
IFB NO. Y19-774-RM

ISSUED: June 14, 2019

INVITATION FOR BIDS

FOR

**ORANGE COUNTY CLASS III LANDFILL GAS MANAGEMENT SYSTEM
HEADER EXPANSION**

**PART H
TECHNICAL SPECIFICATIONS**

**PART H
Volume II**

TECHNICAL SPECIFICATIONS

ORANGE COUNTY CLASS III LANDFILL LANDFILL GAS MANAGEMENT SYSTEM HEADER EXPANSION

Prepared for:



**ORANGE COUNTY UTILITIES
SOLID WASTE DIVISION**

5901 Young Pine Road
Orlando, Florida 32829

Sequence # 66786
CIP # 4410-038-1106-0003
Contract # _____

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Project No. 17-737

April 2019

TECHNICAL SPECIFICATIONS

ORANGE COUNTY LANDFILL ORANGE COUNTY, FLORIDA

CLASS III LANDFILL GAS MANAGEMENT SYSTEM HEADER EXPANSION

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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 Contractor's workmanship, materials and equipment, prior approval of the Engineer notwithstanding.
- C. Utility Installations and Structures:
1. Utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto whether owned or controlled by the Owner, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work shall be deemed included hereunder.

2. The Contract Documents contain data relative to existing utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to investigation on its own to be fully informed of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.
3. The Contractor shall protect all utility installations and structures from damage during the work. Access across any buried utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange its operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at the Contractor's expense. All existing utilities damaged by the Contractor, which are shown on the Drawings or have been located in the field by the utility, shall be repaired by the Contractor, at the Contractor's expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to utility installations or structures.
4. Utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various contract items.
5. Where utility installations of structures owned or controlled by the Owner or other governmental body are encountered during the course of the work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If the Contractor accomplishes such work, it will be paid for as extra work as provided in the General Conditions.
6. The Contractor shall, at all times in performance of the work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of utility installations and structures; and shall, at all times in the performance of the work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.
7. All Owner and other governmental utility departments and other owners of public utilities which may be affected by the work will be informed in writing by the Owner within two weeks after the execution of the Contract or Contracts covering the work. Such notice will set out, in general, and direct attention to, the responsibilities of the Owner and other governmental utility departments and other owners of utilities for such installations and structures as may be affected by the work and will be accompanied by one set of Drawings and Specifications covering the work under such Contract or Contracts.

8. In addition to the general notice given by Owner, the Contractor shall give written notice to Owner and other governmental utility departments and other owners of utilities of the location of the proposed construction operations, at least 72 hours in advance of breaking ground in any area or on any unit of the work.
9. The maintenance, repair, removal, relocation or rebuilding of utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Owners of such utilities.

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 therefore 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 Engineer 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 the Contractor's own expense. Contractor 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 manufacturer shall be of good

reputation and have a plant of ample capacity. Manufacturer shall, upon the request of the Engineer, be required to submit evidence that they have 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 the Contractor's 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 insure 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 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 provided 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 their 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 the Owner 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 Owner 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 its obligations under the Contract shall be final and conclusive.
2. The Contractor shall reimburse the County for all failed 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 their own expense.
4. In case the Owner rejects any materials, then the Contractor shall replace the rejected materials within a reasonable time. If the Contractor fails to do so, the Owner may, after the expiration of a period of thirty (30) calendar days after giving Contractor 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 the 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 its 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. Contractor shall remove any obstructions placed by Contractor contrary to this provision.

B. Surveys:

1. The Contractor shall furnish and maintain, at their 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 may deemed necessary and, before using them, shall call the Engineer's attention to any inaccuracies.
3. The Contractor shall, at their 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. Contractor 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 the Contractor's 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 the Contractor's operations, wherever they may be, is solely the Contractor's 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 work is intended to be performed or which performance of the project work will affect.

