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**IFB NO. Y19-773-RM**

**ISSUED: June 21, 2019**

**INVITATION FOR BIDS**

**FOR**

**ORANGE COUNTY CLASS III LANDFILL ACCESS ROAD IMPROVEMENTS**

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**PART H  
TECHNICAL SPECIFICATIONS**

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**PART H  
Volume II**

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# TECHNICAL SPECIFICATIONS

## ORANGE COUNTY CLASS III LANDFILL ACCESS ROAD IMPROVEMENTS

Prepared for:



**ORANGE COUNTY UTILITIES  
SOLID WASTE DIVISION**  
5901 Young Pine Road  
Orlando, Florida 32829

Sequence #  
CIP #  
Contract #

Prepared by:



**S2L, INCORPORATED**  
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Maitland, Florida 32751  
407-475-9163

Project No. 17-737-1

March 2019

**BID FORM**

**ORANGE COUNTY LANDFILL  
ORANGE COUNTY, FLORIDA**

**Class III Access Road Improvements**

**March 2019**

<u>Item Number and Description</u>	<u>Unit</u>	<u>Est. Qty.</u>	<u>Total Price</u>
<b>001 – Class III Access Road Improvements:</b>			
001 Class III Access Road and Stormwater Management Improvements	LS	1	\$ _____
<b>TOTAL PROJECT ESTIMATED COST</b>			<b>\$ _____</b>

\$ \_\_\_\_\_  
**Total Project Estimated Cost (in words)**

Work to include all construction as denoted on the construction drawings and technical specifications.

Total shall also include insurance, bonds, administration, testing, temporary fencing for security, indemnification, allowances, and miscellaneous.

**TECHNICAL SPECIFICATIONS**  
**ORANGE COUNTY LANDFILL**  
**CLASS III – ACCESS ROAD AND STORMWATER IMPROVEMENTS**  
**ORANGE COUNTY, FLORIDA**

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## SECTION 01000

### GENERAL REQUIREMENTS

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. Description: The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract. The summary of the work is presented in Section 01010.
- B. Requirements Included:
1. The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work, from the date of Notice to Proceed until the date of Final Completion and Acceptance by Owner. The Contractor shall obtain and pay for all required permits. The Contractor shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Owner, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. The Contractor shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.
  2. The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefore.
  3. The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment, prior approval of the Engineer notwithstanding.

##### 1.02 DRAWINGS AND PROJECT MANUAL

- A. Drawings:
1. The Drawings referred to in the Contract Documents bear the general project name and number as shown in the Notice to Bidders (Advertisement).
  2. When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large-scale drawings in preference to small-scale drawings.
- B. Copies Furnished to Contractor:
1. After the Contract has been executed, the Contractor will be furnished one (1) complete set of reproducible sheets (22 inches by 34 inches) or electronic files and one (1) copy of the Project Manual (Contract Requirements and Specifications) and all addenda.
  2. The Contractor shall furnish each of the subcontractors, manufacturers, and material men such copies of the Contract Documents as may be required for their work. All copies of the Contract Documents shall be printed from the reproducible sets furnished to the Contractor. All costs of reproduction and printing shall be borne by the Contractor.

C. Supplementary Drawings:

1. When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and the Contractor will be furnished one (1) complete set of reproducible sheets (22 inches by 34 inches) or electronic files and one (1) copy of the Specifications.
2. The Supplementary Drawings shall be binding upon the Contractor with the same force as the Drawings. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the Owner or compensation therefor to the Contractor shall be subject to the terms of the Contract Documents.

D. Contractor to Check Drawings and Data:

1. The Contractor shall verify all dimensions, quantities and details shown on the Drawings, Supplementary Drawings, schedules, Specifications or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions, as the Engineer will furnish full instructions, should such errors or omissions be discovered.
2. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

E. Specifications: The Technical Specifications consist of three parts: General, Products and Execution. The General Section contains General Requirements, which govern the work. Products and Execution modify and supplement these by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

F. Intent:

1. All work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis. In the event of inconsistencies in the requirements of the Drawings and Specifications, the more expensive will be required.

### 1.03 MATERIALS

A. Manufacturer:

1. The names of proposed manufacturers, suppliers and dealers who are to furnish materials, fixtures, or other fittings shall be submitted to the Engineer for approval, as early as possible, to afford proper investigation and checking. Such approval must be obtained before Shop Drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he

has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

2. All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
3. Any two or more pieces of material of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

B. Delivery:

1. The Contractor shall deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time.
2. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

#### 1.04 INSPECTION AND TESTING

A. General:

1. The Contractor will provide for the testing of materials unless otherwise specified.
2. For tests specified to be made by the Owner, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Owner as a prerequisite for the acceptance of any material.
3. If, in the making of any test of any material, it is ascertained by the Owner that the material does not comply with the Contract Documents, the Contractor will be notified thereof and he will be directed to refrain from delivering said material, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the Owner.

B. Costs:

1. All inspection and testing of materials furnished under this Contract will be paid for by the Contractor, unless otherwise expressly specified.
2. Materials submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. The Contractor shall reimburse the Owner for the expenditures incurred in making such tests of materials, which are rejected, for noncompliance.

C. Inspection of Materials:

1. The Contractor shall give notice in writing to the Owner, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Owner will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that the inspection will be made at a point other than the point of manufacture.
2. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

D. Certificate of Manufacture:

1. When inspection is waived or when the Owner so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificate of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents.
2. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

E. Failure of Tests:

1. Any defects in the materials or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Owner as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive.
2. The Contractor shall reimburse the County for all failed conformance tests or shall pay for all re-tests.
3. If the Contractor fails to make these corrections or if the improved materials, when tested, shall again fail to meet the guarantees or specified requirements, the Owner, notwithstanding its partial payment for work, and materials, may reject the materials and may order the Contractor to remove them from the site at his own expense.
4. In case the Owner rejects any materials, then the Contractor shall replace the rejected materials within a reasonable time. If he fails to do so, the Owner may, after the expiration of a period of thirty (30) calendar days after giving him notice in writing, proceed to replace such rejected materials and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under his Contract.

F. Final Inspection: During such final inspections, the work shall be clean and free from water. In no case will the final estimate be prepared until the Contractor has complied with all requirements set forth and the Owner has made the final inspection with the Contractor of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

## 1.05 TEMPORARY STRUCTURES

A. Temporary Fences:

1. If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall provide a suitable temporary fence at his own expense.
2. The Engineer shall be solely responsible for the determination of the necessity for approving a temporary fence and the type of temporary fence to be used.

B. Responsibility for Temporary Structures: In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance or operation and will indemnify and save harmless the Owner from all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

## 1.06 TEMPORARY SERVICES

A. Accident Prevention:

1. Precautions shall be exercised at all times for the protection of person and property. The safety provisions of applicable laws, building and construction codes shall be observed.
2. The Contractor shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596). Hours and Safety Standards Act (PL 91-54), except where state and local



safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act, shall be complied with.

- B. First Aid: The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when personnel are employed on the work.

#### **1.07 LINES AND GRADES**

- A. Grade:

- 1. All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as given by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.
- 2. The Owner has established benchmarks and base line controlling points for the Contractor to use. Reference marks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible.
- 3. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

- B. Surveys:

- 1. The Contractor shall furnish and maintain, at his own expense, stakes and other such materials for setting project control points.
- 2. The Contractor shall check the Owner's permanent reference points by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies.
- 3. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the Owner's permanent reference marks set by the Owner, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review of the Owner.

- C. Safeguarding Marks:

- 1. The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.
- 2. The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

#### **1.08 ADJACENT STRUCTURES AND LANDSCAPING**

- A. Responsibility:

- 1. The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work.
- 2. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Drawings, and the removal, relocation and reconstruction of such items called for on the Drawings or specified shall be included in the various Contract Items.

3. Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility.
4. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the work shall be performed by and be the responsibility of the Contractor.
5. Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the Owner. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the Owner.
6. Prior to the beginning of any excavations, the Contractor shall advise the Owner of all buildings or structures on which he intends to perform work or which performance of the project work will affect.

#### **1.09 PROTECTION OF WORK AND PUBLIC**

- A. The Contractor shall submit a Maintenance of Traffic (MOT) Plan based on the Uniform Traffic Control Manual. The MOT Plan must be approved by the Engineer.
- B. Barriers and Lights:
  1. During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers and lights as will effectually prevent accidents.
  2. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public.
- C. Noise:
  1. The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers.
  2. Except in the event of an emergency, no work shall be done between the hours of 7:00 P.M. and 7:00 A.M. Monday through Friday, on Saturdays, Sundays and legal holidays without written permission of the Owner. If the proper and efficient prosecution of the work requires operations during the night, the written permission of the Owner shall be obtained before starting such items of the work.
- D. Access to Public Services: Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.
- E. Dust Prevention: The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the roads and/or construction areas sprinkled with water at all times.

#### **1.10 CUTTING AND PATCHING**

- A. The Contractor shall do all cutting, fitting or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Drawings and Specifications.
- B. The work must be done by competent personnel skilled in the trade required by the restoration.

- C. Where existing pavement, curb, curb and gutter, sidewalk, or unpaved road is removed only for the purposes of constructing or removing culverts, pipes, etc., such pave, etc., shall be replaced and restored to as good condition, as determined by the Engineer, as before removal. The replaced pavement or unpaved road shall be the same or similar type as removed unless otherwise directed.

## 1.11 CLEANING

### A. During Construction:

- 1. During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Owner and Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable. The Contractor has the option of disposing of waste at the County facility as long as all waste is processed through the scalehouse prior to disposal.
- 2. The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops. Contractor shall be responsible and liable for all spillage and incur all associated costs including, but not limited to, costs related to repair and maintenance resulting from damages thereof.

### B. Final Cleaning:

- 1. At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.
- 2. The Contractor shall thoroughly clean all materials installed by him and shall deliver such materials undamaged in a bright, clean, polished and new operation condition.

## 1.12 MISCELLANEOUS

### A. Protection Against Siltation and Bank Erosion:

- 1. The Contractor shall arrange his operations and construct erosion control devices to minimize siltation and bank erosion on construction sites and on existing or proposed watercourse and drainage ditches.
- 2. The Contractor, at his own expense, shall remove any siltation deposits and correct any erosion problems as directed by the Owner, which results from his construction operations.

### B. Protection of Wetland Areas:

- 1. The Contractor shall properly dispose of all surplus material, including soil, in accordance with local, State and federal regulations.
- 2. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection or U.S. Army Corps of Engineers.

C. Existing Facilities: The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Section 01010, Summary of Work.

D. Use of Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfection, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions. Contractor must maintain a file on site of MSDs for above materials.

### E. Cooperation With Other Contractors and Forces:

- 1. During progress of work under this Contract, it may be necessary for other contractors and persons employed by the Owner to work in or about the project.

2. The Owner reserves the right to put such other contractors to work and to afford such access to the site of the work to be performed hereunder at such times as the Owner deems proper.
  3. The Contractor shall not impede or interfere with the work of such other contractors engaged in or about the work and shall so arrange and conduct his work that such other contractors may complete their work at the earliest date possible.
- F. Construction shall be conducted and shall result in construction of the improvements of this project in full accordance with the conditions of the permits granted for the project.
- G. The Contractor shall dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to the onsite Class III landfill. No burning shall be allowed on-site. The cost of disposal (hauling) of cleared and grubbed material and debris shall be considered an obligation of the Contractor; the cost of which shall be included in the contract sum.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

**CONTRACTOR'S AFFIDAVIT VERIFYING ACCURACY  
OF  
DRAWINGS AND SPECIFICATIONS**

(This Affidavit shall be submitted to the Engineer prior to the start of Construction)

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ )

The undersigned being first duly sworn as provided by law, deposes and certifies that:

1. The undersigned is authorized to make this Affidavit on behalf of,

\_\_\_\_\_ )  
(Name of Corporation, Partnership, Individual, etc.)

A \_\_\_\_\_, formed under the laws of \_\_\_\_\_  
of which he is \_\_\_\_\_ )  
(Sole Owner, Partner, President, etc.)

2. Prior to the start of work on the site, Affiant has carefully studied, reviewed, and compared the Drawings and Specifications and checked and verified all pertinent figures shown thereon and all applicable field measurements;

3. Affiant hereby verified that the Drawings and Specifications in the Contract Documents for the \_\_\_\_\_ (Project Name) accurately represent the existing site conditions and do not contain any conflicts, errors, ambiguities, or discrepancies except as specifically noted below.

4. Number of exceptions \_\_\_\_\_ (if none, please indicate zero in the space provided). Each exception is explained in detail on the attached sheets. \_\_\_\_\_ additional sheets are attached.

\_\_\_\_\_  
Affiant

BY: \_\_\_\_\_

Sworn and subscribed before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires:

**END OF CONTRACTOR VERIFICATION FORM**

SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.01 LOCATION OF WORK

- A. Work included in this Contract will be done at the Orange County Solid Waste Management Facility, 5901 Young Pine Road, Orlando, Florida 32829. The Orange County Solid Waste Management Facility is owned by the Orange County Board of County Commissioners and operated by the Orange County Solid Waste Division.

1.02 DESCRIPTION OF WORK

- A. The Work of this construction project, in general, is to improve the access road for the Class III landfill and to improve the stormwater system, as shown on the associated Engineering Drawings. The Work includes furnishing all labor, materials (Contractor to provide soils), equipment, tools, transportation, services, incidentals, and performing all work necessary to perform the specified modifications, which consists of the following:
  - a. Construction of erosion/sediment control;
  - b. Demolition and removal of existing roadway;
  - c. Improvement to stormwater conveyance system adjacent to access road;
  - d. Construction of improved access road; and
  - e. Construction and installation of various stormwater culverts, pipes, and structures along the length of the road improvement.

Road construction, and associated stormwater improvements, shall be for Phase I only, as per Sheet No. 2 of the Engineering Drawings.

Insofar as operations by the Owner are required to be ongoing during the construction period, the Contractor is required to maintain traffic in such a way as to not cause interruption of the Owner's operations. The submitted construction schedule shall denote work areas and time necessary to complete the work items within these areas.

- B. This project is a Lump Sum cost basis contract. This Contract is for construction of the Class III landfill access road and to improve the stormwater conveyance system.
- C. The Contractor shall complete all work described above and all other work incidental whether specifically mentioned or not in accordance with the Plan Drawings, Specifications, and Contract Documents.
- D. Work shall conform to the following Drawings that form a part of these Contract Documents.

<u>SHEET. NO.</u>	<u>TITLE</u>
1	COVERSHEET
2	MAINTENANCE OF TRAFFIC
3	PROJECT LAYOUT
4	SUMMARY OF PAY ITEMS
5 - 7	DRAINAGE MAP
8 - 9	TYPICAL SECTION
10 - 20	PLAN PROFILE SHEETS
21 - 24	DRAINAGE CROSS SECTIONS
25 - 39	ROADWAY CROSS SECTIONS
G01	ROADWAY SOIL SURVEY
G02 – G03	REPORT OF ROADWAY AUGER BORINGS
G04	REPORT OF SPT BORINGS
S01	BOX CULVERT TABLE OF VARIABLES
S02 – S03	BOX CULVERT REINFORCING BAR LIST

### 1.03 WORK BY OWNER

- A. Owner will continue the use of the Solid Waste Management Facility that is located at the construction area. Therefore, portions of the roadway around the Class III landfill must be kept open during each phase of construction and the Contractor is to furnish flagmen and/or all-weather bypass lanes when necessary.
- B. Construction Quality Assurance (CQA). Owner will provide on-site inspection and quality assurance during construction. Quality control procedures will involve construction observation of the material and equipment components. Some of the functions are as follows:
- Inspection of materials, and
  - Inspection of slope.

Contractor shall adhere to CQA procedures and work in cooperation with the Owner's and Engineer's representatives toward the successful completion of the project.

