match the surrounding pavement types.

Samples of the subsurface materials recovered from the borings were returned to our laboratory where they were visually examined in the laboratory using the Visual-Manual Method (ASTM D 2488), and classified using the Unified Soil Classification System (ASTM D 2487). Profiles of the borings, including their locations, ground surface elevations, soil types and SPT data are shown on Exhibit A-2. Locations and elevations are approximate and refer to the baseline of survey shown on the 50% design plans (dated November 2015).

3.3 Pavement Section

The existing pavement section was determined at both boring locations. The pavement section at both locations consisted of approximately 2 inches of asphaltic concrete over 10 inches of limerock base course.

3.4 Stratigraphy

Below the asphalt pavement, the soils found in the SPT borings generally consisted a thin (i.e. 1 foot or less) layer of fill consisting of sand with some gravel and shell fragments. The fill was followed by relatively clean to slightly silty fine sand to the maximum depth explored of 15 feet. An organic stained sand layer was found within these surficial sands, at depths between about 5 and 9 feet below surface grades.

In terms of relative density the SPT N-values indicate that the subsurface profile components along the pipeline alignment are generally medium dense to dense near the ground surface and grade to loose to medium dense with thereafter.

More specific descriptions for the strata found in the borings are provided in the following table.

Stratum No.	Relative Density	Soil Description
P	--	Asphalt Concrete over Limerock Base Course (PAVEMENT)
1	Medium Dense to Dense	Gray fine SAND, some gravel, trace shell fragments (SP) (Fill)
2	Medium Dense to Dense	Light gray to gray fine to medium SAND (SP)
3	Loose to Medium Dense	Dark brown slightly silty fine SAND, organic staining (SP-SM)
4	Loose to Medium Dense	Brown fine to medium SAND

Note: Subsurface profile is variable. Refer to Exhibit A-2 for strata boundaries for each boring.

3.5 Groundwater

Groundwater levels were measured in the boreholes upon completion of drilling activities. The measured depths to the groundwater level ranged between 5.3 and 5.7 feet below the ground surface. Utilizing topographic data obtained from the 50% design plans and the measured depths to the groundwater surface, we estimate the groundwater elevation was approximately +9.0 feet NAVD on the date of field exploration (December 8, 2015). Groundwater elevations and dates of measurement are shown on Exhibit A-2 adjacent to the respective subsurface profile.

4.0 DISCUSSION AND RECOMMENDATIONS

Results of this study confirm that the subsurface conditions are suitable for the planned construction when viewed from a geotechnical engineering perspective. Subsurface conditions at the site are not expected to impose any severe constraints or limitations on the construction from an excavation, pipe support, pipe backfill and roadway restoration viewpoint. The subsurface profile components beneath the planned pipeline alignment consist generally of reasonably firm sands. These sands are suitable for support of the proposed piping.

Groundwater is expected to be relatively shallow, and therefore will impact excavations and underground works for the pipeline. Development of a detailed design for construction dewatering is outside the scope of this study, but will require careful planning and implementation by the contractor in order to construct the work in the dry. Discussions related to the design and construction of the pipeline and roadway restoration are provided in the following sections of this report.

5.0 PIPELINES

5.1 Excavations

Below grade excavations should be made in accordance with all applicable State and Federal requirements. Per the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1926, Sub-part P- "Excavations," the subsoils throughout the project area fall within the Type C criteria. As such, temporary excavation slopes should be stable when adequately dewatered and constructed no steeper than 1.5:1 (horizontal:vertical). In areas of space limitation where open cut is not practical, the excavations may require sheeting or shoring. Further, we recommend that the contractor exercise extreme caution in any decision to place men and equipment in unbraced excavations.

Groundwater levels should be maintained at least 24 inches below the excavation bottom. Our experience with similar soils has shown that maintaining groundwater levels 24 inches below the base of the excavation will result in a stable excavation bottom. Dewatering may require a combination of methods including pumping from sumps, wells or wellpoints. The method chosen for dewatering should be the responsibility of the contractor.

The results of the borings indicate that the excavations may generally be performed using heavy track-mounted backhoe equipment. Excavated materials consisting of sands and gravels with particle sizes of less than 1 inch in diameter and no more than 10 percent fines (particles passing through the U.S. Number 200 Sieve) may be stockpiled and re-used for backfill. Oversized materials and fine-grained soils that do not meet these requirements are unsuitable for use as backfill and should be removed if found.

5.2 Ground Support

Based upon the results of the borings and anticipated pipe invert elevations, it appears that the pipelines will bottom within granular soils. The granular soils will provide adequate foundation support for the piping. The upper 12 inches of the subgrade beneath the pipeline should be compacted to not less than 100 percent of the maximum dry density determined in accordance with Standard Proctor (AASHTO T-99).

5.3 Pipe Bedding and Backfill

Pipe bedding and backfill materials should consist of sands and/or sand and gravel (ASTM D 2487) that contain no particle sizes larger than 1 inch, less than 10% fines, and no more than 2% organic matter. The backfill should be placed in the dry in maximum 6-inch thick lifts, and be compacted to at least 100% density (AASHTO T-99) in roadway areas, respectively. We recommend the use of only relatively light, hand-held compaction equipment to limit the potential for damage to the pipelines.

6.0 ROADWAY TRENCH REPAIR

Since the new pipelines will be installed beneath portions of existing roadways, trench repair will be required. We believe that a conventional flexible (asphalt surface) pavement section can be used to restore trench cuts in the existing roadway. A total thickness of Type S-III asphalt concrete of 2 inches (2 - 1" lifts) combined with 10 inches of base course should provide a pavement section equivalent to that of the average condition of the existing asphalt concrete pavement.

The asphaltic concrete should meet the specifications of the FDOT Standard Specifications for Road and Bridge Construction, latest edition Section 334. The base course should meet the requirements of either Sections 911 or 913A of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction." The base materials should have a Limerock Bearing Ratio (LBR) of at least 100 and be compacted to not less than 98 percent of the AASHTO T-180 maximum dry density. Subbase materials should have a minimum LBR value of 40, and be densified to not less than 98 percent of the AASHTO T-180 maximum dry density.

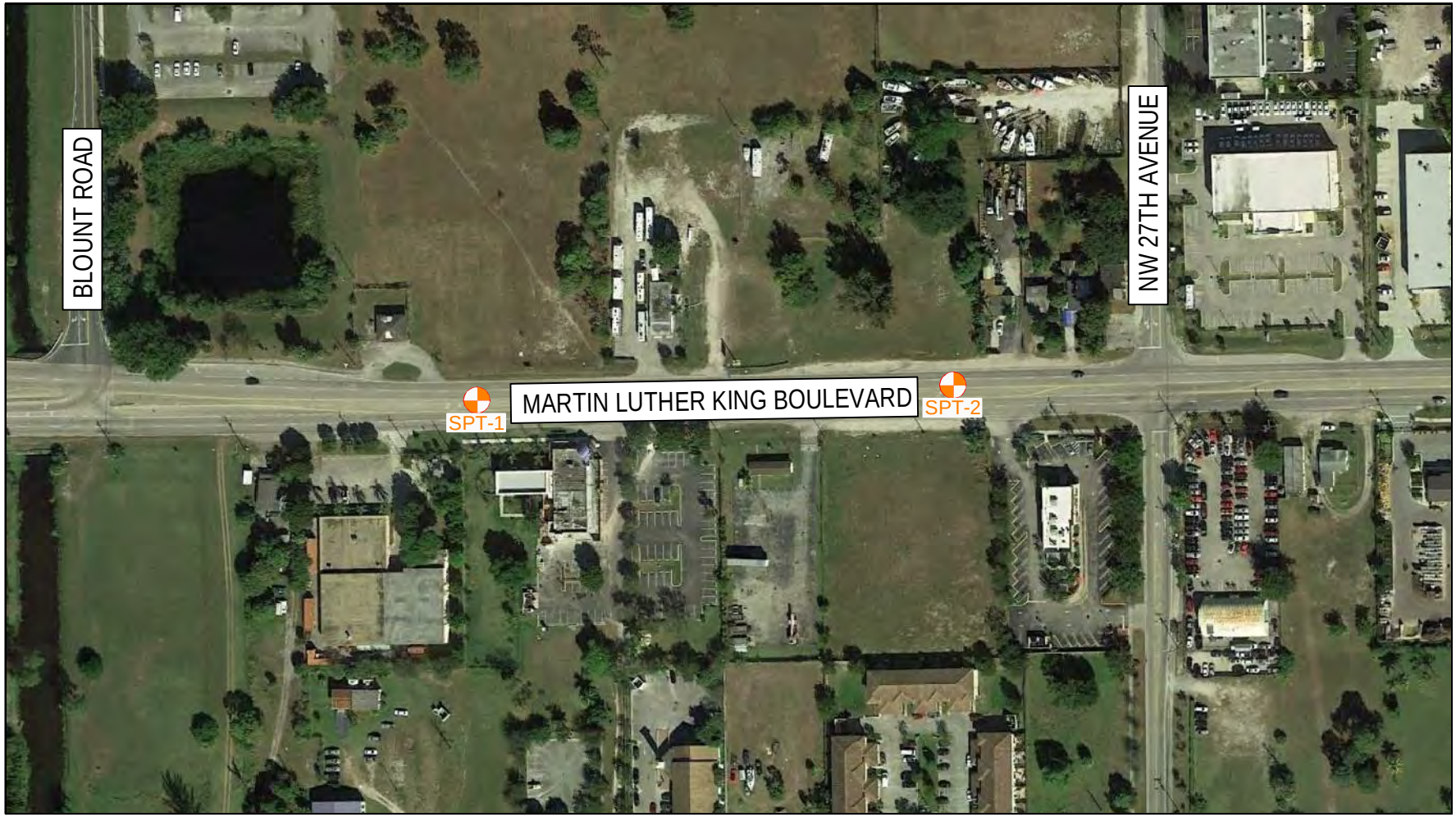
7.0 LIMITATIONS

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. Site safety and excavation support are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

Recommendations provided herein for excavation support and dewatering are for the design team only. Contractors bidding this project should align themselves with an experienced structural engineer and hydrogeologist for design of the excavation bracing system and dewatering system, respectively.

APPENDIX A
EXHIBIT A-1 – BORING LOCATION PLAN
EXHIBIT A-2 – SUBSURFACE PROFILES



SOURCE: GOOGLE EARTH PRO

LEGEND

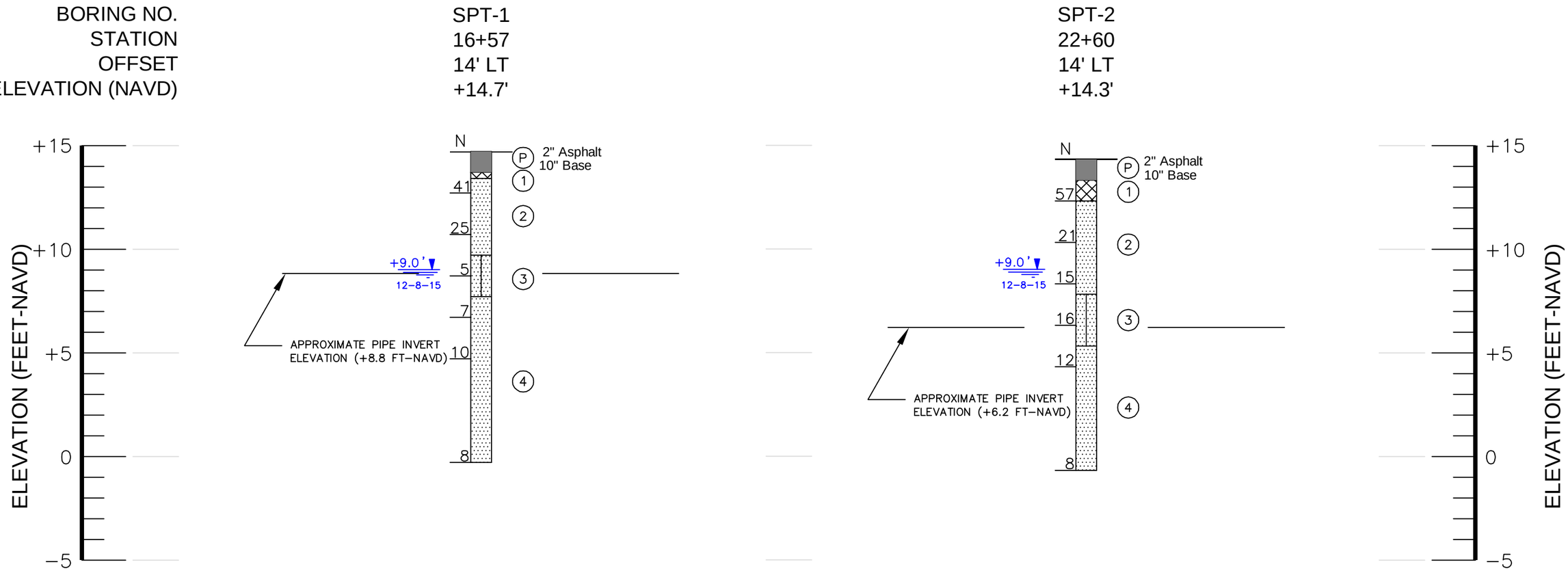
SPT-1 APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

200 0 100 200

SCALE IN FEET

Project Mngr: DM	Project No. HD155099	Terracon Consulting Engineers and Scientists	BORING LOCATION PLAN
Drawn By: DV	Scale: AS-SHOWN	1225 OMAR ROAD WEST PALM BEACH, FL 33405	GEOTECHNICAL ENGINEERING REPORT
Checked By: DM	File No. HD155099-1	PH. (561) 689-4299 FAX. (561) 689-5955	AREA "D" SANITARY SEWER SYSTEM
Approved By: KA	Date: 12-14-15		CITY OF POMPANO BEACH, FLORIDA

EXHIBIT A-1



LEGEND

- (P) Asphaltic Concrete and Limerock Base Course (PAVEMENT)
- (1) Gray fine SAND, some gravel, trace shell fragments (SP) (FILL)
- (2) Light gray to gray fine to medium SAND (SP)
- (3) Dark brown slightly silty fine SAND, organic staining (SP-SM)
- (4) Brown fine to medium SAND (SP)

SP – Unified Soil Classification System Group Symbol (ASTM D 2487)

N – Indicates the number of blows of a 140 pound hammer, freely falling a distance of 30 inches, required to drive a 2-inch diameter sampler 12 inches (ASTM D 1586)

SPT-1 – Standard Penetration Test (SPT) boring and number

+9.0' 12-8-15 – Elevation of groundwater (feet-NAVD) & date measured

NOTES

(1) Borings were drilled on December 8, 2015 using a Central Mine Equipment Model 45B (CME 45B) drilling rig.

(2) Strata boundaries are approximate and represent soil strata at each test hole location only. Soil transitions may be more gradual than implied.

(3) Groundwater depths shown on the subsurface profiles represent groundwater surfaces on the dates shown. Groundwater level fluctuations should be anticipated throughout the year.

(4) Station, offset, and elevation data shown are approximate and were obtained from the 50% design plans provided by Mathews Consulting, Inc. and dated November 2015

Project Mngr: DM	Project No. HC155099	Terracon Consulting Engineers and Scientists	SUBSURFACE PROFILES
Drawn By: DV	Scale: AS-SHOWN	1225 OMAR ROAD WEST PALM BEACH, FL 33405	GEOTECHNICAL ENGINEERING REPORT
Checked By: DM	File No. HC155099-2	PH. (561) 689-4299 FAX. (561) 689-5955	AREA "D" SANITARY SEWER SYSTEM
Approved By: KA	Date: 12-14-15		CITY OF POMPANO BEACH, FLORIDA

EXHIBIT A-2

SECTION 02012
PROTECTING EXISTING UNDERGROUND UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes materials and procedures for protecting existing underground utilities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02220: Trenching, Backfilling, and Compacting

PART 2 - MATERIALS

2.01 REPLACEMENT IN KIND

A. Except as indicated below or as specifically authorized by the Owner's Representative, reconstruct utilities with new material of the same size, type, and quality as that removed.

PART 3 - EXECUTION

3.01 GENERAL

A. Replace in kind street improvements, such as curbs and gutters, barricades, traffic islands, signalization, fences, signs, etc., that are cut, removed, damaged, or otherwise disturbed by the construction.

B. Where utilities are parallel to or cross the construction but do not conflict with the permanent work to be constructed, follow the procedures given below and as indicated in the drawings. Notify the utility owner 48 hours in advance of the crossing construction and coordinate the construction schedule with the utility owner's requirements. For utility crossings not shown in the drawings, refer to the General Conditions and the instructions of the Owner's Representative for guidance.

C. Determine the true location and depth of utilities and service connections which may be affected by or affect the work. Determine the type, material, and condition of these utilities. In order to provide sufficient lead-time to resolve unforeseen conflicts, order materials and take appropriate measures to ensure that there is no delay in work.

D. **Expose utilities 200 feet in advance of the pipeline construction.**

3.02 PROCEDURES

A. Protect in Place: Protect utilities in place, unless abandoned, and maintain the utility in service, unless otherwise specified in the drawings or in the specifications.

B. Cut and Plug Ends: Cut abandoned utility lines and plug the ends. Plug storm drains and sewers with an 8-inch wall of brick and mortar. Cap waterlines with a cast-iron cap or install a 3-foot-long concrete plug. Dispose of the cut pipe as unsuitable material.

C. Remove and Reconstruct: Where so indicated in the drawings or as required by the Owner's Representative, remove the utility and, after passage, reconstruct it with new materials. Provide temporary service for the disconnected utility.