B. Protection of Trees:

1. All trees and shrubs shall be adequately protected by the Contractor with boxes and otherwise and in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or employees of the Contractor shall be replaced by Contractor with new stock of similar size and age, at its proper season and at the sole expense of the Contractor.
2. Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.
3. The Owner may order the Contractor, for the convenience of the Owner, to remove trees along the line or trench excavation. If so ordered, the Owner will obtain any permits required for removal of trees.

C. Lawn Areas: Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where

sod has been removed shall be restored with new sod in the manner described in the Workmanship and Materials section.

D. Restoration of Fences:

1. Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good condition as before the starting of the work.
2. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the Owner.
3. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefor, as part of the overhead cost of the work, and no additional payment will be made therefore.

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. Smoke Prevention: The Contractor shall use hard coal, coke, oil or gas as fuel for equipment generating steam. A strict compliance with ordinances regulating the production and emission of smoke will be required.

D. 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 Saturdays, on 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.

- E. 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.
- F. Dust Prevention: The Contractor shall prevent dust nuisance from its 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 its 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.
 - 2. The Contractor shall remove from the site all of surplus materials and temporary structures used by the Contractor 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 Contractor 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 Contractor 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 its 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. At the Contractor's own expense, Contractor shall remove any siltation deposits and correct any erosion problems as directed by the Owner, which results from Contractor's 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 Specific Provisions.
- 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 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.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

H:\S2Li Projects\Orange County\17-737 Class III LFG Header Extension\Specifications\01000 - General Requirements.OES.sbl chh 7-5-18.doc

**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/she 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 Class III Landfill, 5901 Young Pine Road, Orlando, Florida 32829. The Orange County Class III landfill 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 the header pipe expansion of the landfill gas collection system for Cell 2 and connection to Cell 1 at the Orange County Class III Landfill, as shown on the plans. The Work includes furnishing all labor, materials, equipment, tools, transportation, services, incidentals, and performing all work necessary to provide a Landfill Gas Management System Expansion consisting of header pipe, airline, forcemain piping, valves, condensate pump stations, condensate infiltration wells, and blind flanges for future expansion, complete, in place, and ready for operation and use by the Owner, in accordance with the Drawings and Specifications titled "Landfill Gas Management System Header Expansion, Orange County Solid Waste Management Facility."

The construction of the Cell 2 Landfill Gas Management System Header Expansion shall proceed in an orderly manner as to protect the materials placed.

Insofar as the solid waste disposal operations by the Owner are required to be ongoing during the construction period, the Contractor is required to sequence the work to eliminate interruption of the Owner's solid waste disposal operations.

- B. This project is a unit cost basis contract. Actual field survey quantities will apply in final billing. Contractor shall be aware that this project is within a primarily construction and demolition landfill site (Florida Class III), and thus aware of the potential drilling and trenching difficulties this may pose. Header piping installation will be based on unit cost per linear feet installed. This Contract is for construction of a Landfill Gas Management System Expansion.

Differential settlement occurs at landfills before, during, and after construction. The topographic data provided in the bid documents may not represent the site conditions of the inactive landfill at the time of bidding or start of construction. Neither the Owner nor the Engineer express, imply, or guarantee that the actual amount of Work to be accomplished will correspond to the quantities given. The Bidders must assume that the quantities are inaccurate and therefore, the Bidders must satisfy themselves by personal examination of the project location and site conditions, estimate the quantity and extent of Work based on the Bid drawings, technical specifications and any Addendum thereof, and by such other means as they choose, as to the actual conditions and requirements of the Work and the accuracy of

the estimates given in the Plans, Specifications, and Contract Documents. The Bidder shall not, at any time after submission of Bid, dispute any such estimate of the Owner and Engineer, nor assert that there has been any misunderstanding in regard to the nature, site conditions or the amount of work to be done.

The new topographic surveys shall be in AutoCAD 2013 (or later) format with contours of assigned elevations and shall be submitted to the Engineer in electronic format.