### 1.04 WORK BY CONTRACTOR

- A. The Contractor shall furnish all labor, materials, equipment, tools, services and incidentals to complete all of the work required as shown on the Drawings and specified.
- B. The Contractor shall complete the work, in place, ready for continuous service, and shall include repairs, testing, permits, cleanup, replacements, and restoration required as a result of damages caused during construction.
- C. All material, equipment, skills, tools, and labor which are reasonably 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 the Specifications or Drawings, shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.
- D. The Contractor shall comply with all municipal, county, state, and federal laws, rules, guidelines, and codes, which are applicable to the work.
- E. The Contractor will be responsible for any and all traffic control around the construction area including constructing any by-pass roads, if necessary, to avoid construction areas.
- F. The Contractor shall maintain dust control on all roads used for access to construction and all construction areas.

### 1.05 CONTRACTOR USE OF SITE

- A. Access to Site: Limited to the roads and public rights-of-way around the Solid Waste Management Facility.
- B. Working Period: The normal work hours for the Owner(s) inspector(s) are defined as any 10-hour period between 7:00 a.m. and 7:00 p.m., Monday through Friday. Any work outside the 10-hour period shall be paid for by the Contractor and requested in writing, 48 hours in advance. Weekends, County holidays, all overtime, and weekend work shall be at the rate of \$150/hour and shall be deducted from payments due the Contractor on a monthly basis.
- C. Construction Operations: Limited to the area encompassing the existing Class III access road and stormwater system.

- D. Limit Use of Property:
  - 1. Allow use of parking areas by public and Owner including utilization of paved entrance roads.
  - 2. Allow Owner activities for operation.
- E. Utility Outages and Shutdown: Prior approval by Owner and minimized in duration.
- F. Safety Precautions
  - 1. No smoking on County property.
  - 2. Explosive and hazardous gases may be present. Provide detection equipment and procedures for protection.
- G. Observe regulations posted at the landfill entrance for disposal of materials and use of the landfill.

**1.06 SITE CONDITIONS**

- A. The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his Bid, the conformation of the ground, the character and quality of the substrate, the types and quantities of materials to be encountered, the nature of the ground water conditions, the execution of the work, the general and local conditions and all other matters which can, in any way, affect the work under this Contract. No claim for extras based on substrate or ground water table conditions will be allowed.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**



## SECTION 01025

### MEASUREMENT AND PAYMENT

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. The Contractor shall receive and accept the compensation provided in the Contract as full payment for furnishing all labor, equipment, and materials and for performing all construction/operations necessary to complete the work as described in the Contract, and in full payment for all losses or damages incurred during the work, for any discrepancies between actual and estimated quantities, or from any unanticipated difficulties which may arise during the work until final acceptance by the Owner.
- B. The prices included in the Bid Proposal shall include all costs for labor, equipment, materials, taxes, freight, permits, handling and tests required to perform the work as shown on the Contract Documents.
- C. The Contractor shall field verify all quantities and dimensions shown on the Drawings or contained in the Contract Specifications.
- D. No separate payment shall be made for the following work, and all costs shall be included in appropriate payment item in the lump sum or unit price portion of the bid:
- a. Silt fencing and turbidity barriers;
  - b. Erosion control, protection of work from storms and erosion and construction of temporary; structures during construction;
  - c. Cleaning stormwater inlets, culverts, and structures due to sediment from construction;
  - d. Transportation of any solid waste to active portions of the Class I landfill for disposal.
  - e. Hauling and disposal of construction waste material & site cleaning;
  - f. Traffic control activities;
  - g. Dust control;
  - h. Field verifications or locating buried utilities;
  - i. Taxes, insurance, overhead and profit;
  - j. Project Schedule
  - k. All other work required and incidental to the Contract.
- E. Nonpayment for Rejected or Unused Products
- a. Payment will not be made for the following:
    - i. Loading, hauling, and disposing of rejected material;
    - ii. Quantities of material wasted, eroded, washed away or disposed of in a manner not called for under Contract Documents;
    - iii. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents;
    - iv. Material not unloaded from transporting vehicle;
    - v. Failure to submit updated progress schedule with pay application;
    - vi. Defective work not accepted by Owner;
    - vii. Work performed without approved shop drawing;
    - viii. Material remaining on hand after completion of work.
- F. Partial Payment for Stored Materials and Equipment
- a. Partial Payment: No partial payments will be made for materials and equipment delivered or stored.
  - b. Final Payment: Will be made only for products incorporated in work and the product has been completed, tested and accepted by the Owner.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION**

**3.01 MEASUREMENT AND PAYMENT**

A. Item No. 001 – Class III Access Road and Stormwater System Improvements

1. Measurement. Measurement for this item shall be on a completed lump sum basis.
2. Payment. Payment for this item will be at the Lump Sum Price, and shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents. Payment shall cover all work as per Section 01505 and the General Conditions of the Contract Documents. This includes, but is not limited to, movement of personnel, equipment, supplies and incidentals to the project site; obtaining all permits, insurance, and bonds; and any other pre-construction expense necessary for the start of the work. No price adjustments will be made for this item due to changes in the work. Pay item numbers are provided to reference FDOT specifications. FDOT Division two specifications apply for this project, however, division one specifications and non-FDOT division two specifications are provided as a part of this project's specifications package.

**END OF SECTION**

## SECTION 01027

### APPLICATION FOR PAYMENT

#### PART 1 – GENERAL

##### 1.01 RELATED REQUIREMENTS

- A. General provisions of Contract, including General and Supplementary Conditions.
- B. Division 1 Specification Sections.

##### 1.02 SECTION INCLUDES

- A. Administrative and procedural requirements governing the Contractor's Schedule of Values and Applications for Payment.

##### 1.03 SCHEDULE OF VALUES

- A. Coordinate preparation of the Schedule of Values with preparation of the Progress Schedule.
- B. Submit the preliminary and finalized Schedule of Values in accordance with Section 01370.
- C. Sub-Schedules: Where the work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- D. Format and Content: Use County's Continuation Sheet as the form for the Schedule of Values and the Project Manual Table of Contents Divisions 1 and 3 as a guide to establish the format.
  - 1. Identification: Include the following Project Identification on the Schedule of Values:
    - a. Project name and location.
    - b. Name of the Engineer.
    - c. Project or bid number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
    - a. Generic name.
    - b. Related Specification Section.
    - c. Change Orders (numbers) that have affected value.
    - d. Dollar value.
    - e. Percentage of Contract.
  - 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Separate principal subcontracts into several line items.
  - 4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
  - 5. For each part of the work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, 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.

6. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of indirect cost, general overhead, and profit margin.
- E. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Price.

#### **1.04 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.
- B. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- C. Payment Application Times: Will be determined at the Preconstruction Meeting.
- D. Payment Application Forms: The Owner's form shall be used. Applications for payment shall be made once per month.
- E. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned without action.
  1. Entries shall match data on the Schedule of Values and Progress Schedule. Provide updated schedules if revisions have been made.
  2. Include amounts of Change Orders and work Change Directives issued prior to the last day of the construction period covered by the application.
- F. Transmittal: Submit seven (7) complete original executed copies of each Application for Payment to the Engineer, including Contractor's Warranty of Title, Consent of Surety, waivers of liens from the Contractor, all subcontractors and vendors, and similar attachments, when required, each on the forms provided in the Contract Documents.
  1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Owner.
- G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens on the forms provided in the Contract Documents from Contractor and from subcontractors or 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.
  3. The Owner reserves the right to designate which entities involved in the work must submit waivers.
  4. Submit Final Application for Payment with or preceded by final waivers on the forms provided in the Contract Documents from every entity involved with performance of work, including material and/or equipment suppliers, covered by any Application for Payment who could lawfully be entitled to a lien.

5. Subcontract and Supplier lien waivers shall itemize the current cost and status of their contract with the Contractor, including change orders.
  6. Waivers Form: Submit waivers of lien on the forms provided in the Contract Documents and executed in a manner acceptable to Owner.
- H. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the work.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01039

### COORDINATION AND MEETINGS

#### PART 1 – GENERAL

##### 1.01 PRECONSTRUCTION MEETING

- A. Prior to commencement of work, a pre-construction meeting will be held in compliance with the applicable provisions of Section 01200, for the purpose of clarifying the administrative procedures for prosecution of the work and explaining any requirements of the Contract Documents, which are not understood.

##### 1.02 COORDINATION OF DRAWINGS AND SPECIFICATIONS

- A. Before execution of work, review all Drawings and Specifications and immediately report to the Engineer or Owner, in writing, all errors, discrepancies, and/or omissions discovered and submit one set of Contract Documents marked in red pencil clearly indicating the discrepancies.
- B. Where variances occur between Drawings and Specifications, between large-scale drawings over small scale, or within either document itself, include the item or arrangement of better quality, greater quantity, or higher cost in Bid Price. Engineer will have final decision regarding item and manner in which the work is to be installed.
- C. Where such variances are encountered, notify Engineer for interpretation or decision before proceeding with the work, and such interpretation or decision will be final.
- D. Compare Drawings and verify the figures before laying out work. The Contractor will be held responsible for conflicts which might have been avoided by such verification.
- E. Drawings are diagrammatic and indicate general arrangement of systems and work included in the Contract.
  - 1. Follow Drawings in laying out the work and check Drawings of various trades to verify spaces in which work is to be installed.
  - 2. Notify Engineer where space conditions appear inadequate before proceeding.
  - 3. If directed by Engineer, make reasonable modifications in layout as needed to prevent conflict with work of various trades or for proper execution of work, without extra charge.

##### 1.03 COORDINATION OF THE WORK

- A. Coordinate construction activities of the various trades and disciplines to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
- B. Verify that characteristics and elements of interrelated operating equipment are compatible. Coordinate work of various trades having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. The Contractor must submit a "Contractor's Assistance Request" form to Owner with a minimum of seven (7) days notice for access to Owner's facilities. The aforementioned form is attached to this Section.
- D. The Contractor must submit a Concrete Placement Form (Exhibit B) prior to the installation of concrete. The aforementioned form is attached to this Section.

#### **1.04 COORDINATION RESPONSIBILITIES**

**A. Subcontractor Coordination:**

1. Insure subcontractors are knowledgeable of all provisions of Division 1, General Requirements, and are responsible for conforming to applicable requirements and instructions stated.
2. Assume responsibility for administering work performed by subcontractors in accordance with Division 1, General Requirements.

**B. Installation Sequencing:**

1. Examine materials and installations performed by other trades before starting next stage or adjacent work.
2. Immediately correct unsatisfactory conditions, which hinder or restrict correct installation of next stage or adjacent work.
3. Start of next stage or adjacent work will be construed as acceptance of previous or adjacent work whether or not conditions are satisfactory.
4. Any work requiring subsequent removal or replacement due to unsatisfactory or defective work shall be at no expense to the Owner.

#### **1.05 PROJECT SIGNS**

- A.** Subject to prior approval of Engineer and Owner as to size, design, type and location, and local regulations, temporary signs may be erected by the Contractor and Subcontractor for purposes of identification and for controlling traffic.
- B.** Furnish, erect, and maintain such signs as may be required by Safety Regulations or as necessary to safeguard life and property.

#### **PART 2 – PRODUCTS (NOT USED)**

#### **PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

**ORANGE COUNTY SOLID WASTE MANAGEMENT  
FACILITY  
CLASS II ACCESS ROAD PROJECT  
CONTRACTOR'S ASSISTANCE REQUEST  
FOR ACCESS TO COUNTY FACILITIES**

**DATE:** \_\_\_\_\_ **NUMBER:** \_\_\_\_\_

**LOCATION/STRUCTURE:** \_\_\_\_\_  
\_\_\_\_\_

**PURPOSE:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ADDITIONAL ASSISTANCE REQUESTED:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**DATE ACCESS NEEDED:** \_\_\_\_\_

**DURATION OF WORK:** \_\_\_\_\_

\_\_\_\_\_  
**Contractor**

\_\_\_\_\_  
**County Representative**

**COMMENTS/RESTRICTIONS:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
**PLANT SUPERVISOR**



## SECTION 01200

### PROJECT MEETINGS

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The Engineer will schedule and administer a preconstruction conference, periodic construction progress meetings, and specially called meetings throughout the progress of the work.
  - 1. Prepare agenda for meetings.
  - 2. Make physical arrangements for meetings.
  - 3. Preside at meetings.
  - 4. Prepare and distribute meeting minutes to all attendees.
- 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.
- D. Related Work Described Elsewhere:
  - 1. Section 01310: Progress Schedule and Report.
  - 2. Section 01340: Shop Drawings, Working Drawings, and Samples.
  - 3. Section 01720: Project Record Documents.

##### 1.02 PRECONSTRUCTION CONFERENCE

- A. A preconstruction conference shall be scheduled by the Engineer.
- B. Location: The location of the conference shall be a central site, convenient for all parties, designated by the Engineer.
- C. Attendance Requested:
  - 1. Owner's representative.
  - 2. Engineer and their professional consultants.
  - 3. Contractor's representative.
  - 4. Subcontractor's representative.
  - 5. Supplier's representative.
  - 6. Others, as appropriate.
  - 7. Permitting agencies.
- D. Suggested Agenda:
  - 1. Project schedule.
  - 2. Critical work sequencing: Relationships and coordination with facility operation.
  - 3. Major equipment deliveries and priorities.
  - 4. Project coordination and control.
  - 5. Procedures and processing of:
    - a. Field decisions.
    - b. Proposal requests.
    - c. Submittals.

- d. Change orders.
  - e. Applications for payment.
6. Submittal of Shop Drawings.
  7. Adequacy of distribution of Contract Documents.
  8. Procedures for maintaining Record Documents.
  9. Use of premises:
    - a. Office, work and storage areas.
    - b. Owner's requirements.
    - c. Access and traffic control.
  10. Construction facilities, controls and construction aids.
  11. Temporary utilities.
  12. Safety and first aid procedures.
  13. Check of required Bond and Insurance certifications.
  14. Completion time for contract and liquidated damages.
  15. Request for extension of contract time.
  16. Request for a weekly job meeting for all involved.
  17. Security procedures.
  18. Procedures for making partial payments.
  19. Guarantee on completed work.
  20. Equipment to be used.
  21. Staking of work.
  22. Project inspection.
  23. Labor requirements.
  24. Laboratory testing of material requirements.
  25. Inventory of material stored on site provisions.
  26. Requirements of railroads, highway departments, and other organizations.
  27. Rights-of-way and easements.
  28. Housekeeping procedures.
  29. Liquidated damages.
  30. Posting of signs.
  31. Pay request submittal dates.
  32. Equal opportunity requirements.
  33. Permits.

### 1.03 PROGRESS MEETINGS

- A. Regular periodic construction progress meetings will be scheduled.
- B. Meetings shall be held as required by progress of the work.
- C. Location of the meetings: The location of the conference shall be a central site, convenient for all parties, designated by the Engineer.
- D. Attendance:
  1. Engineer and their professional consultants (as needed).
  2. Contractor.
  3. Owner's representative.
  4. Subcontractors (as appropriate to the agenda).
  5. Suppliers (as appropriate to the agenda).
  6. 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, and conflicts.
4. Problems which impede the Construction Schedule.
5. Review of off-site fabrication and 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. Shop Drawing submittals.
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 of the Project.
14. Other business.
15. Construction Schedule.
16. Critical/long-lead items.

F. The Contractor shall attend construction progress meetings and shall study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics regarding progress of the work.

G. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01310

### PROGRESS SCHEDULE AND REPORT

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. A Progress Schedule shall be submitted to the Owner for approval within ten (10) calendar days after Notice to Proceed. The schedule shall include sequence and dates of construction operations for all major stages of work, order and delivery of materials and equipment, and an estimated time of completion. Changes in the approved schedule will not be allowed without written order. If the construction progress does not adhere to the schedule, as approved or revised, measures shall be taken to make up for lost time so completion of the work is in accordance with the schedule.
- B. Procedures for preparation and submittal of construction progress schedules and periodical updating.