D. In the event an existing City utility is damaged by the Contractor which was accurately marking in the field, shown on the drawings, or previously identified through potholing procedures, the Contractor shall be responsible to make the repair if directed by City or pay City's current repair rate if City is required to make the repair.

3.03 COMPACTION

A. Utilities Protected in Place: Backfill and compact under and around the utility so that no voids are left.

B. Utilities Reconstructed: Prior to replacement of the utility, backfill the trench and compact to an elevation 1 foot above the top of the ends of the utility. Excavate a cross trench of the proper width for the utility and lay, backfill, and compact.

END OF SECTION

SECTION 02110
CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 SCOPE

The work to be performed under this item shall consist of either the clearing of or the clearing and grubbing of the area along the alignment of construction as designated on the drawings.

A. Clearing - Where clearing only is required it shall consist of the cutting and removal of all trees, stumps, bush, logs, hedges, and the removal of all fences and other loose or projecting material from the designated area. The grubbing of stumps and roots will be required.

B. Clearing and Grubbing - Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which, in the opinion of ENGINEER, is unsuitable, including grubbing of stumps, roots, matter roots, foundations and disposal from the project of all spoil materials resulting from clearing and grubbing by burning or otherwise.

1.02 REFERENCES

A. Florida Department of Transportation Standard Specifications for Road and Bridge construction (F.D.O.T.), latest edition.

PART 2 - MATERIALS

2.01 MATERIALS FOR REPLACEMENT

A. All materials required to be brought on to the site for filling of holes caused by grubbing or otherwise shall be consistent with materials of the surrounding area.

PART 3 - EXECUTION

3.01 SCHEDULE

A. CONTRACTOR shall schedule the clearing or clearing and grubbing work at a satisfactory distance in advance of the pipe laying operations.

3.02 SPOIL MATERIALS REMOVAL

A. All materials to be disposed of by removal from the site shall be disposed of by CONTRACTOR at the Contractor's expense. In no case shall any discarded materials be left in piles adjacent to or within the project limits. The manner and location of disposal of materials shall be subject to review by ENGINEER and shall not create an unsightly or objectionable view.

3.03 CLEARING

A. Clear the area of all objectionable materials. Trees unavoidably falling outside the specified limits must be cut up, removed, and disposed of in a satisfactory manner. Preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut to a height of not more than 12-inches above the ground. The grubbing of stumps and roots will be required.

B. Fences shall be removed and disposed of or reinstalled in accordance with the plans or as directed by ENGINEER. Fence wire shall be neatly rolled and the wire and posts stored on the project if they are to be used again, or stored at a designated location if the fence is to remain the property of OWNER.

3.04 CLEARING AND GRUBBING

A. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass and other unsatisfactory materials shall be removed.

B. All holes remaining after the grubbing operation in embankment areas shall have the sides broken down to flatten out the slopes, and shall be filled with acceptable material, moistened and properly compacted in layers to the density required. The same construction procedure shall be applied to all holes remaining after grubbing in excavation areas where the depth of holes exceeds the depth of the proposed excavation.

END OF SECTION

SECTION 02140
DEWATERING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The work covered by this Section consists of furnishing all permits, labor, equipment, appliances and materials, and performing all operations required for dewatering excavations as required to ensure that all work is performed in the dry.

B. The Contractor shall not discharge water from dewatering operations in any manner that will:

1. Adversely affect the water quality of adjoining water bodies.
2. Violate federal, state or local laws and regulations.
3. Allow discharge to flow onto private property.
4. Hamper the movement of traffic.
5. Damage portions of the work previously constructed.

1.02 STATUTORY REQUIREMENTS

A. **All State and local permits associated with the dewatering are the responsibility of the Contractor. Obtain and pay for all permits required for temporary dewatering systems. Contractor will need to secure Dewatering Permit for this project from SFWMD within 30 days of Tentative Notice to Proceed.**

B. Compliance with the Florida Department of Environmental Protection's Generic Permit for the discharge of Produced Ground Water from a Non-Contaminated Site Activity (FDEP Document No. 62-621.300 (2)) shall be required for any dewatering operations.

C. Original permits shall be prominently displayed on the site prior to constructing dewatering systems.

1.03 RELATED WORK

A. Section 01410: Testing Laboratory Services

B. Section 02220: Trenching, Backfilling and Compacting

C. Section 02661: Water Main and Appurtenances

D. Section 02730: Storm Water System

E. Section 02730: Sanitary Sewer System

1.04 SUBMITTALS

A. Administrative Submittals: Discharge permits.

B. **Shop Drawings:**

1. Water Control Plan, including dewatering pumps, stilling basin, and means of sound attenuation.

1.05 WATER CONTROL PLAN

A. As a minimum, include descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment, methods, standby equipment and power supply, pollution control facilities, and discharge locations to be utilized as required by this Section.

PART 2 - PRODUCTS

2.01 PUMP DRIVERS

A. Sound attenuated pumps as manufactured by Thompson Pumps with "Silent Knight" canopy, or approved equal shall be used for all dewatering activities that require a pumping system. Contractor shall demonstrate, measure and record the dB levels at the time of initial set-up. The Contractor shall record the dB levels weekly.

PART 3 - EXECUTION

A. The Contractor's proposed method for dewatering pipe trenches and manhole excavations shall be reviewed by the Engineer prior to instituting any such operations. Methods may include wellpoints, sump pumps, bedding rock or other methods approved by the Engineer. The Contractor is responsible for means and methods of construction dewatering activities.

B. **In areas of deep trench where dewatering and maintenance of vehicular traffic is required, the Contractor shall bench down the sides of the trench in order to cover the dewatering well point heads with temporary steel plating.**

C. The Contractor shall provide all labor, materials, tools and equipment necessary to properly control the quality of the discharge from dewatering operations. The Contractor shall comply with all applicable laws, rules and regulations governing the discharge of water from dewatering operations.

D. The impact of anticipated subsurface soil/water conditions shall be considered when selecting methods of excavation and temporary dewatering and drainage systems. Where groundwater levels are above the proposed bottoms of excavations, a pumped dewatering system is expected for pre-drainage of the soils prior to excavation to final grade and for maintenance of the lowered groundwater level until construction has been completed to such an extent that the foundation, structure, pipe, conduit, or fill will not be floated or otherwise damaged. Type of dewatering system, spacing of dewatering units and other details of the work are expected to vary with soil/water conditions at a particular location.

E. The Contractor is responsible for controlling the bacteriological quality of well point discharges into existing bodies of water. The maximum allowable level for fecal coliform in the wellpoint discharge is a mean MPN of 14 per 100 ML with not more than ten percent (10%) of the samples exceeding an MPN of 43 per 100 ML.

F. Protection of Property - Contractor shall make an assessment for dewatering induced settlement and shall provide devices or systems, including but not limited to re-injection wells, infiltration trenches and cutoff walls, necessary to prevent damage to existing facilities, completed Work and adjacent facilities.

G. Control surface water and groundwater such that excavation to final grade is made in the dry, and bearing soils are maintained undisturbed. Prevent softening, or instability of, or disturbance to, the sub-grade due to water seepage.

H. Provide protection against flotation for all work.

I. Wellpoints shall not be set in such a way that undermines or jeopardizes paved areas; if the setting of wellpoints undermines or impacts paved areas, the impacted areas shall be removed and restored equal to or better than their original condition at the expense of the Contractor.

J. Pipe and conduit shall not be installed in water or allowed to be submerged prior to backfilling. Pipe and conduit which becomes submerged shall be removed and the excavation dewatered and restored to proper conditions prior to reinstalling the pipe and conduit.

K. Collect and properly dispose of all discharge water from dewatering and drainage systems in accordance with State and local requirements and permits. As a minimum, no discharge or run-off of groundwater or surface water that is contaminated with any petroleum products (gasoline, diesel fuel, oil, grease, hydraulic fluid, etc.) and/or sanitary waste shall be made to surface water systems

such as lakes, rivers, streams, the Intracoastal Waterway or "on-site" retention ponds that secondarily discharge to these surface water systems.

L. Dewatering systems shall be designed to allow for localized variations in the depths of the excavations.

M. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of sub-grades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

N. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

O. As the wellpoints are withdrawn, the locations of the voided areas shall backfilled by jetting approved backfill material into the voids until they are completely filled. These restored wellpoint voids are subject to random density verification testing.

P. **Provide adequate noise attenuation enclosure around all engine generator pumping equipment and comply with City's Noise Ordinance, Article III, Noise. Dewatering pumps shall have mitigation measures to meet the City's Noise Ordinance: During such periods of normal construction hours of 7:00 am to 6:00 pm on Monday through Friday, the noise levels generated by construction activities shall not exceed 75 dBA for more than 10 percent of the time when measured at a distance of 50 feet from the construction site. The Contractor will be required to construct additional sound attenuation means to achieve compliance with the City's Noise Ordinance.**

END OF SECTION

SECTION 02220
TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Excavate for all underground piping.

B. Place and compact granular beds and fills over pipelines to rough grade elevations.

C. **Dynamic Vibratory Compactor with rollers is not allowed.**

D. Dewater excavations as required.

1.02 RELATED WORK

A. Section 02661: Water Main and Appurtenances

B. Section 02720: Storm Water System

C. Section 02730: Sanitary Sewer System

1.03 SITE COMPACTION TESTING

A. Testing of compacted fill materials will be performed in accordance with F.D.O.T. and A.A.S.H.T.O. specifications.

B. If, during progress of Work, tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest as directed by ENGINEER.

C. Ensure compacted fills are tested before proceeding with placement of surface materials.

1.04 PROTECTION

A. Protect trees, shrubs, lawn, areas to receive planting, rock outcropping and other features remaining as part of final landscaping.

B. Protect bench marks and existing structures, roads, sidewalks, paving and curbs against damage from vehicular or foot traffic. Install and maintain proper bridging, planking and cants to provide access to buildings.

C. Protect excavations by shoring, bracing, sheet piling underpinning, or by other methods, as required to prevent cave-ins or loose dirt from falling into excavations in accordance with Trench Safety Act.

D. Underpin or otherwise support adjacent structure(s) which may be damaged by excavation work. This includes other utility lines, power poles and pipe runs.

E. Notify ENGINEER of any unexpected sub-surface conditions. Discontinue work in the area until ENGINEER provides notification to resume work.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. Bedding Materials: Pipe shall be placed on dry, undisturbed earth.

B. Selected Backfill: After pipe joints have been inspected and given preliminary approval, and sufficient time has elapsed for setting of joints if necessary, backfilling shall be performed, together with tamping until fill has progressed to an elevation at least one foot above the top of the pipe bell. During this initial stage of backfilling, approved granular materials or loose soil free from lumps, clods, or stones shall be deposited in layers approximately 12-inches thick and compacted by manually operated machine tampers actuated by compressed air, or other suitable means. Tampers and machines shall be suitable for the work, and subject to approval by ENGINEER.

C. Backfill Material: Excavated material, free from roots, rocks larger than 3½ inches in size and building debris.

D. Fill under landscaped areas: Free from alkali, salt, and petroleum products. Use sub-soil excavated from site only if conforming to specified requirements.

E. Imported Backfill:

1. Materials for use as base, fill and backfill shall be as described below.

a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4 and A-3, and as described as common fill, below.

b. Common fill material shall be a satisfactory soil material containing no more than 20 percent by weight finer than N. 200 mesh sieve. It shall be free from organic matter, muck, marl and rock exceeding 3 ½ inches in diameter. Common fill shall not

contain broken concrete, masonry, rubble or other similar materials.

F. Unsuitable Material: Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-5, A-2-6, A-2-7, A-4, A-5, A-6 and A-7 along with peat and other highly organic soils.

PART 3 - EXECUTION

3.01 PREPARATION AND LAYOUT

A. Establish extent of excavation by area and elevation. Designate and identify datum elevation.

B. Set required lines and levels.

C. Maintain bench marks, monuments and other reference points.

3.02 UTILITIES

A. Before starting excavation, establish the location and extent of underground utilities occurring in the work area.

B. Notify ENGINEER if utility lines which are in the way of excavation are uncovered.

C. Protect active utility services uncovered by excavation.

D. Remove abandoned utility service lines from areas of excavation. Cap, plug or seal such lines and identify at grade.

E. Accurately locate and record abandoned and active utility lines re-routed or extended on Project Record Documents or any utility lines which are not shown but are discovered or discovered in a new location during construction.

3.03 TRENCHING

A. Ensure trenching does not interfere with normal 45 degree bearing splay of any foundation.

B. Excavate in accordance with lines and grades.

C. Cut trenches sufficiently wide to enable proper installation of pipe and to allow for inspection. Trim and shape trench bottom and leave free of irregularities, lumps and projections.

D. Do not disturb soil within branch spread of existing trees or shrubs that are to remain. If it is necessary to excavate through roots, perform work by hand and cut roots with a sharp axe.

E. When complete, request ENGINEER to inspect excavations. Correct unauthorized excavation as directed, at no cost to OWNER.

F. Remove excess or unsuitable excavated sub-soil from site. All overexcavations or undermining shall be backfilled and tamped with suitable materials.

G. Where deemed necessary by the Engineer, any undermining of soil beneath adjacent driveways, sidewalks, curb, roadways, footer or any other improved surface shall be filled with flowable fill at no additional cost to the Owner.

H. Where wet or unsuitable materials are encountered at or below the excavation depth shown on the plans, the unsuitable material shall be removed and replaced to a depth of 8 inches below the excavation depth and replaced with suitable backfill material or FDOT #57 stone wrapped in filter fabric.

I. Contractor shall provide all sheeting necessary to construct and protect the excavation, existing utilities, structures and private property.

3.04 DEWATERING

A. Keep trenches dry. Provide necessary equipment including pumps, piping and temporary drains.

B. Do not discharge drainage water into municipal sewers without municipal approval. Ensure water discharge does not contain silt held in suspension.

C. Direct surface drainage away from excavated areas.

D. Control the grading in and adjacent to excavations to prevent water running into excavated areas or onto adjacent properties or public thoroughfares.

E. Furnish and operate suitable pumps on a 24 hour basis to keep excavations free of water until piping has been placed and backfilling has been completed.

F. No water shall be allowed to rise over masonry or mortar until the concrete or mortar has set at least 24 hours.

G. The Contractor is responsible for acquiring all necessary dewatering permits at no cost to the Owner.

H. Dewatering pumps must comply with City noise ordinance.

3.05 BACKFILLING

A. Do not start backfilling until piping has been inspected.

B. Ensure trenches are free of building debris, wood, rocks over 3½ inches in diameter and water.

C. Backfill systematically and as early as possible to allow maximum time for natural settlement and compaction.

D. After backfill has reached a point one foot above the top of the pipe, a variation in the procedure as to manner of placing and amount of compaction to fill will be allowed, depending upon the location of the work and danger from subsequent settlement, as follows:

1. For backfilling in unimproved areas (along utility easements and in parkway strip beyond the edge of driveways and graveled parking areas), from an elevation of one foot above top of pipe to the surface of the ground, backfill may be deposited by equipment. Depositing in layers, or tamping will not be required. Sufficient surplus excavated material shall be neatly rounded over the trench, to compensate for settlement. All surplus excavated materials beyond that indicated above shall be disposed of by Contractor.

2. For backfilling beneath driveways and parking areas, alleys, and streets where non-rigid type surfacing is to be replaced. This shall also include dirt, gravel or asphalt driveways and alleys.

   a. The backfill material shall be carefully deposited in uniform layers not to exceed 12-inches in thickness and each layer shall be compacted to 98% of maximum density in accordance with AASHTO T-180 with manually operated machine tampers.

   b. In lieu of the foregoing compaction method, the backfill material and procedure used may be that as specified under Method 3, below.

3. For backfilling across and beneath driveways, sidewalks, parking areas or streets where a rigid type paving is to be replaced (concrete and asphaltic concrete and brick surfaces).

   a. All backfill material shall be approved granular material of high weight and density. The material shall be carefully deposited in uniform layers not to exceed 12-inches thick (loose measure), and each layer shall be compacted by ramming or tamping with tools approved by ENGINEER in a manner that does not disturb the pipe. Where necessary, granular base material of the type and thickness specified shall be used for the last layer prior to surfacing.

E. **Frequency of Backfill Density Testing**

1. **Density testing shall be required in 12" lifts, above the pipe at intervals not to exceed 300' in unpaved areas; every 100' under pavement and at three (3) locations at perpendicular road crossings. For structures, one test per 12" lift on one side of structure.**

END OF SECTION

SECTION 02260
FINISH GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The Contractor shall, under this Section, supply, place, compact and roll finish grade materials prior to landscaping work.

B. Finish grade sub-soil.

C. Cut out areas to receive stabilizing base course materials for paving and sidewalks.

D. Place, finish grade and compact topsoil.

1.02 RELATED WORK

A. Section 02210: Excavation and Swale Grading.

B. Section 02220: Trenching, Backfilling and Compacting.

C. Section 02934: Sodding.

1.03 PROTECTION

A. The Contractor shall prevent damage to existing fencing, trees, landscaping, natural features, bench marks, pavement, utility lines, and sprinkler system. Correct damage at no cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil shall be friable loam free from subsoil, roots, grass, excessive amount of weeds, stones and foreign matter; acidity range (ph) of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter. (Use topsoil stockpiled on site if conforming to these requirements, or as directed by the Engineer.)

PART 3 - EXECUTION

3.01 SUB-SOIL PREPARATION

A. Rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc., in excess of 2 inches in size. Remove sub-soil which has been contaminated with petroleum products.

B. Cut out areas, to sub-grade elevation, which are to receive stabilizing base for paving and sidewalks.

C. Bring sub-soil to required levels, profiles and contours. Make changes in grade gradual. Blend slopes in to level areas.