- 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>DWG. NO.</u>	<u>TITLE</u>
G-1	COVER SHEET
G-2	LEGEND SHEET
G-3	AERIAL PHOTOGRAPH (2016)
C-1	SITE PLAN
C-2	HEADER PROFILES - NORTH
C-3	HEADER PROFILES – SOUTH (1 OF 2)
C-4	HEADER PROFILES – SOUTH (2 OF 2)
C-5	HEADER PROFILES - WEST
C-6	DETAILS (1 OF 4)
C-7	DETAILS (2 OF 4)
C-8	DETAILS (3 OF 4)
C-9	DETAILS (4 OF 4)

1.03 WORK BY OWNER

- A. Owner will continue the disposal of waste within the active Landfill area. Owner will continue the use of the access road that runs through the construction area. Therefore, the access road must be kept open and the Contractor is to furnish flagmen and/or all-weather bypass lanes when necessary.
- B. If it is necessary in the course of operating the landfill for the Contractor to move its equipment and/or materials, they shall do so promptly and place that equipment and/or materials in an area that does not interfere with landfill operations.
- C. 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,
 - Inspection of pipe placement and slope, and
 - Inspection of condensate pump stations.

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 to avoid construction areas.
- F. The Contractor shall maintain dust control on all roads used for access to construction and all construction areas.
- G. The Contractor shall not cause a shutdown of the County's existing landfill gas system for more than 5 days to comply with the Owner's permit conditions. The Contractor is required to notify the Owner at least 48 hours prior to any needed shutdown of the Flare Station(s). The Contractor shall record the time of the flare station shutdown and the time of the Flare Station restart.

1.05 CONTRACTOR USE OF SITE

- A. Access to Site: Limited to public rights-of-way at the scalehouse facility. Work shall be performed so as to not block or hinder site access, except as authorized by the Owner.
- B. Except in the event of special construction, no work shall be done between the hours of 7:00 p.m. and 7:00 a.m. Monday through Saturdays, Sundays, and Orange County Holidays. If the proposed and efficient prosecution of the Work requires operations during the aforementioned non-working hours, the County's permission shall be obtained 48 hours before starting such items of the work.

The Contractor is hereby informed and understands that normal working hours for the County's Resident Project Representative and Quality Assurance Consultant's sampling and monitoring personnel are 10 hours per day, 50 hours per week. If the Contractor plans to work more than 10 hours per day, 50 hours per week, the written permission for any work beyond the normal operating hours for the Resident Project Representative and Quality Assurance Consultant's sampling and monitoring personnel is to be requested in writing 24 hours in advance. All

compensation to the Resident Project Representative and Quality Assurance Consultant for working beyond the normal 50-hour weekly schedule is considered “overtime” compensation and shall be paid by the Contractor. The overtime rate for each Resident Project Representative is \$150 per hour for each hour beyond 50 hours per week. The overtime rate for the Quality Assurance Consultant’s sampling and monitoring personnel is \$150 per hour for each hour beyond 50 hours per week. The Resident Project Representative’s and Quality Assurance Consultant’s overtime compensation shall be processed as part of the final Change Order.

- C. Construction Operations: Limited to Landfill Area, Contractor’s storage and office areas, as noted on Drawings.
- D. Limit Use of Landfill Property:
 - 1. Allow use of active waste disposal areas by public and Owner including utilization of paved entrance roads and of haul 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 the landfill.
 - 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

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SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 DESCRIPTION