##### 1.02 FORMAT

- A. Progress schedules shall be accomplished by a program, which develops a Critical Path giving data similar and equivalent to PRIMAVERA "Sure Trak" or Microsoft Project.
- B. Content: Identify for each major and minor construction stage, portion of work or operation, with initial start dates and durations. The critical path shall be indicated on the network together with the cumulative number of calendar days to complete the project.
- C. Sequence of Listing: The chronological order of the start of each item of work.
- D. Cost Data: Include a cost estimate for each activity, based on and compatible with the project Bid Quantity line items.
- E. Scale and Spacing: To provide for notations and revisions.
- F. Sheet Size: Minimum 11 x 17 inches.

##### 1.03 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Each event or node of the network shall be uniquely numbered and each activity shall be labeled with a suitable description together with an estimate of the number of working days required for the activity.
- C. With the approved network, the Contractor shall submit two (2) copies of each of two (2) different tabulations giving the type of information: Starting Node, Ending Node, Duration in working days, Description, Earliest Start, Earliest Finish, Latest Start, Latest Finish, Total Float, Free Float.
- D. One tabulation shall be a listing of activities in order of ascending starting node numbers. If there is more than one activity with the same starting node number, than all such activities shall be listed in order of ascending ending node numbers. The second tabulation shall be a listing of all activities in order of ascending "latest starts" as related to the start of the Project. If there is more than one activity with the same "latest start," all such activities shall be listed in order of ascending node numbers.

- E. Show accumulated percentage of completion of each item, and total percentage of work completed, as of the first day of each month.
- F. Computer services, if used to process the tabulation, shall be furnished by the Contractor.

**1.04 REVISIONS TO SCHEDULES**

- A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
- B. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
- C. Provide narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken, or proposed, and its effect, including effect of changes on schedule of separate contractors.
- D. If in the opinion of the Engineer, the Contractor falls behind in scheduled progress, the Contractor shall take steps as required to improve their progress and shall submit their revised network diagram, tabulations, and operational plans to demonstrate the manner in which the lost progress will be regained, all without any time loss or additional cost to the Owner.
- E. Lack of satisfactory progress, as adjusted by the Engineer, shall be considered grounds for the withholding of payment until necessary changes have been made.

**1.05 SUBMITTALS**

- A. Submit preliminary outline schedules within 10 days after Effective Date of the Agreement for coordination with work of separate contracts. After review, submit detailed schedules within 10 days, modified to accommodate revisions recommended by the Owner.
- B. Submit revised progress schedules and progress site photographs with each application for payment.
- C. Submit number of opaque reproductions, which Contractor requires, plus three copies retained by the Owner.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01340

### SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the Engineer for review and approval, such working drawings, shop drawings, test reports and data on materials, material samples, materials list, certificates and affidavits as required for proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
- B. Within ten (10) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer a complete materials list of preliminary data on items for which Shop Drawings are to be submitted. Included in this materials list shall be the names of all proposed suppliers furnishing specified items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials fully in accordance with the Specifications.
- C. The Contractor shall maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the Engineer. This log shall include the following items:
  - 1. Submittal-Description and Number assigned.
  - 2. Date submitted to Engineer.
  - 3. Date returned to Contractor (from Engineer).
  - 4. Status of Submittal (Reviewed, Not Reviewed, Rejected).
  - 5. Date of Resubmittal and Return (as applicable).
  - 6. Projected date of delivery to site.
  - 7. Specification Section.
  - 8. Drawings Sheet Number.

##### 1.02 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall check all drawings, data, and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the drawings and data shall bear Contractor's stamp and signature showing that they have been so checked and by affixing the stamp that they comply to the Contract Documents unless exceptions are given. Shop drawings submitted to the Engineer without the Contractor's stamp and signature will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the Engineer. Shop drawing submittals shall not be used as a vehicle for requesting approval of substitute or alternative materials.
- B. The Contractor shall stamp each shop drawing with a standard stamp. The stamp will verify the Contractor has reviewed the information included in the shop drawing. In addition, the stamp will note any variation from the Contract Documents. The Contractor's stamp shall be submitted to the Engineer for acceptance fourteen (14) days prior to construction or submittal of shop drawings. The Engineer will only review shop drawings which have an Engineer-accepted stamp.
- C. The Contractor shall determine and verify:
  - 1. Field measurements.
  - 2. Field construction criteria.
  - 3. Catalog numbers and similar data.
  - 4. Conformance with Specifications.
  - 5. Conformance with drawings and details.

- D. At the beginning of the project, the Contractor shall furnish the Engineer a schedule of Shop Drawings submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials. This schedule shall indicate those that are critical to the progress schedule.
- E. The Contractor shall not begin any work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned by the Engineer, with no exceptions.
- F. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the Engineer receives them. No extension of contract time will be authorized because of failure to transmit submittals to the engineer sufficiently in advance of the work to permit processing.
- G. All submittals shall be accompanied by a transmittal letter prepared in duplicate containing the following information:
  - 1. Date.
  - 2. Project Title and Number.
  - 3. Contractor's name and address.
  - 4. The number of each Shop Drawing, Product Data, and Sample submitted.
  - 5. Notification of deviations from Contract Documents.
  - 6. Submittal Log Number conforming to Specification Section Numbers.
- H. The Contractor shall submit four (4) copies of descriptive or product data submittals to complement shop drawings for the Engineer plus the number of copies that the Contractor requires returned. The Engineer will retain four (4) sets. All shop drawings shall be submitted as electronic files (in AutoCAD<sup>®</sup> format) and four (4) sets of prints. The Engineer will review the shop drawings and return to the Contractor the set of marked-up drawings with appropriate review comments. All design shop drawings, when practical, shall be 22 inches by 34 inches in size.
- I. The Contractor shall be responsible for and bear all costs of damages, which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by Engineer of the necessary shop drawings.

### **1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS**

- A. The Engineer's review of drawings, data and samples submitted by the Contractor will include only general conformity with the design concept of the Project and with the information given in the contract documents. The Engineer's review and exceptions, if any, will not constitute approval of dimensions, quantities, and details of the material or item shown.
- B. The review of drawings and schedules will be general, and shall not be construed:
  - 1. as permitting any departure from the Contract requirements;
  - 2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
  - 3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the drawings or schedules as submitted describe variations per paragraph (1.04.E) and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

- D. When reviewed by the Engineer, each of the Shop Drawings will be identified as having received such review, being so stamped and dated. Shop Drawings stamped "REVISE AND RESUBMIT" and with required corrections shown will be returned to the Contractor for correction and resubmittal.
- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.
- F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.
- G. Shop drawings and submittal data shall be reviewed by the Engineer for each original submittal and first and second resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor.
- H. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- I. No partial submittals will be reviewed. Submittals not complete will be returned to the Contractor for resubmittal. Make all submittals in groups containing all associated items as indicated in specific Specifications Sections. All drawings, schematics, supplier's product data, certifications and other shop drawing submittals required shall be submitted at one time as a package to facilitate interface checking.

#### **1.04 SHOP DRAWINGS**

- A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for materials, which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of setting and schedule drawings and supplier's scale drawings. Descriptive literature, and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.
- B. Supplier's diagrams, illustrations, and other standard descriptive data shall be clearly marked to identify pertinent materials, product, or models. Delete information, which is not applicable to the work by striking or cross-hatching.
- C. 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.
- D. 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. Project Title and Number.
  - 2. Name of project material.
  - 3. Number and title of the shop drawing.
  - 4. Date of shop drawing or revision.
  - 5. Name of Contractor and subcontractor submitting drawing.
  - 6. Name of Supplier.
  - 7. Separate detailer when pertinent.
  - 8. Specification title and number.
  - 9. Specification Section.
  - 10. Application Contract Drawing Number.



- E. If drawings show variations from Contract requirements for any reason, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, they shall not be relieved of the responsibility for executing the work in accordance with the Contract.
- F. Data on materials and include, without limitation, materials lists, catalog data sheets, cuts, materials of construction and similar descriptive material. Materials lists shall give, for each item thereon, the name and location of the supplier, trade name, catalog reference, size, and all other pertinent data.
- G. All suppliers who proposed to furnish products shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five (5) installations where identical material has been installed and has been in operation for a period of at least one (1) year.
- H. Only the Engineer will utilize the color "red" in marking shop drawing submittals.

#### **1.05 WORKING DRAWINGS**

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's plan for temporary structures such as support of open cut excavation, utilities, ground water control systems, falsework and any other work as may be required for construction but is not an integral part of the Project.
- B. Copies of working drawings as noted in paragraph 1.05 A. above shall be submitted to the Engineer for information only, not review, where required by the Contract Documents or requested by the Engineer and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for work.
- C. Working drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Review of working drawings by the Engineer will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. The Contractor assumes all risks of error; the Owner and Engineer shall have no responsibility therefor.
- D. Submittals that relate to the means, methods, techniques, sequencing, procedures, or safety programs of the contractor will be received by the Engineer for information only. A review of the information will not be conducted. These submittals that will not be reviewed include:
  - 1. Fit-up of parts,
  - 2. Shoring and bracing,
  - 3. Constructability tolerances,
  - 4. Field measurements,
  - 5. De-watering plans, except with respect to the requirements of the technical specification, and
  - 6. False work forming plans.

#### **1.06 SAMPLES**

- A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until after review by the Engineer and required corrections are made.
- B. Samples shall be of sufficient size and quantity to clearly illustrate the functional characteristics of the product. A minimum of two samples of each item shall be submitted.

C. Each sample shall have a label indicating:

1. Name of Project.
2. Name of Contractor and Subcontractor.
3. Material Represented.
4. Place of Origin.
5. Name of Producer and Brand (if any).
6. Location in Project.

D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required in paragraph 1.06 B. above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Review of a sample shall be only for the characteristics or use on the project and shall not be construed to change or modify any Contract requirements.

E. Samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Materials incorporated in work shall match the Engineer reviewed samples. Samples, which failed testing, will be returned to the Contractor at his expense, if so requested at time of submission.

#### **1.07 CERTIFICATES AND AFFIDAVITS**

A. Where specified in the Contract Documents that a certificate or affidavit be submitted to the Engineer for a particular product or product component, such submittals shall be made in accordance with the following:

1. For Installation: A certificate of compliance shall indicate that the material has been properly installed in compliance with supplier's instructions. The supplier's representative shall provide the certificate.

B. Each certificate shall include a sworn statement by an official of the company originating the certificate attesting to the truth and accuracy of all information contained in the certificate. If such attestation of truth and accuracy cannot be included in the certificate itself, it must be provided as an affidavit accompanying the certificate.

#### **1.08 ALTERNATIVES TO SPECIFIED PRODUCTS**

A. The Contract Documents may indicate the name of a trade name or a material to be used in the Contract. Reference made to a particular product of the supplier is made to identify a particular design, quality, construction, arrangement, or style.

B. Where the Contractor proposes to use a substitute product for that specified, complete information on such substitute product including all necessary redesign of the material or any other part of the Contract requiring modification as a result of the use of the requested substitute shall be submitted to the Engineer, for review. All such redesign and all new drawings and detailing required as a result thereof shall be prepared by the Contractor at his own expense, including regulatory permit acquisition for the modifications. Requests for additional money for such substitution will not be considered.

C. If the Contractor proposes to provide products as "equals" to those specified, it shall be his responsibility to furnish complete, specific, detailed information to the Engineer from the supplier of the product he proposes to provide in which the requirements of the Contract Documents are shown to be met. This shall consist of a point-by-point comparison of the Contract requirements with the product proposed to be provided. The burden of responsibility in furnishing this information is with the Contractor. If incomplete or irrelevant data is submitted as evidence of compliance with this subparagraph, the request for approval to provide this specific substitute product will be denied and no further submission will be considered.

**1.09 MISCELLANEOUS DATA**

- A. Any other submittals required by these Specifications but not directly addressed under this Section shall be submitted in accordance with the requirements for the shop drawings.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01370

### SCHEDULE OF VALUES

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. Scope of work:
1. Submit to the Engineer a Schedule of Values allocated to the various portions of the work (lump sum items) at the Pre-Construction meeting, and as otherwise specified or requested to be submitted earlier as evidence of the Awarded Contractor's qualifications.
  2. Upon request of the Engineer, support the values with data, which will substantiate their correctness including the cost of material, labor, and O&P.
  3. The Schedule of Values shall establish the actual value of the component parts of the work to be completed, and shall be used as the basis of the Contractor's Application for Payment.
- B. Related Requirements Described Elsewhere:
1. Conditions of the Construction Contract.
  2. Application for Payment: Section 01027.

##### 1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. The Schedule of Values shall be typed on an 8-1/2 inch x 11 inch white paper. Standard construction forms and computer format in MS-Excel spreadsheet will be considered acceptable by the Engineer. Identify schedule with:
1. Title of project, location, Owner, Bid 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 item prices for progress payments during construction.
- C. 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 major products or operations under the item.
- 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. Paid invoices are required for materials upon request by the Engineer.
    - b. The total installed value.
- F. The sum of all lump sum values listed in the schedule shall equal the total contract sum.

##### 1.03 REVIEW AND RESUBMITTAL

- A. After review by Engineer, revise and resubmit Schedule of Values as required.
- B. Resubmit revised Schedule in same manner as previously submitted schedule.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01400

### QUALITY ASSURANCE/QUALITY CONTROL

#### PART 1 – GENERAL

##### 1.01 QUALITY ASSURANCE/QUALITY 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 manufacturers' instructions 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 persons qualified to produce workmanship of specified quality.
- F. Complete daily reports documenting, at a minimum, work completed, problems encountered, and solutions.
- G. Comply with Technical Specification 01340 – Shop Drawings, Working Drawings, and Samples, regarding compliance of products with product specifications.
- H. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- I. The Engineer shall determine and decide all questions which may arise as to the quality and acceptability of materials and work performed; the manner of performance and the rate of progress of said work; the interpretations of the Contract Documents relating to the work; the acceptable fulfillment of the Contract Documents on the part of the Contractor; and the amount and quantity of the several kinds of work performed and materials which are to be paid for under the Contract.

##### 1.02 INSPECTION AND TESTING SERVICES

- A. Engineer will observe construction for verification purposes only of supplied materials and work performed by the Contractor.
- B. Contractor shall perform the necessary testing to document compliance with the technical specifications and construction drawings.
- C. Cooperate with Engineer, furnish samples of materials, design mix, equipment, tools, storage and assistance as requested. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the Site or at source of products to be tested, and to facilitate tests and inspections.
- D. Retesting required as a result of non-conformance with specified requirements shall be performed as instructed by the Engineer and shall not be charged to the Owner.

**1.03 MANUFACTURERS' FIELD SERVICES AND REPORTS**

- A. When specified in individual Specification Sections, required material or product suppliers or manufacturers shall provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, and quality of workmanship as applicable, and to initiate instructions when necessary.
- B. Individuals shall report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report within ten days of observation to Engineer for review.

**1.04 CONTRACTOR'S RESPONSIBILITIES**

- A. Provide test results as required by the specifications in a timely manner to the Engineer for review and approval.
- B. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes that require control by the testing laboratory.
- C. Furnish incidental labor and facilities:
  - 1. To provide access to work to be tested.
  - 2. To obtain and handle samples at the project site or at the source of the product to be tested.
  - 3. To facilitate inspections and tests.
  - 4. To facilitate storage and curing the test samples.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01501

### HEALTH AND SAFETY PROVISIONS

#### PART 1 – GENERAL

##### 1.01 PURPOSE

- A. The purpose of this Section is to establish minimum health and safety requirements for the Contractor to satisfy in the preparation of the Contractor's Site-Specific Health and Safety Plan (H&S Plan).
- B. The Contractor shall provide an H&S Plan appropriate for the work that will be performed. H&S Plan should include but not be limited to: trenching, construction equipment, worker safety, explosive landfill gas, etc.