D. Slope grade away from building minimum 4 inches in 10 feet (unless indicated otherwise on Drawings).

3.02 PLACING TOPSOIL

A. Place topsoil in area where seeding, sodding and planting is to be performed. Place to the following minimum depths, up to finished grade elevations:

1. 6-inches for seeded areas.
2. 4 1/2-inches for sodded areas.
3. 24-inches for shrub beds.
4. 18-inches for flower beds.

B. Use topsoil in relatively dry state. Place during dry weather.

C. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles and contours of sub-grades.

D. Remove stones, roots, grass, weeds, debris and other foreign material while spreading.

E. Manually spread topsoil around trees, plants, buildings and other structures to prevent damage which may be caused by grading equipment.

F. Lightly compact placed topsoil.

3.03 SURPLUS MATERIAL

A. Remove surplus sub-soil and topsoil from site.

B. Leave stockpile areas and entire job site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 02367
SHEET PILES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary for the temporary sheet piles and cells, complete.

B. The cost of sheet piles, if required, will be incidental to sanitary sewer system and lift station installation.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society for Testing and Materials (ASTM):

a. A36, Structural Steel.

b. A183, Carbon Steel Track Bolts and Nuts.

c. A123, Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.

d. Al53, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware (R 1987).

e. A307, Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

f. A328, Steel Sheet Piling.

g. A572, High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.

h. Comply with all OSHA Standards.

1.03 DEFINITIONS

A. Elevations: Referenced to NGVD 1929.

B. Obstruction: Sudden and significant increase of penetration resistance and deviation of pile out of tolerance resulting from encountering a subsurface or physical condition.

C. Practical Refusal: Penetration resistance of at least 120 blows per foot for 3 continuous feet, 200 blows per foot for 1 foot, or 50 blows per inch for 2-consecutive inches, whichever comes first, and to continue driving pile would be

impractical. These criteria apply only for hammer sizes and operation as specified.

D. Rated Hammer Energy:

1. Diesel Hammers: Product of rated stroke times ram weight.

2. Air Hammers: Rated energy from manufacturer's literature.

E. Refusal: Zero rate of penetration for 10 seconds during pile driving.

F. Set: Pile penetration in inches per blow.

G. Sweep: Deviation from straightness measured along two perpendicular faces of pile while not subject to bending forces.

H. Termination Penetration Resistance: Penetration resistance exceeding 60 blows per foot at which driving may be terminated.

1.04 SUBMITTALS

A. Administrative Submittals: Pile driving schedule.

B. Shop Drawings: Indicate tie rods and accessories, number of piles required, fabricated comers, and detail dimensions.

C. Quality Control Submittals:

1. Manufacturer's product data prior to ordering piles.

2. Written sequence of setting and driving operation

3. Drilling: Manufacturer's literature on equipment and operation procedures.

4. Hammers: Manufacturer's specifications and catalog information. Show data necessary for computing bearing value of piles driven.

5. Installer qualifications.

D. If installed as sheet-piled cells, submit revised wet well sections including antiflotation calculations proposed by a Florida Professional Engineer.

1.05 QUALIFICATIONS

A. Piling Installer: Minimum of 5 years of past successful experience on 10 projects of sheet pile installation (submit project list to Engineer).

1.06 DELIVERY, STORAGE, AND HANDLING

A. Sheet Piles: Lift and handle so that maximum bending stresses shall not exceed 22,500 pounds per square inch.

1.07 SPECIAL TOOLS

A. Tool checking interlock dimensions.

PART 2 - PRODUCTS

2.01 SHEET PILES

A. Minimum size and wall thickness shown manufactured to ASTM A572, Grade 50.

B. Sections: Continuously interlocking type, structural characteristics as follows:

Section Designation	Nominal Web Thickness/In.	Weight Per SF-Pounds	Sect. Modulus Per LF/Cu.In.
PZ38	3/8 by 1/2	38.0	46.8
PZ32	3/8 by 1/2	32.0	38.3
PZ27	3/8	27.0	30.2
PDA27	3/8	27.0	10.7
PMA22	3/8	22.0	5.4
PSA23	3/8	23.0	2.4
PSA28	1/2	28.0	2.5
PS28	3/8	28.0	1.9
PS32	1/2	32.0	1.9
PSX32	29/64	32.0	2.4

C. Section Modulus: Base on individual whole piece, not dependent on the interlock friction between pile sections to secure the required section modulus.

D. Pulling (Handling) Holes: Manufacturer's standard, additional will not be allowed.

E. Tolerances: Weight per square foot may not vary by more than 2-1/2 percent over or under that specified.

2.02 ACCESSORIES

A. Tie Rod Assembly: Adjust spacing, size, plate dimensions, and length of tie rods if piling sections are of different proportions.

1. Tie Rods:

a. Fabricated Steel: ASTM A36, upset ends, threaded American Standard Free Fit, Class 2.

b. Coat with grease and wrap for protection from rust and physical damage while in transit.

2. Turnbuckles:

a. Forged steel with American Standard Class 2 fit threads, takeup, and other dimensions as shown in American Institute of Steel Construction, Manual of Steel Construction.

b. Finished with parts properly shaped and free from fins, cracks, flaws, seams, and other injurious defects.

c. Screw Threads: True to form, clean cut, and free from injurious defects.

d. Nuts: Standard hexagon, American Standard Class 2 fit threads.

B. Steel Shapes, Plates, Bars, and Washers:

1. General: ASTM A36, provide cut washers for each bolt head and nut.

2. Bolts: ASTM A307, of length to finish 1/4 inch outside the nut and have additional thread to retighten.

3. Hardware: Hot-dip galvanize, ASTM A123.

PART 3 - EXECUTION

3.01 DRIVING EQUIPMENT

A. Air or Steam Hammer: Minimum manufacturers' rated capacity of 24,000 foot-pounds of energy per blow.

1. Pressure Gauge: Locate near hammer for measuring air or steam pressure.

B. Diesel Hammers:

1. Ram Weight: Not less than 3,600 pounds.

2. Energy Developed: Exceed 13,000 foot-pounds per blow.

C. Sonic Hammers: Use of adequate size and type. Demonstrate capability prior to approval for pile driving.

D. Drop Hammer or Combination of Water Jets and Hammer:

1. Drop Hammers:

a. Weight:
1) Piles 50 Feet Long or Less: Minimum 3,000 pounds.
2) Piles Over 50 Feet Long: Minimum 4,000 pounds.

b. Drop Height: Maximum 10 feet.

c. Hammer Head: Certified, weight stamped.

3.02 PILE LENGTHS

A. Lengths shown are those required below cutoff as shown on the shop drawings. Furnish sheet piling with sufficient extra length to provide for fresh heading and to reach from the cutoff elevation up to position of driving equipment.

3.03 DRIVING GUIDES

A. Position sheet piles using temporary guide wales support and anchor guide wales to form rigid structures during the sheet pile setting and driving operation.

B. Guide Wales: Stationary (not moveable) with fluctuating water stage.

3.04 SETTING

A. Clean pile, inspect for defects and proper interlock dimensions.

B. Allow pile sufficient clearance in the interlocks to slide, under its own weight, in the interlock of the sheet pile previously placed until the top of existing ground is reached by the tip of the sliding pile. Do not use vibratory or drive hammer to force the interlocking of piles.

3.05 DRIVING

A. Before driving is started. check sheet piles for position and alignment. Locate pile top within 2 inches of location shown.

B. Drive sheet piles to the tip elevations shown. Drive down piles which are raised during the process of driving adjacent piles.

C. If refusal is reached before driving to the specified tip elevation, an impact hammer or controlled jetting may be used. Perform jetting on both sides of sheet pile simultaneously with driving.

D. Remove and replace sheet pile driven out of interlock.

E. Driving Tolerances:

1. Not more than 1/8 inch per foot from the vertical in all directions. Furnish plumb line or other device for checking vertical alignment.

2. Not more than 1 percent from vertical or 2 percent from batter shown.

3.06 PILE CUTOFF

A. Cut square at required elevation with tools that will not damage area below cut surface.

B. Tolerance: Plus or minus 1/2 inch.

3.07 CUTTING AND SPLICING PILES

A. Extend to required grade by welding on additional full length piles driven below grade, and piles with damaged heads which have been cut off to permit further driving.

B. Pile Splicing: Butt weld, making full penetration of the web. Piles adjoining spliced piles shall be full length piles.

3.08 WALES AND CAPS

A. After driving sheet piling, install channel wales. Bolt splices in wales with field bolts. Set wales horizontal.

B. Installation:

1. Weld Splices using a single bevel butt joint, welded on one side on backing structure.

2. Space wales within 1/4 inch for welded splices. Fabricate accessories by welding or as otherwise shown.

3.09 TIE ROD ASSEMBLIES

A. Installation:

1. Hand backfill tie rods to 6-inch depth above rods.

2. Support tie rods in straight line from bulkhead to anchor wall.

3. Maintain tie rod support until such time as rod is tensioned.

B. Use sandfill or wood cribbing to maintain tie rod alignment.

C. Tension tie rods with turnbuckles in ENGINEER's presence. Lubricate turnbuckles with graphite prior to tensioning.

3.10 TIE ROD HOLES .

A. Neatly cut through sheet piles by mechanical means. Flame cutting shall not be used.

B. Spacing may vary up to 4 inches to avoid cutting sheet pile interlocks.

C. Variations in Spacing: Prevent an accumulative variation of more than 4 inches.

3.11 SITE RESTORATION

A. **Sheet piles to be removed by Contractor.**

END OF SECTION

SECTION 02513
ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Prepare sub-grade to receive base course.

B. Place stabilizing base courses, work and compact.

C. Prime base course, place asphalt pavement.

D. Prepare existing pavement to receive asphalt overlay. Place asphalt pavement overlay.

1.02 RELATED WORK

A. Section 01410: Testing Laboratory Services.

B. Section 02580: Pavement Marking.

1.03 REFERENCE STANDARDS

A. ASTM D1557 - Tests for Moisture - Density Relationship of Soils using 10 lb. Rammer in 18 inch Drop.

B. AASHTO M-81 - Penetration Graded Asphalt Cement.

C. AASHTO M-140 - Emulsified Asphalt.

D. FDOT Road and Bridge Construction - Section 200 - Rock Base.

E. FDOT Road and Bridge Construction - Section 204 – Graded Aggregate Base.

F. FDOT Road & Bridge Construction - Section 230 - Limerock Stabilized Base

G. FDOT Road and Bridge Construction - Section 283 - Reclaimed Asphalt Pavement Base

H. FDOT Road & Bridge Construction - Section 300 – Prime Tack Coats for Base Courses

I. FDOT Road & Bridge Construction - Section 320 – Hot Bituminous Mixtures – Plant, Methods and Equipment

J. FDOT Road and Bridge Construction - Section 330 - Hot Bituminous Mixtures General Construction Requirements.

K. FDOT Road and Bridge Construction - Section 916-1 - Asphalt Cement.

1.04 TESTING AND INSPECTION

A. Testing and inspection of asphalt pavement mixes and testing of placed stabilizing base course and asphalt pavement will be performed by an independent testing laboratory, in accordance with Section 01410-Testing Lab Services. Testing and inspection will be performed so as to minimize disruption to work.

B. Allow testing laboratory access to the mixing plant for verification of weights or proportions, character of materials used and determination of temperatures used in the preparation of asphalt concrete mix.

C. When and if required, the testing laboratory will perform laboratory tests on proposed asphalt pavement mixes to determine conformity with requirements.

D. The testing laboratory will perform one series of compaction tests for stabilizing base course and for asphalt pavement. The contractor shall pay for costs of additional testing as required due to improper performance of work and for failed tests. Core samples are to be obtained for asphalt compaction verification as indicated by Engineer.

E. When stabilizing base course or portion thereof has been placed and compacted in accordance with requirements, notify the testing laboratory to perform density and bearing value tests. Do not place asphalt pavement until results have been verified and base course installation approved.

F. If compaction tests indicate that stabilizing base course or asphalt paving do not meet specified requirements, remove defective work, replace and retest at Contractor's expense.

PART 2 - MATERIALS

2.01 LIMEROCK

A. The limerock material shall conform to FDOT Standard Specification for Road and Bridge Construction, Section 200, Section 230 and Section 911.

B. Limerock Bearing Requirements - Limerock material used in construction of limerock base shall have an average LBR value of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.

2.02 CRUSHED CONCRETE

A. Composition - The minimum percentage of carbonates of calcium and magnesium in the material shall be 70. All foreign material such as metal fragments, organic matter, etc. shall be removed from the material before delivery to the job site.

B. Gradation - 100 percent (by weight) of the material shall pass a 3 inch sieve, with 40 percent to 70 percent passing the number 10 sieve. Not more than 20 percent, by dry weight, of the material shall pass the 200 sieve by washing. all crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.

C. Bearing Requirements - The Crushed Concrete Base shall have an average Limerock Bearing Ration (LBR) of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.

D. **Crushed Concrete may be substituted for Limerock as base material by adding 2 inches to the specified thickness.**

2.03 PRIME COAT

A. Prime coat shall conform to FDOT Standard Specification for Road and Bridge Construction, Section 300.

2.04 TACK COAT

A. Tack coat shall conform to FDOT Standard Specification for Road and Bridge Construction, Section 300.

2.05 TYPE S ASPHALTIC CONCRETE

A. Asphaltic concrete surface course - Type S-III asphaltic concrete wearing surface, 1½ inches in compacted thickness or as indicated on the Drawings.

B. Materials.

1. Bituminous Material: Use Asphalt Cement, Viscosity Grade AC-20 or AC-30 meeting the requirements of FDOT Section 916-1.

2. Aggregate: Use aggregate consisting of crushed stone or crushed slag screenings, or a combination of these screenings with silica sand, that meets the gradation requirements and that provides the required stability of the mix, as specified below. Use crushed stone or crushed slag screenings that meet the requirements of Section 901. Use sand that meets

the requirements of 332-2.2.3. Do not use aggregate containing any appreciable amount of phosphate.

3. Mineral Filler: If needed, meet the requirements of Section 917.

C. Composition of Mixture.

1. General: Use a bituminous mixture composed of a combination of aggregate (coarse, fine, or mixtures thereof), mineral filler if required, and bituminous material. Size, uniformly grade, and combine the several aggregate fractions in the proportions that the resulting mixture meets the grading and physical properties of the verified mix design.

   The Contractor may use RAP meeting the requirements of 331-2.2.4 as a substitution for a portion of the combination of aggregates. If using RAP, the Contractor may use a recycling agent in accordance with the requirements of 331-2.2.5 in the mix in lieu of asphalt cement.

   The Contractor may use recycled crushed glass meeting the requirements of 331-2.2.6 as a substitution for a portion of the combination of aggregates.

2. Grading Requirements:

   a. General: Use a mix design that has been verified by the Engineer and meets the design range specified in Table 331-1.

   b. Gradation: When tested before entering the asphalt plant in the combination to be used, ensure that the aggregate, including any mineral filler, does not contain more than 10% by weight of material passing the No. 200. Do not use any screenings in the combination of aggregate that contain more than 15% of material passing the No. 200 sieve. When blending two screenings to produce the screenings component of the aggregate, the Contractor may allow any component of such screenings to contain up to 18% of material passing the No. 200 sieve. The Contractor may wash screenings to meet these requirements. Use screenings that are free from lumps and foreign matter.

   c. Proportions of Sand and Screenings: Allow no more than 25% by weight of the total aggregate used to be local sand. In addition to the local sand, the Contractor may use commercial washed sand in a quantity not to exceed 15% by weight of the total aggregate. Obtain the commercial washed sand from an approved source having a Department sand mine number and meeting the requirements of Section 902 except those in 902-2.2.

      If used in the mixture, consider the sand portion of RAP material to be local sand.

3. Mix Design:

a. General: Meet the mix design requirements of 331-4.3. In addition to these requirements, include, in the mix design, test data showing that the material as produced will meet the requirements of Table 331-2.

b. Stability: Combine the constituents of the mixture in such proportions as to produce a mixture having Marshall properties within the limits shown in Table 331-2.

4. Contractor's Quality Control: Provide the necessary control of the bituminous mixture and construction in accordance with the applicable provisions of 330-2.2 and 331-4.4. Furnish materials that meet the verified mix design. For the extraction gradation analysis, meet the provisions of 331-4.4.2 and Table 331-3. For plant calibration, meet the provisions of 331-4.4.3 and Table 331-3.

D. Acceptance of Mixture.

1. Acceptance at the Plant: The Engineer will accept the bituminous mixture at the plant with respect to gradation and asphalt content in accordance with the requirements of 331-4.

2. Acceptance on the Roadway: The Engineer will accept the bituminous mixture on the roadway with respect to compacted density and surface tolerance in accordance with the applicable provisions of 330-11 and 330-13.

3. Additional Tests: The Engineer will apply the provisions of 331-5.5 to Type III Asphaltic Concrete.

4. Mix temperature must be ± 30° F of mix design prior to placement.

PART 3 - EXECUTION

3.01 INSTALLATION AND QUALITY CONTROL

A. Installation and quality control of the asphaltic concrete pavement shall be in conformance with FDOT Standards for Road and Bridge Construction, latest edition, Section 300 – Hot Bituminous Mixtures – General Construction Requirements.

END OF SECTION

SECTION 02521
FLOWABLE FILL

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section specifies the requirements for flowable fill used for trenches, support for pipe structures, culverts, utility cuts and other works where cavities exist and where firm support is needed for pavements and structural elements. Flowable fill may also be used to fill water pipes that need to be abandoned in place and at other locations approved by the Engineer.