- 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 COUNTY.
- B. Payment for the various items on the CONTRACTOR's Bid Form, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles and for all labor, operations, supervision, overhead, and profit, and incidentals appurtenant to the items of work being described as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor.
- C. No separate payment will be made for any item that is not specifically set forth on the CONTRACTOR's Bid Form and all costs, therefore, shall be included in the prices named on the CONTRACTOR's Bid Form for the various appurtenant items of work. Payment for complying with the safety requirements for construction on the work site shall be included in the contract unit price paid for the various items of work wherein it is required, and no separate payment will be made, therefore. In addition, 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. Trench excavation, sheeting, shoring and bracing;
 - b. Benching, if required, for drilling access to well locations;
 - c. Dewatering, storm water runoff management and disposal of water during construction;
 - d. Trash fencing, silt fencing and turbidity barriers;
 - e. Erosion control, protection of Work from storms and erosion and construction of temporary; structures during construction;
 - f. Cleaning stormwater inlets, culverts, and structures due to sediment from landfill gas (LFG) construction;
 - g. Transportation of any solid waste to the active portion of the landfill face for disposal.
 - h. Removal of any granular fill contaminated with solid waste cuttings or from excavation from well construction or other construction activities of the CONTRACTOR and transport to the active portion of the landfill face for disposal;
 - i. Hauling and disposal of construction waste material and site cleaning;
 - j. Traffic control activities;
 - k. Dust control;
 - l. Field verifications or locating buried utilities;
 - m. Taxes, insurance, overhead and profit;
 - n. Project Schedule; and
 - o. All other work required and incidental to the Contract.

- D. The total Bid Amount shall cover all work required by the Contract Documents. All costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction equipment and tools; including all costs and expenses for taxes, commissions, transportation charges, and expenses, permit fees, patent fees, royalties, handling and tests; and performing all necessary labor and supervision to fully complete the WORK shall be included in the bid. All work not specifically set forth as a pay item on the CONTRACTOR's Bid Form shall be considered a subsidiary obligation of CONTRACTOR and all costs in connection therewith shall be included in the unit prices bid.
- E. There will be no payment for rejected or unused products. Payment will not be made for the following:
- a. Loading, hauling, and disposing of rejected material;
 - b. Quantities of material wasted, eroded, washed away or disposed of in a manner not called for under Contract Documents;
 - c. Rejected loads of material, including material rejected after it has been placed by reason of the failure of CONTRACTOR to conform to provisions of Contract Documents;
 - d. Material not unloaded from transporting vehicle;
 - e. Failure to submit an updated progress schedule with pay application;
 - f. Defective work not accepted by the COUNTY;
 - g. Work performed without approved shop drawing;
 - h. Material remaining on hand after completion of work.
- F. All estimated quantities stipulated on the CONTRACTOR's Bid Form are approximate and are to be used only (a) as a basis for estimating the probable cost of the WORK and (b) for the purpose of comparing the bids submitted for the WORK. The actual amounts of work done and materials under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished unless it exceeds the estimated quantities in which case a change order must be approved prior to payment for quantities exceeding the estimated quantity.
- G. The CONTRACTOR shall field verify all quantities and dimensions shown on the Drawings or contained in the Contract Specifications.
- H. The CONTRACTOR shall be responsible for establishing contracts with its subcontractors, which have a measurement and payment in accordance with this Section. If the CONTRACTOR establishes a contract with its subcontractors, which conflicts with this Section, any additional cost incurred will be borne by the CONTRACTOR.
- I. 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 COUNTY.

1.02 COMPUTATION OF QUANTITIES

- A. Measurement of quantities expressed as area shall be based upon a horizontal, planimetric projection to the work limits as determined by survey record drawings prepared by a surveyor licensed in the State of Florida. Cost of surveying shall be paid by CONTRACTOR, and incorporated into Bid Items, as appropriate or as otherwise called out by this Section.