##### 1.02 APPLICABILITY

- A. These requirements shall be used by the Contractor's Site Health and Safety Officer (Contractor's SHSO) to assist in preparation of the Contractor's H&S Plan. These requirements shall not relieve the Contractor from compliance with any applicable State, Federal, or other health and safety requirements and safe construction practices even if not specifically identified in these requirements. These requirements shall not relieve the Contractor's complete responsibility for the Site's safety and security, including Health and Safety.
- B. If, at any time, the Engineer is apprised of a safety hazard which demands immediate attention because of its high potential for harm to public travel, persons on or about the work, or public or private property, the Engineer shall have the right to order such safeguards to be erected and such precautions to be taken as necessary and the Contractor shall comply with such orders.
- C. If, under such circumstances, the Contractor does not or cannot immediately put the work into proper and approved condition, or if the Contractor or his representative is not upon the Site so that he can be notified immediately of the insufficiency of safety precautions, then the Engineer may put the work into such a condition that it shall be, in his opinion, in all respects safe, and the Contractor shall pay all costs of such labor and materials. The fact that the Engineer does not observe a safety hazard or does not order the Contractor to take remedial measures shall in no way relieve the Contractor of the entire responsibility for any costs, loss, or damage by any party sustained on account of the insufficiency of the safety precautions taken by the Contractor or by the Engineer acting under authority of this Section.
- D. It is the responsibility of the Contractor to take appropriate safety precautions to meet whatever conditions of hazard may be present during the performance of the work, whether the hazard may or may not be reasonably foreseeable. The Contractor is alerted to the fact that it shall be his responsibility to anticipate and provide such additional safety precautions, facilities, personnel, and equipment as shall be necessary to protect life and property from whatsoever conditions of hazard are present or may be present.

##### 1.03 MINIMUM REQUIREMENTS

- A. The Contractor shall prepare and implement a Site-specific H&S Plan that shall conform to applicable OSHA State and Federal requirements.
- B. The Contractor's H&S Plan shall incorporate the requirements contained herein and shall describe all actions to be taken to protect the health and safety of workers and the surrounding community. The plan shall identify all tasks to be undertaken by the Contractor and shall establish health and safety procedures for each task. The Contractor's H&S Plan shall be submitted to the Engineer prior to the initiation of any fieldwork. Any modifications to the H&S Plan shall also be submitted to the Engineer prior to construction. The Engineer may comment on the Contractor's Site-specific H&S Plan and any modifications thereto, but will not provide approval of the Site-specific H&S Plan.



- C. Training requirements of all field personnel shall be specified in the Site-specific H&S Plan. As a minimum, training in accordance with 29 CFR 1910.120 should be required for all personnel involved in intrusive activities (i.e., all below grade work and all grading and handling of soil).

## **PART 2 – PRODUCTS**

### **2.01 SAFETY EQUIPMENT**

- A. All construction equipment shall have safety belts.
- B. The Contractor shall issue or cause to be issued prior to commencing the job, all necessary personal protective equipment (i.e. steel toe boots, hard hats, high visibility vests, etc.).

## **PART 3 – EXECUTION**

### **3.01 RECORDKEEPING**

- A. All parties engaged in on-Site activities shall read the Contractor's Site-specific H&S Plan for the relevant tasks. Documentation demonstrating compliance with this requirement shall be maintained on-site by the Contractor. Written evidence of compliance with 29 CFR 1910.120 and applicable State and Federal requirements, for all parties engaged in on-site activities, shall be maintained on-site in the Contractor's files. Copies of such documentation shall be provided to the Engineer.
- B. Contractor's personnel not following safety requirements shall immediately be removed from the project site. Anyone that has violated safety rules and removed from the project site shall not be allowed to return.
- C. Delays in the performance of the work caused by the removal of personnel due to safety violations shall be the responsibility of the Contractor. These delays shall not create any additional cost to the Owner, and no time extensions shall be granted.

**END OF SECTION**

**SECTION 01505**

**MOBILIZATION AND DEMOBILIZATION**

**PART 1 – GENERAL**

**1.01 DEFINITION AND SCOPE**

**A. Mobilization**

Mobilization shall include the obtaining of all permits, bonds, and insurance; transportation to the site of all equipment and construction facilities; and all other preparatory work and operations required for the proper performance, clean-up, and completion of the Work.

1. Permits by Owner: The Owner prior to the advertisement of the project has filed the following permit application:

Permit Modification Application to Construct Class III-Cell 2-2011 LFG Management System Expansion: Permit No: 0128169-047-SF-MM.

**B. Demobilization**

No additional payment will be made for Demobilization. Demobilization includes removing from the site any private or public properties that were accessed by the Contractor to perform the work, all resources, equipment, materials, temporary support facilities, utilities, and all remaining construction debris at the completion of the project.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01550

### SITE ACCESS AND TRAFFIC CONTROL

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The Contractor shall furnish all materials, labor, equipment, tools, and appurtenances required to maintain site access and traffic control. Traffic congestion around the Site shall be minimized to maintain public safety, and to avoid the potential conflicts with the on-going transfer station operations, other construction activities, and for complaints from the public.
- B. The Contractor shall comply with all applicable codes, ordinances, rules, regulations and laws of local, municipal, State, and Federal authorities having jurisdiction. This includes, but is not limited to, compliance with all traffic laws and with vehicular weight and axle-loading limitations.
- C. The Contractor's responsibility for the maintenance of site access and traffic control shall not cease until the work has been accepted by the Owner.

##### 1.02 SUBMITTALS

- A. Within ten (10) days after the Notice to Proceed and prior to mobilization onto the Site, the Contractor shall develop and submit a Site Access and Traffic Control Plan in accordance with the requirements of Section 01340 of these Specifications, and as specified herein.
- B. The Site Access and Traffic Control Plan shall include, but not be limited to, proposed traffic patterns and layouts, required traffic control devices (i.e., signs, barricades, cones, etc.) and utilization, hours of operation, and other associated details for the proper maintenance and protection of traffic.

#### PART 2 – PRODUCTS (NOT USED)

#### PART 3 – EXECUTION

##### 3.01 SITE ACCESS

- A. Access to the Site will be from the main entrance road as shown on the design drawings.
- B. The Contractor shall coordinate Site access with the Owner. This includes, but is not limited to, scheduling of deliveries and available working hours.

##### 3.02 OFF-LOADING

- A. Coordinate with the Engineer to select the areas to be used for off-loading and temporary storage of materials. Clearly delineate the boundary of all storage and laydown areas.
- B. To reduce tracking of soils back on to the roads, dumping of soils should be done in a manner that minimizes wheel contact with the soils. Off-loading of materials shall be coordinated with construction of temporary access roads to minimize tracking of soils. If tracking of soil onto public roads from the Contractor's operations is severe in the opinion of the Owner and Engineer, the Contractor shall take action such as constructing a wheel-washing station or installation gravel tracking pads as required.

### **3.03 COVERING OF MATERIALS**

- A. The Contractor shall take such steps as necessary to prevent spillage, wind blown deposits on the roads, and damage to other vehicles. All trucks used for transport of soils shall be covered with a well-secured tarp before transportation on public roads.
- B. After dumping the load at the Site, the Contractor shall inspect the truck bed for residual materials and shall remove or cover residual material before allowing the truck to leave the Site and enter public roads.

### **3.04 STREET CLEANING**

- A. Remove all soils, dirt, rock, asphalt and other deposits that accumulate on the public roads, and the on-Site access roads that are a result of the Contractor's hauling operation. This includes windblown deposits, spillage, and materials tracked onto the roads.
- B. Inspection of the roads is to be performed by the Contractor at least daily during hauling operations. When the inspection determines that cleaning is required, or as directed by the Engineer, the Contractor shall immediately perform such cleaning.

### **3.05 TRAFFIC CONTROL**

- A. Facility traffic is not expected in the areas of proposed construction. However, the Contractor shall limit access to these areas for protection of facility personnel, and direct traffic through these areas only if it can be safely accomplished.

### **3.06 ON-SITE TRANSPORTATION**

- A. The control of on-Site traffic is the Contractor's sole responsibility and shall be performed in a safe and orderly manner. A speed limit of 5 MPH or less shall be enforced by the Contractor on all vehicles and equipment on the Site.
- B. Access roads shall be constructed and maintained by the Contractor to prevent adverse impacts or delays to the work. The Contractor is responsible for maintaining the current level-of-service and condition of the on-Site access roads to prevent adverse impacts or delays to the work.
- C. On-site traffic shall be limited to the existing access roads. Damage to, or deterioration of, the Site's access roads, or any other damages to existing on-Site features caused by unauthorized deviation from these pathways, shall be restored and/or replaced to the satisfaction of the Engineer at the Contractor's expense to an "as-was" or "better condition."

**END OF SECTION**

## SECTION 01600

### MATERIAL AND EQUIPMENT

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION OF REQUIREMENTS

- A. Contractor furnished materials and equipment shall be new and shall not have been in service at any other installation unless otherwise provided. It shall conform to applicable specifications approved in writing by the Engineer.
- B. Fabricated and manufactured products shall be designed, fabricated, and assembled in accordance with the best engineering and shop practices. Like parts of duplicate units shall be manufactured to standard sizes and gages to be interchangeable.
- C. Two or more items of the same kind shall be identical, by the same manufacturer.
- D. Products shall be suitable for project service conditions.
- E. Equipment dimensions, sizes, and capacities shown or specified shall be adhered to unless variations are specifically approved in writing.
- F. Equipment and material shall not be used for any purpose other than that for which it is specified or designed.
- G. Where equipment or material is specifically shown or specified to be reused in the work, special care shall be used in removal, handling, storage, and reinstallation, to assure proper function in the completed work.
- H. Contractor shall arrange for transportation, storage, and handling of products that require off-site storage, restoration, or renovation.
- I. Installation of all work shall comply with manufacturer's printed instructions. Contractor shall obtain and distribute copies of the manufacturer's instructions to the parties involved in the installation, including two copies to the Engineer. Also, a set of instructions shall be available at the job site during installation and until completion. All equipment and products shall be handled, installed, connected, cleaned, conditioned, and adjusted in accordance with the manufacturer's instructions and specified instructions. Should specified requirements or job conditions conflict with the manufacturer's instructions, these conflicts shall be called to the Engineer's attention for review and revised instructions.
- J. All materials and equipment, which are furnished and/or installed by the Contractor, shall be guaranteed. The guarantee shall be against manufacturing and/or design inadequacies, materials and workmanship not in conformity with the paragraph above, hidden damage, improper assembly, failure of device and/or components, excessive leakage or other circumstances which would cause the equipment to fail under normal design and/or specific operating conditions for a period of two years or a longer period as may be shown and/or specified from the date of acceptance of the equipment by the Owner. If a piece of equipment, device, or component shall fail within the above specified term of the guarantee shall be replaced and installed with reasonable promptness by the Contractor without cost to the Owner.
- K. Rotating machinery shall be designed and fabricated to provide satisfactory operation without excessive wear and without excessive maintenance during its operating life. Rotating parts shall be statically and dynamically balanced and shall operate without excessive vibration.
- L. Screens, guards, or cages shall be provided for all exposed, rotating, or moving parts in accordance with accepted practices of applicable governmental agencies.

- M. Each major component of equipment shall have the manufacturer's name, catalog and/or model number, and serial number on stainless steel or weather resistant plate securely attached to the item of equipment.

## **1.02 TRANSPORTATION AND HANDLING**

- A. Equipment and materials shall be loaded and unloaded by methods affording adequate protection against damage. Precaution shall be taken to prevent injury to the equipment or materials during transportation and handling. Suitable equipment will be used and the material or equipment shall be under control at all times. Under no condition shall the material or equipment be dropped, bumped, or dragged. When a crane is used, a suitable hook or lift sling shall be used. The crane shall be placed so that all lifting is done in a vertical plane.
- B. Equipment and material shall be delivered to the job site by means that will adequately support it and not subject it to undue stress.

## **1.03 STORAGE AND PROTECTION**

- A. All equipment, products, and materials shall be stored in accordance with the manufacturer's instructions, with seals and labels intact and legible. Humidity and temperature shall be maintained within the ranges required by the manufacturer's instructions. Products subject to damage by the elements shall be stored in weather-tight enclosures. Fabricated products shall be stored above the ground on blocking or skids. Products that are subject to deteriorations shall be covered with impervious coatings with adequate ventilation to avoid condensation. Loose granular materials shall be stored in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- B. Storage shall be arranged in such a manner to provide easy access for inspection. Periodic inspections shall be made of all stored products to assure that they are maintained under specified conditions, and free from damage or deterioration.

## **PART 2 – PRODUCTS (NOT USED)**

## **PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01700

### CONTRACT CLOSEOUT

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. Scope of Work: Comply with the requirements stated in Conditions of the Contract and in specifications for administrative procedures in closing out the work.

##### 1.02 SUBSTANTIAL COMPLETION

- A. When Contractor considers the work as substantially complete, he shall submit to the Engineer:
1. A written notice that the work is substantially complete.
  2. All operations and maintenance manuals and instructions and spare parts required by the Contract Documents.
- B. Within a reasonable time after receipt of such notice, County, Contractor, and Engineer shall make an inspection of the work to determine the status of completion.
- C. If Engineer doesn't consider the work substantially complete:
1. The Engineer will promptly notify the Contractor in writing, listing the reasons for determining that the work isn't substantially complete.
  2. Contractor shall remedy the deficiencies in the work and deliver a second written notice of substantial completion to the Engineer.
  3. Engineer will reinspect the work.
- D. When Engineer finds that the work is substantially complete, he will:
1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion on the form provided herein, with a tentative list of items to be completed or corrected before Final Completion.
  2. After consideration of any objections made by Owner as provided in the Conditions of the Contract, and when Engineer considers the work to be substantially complete, he will execute and deliver to Owner and Contractor a definite Certificate of Substantial Completion with a tentative list of items to be completed or corrected.

##### 1.03 FINAL INSPECTION

- A. When Contractor has completed the minor items in the list attached to the Certificate of Substantial Completion and considers the work to be complete, he shall submit to the Engineer:
1. A written notice of Final Completion.
  2. Written certification that:
    - a. The Contract Documents have been reviewed.
    - b. The work has been inspected for compliance with the Contract Documents.
    - c. The work has been completed in accordance with the Contract Documents and is ready for final inspection.
- B. Engineer, Contractor, and County will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

- C. Should the Engineer consider the work to be incomplete or defective:
1. Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
  2. Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to the Engineer that the work is complete.
  3. Engineer, Contractor, and County will reinspect the work.
- D. After Contractor has completed all corrections to the satisfaction of the Engineer and County as verified by the Final Inspection and delivered all maintenance and operating instructions, schedules, warranties, guarantees, Bonds, certificates of inspection, and record documents, all as required by the Contract Documents and acceptable to County and Engineer, the Engineer will execute and deliver to Owner and Contractor a Certificate of Final Completion and the Contractor may then submit an application for Final Payment.

**1.04 FINAL PAYMENT**

- A. Contractor shall follow the procedures for Final Payment found in the General Conditions of the Contract Documents.

**PART 2 – PRODUCTS (NOT USED)**

**PART 3 – EXECUTION (NOT USED)**

**END OF SECTION**



## SECTION 01720

### PROJECT RECORD DOCUMENTS

#### PART 1 – GENERAL

##### 1.01 SUMMARY

- A. The Contractor shall maintain at the site one record copy of:
  - 1. Drawings.
  - 2. Project Manual.
  - 3. Addenda.
  - 4. Change orders and other modifications to Contract.
  - 5. Project Manager field orders, written instructions or clarifications.
  - 6. Approved submittals.
  - 7. Field test records.
  - 8. Construction photographs.
  - 9. Associated permits.
  - 10. Certificates of inspection and approvals.

##### 1.02 SUBMITTALS

- A. Accompany the submittals with a transmittal letter in duplicate, containing the following.
  - 1. Date.
  - 2. Project title and number.
  - 3. Contractor's name and address.
  - 4. Title of record document.
  - 5. Signature of Contractor or authorized representative.