1.02 REFERENCE SPECIFICATIONS

A. Section 01010 - Summary of Work

B. Section 01090 - Reference Standards

C. Section 01300 - Submittals

D. Section 02220 - Trenching, Backfilling and Compacting

PART 2 - PRODUCTS

2.01 MATERIALS

A. The materials used shall conform with the requirements specified in Division III of the F.D.O.T. Standard Specification for Road and Bridge Construction, latest edition, and herein. Specific reference are as follows:

1.	Portland Cement (Type I, II or III)	Section 921
2.	Fly Ash, Slag and other Pozzolanic materials For Portland Cement Concrete	Section 929
3.	Fine Aggregate (Sand)*	Section 902
4.	Water	Section 923

*Any clean sand with 100% passing 3/8" sieve and not more than 10% passing with 200 mesh may be used.

2.02 MIX PROPORTIONS

A. The Contractor shall be responsible for producing a flowable mixture using these guidelines and by adjusting his mixture design as called for by circumstances or as may be directed by the Engineer.

B. Flowable fill material shall be proportioned to produce a 28-day compressive strength of a minimum of 100 psi.

C. General mix quantities are as follows:

Components	Pounds per Cubic Yard
Cement	50-100*
Fly Ash or Granulated Blast Furnace Slag	0-600
Fine Sand	2,750 (Adjust to yield one cubic yard of flowable fill)
Water	500 (Max.)

*The percentage of cement may be increased above these limits only when early strength is required and future removal is unlikely.

D. Weights for fine aggregates and water shall be adjusted for removability, pumpablity and flowability. If required, strength test data shall be provided prior to batching.

E. If required by the Engineer, the flowablity can be measured by afflux time determined in accordance with ASTM C 939 and shall be 30 seconds +/- 5 seconds as measured on mortar passing the No. 4 sieve. The equipment required to perform this test shall be provided by the Contractor.

PART 3 - EXECUTION

3.01 PRODUCTION AND PLACING

A. Flowable fill shall be produced and delivered using ready mix concrete trucks and placed easily by chute in a flowable condition directly into the cavity to filled or into a pump for final placement.

B. The flowable fill shall be placed to the designated fill line without vibration or other means of compaction. Placement shall be avoided during inclement weather, e.g. rain. The Contractor shall take all necessary precautions to prevent any damages caused by hydraulic pressure of the fill during placement prior to

hardening. Also, necessary means to confine the material within the designated space shall be provided by the Contractor.

3.02 ACCEPTANCE

A. The flowable shall be proportioned and placed as specified herein. In general, the strength desired is the maximum hardness that can be excavated at a later date using conventional excavation equipment. No curing protection is required.

B. The fill shall be left undisturbed until material obtains sufficient strength. Sufficient strength is 250 psi penetration resistance as measured using a hand held penetrometer. The penetrometer shall be provided by the Contractor.

C. All flowable fill areas subject to traffic loads must have a durable riding surface.

D. An approved type of accelerator may be approved for the placement of "Flowable Fill" in traffic areas when submitted to the Engineer. Depending on the condition of the cavity, paving can begin from 8-24 hours after placement.

END OF SECTION

SECTION 02526
CONCRETE SIDEWALKS AND DRIVES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This Section covers work necessary to construct, replace or repair concrete sidewalks, drives and curbs which have been removed or damaged during the course of construction.

B. Sidewalks, drives and curbs shall be replaced in the same location and to the same dimensions as were the originals unless instructed differently by CITY or ENGINEER.

C. See GENERAL CONDITIONS which contain information and requirements that apply to the work specified herein and are mandatory for this project.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02220: Trenching, Backfilling and Compacting.

B. Section 03300: Concrete.

1.03 SUBMITTALS

A. Submittals to show conformance with the Specifications shall be made in accordance with the GENERAL CONDITIONS.

PART 2 - PRODUCTS

2.01 FORMS

A. Materials for forms shall be 2-inch dressed lumber straight and free from defects or standard metal forms may be used. Where short-radius forms are required, l-inch dressed lumber or plywood may be used. Provide stakes and bracing materials as required to hold forms securely in place.

2.02 EXPANSION JOINT FILLER

A. Expansion joint filler shall be ½-inch thick, preformed asphalt-impregnated, expansion joint material conforming to ASTM D 994.

2.03 REINFORCEMENT

A. Welded wire fabric shall conform to ASTM A185 and be sized as indicated on the Drawings.

B. Deformed reinforcing bars shall conform to ASTM A615 and be sized as indicated on the Drawings.

1. Grade: 60

2. Minimum yield strength: 60,000 psi

2.04 CONCRETE

A. Concrete shall be a specified in Section 03300 - Concrete and shall have a compressive strength of 3000 psi at 28 days.

2.05 CURING COMPOUND

A. Liquid membrane-forming curing compound shall be clear or translucent; suitable for spray application and shall conform to ASTM C 309, Type 1.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE

A. Bring the areas on which sidewalks, drives and curbs are to be constructed to required grade and compact by sprinkling and rolling or mechanical tamping. As depressions occur, refill with suitable material and recompact until the surface is at the proper grade. The upper 12 inches of subgrade or fill shall be compacted to 95 percent of maximum density at optimum moisture content as determined by ASTM D 1557.

3.02 SETTING FORMS

A. Construct forms to the shape, lines, grades, and dimensions called for on the Drawings. Stake wood or steel forms securely in place, true to line and grade.

B. Brace forms to prevent change of shape or movement in any direction resulting from the weight of the concrete during placement. Construct short-radius curved forms to exact radius. Tops of forms shall not depart from gradeline more than 1/8 inch when checked with a 10-foot straightedge. Alignment of straight sections shall not vary more than 1/8 inch in 10 feet.

3.03 SIDEWALK CONSTRUCTION

A. Sidewalks shall be 6-inches thick.

B. At locations where the new sidewalk is to abut existing concrete, saw concrete straight and install expansion asphalt joint.

C. Place preformed asphalt expansion joints at intervals not exceeding 45 feet and around concrete poles, valve boxes, manholes or other objects protruding through the sidewalk.

D. Provide contraction joints transversely to the walks at intervals not exceeding 5 feet. These joints shall be 3/16-inch by 1-inch weakened plane joints. They shall be straight and at right angles to the surface of the walk.

E. Place, process, finish and cure concrete in conformance with the applicable requirements of ACI 614 and this Specification. Where the requirements differ, the high shall govern.

F. Broom the surface with a fine-hair broom at right angles to the length of the walk and tool at all edges, joints and markings. Mark the walks transversely at 5-foot intervals with a jointing tool. Upon completion of the finishing, apply an approved curing compound to exposed surfaces. Protect the sidewalk from damage for a period of 7 days.

G. Sidewalk pedestrian ramps shall meet ADA requirements.

3.04 DRIVE CONSTRUCTION

A. Drives shall be 6 inches thick, 9 inches joining to pavement, and reinforced as indicated on the Drawings.

B. Saw cut existing drive as shown on plans. Remove and dispose of existing drive.

C. Place reinforcement as required by Drawings.

D. Place pre-formed expansion joint material where new drive will abut existing drive and around manholes or other objects protruding through the drive.

E. Construct concrete drives to the dimensions and grade of drives existing prior to construction.

F. Broom the surface with a fine-hair broom at right angles to the length of the drive and tool all edges and joints. Upon completion of finishing, apply an approved curing compound to exposed surfaces.

G. Protect drives from damage for a period of seven days.

END OF SECTION

SECTION 02570
MILLING OF EXISTING ASPHALT PAVEMENT

PART 1 - GENERAL

1.01 SCOPE

A. The work specified in this Section consists of removing existing asphaltic concrete pavement by milling to improve the rideability of the finished pavement, to lower the finished grade adjacent to existing curb prior to resurfacing, or to completely remove existing pavement.

B. When milling to improve rideability, an average depth of cut will be specified in the plans.

C. Unless otherwise specified, the milled material becomes the property of the Contractor.

1.02 REFERENCES

A. Florida Department of Transportation - Standard Specification for Road and Bridge Construction (Latest Edition)

PART 2 - EQUIPMENT

2.01 MILLING MACHINE

A. The milling machine shall be capable of maintaining a depth of cut and cross slope that will achieve the results specified in the plans and specifications. The overall length of the machine (out to out measurement excluding the conveyor) shall be a minimum of 18 feet. The minimum cutting width shall be six feet.

B. The milling machine shall be equipped with a built-in automatic grade control system that can control the transverse slope and the longitudinal profile to produce the specified results.

C. Any commercially manufactured milling machine meeting the above requirements will be approved to start the project. If it becomes evident after milling has started that the milling machine cannot consistently produce the specified results, the milling machine will be rejected for further use.

D. When milling to lower the grade adjacent to existing curb or other areas where it impractical to use the above described equipment, the use of a smaller milling machine will be permitted.

E. The milling machine shall be equipped with means to effectively limit the amount of dust escaping the removal operation. For complete pavement removal, the use of alternate removal and crushing equipment, in lieu of the equipment specified above, may be approved by the Engineer.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. When milling to improve rideability, the existing pavement shall be removed to the average depth specified in the plans, in a manner that will restore the pavement surface to a uniform cross section and longitudinal profile. The Project Engineer may require the use of a stringline to ensure maintaining the proper alignment.

B. The contractor may elect to make multiple cuts to achieve the required pavement configuration or depth of cut.

C. The milling machine shall be operated to effectively minimize the amount of dust being emitted from the machine. Prewetting of the pavement may be required.

D. If traffic is to be maintained on the milled surface prior to the placement of the new asphaltic concrete, the pattern of striations shall be such as to produce an acceptable riding surface.

E. Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a power broom or other approved equipment to remove to the greatest extent practicable, fine material which will dust under traffic. This operation shall be conducted in a manner so as to minimize the potential for creation of a traffic hazard and to minimize air pollution.

F. Sweeping of the milled surface with a power broom will be required prior to placing asphaltic concrete.

G. In urban and other sensitive areas where dust would cause a serious problem, the Contractor shall use a street sweeper (using water) or other equipment capable of removing and controlling dust. Approval of the use of such equipment is contingent upon its demonstrated ability to do the work.

H. To prevent, to the greatest extent practicable, the infiltration of milled material into the storm sewer system when the milling operation is within the limits of and adjacent to a municipal curb and gutter or a closed drainage system, the sweeping

operation shall be performed immediately after the milling operations or as directly by the Engineer.

END OF SECTION

SECTION 02580
PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The work included in this Section consists of applying pavement markings as required to restore disturbed pavement areas. Contractor is responsible for providing temporary painted striping during curing period of asphalt, and between asphalt lifts. Contractor shall provide permanent thermoplastic pavement markings. Work shall adhere to all City and FDOT standards.

1.02 RELATED REFERENCES

A. All markings shall conform to the requirements of the Manual of Uniform Traffic Control Devices, and FDOT Roadway and Traffic Design Standards.

B. Thermoplastic shall conform to the requirements of the Florida D.O.T. Standard Specifications for Road and Bridge Construction (Section 711) latest edition.

PART 2 - PRODUCTS

2.01 THERMOPLASTIC

A. All final permanent markings to be Alkyd thermoplastic only.

2.02 TEMPORARY MARKINGS

A. Temporary markings on final asphalt shall be only for backed construction tape. Lower asphalt lifts may be marked with paint or any other approved marking material.

2.03 REFLECTIVE PAVEMENT MARKERS (RPM'S)

A. RPM'S shall meet FDOT Class B Specifications, and shall be installed per drawing details.

PART 3 - EXECUTION

3.01 APPLICATION

A. Thermoplastic shall not be installed on roadway until five (5) calendar days after final lift of asphalt has been completed, with the exception of friction course which shall be thirty (30) days.

B. If existing marking material is not compatible with Alkyd thermosplastic, it shall be removed prior to installation of new markings.

END OF SECTION

SECTION 02726
MANHOLE, WETWELL, AND VAULT CONSTRUCTION

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop Drawings:

1. Precast Manholes, Wetwells, and Vaults: Details of construction.

2. Precast Base Sections: Details of construction.

B. Quality Control Submittals:

1. Concrete: Proposed curing method for cast-in-place concrete structures.

2. Precast Manhole Sections: Manufacturer's results of tests performed on representative sections to be furnished.

3. Manufacturer’s Certification for Liner System.

PART 2 - PRODUCTS

2.01 BASE ROCK

A. FDOT No. 57 stone.

2.02 CONCRETE

A. Ready-Mixed, Meeting ASTM C94, Alternate 2, and the Following:

1. Minimum Compressive Strength: 3,000 psi at 28 days.

2. Maximum Aggregate Size: 1-1/2 inches.

3. Slump: 2 to 4 inches.

4. Cement: ASTM C150, Type II.

5. Minimum Cement Content: 564 pounds per cubic yard.

6. Water Cement Ratio: Maximum of 0.49.

2.03 MORTAR

A. Standard premixed meeting ASTM C387, or proportion 1 part portland cement to 2 parts clean, well-graded sand which will pass a 1/8-inch screen.

B. Admixtures: May be included but do not exceed the following percentages of weight of cement:

1. Hydrated Lime: 10 percent.

2. Diatomaceous Earth or Other Inert Material: 5 percent.

C. Consistency:

1. Tongue-and-Groove Type Joint: Such that mortar will readily adhere to pipe.

2. Confined Groove (Keylock) Joint: Such that excess mortar will be forced out of groove and support is not provided for section being placed.

2.04 BONDING AGENT

A. As Manufactured by:

1. Sika Corp., Sikastix 370.

2. Sika Corp., Sikador Hi-Mod.

3. Horn Co., Epoxtite Binder 2385.

2.05 FORMS

A. Exposed Surfaces: Plywood or steel panels.

B. Other Surfaces: Matched boards, plywood, or other approved material.

C. Trench walls, large rock, or earth are not acceptable form material.

2.06 REINFORCING STEEL

A. Conform to ASTM A615, Grade 40, deformed bars.

2.07 CAST-IN-PLACE MANHOLES

A. Acceptable, subject to OWNER 's approval.

2.08 PRECAST RISER SECTIONS

A. Minimum 48 inches in diameter for manholes or as shown on the Drawings, for other structures, conforming to ASTM C478 and the following:

1. Eight inch minimum wall thickness.
2. Provide concentric cones for manholes. Cones shall have same wall thickness and reinforcement as riser section.
3. Top and bottom of sections shall be parallel.
4. Confined O-ring with rubber gaskets meeting ASTM C443.
5. Bitumastic exterior coating.

B. Source Tests:

1. Prior to delivery of any size precast manhole section to jobsite, conduct yard tests at point of manufacture.
2. Precast sections to be tested will be selected at random from stockpiled material to be supplied for the job.
3. All test specimens shall be mat tested and meet the permeability test requirements of ASTM C14.

2.09 PRECAST BASE SECTIONS AND BASES

A. Preferred by OWNER. Separate slab and base sections with water proofing provision, only if approved.

B. Base Sections: Base slab integral with sidewalls.

C. Base Slab: Minimum 6 inches thick with No. 4 reinforcing bars, 8-inch centers, both directions in center of slab or as shown on the Drawings. Tie reinforcing steel to wall steel.

D. Provide Type 316 stainless steel anchored “J” bolts for pump bases as shown on the Drawings. Coordinate with pump supplier. Drilled anchors not permitted.

2.10 MANHOLE EXTENSIONS

A. Concrete Grade Rings for Extensions: Maximum 6 inches high with a minimum of one No. 2 reinforcing bar centered in the ring.

B. In general, provide manhole extensions on manholes in streets or other locations where a subsequent change in existing grade may be likely. Limit extensions to maximum height of 12 inches.

2.11 PREFORMED PLASTIC GASKETS

A. May be provided in lieu of mortar type joints.

B. Conform to requirements of Federal Specification SS-S-00210.

C. Manufacturers:

1. Hamilton Kent Manufacturing Co., Box 178, Kent, OH 44240, Kent-Seal No. 2.

2. K. T. Snyder Co., Inc., Central National Bank Bldg., Houston, TX 77002, Ram-Nek.

2.12 PIPE AND FITTINGS

A. Tees and Ells for Drop Assemblies: Epoxy lined ductile iron.

1. Tees of same material as the entering pipe.

2. Type of joint optional.

3. Extend ductile iron pipe upstream from the manhole excavation to minimum of 3 feet into trench section.

B. Steel Strapping: 1/8-inch by 1-inch Type 316 stainless steel strap conforming to ASTM A36, for use with drop assemblies.

C. Masonry Anchors:

1. Snapoff or flush type for use with cadmium-plated bolts.

2. Nondrilling Anchors: Flush type for use with a bolt or stud type with projecting threaded stud as manufactured by ITT Phillips Drill Division, Michigan City, IN; Hilti HDI Drop-in anchors, Hilti, Inc., Stamford, CT; or equal.

2.13 STANDARD MANHOLE FRAMES AND COVERS

A. Ductile iron with 24-inch clear opening.

B. Castings:

1. Tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.

2. Conform to ASTM A48, Class 30B, for cast iron and ASTM A536, Grade 60-40-12 for ductile iron.

3. Plane or machine bearing surfaces to ensure flat, true surfaces, and low infiltration/leakage across mating surfaces.

C. Covers: True and seat within ring at all points.

2.14 WATERTIGHT FRAME FASTENERS

A. Fabricate as shown and galvanize after fabrication in conformance with ASTM A123.

2.15 FRAME TO STRUCTURE SEALS

A. Extrude or mold from a high-grade rubber compound.

1. Comply with materials test requirements of ASTM C923.

2. Minimum Thickness: 3/16 inch.

3. Minimum Unstretched Length: Sufficient to extend from the manhole frame, across a maximum of 12 inches of extension rings, to the manhole cone section.