- B. Measurement of linear items will be for quantities actually field installed to the specified work limits, based upon surveyed stations recorded along the straight or curved centerline of each respective item. Measurement conducted by survey is to be conducted by the CONTRACTOR's approved Florida licensed land surveyor.
- C. Payment will be made to the limits as specified in the Contract Documents. If the constructed limits are less than the specified limit, payment will be made to the actual limits of construction as shown on the Record Drawings. Payment for quantities that exceed the specified contract limits will only be made with the approval of the Project Manager. Payment for quantities that exceed the Contract quantities can only be obtained through an approved change order.
- D. No partial payments shall be made for the installation of items which have not been tested and approved.
- E. Payment will be made monthly until the completion of each unit price item based on quantity completed by CONTRACTOR and verified by the Project Manager. Final payment will be based on quantity calculated from Record Drawings prepared by a Florida Licensed Land Surveyor and confirmed by field measurement by the Project Manager and ENGINEER.
- F. Payment for Lump Sum items will be made as described for each individual lump sum Bid Item, as described in Part 3 of this Section.

1.03 VARIATIONS IN ESTIMATED QUANTITIES

- A. The quantities given in the Contract Documents are approximate and are given as a basis for the uniform comparison of bids. The COUNTY does not expressly, or by implication, agree that the actual amount of work will correspond therewith.
- B. The CONTRACTOR must provide, for Unit Price Work, a proposed contract price determined on the basis of estimated quantities required for each item. The estimated quantities of items are not guaranteed and are solely for the purpose of comparing bids. Each such unit will be deemed to include an amount for overhead, profit and indirect costs for each separately defined item.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 MEASUREMENT AND PAYMENT ITEMS

Section 1. General

- A. Bid Item 1a. - Mobilization/Demobilization (Lump Sum)
 - 1. Measurement. The work required for this item shall not be measured for payment.
 - 2. Payment. Payment for this item will be on a lump sum basis as described below 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 01025. This includes, but is not limited to, movement of personnel, equipment, supplies, and incidentals to the project site. No price adjustments will be made for this item due to changes in the work. Demobilization includes removal from the site of all materials, resources, equipment, temporary support facilities, utilities, and all remaining construction debris at the completion of the project and includes the release of liens and other incidentals as specified as requirements of project closeout. The combined mobilization/demobilization cost shall not exceed five percent (5%) of the total contract price and shall be equally split.

The final payment for mobilization/demobilization will not be made until all temporary facilities, temporary erosion and sedimentation controls, equipment, and appurtenances have been removed from the site.

B. Bid Item 1b. - Project Field Survey (Lump Sum)

1. Measurement. The work required for this item shall be on a completed lump sum basis.
2. Payment. Payment for this item shall be on a lump sum basis for the completed survey. The project survey will include tying into the site coordinate and elevations by a Florida Licensed Land Surveyor; field staking of proposed landfill gas extraction wells; field staking of proposed route for landfill gas headers, landfill gas laterals, air supply line and force main line prior to construction; and an as-built survey of installed wells, above and below ground pipe, fittings, tie-ins, road crossings, valves, and appurtenances. The as-built survey notes will identify such items as: state plane coordinates, ground elevations, pipe depth, pipe slope, top of pipe coordinates and elevations, pipe diameter, identification of fitting sizes, and construction, pipe, and fitting notes.

C. Bid Item 1c. - Administration (Lump Sum)

1. Measurement. The work required for this item shall be on a completed lump sum basis.
2. Payment. Payment for this item will be on a lump sum basis as described below 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. This includes, but is not limited to, obtaining all permits, insurance, and bonds; and any other pre-construction expense necessary for the start of the work; attending project meetings; preparing and submitting shop drawings, partial payment requests, contract forms; coordination with subcontractors and suppliers; and providing temporary support facilities.