#### PART 2 – PRODUCTS (NOT USED)

#### PART 3 – EXECUTION

##### 3.01 MAINTENANCE OF RECORD DOCUMENTS AND SAMPLES

- A. The Contractor shall:
  - 1. Store documents and samples in Contractor's field office, if used for this project, apart from documents used for construction.
    - a. Provide files and racks for storage of documents.
    - b. Provide secure storage space for storage of samples.
  - 2. Maintain documents in clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
  - 3. Make documents and samples available at all times for inspection by Engineer or Owner.
- B. Failure to properly maintain record documents may be reason to delay a portion of progress payments until records comply with Contract Documents.

##### 3.02 CONSTRUCTION PHOTOGRAPHS

- A. The Contractor shall submit to the Engineer a Pre-Construction video of the proposed area of construction, construction staging area, and each proposed access to the construction area. Submittal shall be in a DVD format or USB drive (aka thumb drive).

- B. The Contractor shall provide a series of digital color photographs, in print form and CD ROM (2 megapixel resolution or better), documenting all aspects of construction. Record photographs shall be 4 inches x 6 inches, printed in color two per 8.5 inches x 11 inches page, with the following identified for each photograph:
- Project Name
  - Contractor's Name
  - Date and Time (digital on front side of photograph)
  - Photograph file name
  - A detailed description identifying location and name of feature photographed.
- C. The photographs shall detail each major stage of construction as follows:
1. Project site prior to Mobilization.
  2. Demolition of designated areas.
  3. Rehabilitation of maintenance shop floor within various areas and at various stages.
  4. Damage and repair of any existing utilities, appurtenances, or curbing.
  5. Project site after Demobilization.
- D. Photographs shall be taken weekly or during execution of individual work items, whichever is more frequent, beginning prior to the start of construction and continuing through the completion of all construction. Submittal of the above shall be with each application for payment and shall detail all of the construction which has taken place during the payment period.

### 3.03 RECORD DOCUMENTS

- A. Label each document "PROJECT RECORD" in neat, large printed letters.
- B. Maintain record set of Drawings and Specifications legibly annotated to show all changes are made during construction.
1. Graphically depict changes by modifying or adding to plans, details, sections, elevations, or schedules.
  2. Make changes on each sheet affected by changes.
- C. Record information concurrently with construction progress.
1. Do not conceal field work until required information is recorded.
  2. Record changes made by Written Amendment, Field Order, Change Order or Work Directive Change.
- D. Drawings:
1. Record drawings should include the following:
    - a. Title Sheet (includes site location map, site address and phone number, and designer address and phone number).
    - b. Topography of the asphalt pavement.
    - c. Post-rehabilitation.
    - d. As-Built Typical Details.
- E. Project Documentation:
1. Each copy shall be typed, bound and, at the minimum, consist of the following information:
    - a. Construction Notes/Bill of Materials.
    - b. Cover Sheet.
    - c. Table of Contents.
    - d. List of Addenda.

- e. Project Summary - a comprehensive narrative explaining how construction of the project was accomplished along with a brief discussion of problems encountered and the measures taken to resolve these problems.
- f. Project Contact List - includes the names, phone numbers and addresses of the following:
  - Project Manager
  - Site Representative
  - Designer
  - Surveyor
  - Record Documenter
- g. Project Vendor List.
- h. Project Record Drawing Summary.
- i. Photographs.

F. General File Requirements:

- 1. A CD ROM with the Project Documentation text data (where applicable) saved for Microsoft Office 2007 compatibility.
- 2. A CD ROM or thumb drive with the Project Documentation photos saved in jpeg format.
- 3. A CD ROM or thumb drive with the AutoCAD files, saved for version 2007 or later compatibility, for all record drawings including:
  - a. 2-dimensional, 1:1 format.
  - b. Existing survey reference points.
  - c. Breaklines that define all surface features.
  - d. All data must be on accurate levels and have proper line weights.
  - e. Contours and spot elevations must be at correct elevation.
- 4. Label CD ROM(s) or thumb drive(s) with name, date, and file reference names.

**END OF SECTION**

## SECTION 02100

### SITE PREPARATION

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. Scope of Work:
1. This Section covers clearing, grubbing, and stripping along the construction sites and within the limits of construction designated on the drawings, complete as specified herein.
  2. The Contractor shall clear and grub all of the area within the limits of actual construction as required, which includes, but is not limited to, roadways, trenchwork, structures, and open areas. The width of the area to be cleared shall be approved by the Engineer prior to the beginning of any clearing.

#### PART 2 – PRODUCTS (NOT USED)

#### PART 3 – EXECUTION

##### 3.01 CLEARING

- A. The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish, and all other objectionable obstructions resting on, or protruding through, the surface of the ground. However, those trees which are designated by the Engineer shall be preserved as hereinafter specified. Clearing operations shall be conducted so as to prevent damage to existing structures and installations, and to those under construction, so as to provide for the safety of employees and others.

##### 3.02 GRUBBING

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

##### 3.03 STRIPPING

- A. For open areas for sodding or seeding, grass and roots shall be stripped to a depth of 4 inches.
- B. Stripped material suitable for topsoil shall be stockpiled and shall be protected until it is replaced. Any topsoil remaining after all work is in place shall remain for use by Owner.

##### 3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

- A. The Contractor shall dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to the onsite Class III landfill. No burning shall be allowed on-site. The cost of disposal (hauling) of cleared and grubbed material and debris shall be considered an obligation of the Contractor; the cost of which shall be included in the contract sum.

**3.05 PRESERVATION OF TREES**

- A. Trees outside the limits of construction shall be carefully protected from damage. The Contractor shall erect such barricades, guards, and enclosures as may be considered necessary for him for the protection of the trees during all construction operations.
- B. Removal of trees within the limits of construction shall be in accordance with applicable local ordinances. The Contractor shall apply for and pay for all costs associated with the permitting of and removal of trees from the proposed developed area.

**END OF SECTION**

## SECTION 02220

### EXCAVATION, BACKFILLING, AND COMPACTION

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. Scope of Work: The work included under this Section consists of furnishing all labor, materials, equipment and incidentals necessary to perform all excavation, removal of unsuitable material, backfill, fill and grading required to complete the work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to, all excavation and trenching; all backfilling; embankment and grading; ditch grading; and all related work such as sheeting, bracing, dewatering, all earthwork and all other requirements shown on the drawings and specified herein.
- B. Definitions:
1. Maximum Density: Maximum weight in pounds per cubic foot of a specific material.
  2. Optimum Moisture Content: The optimum moisture content shall be determined by ASTM D 698 (latest) specified to determine the maximum dry density for relative compaction. Field moisture content shall be determined on the basis of the fraction passing the 3/4-inch sieve.
  3. Rock Excavation: Excavation of any hard-natural substance which requires the use of explosives and/or special impact tools such as jack hammers, sledges, chisels or similar devices specifically designed for use in cutting or breaking rock, but exclusive of trench excavating machinery.
  4. Unsuitable: Unsuitable materials are highly organic soil (peat or muck) classified as A-8 in accordance with AASHTO Designation M 145.
- C. Plan for Earthwork:
1. The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the conformation of the ground, the character and quality of the substrata, the types and quantities of materials to be encountered, the nature of the groundwater conditions, the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract according to the General Conditions.
  2. The Contractor will secure on or off-site borrow sources which can meet the requirements of these specifications, drawings and contract documents for this project.
  3. The work of this section shall include, but not necessarily be limited to excavating, hauling, backfilling, compaction, and grading of soil. The work will pertain all or in part to the construction of landfill entrance road, stormwater pond excavation, pipes, drainage ditches, and disposal of surplus materials. Contractor shall conform to the dimension lines, grades and sections specified on the Drawings.
  4. The Contractor will furnish transportation if the offsite borrow source is not contiguous to the landfill property.
- D. Trench Safety Act: The Contractor shall comply with all of the requirements of the Florida Trench Safety Act (Chapter 90-96, CS/CB 2626, Laws of Florida). The Contractor shall acknowledge that included in various items of his bid proposal and in the total bid price are costs for complying with the provisions of the Act. Additionally, the Contractor is required to break out the costs for complying with the Florida Trench Safety Act. **FAILURE TO COMPLY WITH THE REQUEST IN THIS SECTION SHALL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.**

##### 1.02 RELATED WORK

- A. Section 02100 – Site Preparation  
Section 02630 – Storm Drainage

### **1.03 APPLICABLE PUBLICATIONS**

- A. All publications and standard specifications referred to herein are the latest or current issue of that publication or specification as of the specification date.

### **1.04 QUALITY ASSURANCE**

- A. All earthwork and related installations shall be performed in accordance with the requirements of these Specifications.
- B. Costs for pre-qualification testing of materials including onsite/offsite materials shall be paid by the Owner.

### **1.05 FEDERAL AND STATE REGULATORY REQUIREMENTS**

- A. All trench excavations which exceed 5 feet in depth shall comply with the applicable trench safety standards as stated in the OSHA excavation safety standards 29 CFR S.1926.650 Subpart P as regulated and administered by the Florida Department of Labor and Employment Security as the "Florida Trench Safety Act."

### **1.06 JOB CONDITIONS**

- A. If, in the opinion of the Engineer, conditions encountered during construction warrant a change in the elevations or in the depth of removal of unsuitable material from that indicated in the soils report, an adjustment will be made in the contract price, as provided in the General and Special Conditions.

### **1.07 PROTECTION**

- A. Pre-Construction Survey:
  - 1. Prior to commencing excavation, backfill or dewatering, the Engineer and Contractor shall jointly conduct a survey of any existing structures which, in the opinion of the Engineer, may be subject to settlement or distress resulting from excavation or dewatering operations.
- B. The Contractor shall install and maintain all erosion control features (i.e., silt fences around all areas downslope of soil disturbance, and wetland boundaries). Other areas which may require erosion protection or silt fences shall be identified by the Engineer during construction. Silt fences shall not be removed until the contained areas are covered with sod (exterior of containment berms) or other sufficient erosion control measures such as erosion matting, seeding/mulching and the Engineer determines that soils are adequately stable (not eroding).

### **1.08 SUBMITTALS**

- A. Submit to the Engineer for review the proposed methods of construction, including dewatering, excavation, filling, compaction and backfilling for the various portions of the work. Review shall be for method only. The Contractor shall remain responsible for the adequacy and safety of the methods.

## **PART 2 – PRODUCTS**

### **2.01 MATERIALS**

- A. General:
  - 1. All fill material from on and off-site sources shall be subject to review by the Engineer
  - 2. All fill material shall be unfrozen and free of organic material, roots, trash, or other objectionable material. Excess or unsuitable material as designated by the Engineer shall be removed from the job site by the Contractor.

B. Clean Common Fill Material:

1. Clean common fill shall be sand not containing stones, rock, concrete, clods, or other rubble larger than 1/4 inch in diameter. It shall have physical properties which allow it to be easily spread and compacted. Material shall be free of solid waste and degradable organic material, as determined by the Engineer.
2. The Contractor shall utilize as much excavated material as possible for reuse in accordance with the contract drawings and specifications or as directed by the Engineer.
3. Materials excessively wet or dry are unsuitable. Allow such material to dry, or moisten, to bring material within plus 3 percent of optimum moisture content range for specified compaction.
4. The Engineer shall direct the Contractor on the type of material allowed in certain sections of the earthwork operations.

C. Structural Fill: Structural fill shall be well graded sand to gravelly sand having the following gradation:

<u>U.S. Sieve Size</u>	<u>Percent Passing By Weight</u>
1 - inch	100
No. 4	75-100
No. 40	15-80
No. 100	0-30
No. 200	0-10

Any soil material which does not meet the above requirement must be classified either SW, SP, SM, or SC, according to the Unified Soil Classification System, and must be evaluated and approved for use by a Florida registered Professional Engineer with primary expertise in geotechnical engineering. The Engineer must state any additional construction requirements to be performed in order for the soil to perform the project design requirements as structural fill.

D. Class I Soils<sup>1</sup>: Manufactured angular, granular material, 1/4 to 1/2 inches (6 to 12 mm) in size, including materials having significance such as crushed stone or rock, broken coral, or crushed shells. Sieve analysis for crushed stone is given below separately.

1. Crushed Stone: Crushed stone shall consist of clean mineral aggregate free from clay, loam or organic matter, conforming with ASTM C33 stone size No. 89 and with particle size limits as follows:

<u>U.S. Sieve Size</u>	<u>Percent Passing By Weight</u>
1/2	100
3/8	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 50	0-5

E. Class II Soils<sup>2</sup>:

1. GW: Well-graded gravels and gravel-sand mixtures, little or no fines. Fifty (50) percent or more retained on No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.
2. GP: Poorly graded gravels and gravel-sand mixtures, little or no fines. Fifty (50) percent or more retained on No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.

<sup>1</sup> Soils defined as Class I soils are not defined in ASTM D2487.

<sup>2</sup> In accordance with ASTM D2487, less than 5 percent pass No. 200 sieve.



3. SW: Well-graded sands and gravelly sands, little or no fines. More than fifty (50) percent passes No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.
  4. SP: Poorly graded sands and gravelly sands, little or no fines. More than fifty (50) percent passes No. 4 sieve. More than 95 percent retained on No. 200 sieve. Clean.
- F. Other Material: All other material, not specifically described, but required for proper completion of the work shall be selected by the Contractor and approved by the Engineer.

## **PART 3 – EXECUTION**

### **3.01 FIELD QUALITY CONTROL**

- A. The minimum frequency of quality control testing is as provided in these specifications or as set during construction by the Owner. Frequency of testing for field Quality Control shall be the same as defined for conformance testing.
- B. Sampling locations may be selected by the Engineer. If necessary, the location of routine in-place moisture content and dry density test shall be determined using a non-biased sampling plan.
- C. An increased testing frequency shall be used at the discretion of the Engineer when visual observations of construction performance indicate a potential problem.
- D. All perforations resulting from testing the subgrade or embankment shall be filled by the Contractor with soil compacted to the satisfaction of the Engineer.
- E. If a defective area is discovered in the earthwork, the Engineer will determine the extent and nature of the defect and notify the Contractor. If the defect is indicated by an unsatisfactory test result, the Engineer shall determine the extent of the defective area by additional tests, observations, a review of record, or other means. The Contractor shall be responsible for the cost of these additional tests. If the defect is related to material, and/or adverse site conditions, such as overly wet soils or surface desiccation, the Engineer shall define the limits and nature of the defect.
- F. After determining the extent and nature of a defect, the Contractor shall correct the deficiency to the satisfaction of the Engineer. The cost of corrective actions shall be borne by the Contractor.
- G. Additional testing shall be performed to verify that the defect has been corrected before any additional work is performed by the Contractor in the area of the deficiency. The Contractor shall be responsible for the cost of these additional tests.

### **3.02 PROTECTION**

- A. Sheeting and Bracing:
  1. Furnish, put in place, and maintain sheeting and bracing as required to support the sides of excavations, to prevent movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, and to protect workers from hazardous conditions or other damage. Such support shall consist of braced steel sheet piling, braced wood lagging and soldier beams or other approved methods. If the Owner is of the opinion that sufficient or proper supports have not been provided, he may order additional supports be installed at the expense of the Contractor, and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids beside the sheeting, but if voids are formed, they shall be immediately filled and compacted. Where soil cannot be properly compacted to fill a void, lean concrete shall be used as backfill at no additional expense to the Owner.
  2. The Contractor shall construct sheeting outside the neat lines of the foundation unless deemed desired otherwise for his method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting and bracing shall withstand all pressure to which the structure or trench will be subjected. Any deformation shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.