B. Fabricate bands used for compressing the sleeve against manhole from minimum 16 gauge if channeled sheet, or 5/16-inch diameter (if round) stainless steel conforming to ASTM A240, Type 316 for sheet, and ASTM A4769, Type 316 for rods.

C. Screws, Bolts, or Nuts: Stainless steel conforming to ASTM F593 and 594, Type 316.

D. The internal seal or its appurtenances shall not extend into the manhole opening to restrict entry into or exit from the manhole.

E. The seal shall be made only of materials that have been proven to be resistant to the following exposures and conditions:

1. Sanitary sewage.

2. Corrosion or rotting under wet or dry conditions.

3. Gaseous environment in sanitary sewers and at road surfaces including common levels of ozone, carbon monoxide, and other trace gases at the sites of installation.

4. Biological environment in soils and sanitary sewers.

5. Chemical attack by road oil and common street spillages or solvents used in street construction or maintenance.

6. Temperature ranges, variations, and gradients in the area of construction.

7. Variations in moisture conditions and humidity.

8. Vibrations due to traffic loadings.

9. Fatigue failure due to repeated variations of tensile, compressive and shear stresses, and repeated elongation and compression.

10. Any combination of the above.

F. Materials used shall be compatible with each other and with the manhole materials and be capable of providing a service life of at least 20 years.

G. Design Seal to Meet the Following Requirements:

1. Continuously prevent leakage of water from outside the manhole into the manhole at the joints between the manhole frame and the cone section.

2. At the same time, seal shall remain flexible, allowing repeated vertical movements of the frame from 0 to 2 inches, or repeated horizontal movements of the frame with respect to the top of the extension or cone of from 0 to 1/2 inch due to pavement movements or other causes, or both types of movement occurring simultaneously at rates not exceeding 1/10 inch per minute.

H. As approved by the OWNER

2.16 CONCRETE PROTECTIVE LINER FOR PRECAST NEW STRUCTURES

A. Sewpercoat as manufactured by Lafarge Aluminates of Chesapeake, Virginia.

2.17 MANHOLE REPAIR MATERIALS

A. Nonshrink Grout: Grout shall be nonmetallic. The grout shall be nongas-liberating type, cement-base, premixed product requiring only the addition of water for the required consistency. All components shall be inorganic. The following listed grouts meet these requirements and are acceptable for use:

1. Horngrout, TAMMS Industries, Mentor, OH.
2. UPCON Super Flow, The UPCO Company, Cleveland, OH.
3. Set Grout, The Master Builders Co., Cleveland, OH.
4. Crystex, L&M Construction Chemicals, Inc., Omaha, NE.

B. Patching Mortar: Shall be as approved by waterproofing/structural repair materials manufacturer as listed in Paragraph Waterproofing/Structural Repair Material.

C. Waterproofing/Structural Repair Material: The following listed waterproofing/structural repair materials are acceptable for use:

1. EMACO 588-CA, Master Builders, Inc., Cleveland, OH.
2. QUADEX QM-1s RESTORE, QUADEX Sewer Rehabilitation Products of Maumelle, AR.
3. Mainstay ML-72, Parson Environmental Products, Inc., Reading, PA.

D. Concrete: Conform to the requirements of Section 03301, REINFORCED CONCRETE.

E. Mortar: Mortar shall be sand/portland cement mix conforming to ASTM C270.

F. Pipe Plugs: Pipe plugs shall be rubber gasketed test plugs, sized as necessary.

G. Backfill: Conform to the requirements of Section 02220, TRENCHING, BACKFILLING AND COMPACTING.

PART 3 - EXECUTION

3.01 EXCAVATION AND BACKFILL

A. As specified in Section 02210, EXCAVATION AND SWALE GRADING.

B. Backfill Around Manholes: Use highest class of trench backfill immediately adjacent. Backfill in 12-inch lifts with one density test taken adjacent to the structure with each lift.

3.02 BASE ROCK

A. Remove water from the excavation.

B. Place minimum of 6 inches of rock base (FDOT No. 57 stone) and thoroughly compact with a mechanical vibrating or power tamper.

3.03 CONCRETE BASE

A. Construct concrete base as shown.

B. Vibrate to densify concrete and screed so first precast manhole section to be placed has a level, uniform bearing for full circumference.

C. Deposit sufficient mortar on base to assure watertight seal between base and manhole wall, or place first precast section of manhole in concrete base before concrete has set. Properly locate and plumb first section.

D. If material in bottom of trench is unsuitable for supporting manhole, excavate below the base as directed by OWNER , and backfill to required grade with rock, as specified in Section 02220, TRENCHING, BACKFILLNG AND COMPACTING.

3.04 PLACING PRECAST SECTIONS

A. Section Installation:

1. Thoroughly clean ends of sections to be joined.

2. Thoroughly wet joint with water prior to placing mortar.

3. Place mortar on groove of lower section.

4. Set next section in-place.

5. Fill joint completely with mortar of proper consistency.

6. Trowel interior and exterior surfaces smooth on standard tongue-and-groove joints.

7. Prevent mortar from drying out and cure by applying an approved curing compound or comparable approved method.

8. Do not use mortar mixed for longer than 30 minutes.

9. Chip out and replace cracked or defective mortar.

10. Completed Manholes: Rigid and watertight.

B. Preformed Plastic Gaskets: If used in lieu of mortar joints, install in accordance with manufacturer's instructions and the following:

1. Carefully inspect precast manhole sections to be joined.

2. Do not use sections with chips or cracks in the tongue.

3. Use only pipe primer furnished by gasket manufacturer.

4. Install gasket material in accordance with manufacturer's instructions.

5. Completed Manholes: Rigid and watertight.

C. Rubber Gasketed Joints: Install in accordance with manufacturer's instructions.

3.05 MANHOLE INVERT

A. Construct as shown with smooth transitions to ensure an unobstructed flow through manhole. Remove sharp edges or rough sections which tend to obstruct flow.

B. Where full section of pipe is laid through manhole, break out top section as shown and cover exposed edge of pipe completely with mortar. Trowel mortar surfaces smooth.

3.06 DROP ASSEMBLIES

A. Construct drop assemblies as shown, at locations shown.

B. Extend ductile iron pipe from the drop to a minimum of 3 feet beyond the manhole excavation into the trench, and connect to sewer pipe with an approved adapter.

C. Support lower drop elbow by concrete poured monolithically with manhole base.

3.07 FLEXIBLE JOINTS

A. Provide joints in all pipe not more than 1-1/2 feet from manhole walls. Lay pipes entering manholes on compacted base rock extending to undisturbed earth.

B. Where last joint of the line laid up to manhole is between 1-1/2 and 6 feet from manhole wall, provide a flexible joint in the manhole wall using:

1. "Kor-N-Seal" flexible rubber boot with stainless steel accessories as manufactured by Kor-N-Seal Co. (NPC Systems, Inc.), Milford, New Hampshire 03055.

2. "Z-Lok XP" or "A-LOK" flexible connectors as manufactured by A-Lok Products, Inc., Tullytown, Pennsylvania 19007.

C. Shorten pipes laid out of manhole to ensure first joint is no more than 1-1/2 feet from manhole base.

3.08 PERMANENT PLUGS

A. Clean interior contact surfaces of pipes to be cut off or abandoned as shown, and construct plug as follows:

1. Pipe 18 Inches or Less in Diameter: Concrete plug in end, minimum 8 inches in length.

2. Pipe 21 Inches and Larger:

a. Construct plugs of common brick, concrete block, or concrete.

b. Plaster exposed face of block or brick plugs with mortar.

3. Plugs shall be watertight and capable of withstanding internal and external pressures without leakage.

3.09 MANHOLE EXTENSIONS

A. Install extensions as shown, to height not exceeding 12 inches.

B. Lay grade rings in mortar with sides plumb and tops level. Seal joints with mortar as specified for manhole sections, and make watertight.

3.10 MANHOLE FRAMES AND COVERS

A. Install on top of manholes to positively prevent infiltration of surface or groundwater into manholes.

B. Set frames in bed of mortar with mortar carried over flange as shown.

C. Set tops of covers flush with surface of adjoining pavement or ground surface, unless otherwise shown or directed.

3.11 WATERTIGHT MANHOLES

A. Prevent watertight manhole frames and covers from blowing off during sewer surcharging by installing watertight manhole frame fasteners as provided by the manufacturer.

3.12 CONNECTION TO EXISTING MANHOLES

A. Connect sewers to existing manholes at locations shown.

1. Break out existing manhole bases or grouting as necessary.

2. Clean all surfaces and apply a bonding agent.

3. Regrout to provide smooth flow into and through existing manholes.

B. Provide diversion facilities and perform work necessary to maintain sewage flow during connection to manholes.

3.13 SPECIAL MANHOLES

A. Construct special manholes to meet these Specifications and as shown.

3.14 CONCRETE STRUCTURES

A. Excavation and Formwork:

1. Remove and keep all water clear from the excavation.

2. Place 6-inch minimum layer of base rock to undisturbed earth.

3. Thoroughly compact base rock with a mechanical vibrating or power tamper.

4. Form all vertical surfaces with materials as specified.

B. Reinforcing Steel:

1. Bar Splices: 24 diameters, but in no case less than 12 inches.

2. Wire tie splices and intersections.

C. Placing Concrete:

1. Remove all water from forms prior to placing concrete.

2. Place concrete so there is no segregation of aggregate and vibrate all concrete placed.

3. Do not place concrete when ambient temperature is below 40 degrees F without special protection.

4. Do not remove forms until concrete has cured for 7 days or until concrete has reached 70% compressive strength.

D. Finish:

1. After form removal, patch rock pockets, form tie holes, and irregularities with a stiff mixture of portland cement and sand mixed in same proportion as original mix.

2. Steel trowel slabs and tops of walls.

3. Finish exposed walls to produce a uniform, flat surface.

E. Backfill:

1. Remove all form materials and debris from excavations before placing any backfill.

2. Backfill around structures only after concrete has attained 2/3 of specified compressive strength.

3. Obtain OWNER 's approval of concrete work prior to backfilling.

3.15 FIELD QUALITY CONTROL

A. Hydrostatic Testing:

1. When, in OWNER's opinion, the groundwater table is too low to permit visual detection of leaks, hydrostatically test all project manholes.

2. Procedure: Plug inlets and outlets and fill manhole with water to height determined by OWNER.

3. A manhole may be filled 24 hours prior to time of testing, if desired, to permit normal absorption into the pipe walls to take place.

4. Leakage in each manhole shall not exceed 0.1 gallon per hour per foot of head above the invert.

5. Repair manholes that do not meet the leakage test, or do not meet specified requirements from visual inspection.

END OF SECTION

SECTION 02730
SANITARY SEWER SYSTEM

PART 1 - DESCRIPTION

1.01 GENERAL

A. The work specified in this Section consists of furnishing sanitary sewer pipe and fittings conforming to these specifications and of the particular types, sizes and dimensions shown in the plans. This work shall include the installation of the pipe and fittings at the location called for, in conformity with the lines and grades given and the furnishing and installation of standard precast manholes conforming to this section of the specification and in accordance with the details. These structures shall be of reinforced concrete and shall include the necessary connections to sewer pipes, metal frames and covers.

B. Contractor shall submit a bypass plan to the Engineer and Owner for approval for the flow bypass of the existing manhole at the intersection of Martin Luther King Blvd. / NW 27th Avenue.

PART 2 - MATERIALS

2.01 GENERAL:

A. All pipe and fittings shall be clearly marked with the name or trademark of the manufacturer, the batch number, the location of the plant and strength designation, as applicable. The Contractor shall furnish the Engineer with a certificate that all tests and inspections have been complied with as required by the specifications under which the pipe is manufactured.

2.02 POLYVINYL CHLORIDE PIPE (PVC):

A. Pipe and fittings installed to a depth of up to 14 feet are to conform to ASTM D 3034-SDR 35. The maximum length of each section of pipe shall be 13 feet. All PVC pipe and fittings shall have a minimum pipe stiffness (PS) equal of 46 p.s.i. and a minimum modulus of elasticity (E) of 440,000 p.s.i.

B. The pipe joint shall be the bell and spigot, rubber gasket type in which the bell portion is an integral portion of the pipe and shall meet the requirements of Specifications R4F477.

C. Pipe and fittings deeper than 14 feet shall be C900 PVC or ASTM D3034-SDR 26.

2.03 DUCTILE IRON PIPE (DIP):

A. All Ductile Iron pipe, fittings and their appurtenances used for gravity sewer main construction shall be pressure class 350 and receive an exterior asphaltic coating, and an epoxy inside coating, (Protecto 401 or approved equal) and be manufactured in accordance with the latest edition of the following ANSI/AWWA American National Standards:

C105/A21.5	"Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids"
C110/A21.10	"Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in. for Water and Other Liquids"
C111/A21.11	"Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings"
C115/A21.15	"Flanged Ductile-Iron With Ductile Iron or Cast Iron Threaded Flanges"
C150/A21.50	"Thickness Design of Ductile-Iron Pipe"
C151/A21.51	"Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids"
C153/A21.53	"Ductile-Iron Compact Fittings, 3 in. through 24 in. and 54 in. Through 64 in. for Water Service"

B. A sufficient quantity of non-toxic lubricant shall be supplied with the pipe, valves or fittings. The soap lubricant shall be suitable for installation of pipe under dry and/or sub aqueous trench conditions.

C. Wall thickness and outside diameter of pipe shall conform to ANSI/AWWA C150/A21.50 and be pressure class 350, for 4-inch through 12-inch diameter pipe.

D. Pipe shall be shipped in standard 18-foot or 20-foot lengths.

E. All gaskets and joint materials shall be shipped in suitable protective containers.

F. Pipe and fittings shall be as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company or Clow Corporation.

2.04 SANITARY SEWER MANHOLES:

A. General

1. Manholes are to be precast concrete, as shown in the Standard Detail. The minimum diameter of manholes will be 48 inches for sewer sizes 21 inches in diameter or less. Special design must be submitted for larger diameter pipes, or when more than 2 pipes larger than 12 inches diameter are entering the manhole.

B. Certification

1. Each section shall be inspected, tested and certified by an accredited testing laboratory as to steel size/content area, placement and concrete compressive strength.

2. Each section shall be delivered unpainted and bear the stamp of the testing laboratory prior to installation. No section shall be installed or painted until approved for same by the Engineer.

3. Three copies of the above certification must be submitted to the Engineer for review prior to any partial payment requests.

C. Precast Reinforced Concrete Manholes.

1. All manhole sections shall be manufactured and conform with all sections of ASTM Designation C478, Standard Specifications for Precast Reinforced Concrete Manhole Sections except that no steps are to be installed and the inspector is to be employed by the precast manufacturer.

2. The minimum wall thickness for the barrel sections shall be 8 inches and shall have tongue and groove joints. Inside diameter is to be 48 inches.

3. Concrete shall conform to ASTM C-94, Type II cement, with a compressive strength of 4,000 psi at 28 days. Mortar shall be composed of one part cement to two parts sand.

4. Base section is to be integrally poured with the first barrel section.

5. Reinforcement bars and steel shall be as a minimum what is shown of the drawings.

6. Pre-formed flexible plastic joint sealed conforming to Federal Specifications SS-S-00210 (GSA-FSS), "Ram-Nek", as manufactured by the K.T. Snyder Company, Houston, Texas, or an approved equal shall be installed at each section joint.

7. The interior and exterior surfaces of the structure are protected by the application of sewper coat or approved equal. Surface preparation and application are to comply with the manufacturer's recommendations.

D. Frames and Covers

1. Bricks used for frame and cover risers shall comply with A.S.T.M. Designation C 32, Grade MS (hard brick) and the mortar for the masonry work shall be as specified in A.S.T.M. Designation C270, Type M.

2. Frames and covers for manholes shall be constructed of iron conforming to A.S.T.M. Designation A48, Class 30, and shall be manufactured by the U.S. Foundry and Manufacturing Corp., No. 410 or 420, or an approved equal. Each cover shall be cast with the legend "CITY OF POMPANO BEACH" and "SANITARY SEWER" as shown on the details. Frame shall be suitable for future addition cast iron adjustment ring as may be necessary for an upward adjustment.

PART 3 - INSTALLATION OF PIPE, FITTINGS & MANHOLES

3.01 GENERAL:

A. The installation of gravity sewer mains, manholes, fitting and service laterals shall be performed in accordance with section of the specifications, the details and to the lines and grades indicated on the plans and as directed by the Engineer. All materials shall be installed "in the dry".

B. The type of sewer service lateral, single or double service and the exact horizontal location thereof shall be as determined in the field by the Engineer. The Contractor shall be required to provide all control staking.

C. Piping is to be installed along straight line and grade between fittings, manholes, or other defined point, unless definite lines, alignment, deflection, or grade change have been established. Modification to approved alignment or grade during construction must receive prior approval from the Engineer. Gravity sewer mains are to be installed with a minimum cover of 3 feet.

D. Materials are to be cleaned and maintained clean, with all coating protected from damage. The interior of the pipe must be free of dirt and debris and when work is not in progress, all open ends will be plugged.

E. Pipes, fittings or other items are to be inspected prior to installation; any items showing a fracture or other defects will be rejected. Additionally, any pipe or fittings which has received a severe blow that my have caused an incipient fracture, even though not visible, must also be rejected. However, cast of ductile iron pipe showing an end crack, with no fracture indicated beyond that visible, may be salvaged by cutting off the damaged section 12 inches past, providing the remaining pipe is sound.