D. Bid Item 1d. - Project Record Documentation (Lump Sum)

1. Measurement. Measurement for this item shall be on a completed lump sum basis.
2. Payment. Payment for this item shall be on a lump sum basis for the completed Project Record Documents. The pay item includes drawings, operation and maintenance manuals, vendor and material supply information, construction photographs and video, and all other items required for Project Record Documentation as described in Section 01720. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

Section 2. Landfill Gas Header, Condensate Discharge Force Main, and Compressed Airline

A. Bid Item 2a. - 12-inch HDPE SDR-17 Landfill Gas Header Pipe (Linear Foot)

1. Measurement. Measurement for this item shall be on a horizontally installed linear foot basis per specified pipe size as measured during the conformance survey conducted by a Florida Licensed Professional Surveyor. Measurement shall not include vertical components (i.e., riser) of laterals.
2. Payment. Payment for this item shall be at the contract unit price per horizontal linear foot for each pipe size specified on the bid form. Payment includes health and safety requirements; excavation, trenching, transportation of excavated refuse to the working face, sand and clean soil backfill material, pipe bedding, backfilling, soil compaction, fittings, piping, connections, flange backing

rings, cleanouts, risers, pipe location markings, quality control surveying, testing, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

B. Bid Item 2b. - 8-inch HDPE SDR-17 Landfill Gas Header Pipe (Linear Foot)

1. Measurement. Measurement for this item shall be on a horizontally installed linear foot basis per specified pipe size as measured during the conformance survey conducted by a Florida Licensed Professional Surveyor. Measurement shall not include vertical components (i.e., riser) of laterals.
2. Payment. Payment for this item shall be at the contract unit price per horizontal linear foot for each pipe size specified on the bid form. Payment includes health and safety requirements; excavation, trenching, transportation of excavated refuse to the working face, sand and clean soil backfill material, pipe bedding, backfilling, soil compaction, fittings, piping, connections, flange backing rings, cleanouts, risers, pipe location markings, quality control surveying, testing, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

C. Bid Item 2c. - 3-inch HDPE SDR-11 Condensate Discharge Force Main (Linear Foot)

1. Measurement. Measurement for this item shall be on a horizontally installed linear foot basis per specified pipe size as measured during the conformance survey conducted by a Florida Licensed Land Surveyor. Measurement shall not include vertical components (i.e., riser to wellheads).
2. Payment. Payment for this item shall be at the contract unit price per horizontal linear foot for each pipe size specified on the bid form. Payment includes health and safety requirements; excavation, trenching, transportation of excavated refuse to the working face, sand bedding, clean soil backfill, backfilling, soil compaction, fittings, piping, connections, risers for connection to pumps, pipe location markings, quality control surveying, testing, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Contract Documents. Price shall include the above-grade riser pipe at each well for the pump. Additional payment will not be made for the above-grade riser.

D. Bid Item 2d. - 2-inch HDPE SDR 9 Compressed Air Line (Linear Foot)

1. Measurement. Measurement for this item shall be on a horizontally installed linear foot basis per specified pipe size as measured during the conformance survey conducted by a Florida Licensed Land Surveyor. Measurement shall not include vertical components (i.e., riser to wellheads).
2. Payment. Payment for this item shall be at the contract unit price per horizontal linear foot for each pipe size specified on the bid form. Payment includes health and safety requirements; excavation, trenching, transportation of excavated refuse to the working face, sand bedding, clean soil backfill, backfilling, soil compaction, fittings, piping, connections, risers for connection to pumps, pipe location markings, quality control surveying, testing, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Contract Documents. Price shall include the above-grade riser pipe at each well for the pump. Additional payment will not be made for the above-grade riser.

E. Bid Item 2e. - 12-inch Butterfly Control Valve (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment. Payment for this item will be at the contract unit price per installed unit, including health and safety requirements; excavation, transportation of excavated refuse to the working face, backfilling, valving, valve stem extension controls, fittings, spacers, piping installation and connections, monitoring ports, and related component, identification markings, testing, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

F. Bid Item 2f. - 8-inch Butterfly Control Valve (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment. Payment for this item will be at the contract unit price per installed unit, including health and safety requirements; excavation, transportation of excavated refuse to the working face, backfilling, valving, valve stem extension controls, fittings, spacers, piping installation and connections, monitoring ports, and related component, identification markings, testing, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