3. Where sheeting and bracing are required to support the sides of excavations for structures, the Contractor shall engage a Professional Geotechnical Engineer registered in the State of Florida to design the sheeting and bracing. The sheeting and bracing installed shall conform with the design, and certification of this shall be provided by the Professional Geotechnical Engineer.
4. The installation of sheeting, particularly by driving or vibrating, may cause distress to existing structures. The Contractor shall evaluate the potential for such distress and, if necessary, take all precautions to prevent distress of existing structures because of sheeting installation.
5. The Contractor shall leave in place to be embedded in the backfill, all sheeting and bracing not shown on the Drawings but which the Owner directs him in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities, or property, whether public or private. The Owner may direct that timber used for sheeting and bracing be cut off at any specified elevation.
6. All sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction, or other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted for that purpose, or otherwise directed by the Owner.
7. The right of the Owner to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
8. No wood sheeting is to be withdrawn if driven below mid-diameter of any pipe, and under no circumstances shall any wood sheeting be cut off at a level lower than 1 foot above the top of any pipe.

**B. Pumping and Drainage:**

1. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels. The Contractor shall submit to the Engineer for review a plan for dewatering systems prior to commencing work. The installed dewatering system shall be in conformity with the overall construction plan. The Contractor shall be required to monitor the performance of the dewatering systems during the progress of the work and require such modifications as may be required to assure that the systems are performing satisfactorily.
2. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at the bottom of the excavation and to preserve the integrity of adjacent structures.
3. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.
4. The Contractor shall take all additional precautions to prevent buoyant uplift of any structure during construction.
5. The conveying of dewatering liquids off site will not be allowed unless approval by the proper regulatory agencies is obtained. Dewatering liquids should be routed into the facility's stormwater management system, or other onsite storage area if approved by the Owner and Engineer. The Contractor shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and he shall leave the facilities unrestricted and as clean as originally found. Any damage to facilities shall be repaired or restored as directed by the Owner.
6. Flotation shall be prevented by the Contractor by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages which may result from failure of this system.

7. Removal of dewatering equipment shall be accomplished after the system is no longer required; the material and equipment constituting the system shall be removed by the Contractor.
8. The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. in order to prevent adverse effects on groundwater quality.

### 3.03 EXCAVATION

#### A. Excavating for Landfill Entrance Road, and Structures and Utilities:

1. Excavation work shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards. Excavations shall provide adequate working space and clearances for the work to be performed therein and for installation and removal of concrete forms.
2. The landfill site shall be graded to drain as shown on the plans and will require the contractor to excavate some portions of the site and to fill others. The Contractor shall provide a surveyor to determine excavation or fill required in the landfill area to meet the lines and grades presented on the plans.
3. Excavation shall be made to such dimensions as will give suitable room for bracing and supporting, for pumping and draining, for installing the pipelines, and for all other work required.
  - a. Excavation for precast or prefabricated structures shall be carried to an elevation of 2 feet lower than the proposed outside bottom of the structure to provide space for the structural backfill material.
  - b. Excavation for structures constructed or cast-in-place in dewatered excavations shall be carried down to the bottom of the structure where dewatering methods are such that a dry excavation bottom is exposed and the naturally occurring material at this elevation leveled and left ready to receive construction.
4. Immediately document the location, elevation, size, material type, and function of all new subsurface installations and utilities encountered during the course of construction.
5. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the Drawings and should anticipate the encounter of unknown obstructions during the course of the work.
6. Encounters with subsurface obstructions shall be hand excavated unless otherwise approved by owner.
7. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Subgrade soils which become soft, loose, "quick" or otherwise unsatisfactory for support of the proposed road and structures as a result of inadequate dewatering or other construction methods, shall be removed and replaced with Class I soils for pipes and structures, as required by the Engineer at the Contractor's expense. Placement and compaction of the replacement material shall conform to the requirements contained herein.
8. The bottom of excavations shall be rendered firm and dry before placing any soil, structure or pipe. Excavated material not suitable for backfill shall be removed from the work and stockpiled as directed by the Owner. The bedding schedule for pipes shall be as shown in Table 02220-B.
9. Excavated material shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered.
10. All soil, structure and pipe locations and elevations as required herein must be permanently documented by the Contractor on the Record Drawings prior to the Engineer's approval of the Application for Payment for that work.
11. All pavements shall be cut prior to removal, with saws or approved power tools.
12. All trenches opened during the day shall be closed at the end of the workday or safely secured.

### 3.04 DRAINAGE

- A. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations, and keep such excavations dry so as to obtain a satisfactory undisturbed liner subgrade foundation condition or structure subgrade foundation condition. The dewatering method used shall prevent disturbance of earth below grade.

- B. All water pumped or drained from the excavated area shall be disposed of in a suitable manner without undue interference with other work, without damage to surrounding property, and in accordance with pertinent rules and regulations.
- C. No construction, including pipe laying, shall be allowed in water. Groundwater shall be maintained at least 12 inches below excavation except in borrow areas. The Contractor shall constantly guard against damage due to water and take full responsibility for all damage resulting from his failure to do so.
- D. The Contractor will be required at his expense to excavate below grade and refill with approved fill material if the Owner determines that adequate drainage has not been provided.

### **3.05 UNDERCUT**

- A. If the bottom of any excavation is below that shown on the Drawings or specified because of Contractor error, convenience, or unsuitable subgrade due to the Contractor's excavation methods, refill to normal grade with fill at Contractor's cost. Fill material and compaction method shall be as directed by the Engineer.

### **3.06 STABILIZATION**

- A. Subgrades for structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact.
- B. Subgrades for structures or trench bottoms which are otherwise solid, but which become mucky on top due to construction operations, shall be reinforced with one or more layers of crushed rock or gravel. Not more than 1/2-inch depth of mud or muck shall be allowed to remain on stabilized trench bottoms when the pipe bedding material is placed thereon. The finished elevation of stabilized subgrades for structures shall not be above subgrade elevations shown on the Drawings.
- C. All stabilization work shall be performed by and at the expense of the Contractor.

### **3.07 FILL AND COMPACTION**

- A. Materials:
  - 1. To the maximum extent available, excess earth obtained from subgrade, structure, and trench excavation shall be used for the construction of fills and embankments.
  - 2. Materials used as backfill shall be free from rocks or stones larger than 2 inches in their greatest dimension; brush, stumps, logs, roots, debris, and organic or other deleterious materials; and must be acceptable to the Engineer.
- B. Placement and Compaction:
  - 1. Degree of compaction: Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in AASHTO T180. Field verification will be obtained by the test procedure presented in AASHTO T191. The term "maximum density" shall mean the maximum density determined under AASHTO T180.
  - 2. Backfill materials shall be placed in approximately horizontal layers not to exceed 8 inches in uncompacted thickness. Material deposited in piles or windrows by excavating and hauling equipment shall be spread and leveled before compaction.
  - 3. Each layer of material being compacted shall have the best practicable uniform moisture content to ensure satisfactory compaction. The Contractor will be required to add water and harrow, disc, blade, or otherwise work the material in each layer to ensure uniform moisture content and adequate compaction. Each layer shall be thoroughly compacted by rolling or other method acceptable to the Engineer to the percent of maximum density at optimum moisture content as described in Table 02220-A and as determined by AASHTO T180, (latest).

4. Whenever a trench passes through a backfill or embankment, material shall be placed and compacted to an elevation 12 inches above the top of the pipe before the trench is excavated.
- C. Compact and backfill excavations and construct embankments according to the schedule listed in Table 02220-A. Backfill schedule for pipes is listed in Table 02220-B. (AASHTO T180, (latest)).
- D. Pipe shall be laid in open trenches unless otherwise indicated on the Drawings or elsewhere in the Contract Documents.
- E. Excavations shall be backfilled to the original grade or as indicated on the Drawings. Deviation from this grade because of settling shall be corrected. Backfill operation shall be performed to comply with all rules and regulations and in such a manner that it does not create a nuisance or safety hazard.

**Table 02220-A**  
**COMPACTION AND BACKFILL SCHEDULE**

Area	Material	Compaction
Perimeter road berms embankments, containment berms, and drainage conveyance berms	Common Fill (Para. 2.01 B)	8 inches lifts, compacted to 95% Modified Proctor maximum dry density. Fill should not be placed over any in-placed soils until those layers have been compacted to 95% Modified Proctor maximum dry density.
Beneath all structures, and foundations (minimum 2 feet depth)	Structural Fill (Para. 2.01 C)	8 inches lifts, compacted to 98% Modified Proctor maximum dry density. Fill should not be placed over any in-place soils until those layers have been compacted to 95% Modified Proctor maximum dry density.
Beneath pavements (minimum 2 feet depth and minimum distance of 2 feet outside the edge of pavement).	Structural Fill (Para. 2.01 C)	8 inches lifts, compacted to 95% Modified Proctor maximum dry density. Fill should not be placed over any in-place soils until those layers have been compacted to 98% Modified Proctor maximum dry density.

Table 02220-B

**BACKFILL SCHEDULE FOR GRAVITY  
AND PRESSURE PIPING (Non-Perforated)**

<u>Pipe Material</u>	<u>Pipe Size</u>	<u>Trench Condition</u>	<u>Bedding Material</u>	<u>PIPE ENVELOPE</u>			
				<u>PRIMARY ZONE Material</u>	<u>PRIMARY ZONE Depth</u>	<u>SECONDARY ZONE Material</u>	<u>SECONDARY ZONE Depth</u>
HDPE, PVC and other Plastic Pipe	> □ 6"	Normal <sup>a</sup>	Class II or Common Fill	Class II or Common Fill	0.7 O.D.	Class II or Common Fill	0.3 O.D.+12"
R.C.P.	<48"	Normal <sup>a</sup>	Class II or Common Fill	Class II or Common Fill	0.5 O.D.	Class II or Common Fill	-

<sup>a</sup> Dry soils.

<sup>b</sup> Saturated soils.

<sup>c</sup> Outside Diameter of pipe = O.D.

Notes:

1. No special bedding shall be required in case of suitable undisturbed earth type trench bottom.
2. Bedding thickness shall be 12 inches unless specified otherwise.
3. The backfill shall be placed and compacted in 6-inch lifts for pipe envelope and in 12-inch lifts from secondary zone to grade. Common fill shall be used as final backfill material.
4. It is intended that additional excavation be conducted to remove unsuitable material below bedding level which prevents bedding compaction as required herein and replaces such materials with suitable materials. Over excavation, geotextile fabric, gravel blanket, granular fill and other acceptable stabilization method shall be placed within 4 feet of the bedding level or within 10 feet of the existing ground (whichever is greater depth) at no additional cost to the Owner. Construction required beyond these limits shall be executed in accordance with the General Conditions. When indicated on the Drawings, the Contractor shall remove unsuitable material below bedding level to the limits indicated and replace with coarse sand or other acceptable stabilization method up to the bedding level without any additional cost to the Owner.

- F. Embankments shall be constructed true to lines, grades, and cross sections shown on the plans or ordered by the Owner. Embankments shall be placed in successive layers of not more than 12 inches in thickness, loose measure, for the full width of the embankment. As far as practicable, traffic over the work during the construction phase shall be distributed so as to cover the maximum surface area of each layer.
- G. If the Contractor requests approval to backfill material utilizing lifts and/or methods other than those specified herein, such request shall be in writing to the Engineer. Approval will be considered only after the Contractor has performed tests, at the Contractor's expense, to identify the material used and density achieved throughout the backfill area utilizing the method of backfill requested. The Engineer's approval will be in writing.
- H. Foundation Preparation
  - 1. Backfilled areas shall be compacted in 8-inch layers to a density of not less than the percent of Modified Proctor maximum dry density as described in Table 02220-A for a depth of not less than 2-feet below the bottom of the foundations or concrete slabs to be not less than that depth indicated in Table 02220-A. Any unsuitable foundation material shall be removed and replaced with suitable material.
  - 2. Slabs On Grade: Subgrades for concrete slabs shall be removed, backfilled, and compacted to the required grade. The top 2-feet of concrete slab subgrade in cut sections and all fill material shall be compacted in 8-inch layers to a density of not less than the percent of Modified Proctor maximum dry density as described in Table 02220-A.

### **3.08 TRENCH EXCAVATION**

- A. The Contractor shall not open more trench in advance of pipe laying than is necessary to expedite the work. Four hundred (400) feet shall be the maximum length of open trench on any line under construction. All trench excavation shall be open cut from the surface.
  - 1. Alignment, Grade, and Minimum Cover: The alignment and grade or elevation of each pipeline shall be fixed and determined from offset stakes. Vertical and horizontal alignment of pipes, and the maximum joint deflection used in connection therewith, shall be in conformity with requirements of the section covering installation of pipe.
  - 2. Where pipe grades or elevations are not definitely fixed by the contract drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe of 42 inches where in paved or graded streets where surface grades are definitely established and 36 inches in other locations. Greater pipe cover depths may be necessary on vertical curves or to provide necessary clearance beneath existing pipes, conduits, drains, drainage structures, or other obstructions encountered at normal pipe grades. Measurement of pipe cover depth shall be made vertically from the outside top of pipe to finished ground or pavement surface elevation.
- B. Limiting Trench Widths:
  - 1. Trenches shall be excavated to a width which will provide adequate working space and sidewall clearances for proper pipe installation, jointing, and embedment. However, minimum permissible sidewall clearances between the installed pipe and each trench wall, expressed in inches, shall be as follows:

<u>Pipe Size</u>	<u>Minimum Sidewall Clearance</u>
60	24
54	21
48	19
36 or smaller	12

2. Stipulated minimum sidewall clearances are not minimum average clearances but are minimum clear distances which will be required.
3. Cutting trench banks on slopes to reduce earth load to prevent sliding and caving will be permitted only in areas where the increased trench width will not interface with surface features or encroach on right-of-way limits. Slopes shall not extend lower than 1 foot above the top of the pipe.

C. Mechanical Excavation:

1. The use of mechanical equipment will not be permitted in locations where its operation would cause damage to trees, buildings, culverts, and other existing property, utilities, or structures above or below ground. In all such locations, hand excavating methods shall be used.
2. Mechanical equipment used for trench excavation shall be of the type, design, and construction, and shall be so operated, that the rough trench excavation bottom elevation can be controlled, that uniform trench widths and vertical sidewalls are obtained at least from an elevation one foot above the top of the installed pipe to the bottom of the trench, and that trench alignment is such that pipe when accurately laid to specified alignment will be centered in the trench with adequate clearance between the pipe and sidewalls of the trench. Undercutting the trench sidewall to obtain clearance will not be permitted.

D. Pavement Cutting:

1. Cuts in concrete pavement, asphalt pavement, and asphalt base pavements shall be no larger than necessary to provide adequate working space for proper installation of pipe and appurtenances. Cutting shall be started with asphalt or concrete saw in a manner which will provide a clean groove for the full depth of pavement along each side of the trench and along the perimeter of cuts for structures.
2. Asphalt pavement and asphalt base pavement over trenches excavated for pipelines shall be removed so that a shoulder not less than 6 inches in width at any point is left between the cut edge of the pavement and the top edge of the trench. Trench width at the bottom shall not be greater than at the top and no undercutting will be permitted. Pavement cuts shall be made to and between straight or accurately marked curved lines which, unless otherwise required, shall be parallel to the centerline of the trench.
3. Pavement removed for connections to existing lines or structures shall not be greater than necessary for the installation as determined by the Engineer.

E. Artificial Foundations in Trenches: Whenever so ordered by the Engineer, the Contractor shall excavate to such depth below grade as the Engineer may direct and the trench bottom shall be brought to grade with such material as the Engineer may order installed. All piling, concrete, or other foundations made necessary by unstable soil shall be installed as directed by the Engineer. Compensation for extra excavation and piling, concrete, or other foundations, except where provided by contract unit prices, shall be made in accordance with the contract provisions for extra work.

F. Bell Holes: Bell holes shall provide adequate clearance for tools and methods used in installing pipe. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or granular embedment when the pipe is jointed.



### **3.09 TESTS**

- A. All tests required for preliminary review of materials shall be made by the Owner. Moisture-density (Proctor) tests and relative in place density tests on the materials, and all in-place field density tests, shall be made at the expense of the Owner.
- B. The frequency for testing the density of placed material will be at a minimum rate of two tests per acre per lift, or as necessary.
- C. Re-tests for failures will be at the cost of the Contractor.