F. Underground piping will not be driven to grade by striking it with an unyielding object. When the pipe has been properly bedded, enough compacted backfill will be placed to hold the utility in correct alignment. If necessary, precautions will be taken to prevent flotation.

G. Jointing will be by an approved method and shall not require undue force to accomplish full satisfactory seating and assembly. Connections at structures shall be cut accurately and worked into place without forcing and shall align with the connecting point. The installation is to be permanently watertight, with no visible leakage at joints, connections with structures, or other locations, under operational or testing condition. Materials that in jointing do not remain completely seated and/or watertight shall be rejected.

3.02 DUCTILE IRON PIPE (D.I.) PIPE:

A. Installation shall be performed in accordance with the applicable provisions of ANSI/AWWA Standard C600. The opening cut in the pipe wall for installation of tapping saddles and sleeves must be made by a special tapping machine designed for this specific service. All pipe cutting is to be accomplished by power operated abrasive wheel or saw cutters, or other methods approved by the Pipe Manufacturer. Where required, Polyethylene Encasement must be installed as set forth under ANSI/AWWA C105/A21.5," Polyethylene Encasement For Ductile-Iron Piping For Water And Other Liquids".

3.03 POLYVINYL CHLORIDE (PVC) PIPE:

A. PVC pipe and fittings shall be installed to a depth not greater than 16 feet nor less than a depth of 3 feet and in accordance with A.S.T.M. D 2321-74 and the manufacturer's recommendations.

B. Class II pipe bedding, consisting of dry coarse sand and gravel's shall be required and in sufficient quantities so that a tamper bar may be used to force the bedding material under the haunch of the pipe as necessary for proper support of the pipe. Compaction of all trench materials shall be in accordance with the Utility Excavation, Trenching and Backfilling section of the specifications.

C. PVC pipe or fittings which show signs of ultraviolet degradation shall be considered substandard and shall be rejected accordingly.

3.04 MANHOLES:

A. All precast reinforced concrete manholes are to be manufactured in strict accordance with ASTM Designation C478 latest revision, with the exception that manhole steps are not to be provided.

B. Extreme care shall be used in the handling and stockpiling of all manhole sections. Prior to installation, the Engineer shall inspect all sections to assure there are no indications of damage. Any section or manhole determined by the Engineer to be unsatisfactory shall be removed from the job site and shall be replaced by the Contractor at no expense to the owner.

C. Class II bedding shall be required for sanitary sewer manholes and shall be as specified for Class II bedding for PVC pipe in this section of the specifications.

D. The base section shall be set on a thoroughly compacted gravel sub-base, all sections are to be set vertical and in true alignment with a 1/4 inch maximum tolerance to be allowed.

E. The outside and inside joint shall be filled with mortar and finished flush with adjoining surfaces. Allow joints to set for 24 hours before painting.

F. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides. If leaks appear in the structures, the inside joints shall be caulked to the satisfaction of the Engineer. The Contractor shall install the precast sections in a manner that will result in a watertight joint.

G. Holes in the concrete pipe sections required for handling or other purposes shall be plugged with a non-shrinking grout or by grout in combination with concrete plugs.

H. New pipe connections to new and existing manholes are to be caulked watertight with non-shrinking grout.

3.05 CONNECTIONS AT STRUCTURES:

A. Where PVC pipe is to be connected to manholes and other structures, manhole couplings corresponding to the size of the sewer pipe must be cast directly into the structure; the PVC pipe is then inserted into the coupling. For other material, such as ductile iron and vitrified clay that bond more readily with concrete pipe joints are to be provided at the wall face.

B. Where sanitary sewers connect to structures, pipe joints are to be provided at the wall face; and, where the connection is to wet walls or other

installations where backfill exists below trench grade, one joint (18 to 20 feet) of cast or ductile iron pipe is to extend outward from the structure. When it is necessary to extend sewers through structures, such as conflicting elevation storm drain by-passing chambers, the pipe within must be ductile iron with no inside joints.

3.06 TRANSITION CONNECTIONS:

A. Where pipes of alternate materials (PVC to D.I., etc.) are to be connected between manholes, suitable approved transition couplings shall be installed. Couplings are to be "Fernco Strongback" or an approved equal. Specially designed units may be submitted for approval; however, concrete collars are not acceptable.

3.07 SEWER SERVICE LATERALS:

A. Installation of service laterals shall be in accordance with Standard Details, including the wye branches installed in the sewer main at the point of connection, and the service pipe and required fittings extended to the property line, perpendicular to said line, terminating with stoppered ends or fittings, as indicated.

PART 4 - UTILITY EXCAVATION, TRENCHING AND BACKFILLING

For Specifications See Section 02210: Trenching, Backfilling, and Compacting.

PART 5 - TESTING OF GRAVITY SEWERS

5.01 GENERAL

A. The Contractor shall perform testing of all sanitary gravity sewers, as specified below, and is to conduct his/her tests in the presence of the Engineer, with 24 hours advance notice provided by the Contractor.

5.02 LAMPED

A. The installed sewers are to be "lamped" between manholes or other structures in order to ascertain that they are clear and to correct alignment. The concentricity of the lamp image received must be such that the diameter of image will have no vertical reductions from that of the pipe inside diameter and no horizontal reduction; that is, there must be a "full moon" or full oval image.

B. Sanitary sewers to be tested shall be within sections as previously approved by the Engineer. Testing is not to proceed until all facilities are

completely in place and the concrete cured. All piping is to be thoroughly cleaned of all foreign matter prior to testing. The water tightness of a sewer, which has a crown lying below ground water level, shall be tested by measuring the infiltration. The water tightness of sewers having a crown one inch or more above ground water level is to be tested by filling the pipe with water to produce a hydrostatic head of three feet or more above the crown of the sewer at the upper end of the test section or the water table outside of the sewer, whichever is higher, and then measuring the exfiltration. In no case is the infiltration or exfiltration to exceed 0.20 gallons/inch of diameter/hour/100 feet of line/24 hours when field tested by actual infiltration conditions. If exfiltration testing is required, an allowance of an additional 10 percent of gallonage will be permitted for each additional 2-ft. head over a basic 3-ft. minimum internal head.

C. Testing shall continue for a period of two (2) hours, with exfiltration or infiltration amounts measured by methods approved by the Engineer. Upon application of internal hydrostatic pressure for exfiltration testing, care should be taken to preclude unseating the joint gaskets for a specific type of pipe by exceeding the pressure capability thereof.

D. Should the test fail, necessary repairs are to be made by the Contractor and the test repeated until the test results are satisfactory. The Contractor is to furnish the necessary labor, water and all other items required to conduct the required testing.

5.03 VIDEO INSPECTION

A. All gravity sewers are to be video inspected by the City's Utility Services Department prior to any connections being made and prior to any acceptance of same unless approved otherwise by the Director of Utility Services.

B. Any questionable portions of the system shall be videotaped and made available to the Contractor. Any portions of the system determined to be unacceptable by the Engineer shall be removed, reconstructed, or corrected by the Contractor at the Contractor's expense.

END OF SECTION

SECTION 02734
FLOW BYPASS PUMPING SYSTEM

PART 1 - GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society for Testing and Materials (ASTM): D3350-84, Polyethylene Plastics, Pipe and Fittings Materials.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements:

1. It is essential to the operation of the existing sewerage system that there be no interruption in the flow of sewage throughout the duration of the Project. Provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and backup units as required), conduits, and all necessary power to intercept the sewage flow before it reaches the point where it would interfere with the Work, carry it past the Work, and return it to the existing sewer downstream of the Work.
2. Design, install, and operate the temporary pumping system.
3. Convey the sewage safely past this Work area. Do not stop or impede the main flows under any circumstances.
4. Maintain sewer flow around the Work area in a manner that will not cause surcharging of sewers, damage to sewers, and that will protect public and private property from damage and flooding.
5. Protect water resources, wetlands, and other natural resources.

B. Design Requirements:

1. Provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping, to ensure that the total flow of the sewer and service connections can be safely diverted around the section to be replaced. Bypass pumping system will be required to be operated 24 hours per day 7 days per week, including holidays during bypass pumping operation. The system operating pressure shall be as required to pump into the system.
2. **Install one bypass pump at each pump station or manhole to be bypassed. There shall be one back-up pump ready for immediate use in the event of an emergency or breakdown of any of the pumps.** Each pumping location shall have provisions for immediate installation of a

redundant pump without shutting the system down.

3. Single discharge piping shall be provided for all bypass pumping operations. Each individual discharge pipeline shall be of adequate size to convey the required flow for the system's normal operating pumps.

4. Provide adequate enclosure around all bypass pumping equipment.

5. To minimize odors, install the discharge piping to within 2 feet of the manhole bottom and provide lockable security covers with an inspection door over all suction and discharge manholes. Covers can be made of ¾-inch plywood, securely fastened over the manholes.

6. Maintain onsite portable lights for emergency use only.

7. Discharge must have an isolation valve and a check valve.

8. Pump station cleanouts shall not be used for bypass pumping.

1.03 SUBMITTALS

A. Shop Drawings: Detailed plans and descriptions outlining all provisions and precautions regarding the handling of existing wastewater flows. This plan must be specific and complete including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of public and private property from damage and flooding by surcharging of sewers. The plan shall include, but not be limited to, details of the following:

1. Staging areas for pumps.

2. Sewer plugging method and types of plugs.

3. Size, material, location and method of installation of suction piping.

4. Size, material, method of installation and location of installation of discharge piping.

5. Bypass pump sizes, capacity, and power requirements.

6. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).

7. Standby power generator size, location.

8. Downstream discharge plan.

9. Method of protecting discharge manholes or structures from surface water infiltration, erosion, and damage.

10. Thrust and restraint block sizes and locations.

11. Sections showing any suction and discharge pipe depth, embedment, select fill and special backfill where required.

12. Method of noise control for each pump and/or generator.

13. Any temporary pipe supports and anchoring required.

14. Plans for access to bypass pumping locations.

15. Calculations for selection of bypass pumping pipe size.

16. Schedule for installation of and maintenance of bypass pumping lines.

17. Plan indication selected location of bypass pumping line and air valve locations.

18. Inventory of disinfection materials in case of spillage.

B. Quality Control Submittals:

1. Certification of vendor's compliance with qualifications included in Article QUALITY ASSURANCE.

2. Weekly maintenance and inspection logs.

1.04 QUALITY ASSURANCE

A. System operators to be full-time employees or specialized vendor with minimum 1 year experience in operating and maintaining bypass systems.

1. Provide five references from projects of similar size performed in the past 3 years.

B. Be responsible for any spillage of raw sewage that results in civil or criminal charge from any local, state, or federal agency. Bear costs for these charges and any required restoration.

1.05 MAINTENANCE

A. Maintenance Service: Ensure that the temporary pumping system is properly maintained and that a responsible operator is on call at all times when pumps are operating.

B. Extra Materials: Spare parts for pumps and piping shall be kept onsite as necessary. Spare parts shall include, but not be limited to, the following: Extra pipe for each size and repair clamps for each bypass discharge line installed.

C. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

PART 2 - PRODUCTS

2.01 BYPASS PIPING MATERIALS

A. Header Piping: Header piping shall be used to connect the pumps to the discharge

piping. The header shall be constructed of rigid pipe with positive, restrained joints, with a total maximum length of 50 feet. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed. Header piping will only be allowed in short sections and by specific permission from the ENGINEER or OWNER.

B. Discharge Piping: Discharge piping shall be used from the connection at the header piping to the discharge point. At the beginning of the Project, all discharge piping shall be new high density polyethylene pressure piping conforming to ASTM D3350 with a minimum SDR of 32.5. Discharge piping may be reused for subsequent flow bypass pumping system placements, however, the OWNER or ENGINEER at their sole discretion shall have the right to reject sections of discharge piping deemed by either of them to be unserviceable. Joints shall be butt fusion welded. Discharge piping shall be as manufactured by Phillips Driscopipe, Inc., or equal.

2.02 EQUIPMENT

A. All pumps used shall be fully automatic self priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The primary pumps must be electric with diesel powered backup. Pumps can be trailer mounted. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

B. Provide the necessary stop/start controls and a visual alarm indicating a pump malfunction for each pump.

C. The back-up pumps shall be online, isolated from the primary system by a valve.

D. Incorporate noise prevention measures for any and all equipment being used to insure minimum noise impact on the surrounding areas.

1. Include: hospital grade silencers or mufflers, equipment modifications, and special equipment or sound barrier walls as necessary to limit noise levels below 55 decibels at a distance of 25 feet in the direction of any residential home for all diesel powered back-up pumps.

2. In the event the CONTRACTOR fails to comply with maximum permissible noise level decibels in the operation of the flow bypass pumping system, the OWNER or ENGINEER may order the CONTRACTOR to stop operation of the flow bypass pumping system until such time as specified noise levels are achieved. The termination of the flow bypass pumping system for such reason shall not be the basis for any extension of Contract time not for any claim for additional compensation.

E. Repair clamps shall be full circle, stainless steel clamps, Style FS2 or FS3 as manufactured by the Ford Meter Box Company, Inc., or equal.

PART 3 - EXECUTION

3.01 PREPARATION

A. Precautions:

1. Locate any existing utilities in the area selected to locate the bypass pipelines. Locate bypass pipelines to minimize any disturbance to existing utilities and obtain approval of the pipeline locations from OWNER, property owners, all utilities, and the ENGINEER prior to installation.

2. Bypass pump all wastewater flows during all phases of the Work and coordinate all bypass pumping operations with the ENGINEER or OWNER.

3.02 INSTALLATION

A. Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of Work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

B. When working inside manholes, exercise caution and comply with combustible or oxygen-deficient atmospheres, and confined spaces.

C. The bypass pipeline must be located off streets, sidewalks, and shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, place the bypass pipelines in trenches and cover with temporary pavement or other approved methods. Obtain approvals for placement of the temporary pipeline within public rights-of-ways.

D. Protect the bypass discharge line from damage in the areas of backhoe operations. Protection shall be by either concrete jersey barriers or wood timbers.

E. Confine the bypass discharge pipeline to the area within the temporary construction area and permanent easement, for in-place or during relocation of the pipeline. Concrete barriers or timber deadman posts can be used to confine the movement of the discharge pipeline during relocation.

3.03 FIELD QUALITY CONTROL

A. Test: Perform a hydrostatic pressure test for each section of discharge piping with a maximum pressure equal to 1.5 times the maximum operation pressure of the system. The ENGINEER or OWNER shall witness the test to ensure that there are no leaks in the discharge piping prior to actual operation.

B. The Operator shall inspect the bypass pumping system every hour, or on a

schedule approved by the ENGINEER or OWNER.

1. An inspection log shall be kept at each pumping location. Each inspection log shall be marked with a time clock stamp to ensure the required maintenance and inspections are being performed.

3.04 CLEANING

A. Sewage remaining in the bypass discharge pipeline and/or pumping equipment shall be flushed with City water and discharged to a working sewer before the bypass pumping system is broken down and moved to the next section. City water service must be protected by use of a backflow preventor.

B. Disturbed Areas: Upon completion of the bypass pumping operation, the contractor shall clean up all areas disturbed by these operations, restoring same to a condition, including pavement restoration, at least equal to that which existed prior to the start of the Work.

END OF SECTION

SECTION 02931
IRRIGATION SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work specified in this section of the specifications consists of the removal, disposal, maintenance, and replacement of existing operating irrigation systems on or adjacent to private property affected by the construction operations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 REMOVAL, DISPOSAL AND MAINTENANCE

A. The Contractor shall remove and dispose of that portion of the existing irrigation systems necessary for the prosecution of the grading, trench excavation and pavement construction operations and as directed by the City and shall perform any required adjustments to the irrigation systems to insure that the balance of the system not affected by the construction operations will remain operative. All materials removed shall become the property of the Contractor and shall be disposed of in areas provided by him/her and by methods approved by the City.

B. The Contractor shall be required to verify the location and working order of existing irrigation systems and shall develop a plan to modify each system in accordance with this section of the specifications. The plan shall show the location and size of all irrigation lines, heads, plugs, tie-ins, sleeves, etc., and shall submit copies of this plan to the City for approval prior to any excavation effecting irrigation systems.

3.02 REPLACEMENT

A. The Contractor shall determine and install any casing or carrier pipes that may be required when the irrigation pipes are to be installed under driveways.

B. The Contractor upon completion of the final dressing and prior to grassing shall replace the affected irrigation system to include that grassed area between right-of-way and the roadway.

C. All materials used for replacement shall be of equal or better quality found to be existing on each lot and shall be subject to the approval of the City.

END OF SECTION

SECTION 02934
SODDING

PART 1 - GENERAL

1.01 SCOPE

A. The Specifications for Sodding conform to the applicable portions of Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition Section 570 with the following exceptions:

1. Add the following to the applicable section, deleting all references that are contrary: The Contractor is required to mow all sodded areas immediately prior to final acceptance of the project by the City. The payment for mowing, maintaining the sod in a moist condition until final acceptance as well as payment for the water shall be included in the Contract price for miscellaneous restoration in park, as indicated in the Bid Form of the Proposal.

2. The payment for sodding shall also include an adequate layer of 1" minimum topsoil with the sod acceptable to the City Landscape Architect and the price and payment shall be full compensation for items applicable to this section excluding those items covered in other bid items.

3. The work consists of soil preparation, lawn bed preparation, and sodding complete, in strict accordance with the specifications and the applicable drawings to produce a grass lawn acceptable to the City Landscape Architect.