G. Bid Item 2g. - Header Line Tie-In to Existing Pipe (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment for this item shall be at the contract unit price per installed unit, including health and safety requirements; excavation, transportation of excavated refuse to the working face, soil, pipe bedding, backfilling, soil compaction, piping, connections, fittings, connections, quality control surveying, testing, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

H. Bid Item 2h. - Airline Tie-In to Existing Pipe (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment for this item shall be at the contract unit price per installed unit, including health and safety requirements; excavation, transportation of excavated refuse to the working face, soil, pipe bedding, backfilling, soil compaction, piping, connections, fittings, connections, quality control surveying, testing, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

I. Bid Item 2i. - Condensate Force Main Tie-In to Existing Pipe (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment for this item shall be at the contract unit price per installed unit, including health and safety requirements; excavation, transportation of excavated refuse to the working face, soil, pipe bedding, backfilling, soil compaction, piping, connections, fittings, connections, quality control surveying, testing, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

J. Bid Item 2j. - Air Supply Line Isolation/Blow-off Station (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment. Payment for this item shall be at the contract unit price per installed unit, including health and safety requirements; excavation, transportation of excavated refuse to the working face, soil, pipe bedding, backfilling, soil compaction, piping, connections, valving, fittings, connections, pipe supports, pipe location markings, appurtenances, quality control surveying, testing, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

K. Bid Item 2k. - Forcemain Line Blow-off (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment. Payment for this item shall be at the contract unit price per installed unit, including health and safety requirements; excavation, transportation of excavated refuse to the working face, soil, pipe bedding, backfilling, soil compaction, piping, connections, valving, fittings, connections, pipe supports, pipe location markings, appurtenances, quality control surveying, testing, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

L. Bid Item 2l. - Road Crossing CMP Casing for Piping (Linear Feet)

1. Measurement. Measurement for this item shall be on an installed linear foot basis as measured during the conformance survey conducted by a Florida Licensed Land Surveyor.
2. Payment. Payment for this item shall be at the contract unit price per linear foot as specified on the Bid Form. Payment is in addition to the payment for HDPE piping and includes additional health and safety requirements; excavation, transportation of excavated refuse to the working face, bedding, backfilling, piping placement inside the casing, and repair of the road to its original condition after construction to the satisfaction of the COUNTY.

Section 3. 36-inch HDPE Condensate Pump Stations

A. Bid Item 3a. - 36-inch HDPE Condensate Pump Stations (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment. Payment for this item shall be at the contract unit price per installed unit including boring, transportation of excavated refuse to the working face, gravel leveling layer, concrete ballast, connection to LFG piping, connection to airline and forcemain piping, pump, pump tubing, pump cycle counter, air pressure regulator, backfilling, compaction, quality control surveying, testing and other incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

Section 4. Condensate Injection Manifolds

A. Bid Item 4a. – Condensate Injection Manifold (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.

2. Payment. Payment for this item shall be at the contract unit price per installed unit including boring, transportation of excavated refuse to the working face, gravel fill, piping, fittings, backfilling, compaction, quality control surveying, testing and other incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

Section 5. Stormwater Ditch Crossing

A. Bid Item 5a – Earthwork (Lump Sum)

1. Measurement. Measurement for this item shall be on a completed lump sum basis.
2. Payment. Payment for this item will be on a lump sum basis 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. This includes, but is not limited to, health and safety requirements, excavation of unsuitable soils, soil, pipe bedding material, placement of the soil, placement of the pipe bedding material, excavation, backfill, grading, compaction, and fine grading at the mitered end sections.