### **3.10 DRAINAGE MAINTENANCE**

- A. Trenches across roadways, driveways, walks, or other trafficways adjacent to drainage ditches or water courses shall not be backfilled prior to completion of backfilling the trench on the upstream side of the trafficway to prevent impounding water after the pipe has been laid. Bridges and other temporary structures required to maintain traffic across such unfilled trenches shall be constructed and maintained by the Contractor. Backfilling shall be done so that water will not accumulate in unfilled or partially filled trenches. All material deposited in roadway ditches or other water courses crossed by the line of trench shall be removed immediately after backfilling is completed and the original sections, grades, and contours of ditches or water courses shall be restored. Surface drainage shall not be obstructed longer than necessary.

### **3.11 FINAL GRADING**

- A. After other outside work has been finished and backfilling completed and settled, all areas on the site of the work which are to be graded shall be brought to grade with the tolerance of  $\pm 0.1$  feet at the indicated elevations, slopes, and contours where seeding or sodding is not required or, where sodding is required within 2 inches of finished grade. Use of graders or other power equipment will be permitted for final grading and dressing of slopes, provided the result is uniform and equivalent to hand work. All surfaces shall be graded to secure effective drainage. Unless otherwise shown, a slope of at least one percent shall be provided.
- B. Grading and surfacing shall be completed to the satisfaction of the Engineer.

### **3.12 EXCESS EXCAVATED MATERIALS**

- A. Insofar as needed, suitable excavated materials shall be used in fills and embankments shown on the Drawings. All suitable excess excavated material shall be placed outside the limits of construction, in an area approved by the Owner.
- B. The Contractor shall segregate different types of excavated materials (i.e. sands, clayey sands, clay) in the stockpile area. All debris, junk (such as broken pipe, or other discarded construction material), stones, logs, stumps, roots, and other unsuitable materials may be disposed of by the Contractor in the landfill, if approved by the Owner.
- C. The Contractor shall slope and compact the stockpile with a light roller type vehicle to maintain stability.
- D. The Contractor shall maintain proper soil and erosion control measures.

**3.14 SETTLEMENT**

- A. The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within the correction period stipulated in the General Conditions.
- B. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from the Engineer or Owner.

**END OF SECTION**

## SECTION 02221

### TRENCHING AND TRENCH BACKFILLING

#### PART 1 – GENERAL

##### 1.01 REFERENCES

- A. American Society of Testing and Materials (ASTM):
  - 1. C33 - Concrete Aggregates.
  - 2. D442 - Particle Size Analysis of Soils.
  - 3. D698 - Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (Standard Proctor Method). (12400ft-lbf/ft)
  - 4. D1556 - Density and Unit Weight of Soil in Place by the Sand Cone Method.
  - 5. D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
  - 6. D2434 - Permeability of Granular soils (Constant Head).
  - 7. D2937 - Density of Soil in Place by the Drive Cylinder Method.
  - 8. D4318 - Liquid Limit, Plastic Limit (Atterberg Limits) and Plasticity Index of Soils.
  - 9. D5084 - Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
- B. U.S. Army Corps of Engineers / U.S. Department of Interior:
  - 1. Unified Soil Classification System (USCS).

##### 1.02 GENERAL

- A. The work specified in this Section includes the trenching and trench backfilling activities associated with construction of the access road and improvements to the stormwater collection system.
- B. Work under this Section shall include trenching activities both in and outside of Class I and Class III waste, as defined within the Florida Administrative Code
- C. All work shall be performed in strict accordance with the Health and Safety requirements set forth in the General Conditions of the Contract Documents.
- D. All work shall be performed in strict accordance with all local, State, US Occupational Safety and Health Administration (OSHA) and other applicable Federal regulations regarding trenching operations and trench safety.
- E. Work shall be performed as to not block or hinder site access, except as authorized by the Owner.
- F. All work regarding site access and utilities shall be performed in strict accordance with the requirements set forth in the General Conditions of the Contract Documents.

##### 1.03 SUBMITTALS

- A. Health and Safety Plan: Please see section 01501 for full health & safety provisions.

## **PART 2 – PRODUCTS**

### **2.01 GENERAL BEDDING MATERIAL**

- A. Contractor to provide pipe bedding material, which shall be free of sticks, roots, organic matter, and stones larger than 1-inch in any dimension. Pipe bedding material can be imported natural sand or sand produced from crushed gravel or crushed rock, maximum size 1/4-inch; 95 percent shall pass a No. 4 sieve, free from clay, shell, limestone and organic material, with a maximum of 8 percent passing the No. 200 sieve.

### **2.02 GENERAL BACKFILL SOIL**

- A. Contractor to provide general backfill soil free of sticks, roots, organic matter, and stones larger than 1-inch in any dimension. Remove material that cannot be made to compact readily and replace with suitable material. Soil shall be free of MSW, as determined by the Engineer.
- B. General backfill soils shall be well graded or poorly-graded sand (SW-SP), silty sand (SM), clayey sand or sandy clay (SC) as classified by the Unified Soil Classification System, or other soils as approved by the Engineer.
- C. Soil materials excessively wet or dry are unsuitable. Allow such material to dry, or moisten, as required, to bring material within plus 3 percent of optimum moisture content range for specified compaction.

## **PART 3 – EXECUTION**

### **3.01 ALIGNMENT SURVEY**

- A. A survey shall be performed of the proposed trench alignment. The alignment shall be staked in the field, and an inspection of the proposed alignment shall be performed by the Engineer. The field stakes shall include the location of the alignment at each location staked. The survey shall identify conflicts between the proposed work and all existing features. The Engineer shall accept the proposed alignment prior to the Contractor beginning excavation activities.

### **3.02 EXCAVATION**

- A. Prior to starting main excavations, the Contractor shall remove from those areas that require change of contours, existing topsoil, general fill, and clay cover material to a practical extent. These materials shall be removed in a manner to separate it clearly from underlying material and shall be properly stockpiled.
- B. Excavated cover material shall be separated from excavated refuse wherever possible and any cover material free of refuse shall be used as backfill material. Waste materials shall be direct loaded into transport vehicles and hauled by the Contractor to the operating portion of the landfill for disposal as directed by the Owner during normal landfill operating hours. All waste excavated is considered Class I waste, which should be disposed of in the Class I Landfill; which will require weighing at the scalehouse prior to being directed to the Class I Landfill at no cost to the Contractor.
- C. Excavate to lines, grades, and dimensions necessary to complete the work.
- D. Trenching Tolerances:
  - 1. Excavate to install pipes in straight runs at a uniform grade, without sags or humps, between vertical and horizontal control points in accordance with the Construction Drawings.
  - 2. Maintain protective sand over the top of the pipe and minimum trench width as detailed in the project design drawings.

- E. Contractor may not excavate more trench daily than can be completely backfilled after installation of the pipe. Excavations shall not be left open overnight.

### **3.03 DEWATERING**

- A. Contractor shall take every precaution to prevent water from entering an open trench. Should water enter the trench the water shall be removed so as to return the trench bottom to a firm, dry condition.
- B. Contractor shall provide all pumps, equipment, piping and labor required for trench dewatering at no additional cost to the Owner.
- C. Liquids pumped from excavations inside the limits of refuse must be pumped via pipeline or tank truck into Leachate Collection System manhole with Owner's approval on a per incident basis.
- D. Groundwater pumped from excavations outside the limits of the landfill may be discharged into the existing stormwater management system. Pumping and discharge methods shall minimize suspension of fine-grained soils while facilitating settling of soil particles suspended in the water as a result of the trenching activities.
- E. Protect adjacent properties and structures from damage resulting from dewatering operations or from uplift pressures resulting from dewatering activities.

### **3.04 ROAD CROSSING**

- A. Contractor shall schedule all road crossings with Owner to minimize disruption to waste disposal operations.
- B. Before excavation is started on any paved road the pavement shall be saw cut by means of a power saw, to the width of the trench and so as to minimize damage to pavement outside of the trench limits. The cost of this removing of pavement shall be included in the price bid for excavation.

### **3.05 PIPE SURVEY**

- A. Contractor shall verify that pipe and culvert slopes meets the requirements specified in this Section and on the Plans. Station numbering shall be used and marked on the pipe.
  - 1. Contractor shall measure each length of installed pipe and mark the 50-foot stations.
  - 2. Survey equipment shall be used to measure the change in relative elevation between each 50-foot station.
  - 3. The change in elevation and slope for each 50-foot section shall be recorded in the Contractor's project notes.
  - 4. A trench laser may be used by the Contractor for installing the pipe at the correct grades, but will not be considered acceptable survey equipment for the purpose of verifying pipe slope.
- B. The project notes detailing the required pipe slope confirmation, type of pipe, location of fittings, etc. shall be provided daily to and be checked by the Engineer prior to proceeding with backfilling.

### **3.06 MATERIALS FOR BACKFILLING**

- A. Cover Materials Outside the Limits of Waste:
  - 1. Concrete Stormwater Pipe: General backfill soil, as described in Part 2.02, this Section

### **3.07 BACKFILLING PROCEDURES**

- A. Backfill shall meet the requirements of Part 2, this Section.
- B. Contractor shall notify Engineer prior to beginning backfilling operations. The Engineer shall inspect all pipe, fittings, and connections prior to approving backfilling. If Contractor backfills pipe without inspection of the pipe while pipe is installed in the open trench, Contractor shall uncover all uninspected buried pipe so that it may be properly inspected. This shall be done at no additional cost to the Owner.
- C. Pipe Bedding and Cover Material Placement:
  - 1. Backfilling procedures shall be modified as necessary to not displace (either horizontally or vertically) piping installed in trench during backfill or bedding placement.
  - 2. Place pipe bedding and compact to height of 6 inches above top of pipe.
  - 3. Place general backfill in maximum 12 inches lifts above pipe bedding to 2.5 feet below final grade.
  - 4. Place landfill cover to equal existing landfill cover compaction and thickness.
  - 5. Remove all excess material.

### **3.08 FIELD QUALITY CONTROL**

- A. A conformation survey shall be performed of all completed trenches and recorded by the surveyor on the record drawings. The survey shall document the horizontal and vertical location of both the bottom of the excavation and the inverts and locations of all piping or structures installed. The survey information shall be incorporated into the record drawings described in Section 01720 - Project Record Documents. Conformation survey must be sealed by a Professional Land Surveyor registered in the State of Florida.

**END OF SECTION**

## SECTION 02270

### EROSION CONTROL

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The work specified in this Section consists of furnishing all necessary labor, equipment, material and transportation necessary to provide temporary and permanent erosion and sediment control as required by appropriate government agency permits, as required so as to prevent pollution of water, detrimental effects of public or private property adjacent to the project, and damage to work on the project.

##### 1.02 RELATED WORK

Not Used.

##### 1.03 QUALITY ASSURANCE

Not Used.

##### 1.04 SUBMITTALS

- A. Submit shop drawings of all proposed erosion control measures including but not limited to silt fence, enviro-fence, sandbagging, hay bales, and floating silt barriers for approval prior to construction.

##### 1.05 START OF WORK

- A. Prior to starting, field survey and stake the limits of construction.
- B. Obtain the Engineer's approval of the field survey.
- C. Install all silt fence, hay bales and enviro-fence along the limits of construction.
- D. Initiate clearing and grubbing operations.

#### PART 2 – PRODUCTS (Not used)

#### PART 3 – EXECUTION

##### 3.01 INSTALLATION

- A. Install temporary erosion and sediment control items prior to clearing and commencing earthwork.

##### 3.02 PROTECTION

- A. Stabilization of Denuded Areas: No disturbed area may be denuded for more than eighteen (18) calendar days (excluding rights-of-way), unless otherwise authorized by the Owner. During construction, denuded areas shall be covered by mulches such as straw, hay, filter, seed and mulch, sod or some other permanent vegetation. Within three (3) calendar days after final grade is established on any portion of a project site, that portion of the site shall be provided with established permanent soil stabilization measures per the original site plan, whether by impervious surface or landscaping.
- B. Protection and Stabilization of Stockpiles: Fill material stockpiles shall be protected at all times by on-site drainage controls which prevent erosion of the stockpiled material. Control of dust from such stockpiles may be required, depending upon their location and the expected length of time the stockpiles will be present. In no case shall an unstabilized stockpile remain after thirty (30) calendar days.

- C. Protection of Existing Storm Water Management System: During construction, all storm water management inlets, that may be impacted by the Contractor's activities shall be protected by approved sediment traps such as secured hay bales, sod, stone, etc., which shall be maintained and modified as required by construction progress, and which must be approved by the Owner.
- D. Sediment Trapping Measures: Sediment basins and traps, perimeter berms, filter fences, berms, sediment barriers (hay bales), vegetative buffers and other measures intended to trap sediment and/or prevent the transportation of sediment onto adjacent properties, or into existing waterbodies, must be installed, constructed or, in case of vegetative buffers, protected from disturbance, as a first step in the land alteration process.
- E. Swales and Ditches: All swales and ditches leading from the site shall be sodded within three (3) days of excavation. All other interior swales, etc., including detention areas will be sodded prior to issuance of a Certification of Occupancy.

### **3.03 REMOVAL OF TEMPORARY EROSION CONTROL FEATURES**

- A. 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 such a manner that there will be no detrimental effect.

### **3.04 MAINTENANCE OF EROSION CONTROL FEATURES**

- A. General: Provide routine maintenance of permanent and temporary erosion control features until the project is completed and accepted.

### **3.05 PROTECTION DURING SUSPENSION OF CONTRACT TIME**

- A. In the event that it is necessary that the construction operations be suspended for any appreciable length of time, shape the top of the earthwork in such a manner as 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 which are located in the vicinity of rivers, streams, canals, lakes, and impoundments. Should such preventive measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation.

### **3.06 SURFACE WATER MANAGEMENT, STORMWATER RUNOFF CONTROL AND EROSION CONTROL**

- A. The Contractor shall be responsible for all runoff control efforts, including without limitation providing protection of areas receiving runoff, in accordance with any applicable regulations, codes, plans and permits.
- B. The Contractor shall furnish, install and maintain, at no additional cost to the owner, all necessary surface protection such as temporary retention basins, silt screens, diapers, jute mesh, filter fabric, hay bales, sandbags, etc., for turbidity control and to prevent erosion and surface degradation.

**END OF SECTION**



## SECTION 02630

### STORM DRAINAGE

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section includes storm drainage system.

##### 1.02 QUALITY ASSURANCE

- A. Compliance: Comply with Florida Department of Environmental Protection (FDEP) and local government regulations pertaining to storm drainage systems.

##### 1.03 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic structures in direct sunlight.
- B. Do not store plastic pipe or fittings in direct sunlight.
- C. Protect pipe, pipe fittings, and seals from dirt and damage.
- D. Handle precast concrete manholes and other structures according to manufacturer's rigging instructions.