1.02 WORK INCLUDED

A. Testing of topsoil.

B. Raking and leveling topsoil as required for sodding.

C. Liming and fertilizing of topsoil.

D. Laying and rolling of sod.

E. Maintaining sod.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fertilizer:

1. Fertilizer shall be commercial fertilizer, as manufactured by Florikan, Lenard Reed mix or approved equal.

2. Said fertilizer shall have a 10-20-6 N.P.K. content and contain a minimum of 60 percent of organic material.

3. It shall be delivered at the site in the original sealed containers.

B. Sod:

1. The sod shall be as grown by a certified turf nursery and CONTRACTOR shall inform ENGINEER as to the source of the sod to be utilized prior to ordering and delivery of sod.

2. Sod shall be furnished and installed in rectangular sod strips measuring 12 to 16-inches in width of standard lengths of not less than 2 feet and delivered on pallets.

3. After the preparation of the areas to be sodded has been approved by ENGINEER sod all previously sodded areas where no permanent construction exists. Supply and install sod which is equal to or approved equal to sod which exists at the project site. As a minimum, Type No. 1 sod composed of grasses grown from a Bahia Seed mixture shall be used for stabilization of final grade.

4. St. Augustine Floratam Sod shall be placed in areas that will be or are irrigated. Bahia sod shall be placed in areas not irrigated.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Soil Preparation: All areas that are to be sodded shall be eradicated of any grass, weeds, and debris to a depth of 12 inches, through mechanical and chemical means and the ground brought to an even grade. The whole surface shall be rolled with a roller weighing not more than one hundred (100) pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional soil, and the surface shall be regraded and rolled until

presenting a smooth and even finish that is up to the required grade. Finish grade shall allow for 1" topsoil (as above) and the sod to allow for proper mowing height in relation to adjacent beds and pavement.

B. Applying Fertilizer: Prepare sodded areas by distributing topsoil with fertilizer to a depth indicated on the drawings. Apply fertilizer at rate of twenty (20) pounds per one thousand (1,000) square feet. Application shall be uniform, utilizing approved mechanical spreaders. Mix fertilizer thoroughly with the soil to a depth of three (3) inches. Hand rake until all bumps and depressions and all foreign materials are removed. Wet prepared area thoroughly.

C. Sodding

1. The Contractor shall sod all areas that are not paved or planted as designated on the drawings within the contract limits, unless specifically noted otherwise.

2. The sod shall be certified to meet Florida State Plant Board Specifications, absolutely true to variety type, and free from weeds, fungus, insects and disease of any kind.

D. All sod furnished shall be living sod containing at least 70 percent of thickly matter grasses as specified and free from noxious weeds.

E. No broken pads or torn or uneven ends will be accepted. Standard size sections of sod shall be strong enough to support own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section. Sod shall not be harvested when its moisture content (excessively wet or dry) may adversely affect its survival.

F. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not installed within this time period shall be subject to inspection and rejection by ENGINEER, and shall be removed from the side and a fresh sod supply shall be furnished at no extra cost to OWNER.

G. Sod panels shall be laid tightly together so as to make a solid sodded lawn area with edges butted together and without stretching grass panels. Sod shall be laid uniformly against the edges of all buildings, paved and planted areas. Immediately following sod laying, the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered immediately. If, in the opinion of the City Landscape Architect, top-dressing is necessary after rolling to fill the voids between the sod panels and to even out inconsistencies in the sod, clean sand as approved by the City Landscape Architect shall be uniformly spread over the entire surface of the sod and thoroughly watered in.

H. The topsoil shall not be moist at time of installation; however, it shall contain sufficient moisture so as not be powdery or dusty, both as determined by the supplier's representative.

I. During delivery, prior to and during the planting of the lawn 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.

J. CONTRACTOR shall be responsible to furnish his own supply of water to the site at no extra cost. If possible, OWNER shall furnish CONTRACTOR, upon request, with a source and supply of water. Contractor shall apply for temporary meter and pay Owner for water used at current utility billing rates. However, if OWNER' water supply is not available or not functioning, CONTRACTOR shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of, or the use of too much water, shall be CONTRACTOR's responsibility to correct.

3.02 MAINTENANCE

A. Within the contract limits, the Contractor shall produce a dense, well-established lawn. The Contractor shall be responsible for all mowing every week after installation, repair and re-sodding of all eroded areas, sunken or bare spots until Certification of Acceptability by the City Landscape Architect. Repaired sodding shall be accomplished to blend with the original work.

B. Water every day for ten (10) successive days, then water a minimum of three (3) times per week (at even intervals) for two (2) additional weeks. All watering shall be of sufficient quantity to wet or restore water to depth of four (4) inches.

C. Maintain the entire sodded areas until final acceptance at the completion of the Contract. Maintenance shall include watering as specified, weeding and removal of stones which may appear. In the event that the sod installation is not accepted by ENGINEER, the entire area shall be maintained and cut by CONTRACTOR until final acceptance of the sod installation.

D. Take whatever measures are necessary to protect the sod while it is developing. These measures shall include furnishing or warning signs, barriers, or any other necessary measures of protection.

END OF SECTION

DIVISION 3

CONCRETE

SECTION 03051
LEAKAGE TESTING OF HYDRAULIC STRUCTURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes the method of testing concrete hydraulic structures (manholes, wetwells, valve vaults, etc.) for leakage.

PART 2 - MATERIALS

2.01 GENERAL

A. Provide water, piping, and equipment to test concrete structures for leakage.

PART 3 - EXECUTION

3.01 GENERAL

A. Hydrostatically test reinforced concrete structures which will contain sewage to determine that they conform to Paragraph 3.02 herein and are free of detectable leaks.

B. Prior to testing, clean exposed surfaces by thoroughly hosing and removing surface laitance and loose matter from walls and slabs.

C. Conduct testing before backfill is placed against walls.

3.02 LEAKAGE TEST PROCEDURE

A. Fill hydraulic structures to be subjected to leakage tests with water to the normal operating liquid level line. Filling shall not exceed 8 feet of water depth per 24-hour period. Filling shall be at a uniform rate over a 24-hour period with continuous monitoring. Repair any running leaks which appear during filling before continuing.

B. After the structure has been kept full for 24 hours, it will be assumed for the purposes of the test that the absorption of moisture by the concrete in the structure is complete.

C. During the test period, examine exposed portions of the structure, and mark visible leaks or damp spots. Repair visible leaks or damp spots after dewatering. If the drop in water surface in the 24-hour period exceeds 1/20 of 1% of the

normal volume of liquid contained in the structure, the leakage shall be considered excessive.

D. The determination of surface moisture evaporation shall be aided with a 24-inch-deep, white-colored, watertight container with not less than 10 square feet of surface area exposure. Position container to experience environmental conditions similar to the structure being tested. Subtract the water loss due to evaporation from the measured water loss in the structure to determine the water loss due to leakage.

E. If the leakage is excessive, drain the structure, repair leaks and damp spots, and refill the structure and again test for leakage. Continue this process until the drop in water surface in a 24-hour period meets the test requirements.

F. Repair flowing leaks whether leakage exceeds the allowable leakage or not.

G. Repairs and additional filling and testing (including the cost of water) shall be made by the Contractor at no additional cost to the Owner.

3.03 REPAIR METHODS

A. Methods for repairing concrete not passing the leakage test shall be as described in Section 03732.

END OF SECTION

SECTION 03300
CONCRETE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section covers all work necessary for providing, testing and placing ready mix concrete.

B. See GENERAL CONDITIONS which contain information and requirements which apply to the Work specified herein and are mandatory for this project.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01400 - Quality Control.

B. Section 02521 – Flowable Fill

1.03 REFERENCE STANDARDS, CODES AND SPECIFICATIONS

A. ACI 214 "Recommended Practice for Evaluation of Compressive Test Results of Field Concrete".

B. ACI 318 "Building Code Requirement for Reinforced Concrete".

C. ASTM C31 "Standard Method for Making and Curing Concrete Compressive and Flexure Test Specimens in the Field".

D. ASTM C33 "Standard Specification for Concrete Aggregates".

E. ASTM C94 "Standard Specification for Ready-Mix Concrete".

1.04 SUBMITTALS

A. Submittals shall be in accordance with the GENERAL CONDITIONS and shall include the following:

1. Concrete mix designs and trial mix laboratory reports.

2. Manufacturer's certification of admixtures.

3. Contractor's schedule and sequence of placement.

4. All Test Results.

5. Drawings showing locations of construction joints.

1.05 QUALITY ASSURANCE

A. Submit certificates of mill reports on all foreign cements for review by ENGINEER before batching concrete.

B. Secure the services of a reputable manufacturer for counseling regarding the use of any specified admixture, as required.

C. The ENGINEER shall have access to and have the right to inspect all batch plants, cement mills, and supply facilities of suppliers, manufacturers, subcontractors, and contractors providing products included in these Specifications. Batch plants shall have current certification that all weighing scales have been tested and are within the tolerances as set forth in the National Bureau of Standards Handbook No. 44.

1.06 CERTIFICATION

A. Submit batch delivery tickets to the ENGINEER in compliance with and in accordance to ASTM C94.

1.07 TESTING

A. Performed by an acceptable Engineering Laboratory at CITY's expense. CONTRACTOR shall assist in the collection of samples. Any retests shall be within the Scope of the Contract.

B. Criteria:

1. Each test: not less than 5 cylinders; retain one after 28 days.

2. One test for every 50 consecutive cubic yards of concrete cast.

3. Furnish ENGINEER with 4 certified copies of tests made of 2 at 7 days, and 2 at 28 days.

4. (1) Slump and temperature verification. Concrete temperature shall not exceed 100°F when placed.

C. Questionable strength of in-place concrete:

1. Additional tests may be ordered by the ENGINEER.

2. Execute the core tests in accordance with ASTM C42 procedure.

3. Costs of additional tests showing strength of in-place concrete conforming to design criteria are the responsibility of the CITY.

4. Costs of additional tests showing noncompliance with the design criteria are the responsibility of the CONTRACTOR.

5. Additional items at CONTRACTOR's expense:

   a. Provide load tests as directed by the ENGINEER.

   b. Reinforce structure as directed or remove and replace all Under strength concrete structure in place.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement

1. Portland cement Type I or Type II conforming to ASTM C 150. In addition, the tricalcium aluminate content of Type I cement shall not exceed 12 percent.

2. Type I or Type II cement, at the Contractor's option, may be used for nonhydraulic structures, slabs on grade, sidewalks, thrust blocks and miscellaneous.

3. Type II cement or Type I cement, in combination with pozzolan (fly ash) as hereinafter specified, shall be used for all precast sanitary structures.

B. Water: potable, salt free.

C. Fine Aggregate: salt free and clean, conforming to ASTM C33.

D. Coarse Aggregate: salt free and clean, conforming to ASTM C33.

E. All Aggregate: quarried/mined in fresh water only.

2.02 MIXES

A. Slab on Grade, Thrust Blocks, sidewalks, curb and Miscellaneous Cast-In-Place

1. 28 day compressive strength: 3000 psi

2. Minimum cement content: 470 lbs/yd^3.

3. Admixture: As required below, use only specified product.

4. Slump: 4-inches ± 1 inch. (Thrust blocks, curbs, footers)

   Slump: 6-inches ± 1 inch. (Sidewalk, driveways, slab on grade)

5. Air Content: (ASTM C231): 2 ½ - 5 ½ percent.

6. Maximum water/cement ratio: 0.55 lb/lb.

B. Precast concrete:

1. 28 day compressive strength: 4000 psi, minimum, or as illustrated on the Drawings.

2. Minimum cement content for 4000 psi concrete: 6 bags per cubic yard.

3. Admixture: As required below, use only specified products.

2.03 ADMIXTURES

A. Provide air-entraining admixture in all concrete. Admixture shall conform to ASTM C 260, except it shall be nontoxic after 30 days and shall contain no chlorides. Furnish manufacturer's compliance statement for these requirements.

B. All concrete shall contain a water-reducing admixture. The admixture shall conform to ASTM C 494, Type A or Type D, except it shall contain no chlorides, shall be nontoxic after 30 days, and shall be compatible with the air-entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations. Furnish a compliance statement that the admixture used satisfies all requirements of this Specification.

C. The pozzolan to be used in combination with Type I cement, as previously specified, shall be Class C or Class F fly ash conforming to ASTM C 618-78. Furnish test data confirming that the fly ash in combination with the cement to be used meets all strength requirements, is compatible with air-entraining agents and other additives, and provides increased sulfate resistance equivalent to or better than Type II cement.

2.04 CURING COMPOUNDS

A. Normal placement without special finish; approved products:

1. Master Builders Company: "Masterseal".

2. Sonneborn-Contech: "Kure-N'Seal".

2.05 DEFORMED REINFORCING BARS

A. ASTM A615: "Standard Specification for Deformed and Plain Billet-Steel Bars for concrete Reinforcement".

1. Grade: 60

2. Minimum yield strength: 60,000 psi.

B. Sizes shall be as indicated on the Drawings.

2.06 WELDED WIRE FABRIC

A. Welded wire fabric shall conform to ASTM A185.

2.07 ACCESSORIES

A. Tie wires shall be 16-gauge, black, soft-annealed wire.

B. Bar supports shall be of proper type for use intended. Bar supports in beams and slabs exposed to view after stripping shall be galvanized or plastic coated. Use concrete supports for reinforcing in concrete placed on grade.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Place no concrete until all reinforcing steel, pipes, inserts, sleeves, etc., have been set in place and reviewed by the ENGINEER. Notify the ENGINEER of scheduled pours 24 hours prior to placement.

3.02 PLACING

A. Place concrete expeditiously in clean forms that are not hot to the touch; spray forms with water just prior to placing concrete. Before placing concrete directly against earth, install vapor barrier to prevent water absorption, secure reinforcement in position, inspect, and approve before placing concrete. Do not rest runways for transporting concrete on the reinforcing steel. Deposit concrete as nearly as practical in final position; and, do not allow concrete to drop freely more than 5 feet. Place all concrete during daylight, unless otherwise authorized. Where reinforcing steel above the top of the cast is coated with concrete while placing below, remove all concrete from such reinforcing steel after the placing is complete and prior to the next cast.

B. Place slabs-on-grade carefully to avoid damages to the vapor barrier.

C. Concrete shall not be placed in the rain or when it looks as if it is going to rain unless specifically authorized by the ENGINEER.

3.03 CONSOLIDATION

A. Consolidate concrete in layers by internal vibrating equipment, supplemented by hand rodding and tamping as required. Do not use vibrators to move the concrete laterally inside the forms.

B. Maintain internal vibrators at speed of at least 5000 impulses per minute when submerged in concrete. Maintain at least 1 spare vibrator in working condition at site at all times.

C. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation. In no case more than 15 seconds per square foot of exposed surface. Move the vibrator constantly and place in each specific spot only once.

3.04 JOINTS

A. Construction joints:

1. Locate as illustrated on the Drawings and as reviewed by the ENGINEER for slabs.

2. Key joints.

B. Expansion Joints. Place pre-formed expansion joints as indicated on the Drawings.

3.05 CURING

A. Begin curing of concrete as soon as practicable after placing, but not more than 3 hours thereafter.

B. Begin curing of the structural elements immediately after removal of forms.

C. Apply curing compounds as specified.

3.06 FINISHES

A. Formed surfaces:

1. Patching: immediately after stripping forms, patch all defective areas with mortar similar to the concrete mix; but, without coarse aggregate. Patch minor honeycombs, bulges and other minor defects as designed by the ENGINEER, only where exposed to view. Clean, dampen, and fill all the holes with patching mortar.

a. Major defective areas, as judged by the ENGINEER, including those resulting from the leakage of forms, excessive honeycombs, large bulges, and large offsets at form joints: chip away to a depth of at least 1/4 inch; and, the surfaces that are to be patched coat with an epoxy-polysulfide adhesive. Press patching mortar in for a complete bond and finish to match adjacent areas.

b. Minor defective areas, as judged by the ENGINEER, including honeycombs, air bubbles, holes resulting from removal of ties and those resulting from leakage of forms: patch with grout without resorting to chipping. Minor bulges and offsets at form joints: finish as specified herein below.

2. Finishes; locations:

a. Rough or board finish: for all concrete surfaces not exposed to public view.

3. Finishes; definitions:

a. Rough or board finish: reasonably true to line and plane. Tie holes and defects patched, and the fins exceeding ¼ inch rubbed down, otherwise, surfaces may be left with texture imparted by forms.

B. Unformed surfaces (flatwork):

1. Finishes:

a. General: grade and screed slab to exact elevation, as required. After screeding, tamp mixture thoroughly to drive the coarse aggregate down from surfaces and apply finish specified hereinafter.

b. Broom finish: slab on grade.

2. Finishes; definition:

a. Broom finish: finish with street type broom as soon as surface water sheen has disappeared.

3.07 FIELD QUALITY CONTROL

A. Only ready mixed concrete in accordance with ASTM C94 will be accepted.

B. Place all concrete within 1-1/2 hours after introduction of water to mix.

C. Under no circumstances may additional water be added to mix.

D. Discard unused concrete older than 1-1/2 hours. Retempering is prohibited.

END OF SECTION

SECTION 03732
CONCRETE REPAIRS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all materials, labor, equipment, tools, etc., required for the repair, renovation, and replacement of concrete and/or reinforcing steel as indicated on the Drawings, specified herein, and determined by field survey.

The Contractor, in conjunction with the Engineer, shall determine the extent of cracked or deteriorated concrete to be rehabilitated and/or resurfaced. A summary of the work to be performed shall be submitted to the Engineer for review, and such summary shall be approved by the Engineer prior to commencement of the Work.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Shall be as specified in Section 01090, Reference Standards.