#### PART 2 - PRODUCTS

##### 2.01 PIPES AND FITTINGS

- A. Reinforced Concrete Pipe:
  - 1. Pipe: ASTM C 76, Class III unless indicated otherwise on Drawings.
  - 2. Gaskets: ASTM C 443; rubber compression gaskets installed in accordance with manufacturer's published instructions.
- B. Polyvinyl Chloride (PVC) Pipe:
  - 1. Pipe: ASTM D 3034, SDR 35 Rated.
    - a. Continuously mark pipe with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification.
  - 2. Joints: ASTM D 3034, Table 2; integrally molded bell ends with factory supplied elastomeric gaskets and lubricant.
- C. High Density Polyethylene (HDPE) Pipe:
  - 1. Pipe Material: ASTM D3350 minimum cell classification 335420C; or STM 1248 Type III, Class C, Category 4, Grade P33.
  - 2. Pipe, Joints, and Fittings:
    - 12 inches to 36 inches: AASHTO M294 Type S
    - 42 inches and 48 inches: AASHTO MP6-95

## 2.02 SPECIAL PIPE COUPLINGS AND FITTINGS

- A. Sleeve-Type Pipe Couplings: Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined, for non-pressure joints.
1. Sleeves for Concrete Pipe: ASTM C 443, rubber.
  2. Sleeves for Cast-Iron Soil Pipe: ASTM C 564, rubber.
  3. Sleeves for Plastic Pipe: ASTM F 477, elastomeric seal.
  4. Sleeves for Dissimilar Pipes: Compatible with pipe materials being joined.
  5. Bands: Stainless steel, at least one at each pipe insert.
- B. Gasket-Type Pipe Couplings: Rubber or elastomeric compression gasket, made to match outside diameter of smaller pipe and inside diameter or hub of adjoining larger pipe, for non-pressure joints.
1. Gaskets for Concrete Pipe: ASTM C 443, rubber.
  2. Gaskets for Cast-Iron Soil Pipe: ASTM C 564, rubber.
  3. Gaskets for Plastic Pipe: ASTM F 477, elastomeric seal.
  4. Gaskets for Dissimilar Pipes: Compatible with pipe materials being joined.
- C. Internal, Expansion-Type Pipe Couplings: Stainless-steel expansion band with ethylene-propylene-diene-monomer (EPDM), rubber-compound sealing sleeve, made to match inside diameter of pipes for non-pressure joints. Use nitrile rubber-compound sealing sleeve for fluids containing oil or gasoline.

## 2.03 MANHOLES (Not Used)

- A. Precast Concrete Manholes and Catch Basins: Precast, reinforced concrete, with provision for rubber gasket joints. For manholes, comply with ASTM C 478. For catch basins, comply with ASTM C 858.
1. Gaskets: ASTM C 443, rubber.
  2. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6 inches to 9 inches total thickness, that match a 24 inches diameter frame and cover.
  3. Steps: Fiberglass, individual steps, or ladder. Include a width that allows a worker to place both feet on one step and is designed to prevent lateral slippage off the step. Cast steps or anchor ladder into base, riser, and top section sidewalls at 12 inches to 16 inches intervals. Omit steps for manholes less than 60 inches deep.
  4. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
  5. Additional requirements, manholes:
    - a. Base Section: 6 inches minimum thickness for floor slab and 4 inches minimum thickness for walls and base riser section and having a separate base slab or base section with integral floor.
    - b. Riser Sections: 4 inches minimum thickness, 48 inches diameter, and lengths to provide depth required.
    - c. Top Section: Eccentric cone type. Top of cone of size that matches grade rings.
- B. Brick Manholes: Brick and mortar.
1. Base, Channel, and Bench: Concrete.
  2. Wall: ASTM C 32, Grade MS, manhole brick; 8 inches minimum thickness and an inside diameter of 48 inches with tapered top for a 24 inches frame and cover. Include 12 inches minimum wall thickness for section of manhole deeper than 96 inches.
    - a. Option: ASTM C 139, concrete masonry units may be used instead of brick.
  3. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II, Portland cement, 1/2-inch minimum thickness on exterior surface.

4. Steps: Fiberglass, individual steps, or ladder. Include a width that allows a worker to place both feet on one step and is designed to prevent lateral slippage off the step. Cast steps or anchor ladder into sidewalls at 12 inches to 16 inches intervals. Omit steps for manholes less than 60 inches deep.
- C. Cast-in-Place Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top, designed according to ASTM C 857 for loading.
1. Steps: Fiberglass, individual steps, or ladder. Include a width that allows a worker to place both feet on one step and is designed to prevent lateral slippage off the step. Cast steps or anchor ladder into sidewalls at 12 inches to 16 inches intervals. Omit steps for manholes less than 60 inches deep.
- D. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron.
1. Manhole Covers: 24 inches inside diameter by 7 inches to 9 inches riser with 4 inches minimum width flange, and 26 inches diameter cover. Include indented top design with lettering, STORM SEWER, cast into cover.
  2. Square Drainage Frames and Grates: Include 24 inches by 24 inches minimum flat grate with small square or short-slotted drainage openings.
  3. Round Drainage Frames and Grates: 24 inches inside diameter by 7 inches to 9 inches riser with 4 inches minimum width flange, and 26 inches diameter flat grate having small square or short-slotted drainage openings.

#### **2.04 FRAMES AND GRATES (Not Used)**

- A. Frames and Grates: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron, frames and flat grates, of dimensions according to authority standards. Include small square or short-slotted drainage openings in grates.

#### **2.05 CONCRETE (Not Used)**

- A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
1. Cement: ASTM C 150, Type II.
  2. Fine Aggregate: ASTM C 33, sand.
  3. Coarse Aggregate: ASTM C 33, crushed gravel.
  4. Water: Potable.
- B. Structures: Portland-cement design mix, 4000 psi minimum, with 0.45 maximum water-cement ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  2. Reinforcement Bars: ASTM A 615, Grade 60, deformed steel.
- C. Ballast and Pipe Supports: Portland-cement design mix, 3000 psi minimum, with 0.58 maximum water-cement ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  2. Reinforcement Bars: ASTM A 615, Grade 60, deformed steel.

#### **2.06 OUTFALLS**

- A. Construct headwall, apron, and tapered sides of cast-in-place, reinforced concrete.
- B. Riprap: Broken stone, irregular size and shape, weighing 15 to 50 pounds each.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION, GENERAL**

- A. Install piping beginning at low point of systems, true to grades and alignment with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
- B. Use manholes for changes in direction, except where fittings are indicated. Use fittings for branch connections, except where direct tap into existing sewer is indicated.
- C. Use proper size increasers, reducers, and couplings, where different sizes or materials of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.
- D. Install gravity-flow-systems piping at constant slope between points and elevations. Install straight piping runs at constant slope.
- E. Install drainage piping pitched down in direction of flow, at minimum slope of 1 percent and 36 inches minimum cover, unless otherwise indicated.
- F. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.
- G. Set tops of frames and covers flush with finished surface where manholes occur in pavements. Set tops 3 inches above finished surface elsewhere, except where otherwise indicated.

### **3.02 PIPE JOINT CONSTRUCTION AND INSTALLATION**

- A. General: Join and install pipe and fittings according to the following.
- B. Ductile-Iron Pipe with Ductile-Iron or Cast-Iron Fittings: With push-on-joint, rubber gaskets according to AWWA C600.
- C. Install with top surfaces of components, except piping, flush with final finished surface.
- D. Corrugated-Steel Pipe: Join and install according to ASTM A 798. Use soiltight joints made with coupling bands and gaskets.
- E. Corrugated-Aluminum Pipe: Join and install according to ASTM B 788. Use soiltight joints made with coupling bands and gaskets, except where other joints are indicated.
- F. Polyethylene (PE) Plastic Pipe and Fittings: As follows:
  - 1. Join pipe, tubing, and fittings with couplings for soiltight joints according to AASHTO "Standard Specifications for Highway Bridges," Division II, Section 26.4.2.4 "Joint Properties" and manufacturer's written instructions.
  - 2. Join pipe, tubing, and gasketed fittings with elastomeric seals for watertight joints according to ASTM D 2321 and manufacturer's written instructions.
  - 3. Install according to ASTM D 2321 and manufacturer's written instructions.
- G. Concrete Pipe and Fittings: Install according to ACPA "Concrete Pipe Handbook," with ASTM C 443, rubber gaskets.
- H. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and fit both systems' materials and dimensions.

### 3.03 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

- A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.
  - 1. Use the following pipe couplings for non-pressure applications:
    - a. Strait-pattern, sleeve type to join piping, of same size, with small difference in outside diameters.
    - b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.
    - c. Gasket type to join piping of different sizes where annular space between smaller piping outside diameter and larger piping inside diameter permits installation.
    - d. Internal-expansion type to join piping with same inside diameter.

### 3.04 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318, ACI 350R.

### 3.05 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so finished work conforms as nearly as practical to requirements specified for new work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6 inches overlap, with not less than 6 inches of 3000-psi, 28-day, compressive-strength concrete.
- C. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

### 3.06 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as the work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
  - 1. In large, accessible piping, brushes and brooms may be used for cleaning.
  - 2. Place plug in end of incomplete piping at end of day and whenever work stops.
  - 3. Flush piping between manholes and other structures, if required by authorities having jurisdiction, to remove collected debris.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of the Project.
  - 1. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visual between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of a ball or cylinder of a size not less than 92.5 percent of piping diameter.
    - c. Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  - 2. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.
  - 3. Re-inspect and repeat procedure until results are satisfactory.

**END OF SECTION**

## SECTION 02930

### SODDING

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The extent of sodding consists of supplying and placing sod on finished slopes that are steeper than 3:1.
- B. The sod work shall include, but not be limited to, supplying all labor, materials, and equipment necessary to perform sodding, fertilizing, watering, mowing, and cleanup.

##### 1.02 QUALITY ASSURANCE

- A. The CQA Manager and Engineer reserve the right to test, reject, or accept all materials before application.
- B. Sod shall be provided in accordance with Section 981-2, placed in accordance with Section 575, and maintained in accordance with Section 570-5 of the Florida Department of Transportation – Standard Specifications for Road and Bridge Construction, 1991 or as amended.

##### 1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver fertilizer in waterproof bags showing weight, chemical, analysis, and name of manufacturer.
- B. The Contractor shall, at the time of delivery, furnish the CQA Manager invoices of all materials received in order that the minimum application rate of materials may be determined. Failure to supply invoices at the time of delivery will warrant that payment for those items be delayed until proper submittal of invoices is obtained and the minimum application rates of material may be verified.

#### PART 2 – PRODUCTS

##### 2.01 SOD

- A. All slopes with equal to or greater than a 3H:1V slope, and portions of the perimeter ditches and berms shall be sodded. Additionally, all grassed areas on the property disturbed by the Contractor's activities shall be sodded by the Contractor after the areas are fine graded.
- B. Sod shall be Bahia with well matted roots.
- C. The sod shall be supplied in commercial size rolls.
- D. The sod shall be sufficiently thick to secure a dense stand of live grass, with a minimum thickness of 2-inches. The sod shall be live, fresh, and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses.
- E. Sod shall be planted as soon as possible after being harvested and shall be shaded and kept moist from the time of harvesting until it is planted. No sod which has been cut for more than 72 hours may be used.
- F. The source of the sod may be inspected and accepted by the CQA Manager prior to construction.

## **2.02 FERTILIZER**

- A. The fertilizer shall be a commercial granular type with a chemical designation of 12-8-8.
- B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid, and (3) water soluble potash, contained in the fertilizer.
  - 1. At least 50 percent of the phosphoric acid shall be from a normal super phosphate or an equivalent source which will provide a minimum of two units of sulfur.
  - 2. The amount of sulfur shall be indicated on the quantitative analysis card attached to each bag or container.
- C. Commercial fertilizers shall comply with the State fertilizer laws.
- D. Fertilizer may, at the discretion of the CQA Manager, upon satisfactory evidence of its feasibility from the manufacturer, be applied in liquid form.

## **2.03 WATER**

- A. The water used in the sodding operations may be obtained from any accepted spring, pond, lake, stream, or municipal water system. The Contractor may use water from the on-site stormwater pond.
- B. The water shall be free of excess and harmful chemicals, acids, alkalies, or any substance which might be harmful to plant growth or obnoxious to traffic.
- C. Salt water shall not be used.

## **2.04 EROSION CONTROL MAT**

- A. A permanent erosion control mat shall be placed under the sod in areas designated on the construction drawings.
- B. The mat edges shall be buried in place in accordance with the manufacturer's recommendation.
- C. The erosion control mat to be used shall be identified for velocities of 10 ft/sec. for vegetated and un-vegetated state. Contractor to use North American Green SC150®, or approved equal.

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

The order of work for sod installation shall be as follows:

- A. Fine grading
- B. Removal of debris
- C. Application of fertilizer
- D. Placement of sod
- E. Clean-up
- F. Watering

### **3.02 SOIL MANIPULATION**

All soil manipulation shall be done at right angles to the direction of the slope.

### **3.03 FINE GRADING**

- A. After removal of debris, fine grading shall be performed as required to bring all areas to receive sod to an acceptable smooth and finished grade. Areas to receive sod shall be fine graded by raking to eliminate wind rows, ridges, depressions, and other irregularities.
- B. All sodded areas bordered by paving shall have a finished grade (top of the sod) that is 1/2 inch below the grade established by the adjacent paving. All sodded areas bordered by planting areas shall have a finished grade (top of the sod) that is 2 inches above the soil level in the adjacent planting bed.

### **3.04 REMOVAL OF DEBRIS**

- A. Areas to receive sod shall be cleaned of all stones larger than one-inch in diameter, sticks, stumps, paper, glass, and other debris which might interfere with the placement of sod, growth of grass, or subsequent maintenance of sod area. All weeds shall be removed from areas to be sodded.

### **3.05 APPLICATION OF FERTILIZER**

- A. The fertilizer (and/or lime) shall be spread uniformly in one or more applications as specified below.
  - 1. Test soil for pH which must be between 5.5 and 6.5 before installation of sod.
  - 2. An initial application of 500 lbs. per acre is required for fertilizer.
  - 3. Lime shall be spread at a minimum uniform rate of 250 pounds per acre and thoroughly mixed with the soil to a depth of 4-inches. Additional lime may be required as determined by the pH tests. If pH is above the required limits, the Contractor shall apply a suitable soil amendment to bring the pH into compliance.
- B. Fertilizing operations will not be permitted when wind velocities exceed 15 miles per hour.

### **3.06 PLACING OF SOD**

- A. Sod size shall be as previously specified. The setting of sod shall be staggered in such a manner as to avoid continuous seams. Sod shall be moist and shall be placed on a moist earth bed. Sod shall be carefully placed by hand, edge to edge, in rows at an oblique angle to the slope, commencing at the base of the area to be sodded and working upward. Sod shall be immediately pressed firmly into contact with the sod bed by rolling with a one-ton roller or any other CQA Manager accepted equipment. The rolling operation shall provide a true and even surface and insure knitting without displacement of sod or deformation of the surfaces. Sod located on slopes should be placed carefully enough so that rolling with a power roller is not necessary. Sod located around retention areas, along pavement areas, in swales or sideslopes may require staking. The repair of any erosion or sod relocation necessary prior to the sod becoming firmly rooted to the existing soil will be the responsibility of the Contractor. Stakes, if used, shall not interfere with the mowing of the lawn areas. All sod placed in areas with slopes steeper than 4:1 shall be staked.
- B. The Contractor shall ensure that the finished grade of sod placed directly adjacent to buildings or other walls does not vary more than 1/2-inch from a 10-foot long straight edge.
- C. A letter of certification from the grassing contractor as to when the sod was cut, and what type, shall be provided to the CQA Manager upon delivery of the sod to the job site.



**3.07 CLEAN UP**

- A. Upon completion of the work, all debris, fertilizer bags, pallets, etc. shall be removed from the site. Any paved areas including curbs and sidewalks shall be thoroughly swept.

**3.08 WATERING**

- A. The sod shall be kept in a moist condition after planting and for the duration of the Contract (and in no case less than two weeks). The moistened condition shall extend to at least the full depth of the rooting zone.

**3.09 MAINTENANCE**

- A. The Contractor shall, at his expense, maintain the planted areas in satisfactory condition until final acceptance. Such maintenance shall include watering, filling, leveling, and repairing any washed or eroded areas, and additional fertilizer and sod applied to areas where satisfactory stand of grass has not been achieved.
- B. Immediately prior to final inspection, the Contractor shall mow the areas sodded under this Contract.

**3.10 ACCEPTANCE**

- A. The Contractor shall schedule the laying of sod to allow the sod to be well established prior to the date of final completion. The Owner shall not accept the sod unless the roots have grown into the soil and the sod cannot be raised. The sod shall also show signs of health, good growth, and proper maintenance.

**END OF SECTION**