1.03 SUBCONTRACTOR/APPLICATOR QUALIFICATIONS

The Contractor shall furnish the name of all subcontractors/applicators which he proposes to use for this work, including necessary evidence and/or experience records to ascertain their qualifications in the application of epoxy, urethane, and polymer-modified mortars. Approved applicator qualifications shall include:

A. A minimum of 5 years experience in applying epoxy, urethane, and polymer-modified and cement-based compounds similar to those specified in this Section.

B. A letter from the manufacturer of the specified materials, on the manufacturer's letterhead, signed by an officer of the company, stating that the subcontractor/applicator has been trained in the proper techniques for applying the product, including surface preparation and mixing, placing, curing, and caring for the manufacturer's products. This letter shall further state that the subcontractor/applicator is on the manufacturer's approved list of contractors.

1.04 SUBMITTALS

A. Material certifications and technical data sheets on all grouts, mortars, epoxy resins, aggregates and repair products specified in this Section.

B. Subcontractor/Applicator qualifications as specified in Section 1.04.

C. Shop Drawings detailing any planned deviation from the proposed construction sequence and/or method of repair.

D. The Contractor, based on their experience in their profession, may submit to the Engineer for approval, alternative materials and/or methods of work to assure the durability and watertight integrity of the repair work performed.

1.05 ADDITIONAL GUARANTEE

A. The Contractor shall guarantee all repair work performed under this Contract against defects in workmanship resulting in leakage and/or failure of concrete bond for a period of two years from the date of the Certificate of Substantial Completion.

PART 2 - MATERIALS

2.01 WATER

A. The water used for mixing concrete repair products shall be clean, potable, and free of deleterious substances.

2.02 AGGREGATE

A. All aggregate shall conform to ASTM C-33. The aggregate supplier shall submit to the Engineer documentation that the proposed aggregates comply with ASTM C-33 and the requirements listed below:

B. Pea Gravel - Pea gravel shall meet the gradation and material requirements of Standard Size 14 as defined by ASTM C-33. Pea gravel shall be clean and free from deleterious matter and shall contain no limestone.

2.03 EPOXY BONDING AGENT

A. An epoxy bonding agent shall be used when applying fresh concrete to previously placed concrete. Epoxy bonding agent shall conform to ASTM C-881 Type I, II, IV or V; Grade 2 for epoxy resin adhesives, depending on the application. The class of epoxy bonding agent shall be suitable for all ambient and substrate temperatures. The epoxy resin shall be "Sika Armatec 110" as manufactured by the Sika Corp, Lyndhurst, NJ, "CR 246" as manufactured by Sto Concrete Restoration Division, Atlanta, GA, "Duralbond" as manufactured by Tamms Industries Co., Mentor OH, or equal.

2.04 ANTI-CORROSION REBAR COATING

A. All reinforcing steel cut or exposed during demolition and/or repair operations shall be protected with an anti-corrosive coating. The anti-corrosive coating shall be a two- component, polymer-modified cementitious material such as "Sika Armatec 110" manufactured by Sika Corp., Lyndhurst, NJ, IOCR 246" manufactured by Sto Concrete Restoration Division, Atlanta, GA, or equal.

2.05 WATERPROOF INJECTION GROUT

A. Waterproof crack repair material shall be a one-component, water-activated polyurethane hydrophilic/hydrophobic injection grout capable of 700% expansion. Polyurethane grout shall form a tough flexible/rigid foam seal that is impenetrable to water. Hydrophilic injection grout shall be .Prime Flex 900 LV" manufactured by Prime Resins, Conyers, GA, "Scotch-Seal 5600 Chemical Grout" manufactured by 3M Construction Markets, St. Paul, MN, "Hydro- Active Flex LV" manufactured by De Neef Construction Chemicals, Waller, TX, or approved equal. Hydrophobic injection grout shall be "Prime Flex 920" manufactured by Prime Resins, Conyers, GA, "Sikafix HH" manufactured by Sika Corp., Lyndhurst, NJ, "Hydro-Active Cut" manufactured by De Neef Construction Chemicals, Waller, TX, or equal.

2.06 SPALL REPAIR PATCHING MATERIAL

A. All spall repairs not requiring formwork shall be repaired using a two-component, polymer- modified cementitious mortar and shall have a minimum 28-day compressive strength of 7000 psi. Spall repair mortar for use in horizontal applications shall be manufactured by Sika Corp., Lyndhurst, NJ, "Duraltop Fast Set" manufactured by Tamms Industries, Mentor, OH, IOCR 700" manufactured by Sto Concrete Restoration Division, Atlanta, GA, or approved equal.

1. Spall repair mortar for use in vertical applications shall be "Sikatop III" manufactured by Sika Corp., Lyndhurst, NJ, "Duraltop Gel" manufactured by Tamms Industries, Mentor, OH, "CR730" manufactured by Sto Concrete Restoration Divisoin, Atlanta, GA, or equal.

B. All spall repairs requiring formwork shall be repaired using a two-component, polymer- modified cementitious mortar/pea gravel mixture and shall have a minimum 28-day compressive strength of 6000 psi. Each unit of mortar shall be mixed with Saturated Surface Dry (SSD) pea gravel to form the repair material following the manufacturer's recommendations. Spall repair mortar shall be "Sikatop 111 Plus" manufactured by Sika Corp., Lyndhurst, NJ, "Duraltop Flowable Grout" manufactured by Tamms Industries, Mentor, OH, "CR 730" manufactured by Sto Concrete Restoration Division, Atlanta, GA, or equal.

C. All spall repair materials shall conform to EPA/USPHS standards for surface contact with potable water supplies.

2.07 STORAGE OF MATERIALS

A. The Contractor shall provide an area for repair material storage free from exposure to moisture in any form, before, during, and after delivery to the site. Manufactured materials shall be delivered in unbroken containers labeled with the manufacturer's name and product type. All mortar products shall be stored on raised platforms. Materials susceptible to damage by freezing shall be stored in a dry, heated, insulated area. Any material that has hardened, partially set, become caked and/or has been contaminated or deteriorated shall be rejected. All aggregates shall be stored in clean bins, scows or platforms.

PART 3 - INSTALLATION

3.01 GENERAL REQUIREMENTS

A. No repair work shall be undertaken when ambient temperatures are below manufacturer's safe recommendations. No admixtures, except those required by the manufacturer, shall be used in the repairs specified herein. All products shall be applied in strict accordance with manufacturer's recommendations. The Contractor shall furnish and install safe scaffolding and ladders for the Engineer's prework inspection, the repair work activities, and the Engineer's final inspection

B. Sandblast or waterblast (3000-4000 psi waterjet) deteriorated areas to remove all loose concrete, existing coatings, unsound material, debris, and laitance. All surfaces shall be clean, free of dirt, grease, loose particles, and deleterious substances and shall be prepared according to manufacturer's requirements.

3.02 EPOXY BONDING AGENT

A. Existing concrete surfaces shall be roughened prior to application of bonding agent. Concrete surface shall be clean and sound, free of all foreign particles and laitance. Repair material shall be placed while bonding agent is still tacky. If bonding agent cures prior to placement of repair material, bonding agent shall be reapplied.

B. Repairing concrete with epoxy mortars shall conform to all the requirements of ACI 503.4 "Standard Specification for Repairing Concrete with Epoxy Mortars" (latest edition), except as modified herein.

3.03 ANTI-CORROSION REBAR COATING

A. Reinforcing steel cut or exposed during demolition and/or repair operations shall be sandblasted and cleaned prior to coating with an anti-corrosive coating. Coating shall thoroughly cover all exposed parts of the steel and shall be applied according to manufacturer's recommendations.

3.04 WATERPROOF INJECTION GROUT

A. All existing, leaking cracks 1/4" or smaller shall be repaired by pressure injecting a waterproof injection grout into the prepared crack. Seal crack surface and install injection ports per manufacturer's recommendations. Holes drilled for injection ports shall not cut rebar. If rebar is encountered during drilling, the hole shall be abandoned and relocated, and the abandoned hole shall be patched immediately with non-shrink grout flush with the surface of the existing concrete. Once the surface sealing material has cured, inject crack with waterproof injection grout using standard pressure injection equipment as directed by the manufacturer.

3.05 SPALL REPAIR PATCHING MATERIAL

A. All voids or spalled areas to be repaired shall be chipped back to sound concrete a minimum 1/8" deep, cleaned and repaired with spall repair patching material according to manufacturer's recommendations. All patching shall provide a final finished surface which is flat, level and even with the existing concrete surface. Repair mortar shall not be feathered to meet existing concrete surface. Final patching on horizontal surfaces shall receive a broom finish consistent with the finish on the existing structure.

3.06 CURING

A. All repair products shall be cured in strict accordance with manufacturer recommendations.

3.07 WORK IN CONFINED SPACES

A. The Contractor shall provide and maintain safe working conditions for all employees and subcontractors. Fresh air shall be supplied continuously to confined spaces through the combined use of existing openings, forced-draft fans and temporary ducts to the outside, or by direct air supply to individual workers. Fumes shall be exhausted to the outside from the lowest level of the confined space. Electrical fan motors shall be explosion-proof if in contact with fumes. No smoking or open fires shall be permitted in or near areas where volatile fumes may accumulate.

END OF SECTION

DIVISION 5

METALS

SECTION 05500
METAL FABRICATIONS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and install miscellaneous metal items as shown on the Drawings and specified herein for a complete installation.

1.02 SUBMITTALS

A. The Contractor shall submit shop drawings and other information to the Engineer for review in accordance with Section 01300 entitled "Submittals". No fabrication shall be started until shop drawings have been reviewed by the Engineer. The drawings shall be made in conformity with standard practice and indicate: fabrication, assembly and erection details, sizes of members, profiles, fastenings, supports and anchors, finishes, patterns, clearances, and connections to other work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials shall be of the best quality and entirely suited for the particular service. Metals shall be free from defects and have structural properties to safely render required service.

B. Fastenings shall, insofar as practicable, be noncorrosive, nonstaining and concealed. Exposed welds shall be ground smooth to form a neat uniform fillet without weakening base metal. Unexposed welds shall have all slag removed before applying shop coating. Moulded, bent or shaped members shall be formed and clean, sharp rises, without dents, scratches, cracks or other defects. All anchors, bolts, shims and accessory items shall be provided as required for building into or fastening to adjacent work. All ferrous metals shall be galvanized, except as otherwise specified.

C. Unless otherwise specified the miscellaneous metal work shall be equal to or exceed the requirements of the following standards:

Carbon and Low Alloy Steel	ASTM Designation
Plates and Structural Fabrication	A 36, A 529 or A 283, Grade C
Sheet Steel	A 570, Grade C

Bars and Rods	A 36 or A 306, Grade 60
Pipe - general use process pipe	A 53 or A 120 Schedule 40 A 524 Grade I
<u>Fasteners*</u>	
Standard Strength Bolts	A 307, Grade A
High Strength Bolts	A 325
Eyebolts	A 489
<u>Steel Coatings</u>	
Zinc - Electrodeposited	A 164
Hot Dipped	A 123 and A 386
Cadmium	A 165
<u>Stainless Steel</u>	
Plate and Sheets	A 167, Type 316
Bars and Shapes	A 276, Type 316
Fasteners*	A 167 and A 276, Type 316
<u>Cast Iron</u>	
Gray	A 48. Class 30B
Malleable	A 47
Ductile	A 536, Grade 60-40-18
<u>Wrouqht Iron</u>	
Plates	A 42
Sheets	A 162
Shapes and Bars	A 207
Pipe	A 72
<u>Bronze</u>	
Rods, Bars, and Shapes	B 138, Alloy B Soft
<u>Fasteners</u>	
Yellow Brass Cap Screws and Other Small Fasteners	B 16, B 36, or B 134
Silicon Bronze Bolts	B 97, B 98, B 99 and B 124
<u>Aluminum</u>	
Structural Shapes	B 308, Alloy 6061- T6
Castings	B 26, B 85 and B 108
Extruded Bars, Rods and Tubes	B 221 Bars - Alloy 6061 Other - Alloy 6063
Plates and Sheet	B 209 Plates - Alloy 6061 Sheets - Alloy 3003

*All fasteners shall be manufactured in the U.S.A. Certifications of compliance shall be submitted for all fasteners supplied on this project.

D. Materials with more than one specification or grade listed shall conform to specification or grade providing the highest strength and appropriate mechanical properties for the fabrication technique used.

2.02 PROTECTIVE COATINGS

A. All ferrous metal, except stainless steel and galvanized surfaces, shall be properly cleaned and given one shop coat of primer compatible with the coating system specified in Section 09900 entitled “Painting", Metal work, including anchors, to be encased in concrete shall be shop primed unless specified to be stainless steel or galvanized.

B. Castings that are to be left unpainted shall be cleaned and coated with a coal-tar-pitch varnish.

C. Hot-dip galvanizing or zinc coatings applied on products fabricated from rolled, pressed or forged steel shapes, plates, bars and strips shall comply with ASTM A 123. Hot-dip galvanizing or zinc coatings on assembled steel products shall comply with ASTM A 386. The weight of coatings shall be designated in Table 1 for the class and thickness of material to be coated.

D. Galvanized surfaces for which a shop coat of paint is specified shall be chemically treated to provide a bond for the paint. Except for bolts and nuts, all galvanizing shall be done after fabrication.

E. Aluminum to be placed adjacent to masonry or dissimilar metals shall be protected with an isolating coating of bitumastic and/or felt.

2.03 STEEL

A. Unless otherwise noted, all steel shall conform to the following:

1. Stainless steel floor plates shall conform to ASTM A 793 and shall be furnished with checkered design.

2. Galvanized steel pipe shall conform to ASTM A 53.

3. Carbon steel bolts and fasteners shall conform to ASTM A 307 and shall be galvanized.

4. Carbon steel rails, 40 pound, shall conform to the dimensions listed in AISC Specifications.

5. Other steel shall be mild steel.

6. All stainless steel anchor bolts and fasteners shall be of Type 316 stainless steel.

2.04 STRUCTURAL AND MISCELLANEOUS ALUMINUM

A. All structural and miscellaneous aluminum shapes, bars and plates shall be Alloy 6061- T6. Aluminum to be placed adjacent to concrete, masonry or dissimilar metals shall be protected with one coat of bitumastic paint. Mill finish shall be provided.

2.05 FASTENERS

A. General: Bolts, screws, nuts, washers, anchors and other fasteners shall be first quality and shall conform to the material specifications named herein. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the Contractor in accordance herewith. Anchor bolts shall have suitable washers and, where so required, their nuts shall be hexagonal. Stainless steel and silicon bronze bolts shall have a raised letter or symbol on the bolts indicating the manufacturer.

Concrete and masonry inserts shall be drill-in type as manufactured by Phillips Drill Company, Michigan City, Indiana; Hilti, Tulsa, OK; or equal. Powder or gun-driven, fiber, and plastic inserts shall not be used unless specifically noted.

B. Material: All bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be Type 316 stainless steel.

If any bolts, anchor bolts, nuts and washers, are specified to be galvanized, they shall be zinc coated, after being threaded, by the hot dip process in conformity with ASTM A 123, or A 153, as is appropriate.

C. Concrete Inserts: Concrete inserts shall be designed to support safely, in the concrete that is used, the maximum load that can be imposed by the bolts used in the inserts.

D. Dissimilar Metal: All dissimilar metal shall be connected with appropriate fasteners and shall be insulated with a dielectric or approved equal. Unless otherwise specified, aluminum shall be fastened with ASTM A276 Type 316 stainless steel bolts and insulated with micarta, nylon, rubber, or equal.

E. Anchor Bolts: Anchor bolts shall be set accurately and be carefully held in suitable templates of approved design. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4-inches by 1/8 inch or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. Drill-in type anchors shall be as shown on the Drawings.

PART 3 - EXECUTION

3.01 FABRICATION

A. General: All workmanship shall be first class and conform to recognized and accepted best practice. All structural materials shall be thoroughly straightened in the shop by methods that will not injure them before templates are placed on same for laying out and before any work is done upon them.

B. Finished members shall be absolutely straight and free from open joints and distortions of any kind. All shearings shall be neatly finished. Flame cutting may be used in the preparation of the various members provided this operation is performed by a machine. All necessary fillets, connections, brackets, posts, and other details not shown on the drawings, but necessary for the work, shall be furnished by the Contractor. Fabrication shall be by welding except where riveted construction is specifically allowed by the Contract Documents.

C. Steel: Steel fabrication shall meet the applicable requirements of the AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.

D. Aluminum: Aluminum fabrication shall meet the applicable requirements of the Aluminum Construction Manual, Specifications for Aluminum Structures.

E. Welding: All welding shall be in accordance with the latest revised standards and recommendations of the American Welding Society. The welding of all joints shall produce complete fusion with the parent metal and shall be free from deleterious metals and cracks. Machine welding shall be used insofar as practicable. Tack welding will not be permitted on exposed surfaces. Finished welded joints shall be reasonably smooth and free from grooves, depressions or other irregularities. Any other irregularities shall be corrected by welding and/or grinding. All scale or flux shall be removed after each pass. Bronze shall be welded by either the inert gas shielded arc method or by brazing with the proper flux and filler metal. All flush welds of butt joints shall be ground smooth where exposed to view.

F. Castings:

1. Castings shall be tough, sound and free from blow holes, shrinkage cracks or other defects. Castings shall be smooth and clean. Units that have been plugged or filled will be rejected.

2. Iron castings shall be close-grained gray iron or ductile iron.

3.02 INSTALLATION

A. All miscellaneous items shall be installed in conformance with specifications and details as shown on the drawings, or processed shop drawings. Installation and erection shall conform to the best practice with each item set plumb, level, true to line and securely anchored in its proper place.

END OF SECTION