B. Bid Item 5b – 48-inch Corrugated HDPE Culvert Pipe (Linear Feet)

1. Measurement. Measurement for this item shall be on an installed linear foot basis as measured during the conformance survey conducted by a Florida Licensed Land Surveyor
2. Payment. Payment for this item shall be at the contract unit price per linear foot as specified on the Bid Form. Payment includes health and safety requirements; placement of the pipe, quality control surveying, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

C. Bid Item 5c – Mitered End Sections (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment. Payment for this item will be at the contract unit price per installed unit. A unit is defined as one mitered end section. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents

Section 6. Final Grade Treatment

A. Bid Item 6a. - Bollards (Each)

1. Measurement. Measurement for this item shall be on a completed and installed unit basis.
2. Payment. Payment for this item will be at the contract unit price per installed unit. A unit is defined as one bollard. Two bollards are to be installed at each designated location including at the riser pipes, piping blow offs, and new valves. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Documents.

B. Bid Item 6b. - Sod (Lump Sum)

1. Measurement. Measurement for this item shall be on a completed and installed lump sum basis.
2. Payment. Payment for this item shall be on a completed and installed lump sum basis. Payment for sod for the surface areas disturbed during the installation of piping and valve within the Cell I landfill area and ditch crossing as designated by the Contract Documents. Payment shall include any necessary surface regrading of equipment disturbed areas and watering and shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Document and to the satisfaction of the COUNTY. Payment is for regrading, installing new sod, and watering. Payment will not be made for any needed surface area repaired by the CONTRACTOR that the ENGINEER and COUNTY believes has been disturbed unnecessarily. Installation shall be completed by the Substantial Completion date and watering shall continue through the Final Completion date.

C. Bid Item 6c. - Hydro-Seeding/Mulch (Lump Sum)

1. Measurement. Measurement for this item shall be on a completed and installed lump sum basis .
2. Payment. Payment for this item shall be on a completed and installed lump sum basis. Payment for hydroseeding and mulching for the surface areas disturbed during the installation of piping, risers, valves, equipment staging and material storage areas within the site not repaired by sod as designated by the Contract Documents. Payment shall include any necessary surface regrading of equipment disturbed areas and watering and shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Contract Document and to the satisfaction of the COUNTY. Payment is for regrading, placing hydro-seed, placing mulch, and watering. In addition, the area shown on the drawings allocated for the equipment staging and material storage areas. Payment will not be made for any needed surface area repaired by the CONTRACTOR that the ENGINEER and COUNTY believes has been disturbed unnecessarily. Installation shall be completed by the Substantial Completion date and watering shall continue through the Final Completion date.

Section 7. Air Compressor

D. Bid Item 7a. – Air Compressor (Lump Sum)

1. Measurement. Measurement for this item shall be on a completed and installed lump sum basis.
2. Payment. Payment for this item will be on a lump sum basis 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. This includes, but is not limited to, procurement of air compressor and appurtenances, upgrading electrical wiring, routing and installation of new conduit, installation of surge protector, installation of phase monitor, installation of control panel, installation of air compressor, installation of air pressure regulator, connection to compressed air piping system, startup and testing of the installed equipment, complete in place, meeting code requirements and ready for use by the County.

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 the General Conditions.
- 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: each progress payment date is as indicated in the General Conditions. The period of Construction work covered by each Application of Payment is the period indicated in the General Conditions.
- D. Payment Application Forms: 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 three (3) 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 Engineer.
- 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 proceeded 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

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SECTION 01030

SPECIAL PROVISIONS

PART 1 – GENERAL

1.01 CONTRACTOR QUALIFICATIONS

- A. Qualifications: The Contractor and SubContractor for installation of the landfill gas header piping air supply lines, and force main piping shall have the following minimum qualifications. The qualification documents shall be submitted with the bid documents. If any Landfill Gas SubContractor cannot meet the following qualification in the opinion of the Owner and Engineer, the Owner reserves the right to require the Contractor to propose another company who can meet these minimum qualifications:
1. The Contractor shall demonstrate, by submitting a list of previous projects and references, a minimum of three (3) similar size active landfill gas construction projects within the last five (5) years.
 2. The Contractor shall submit resumes of Landfill Gas Contractor and SubContractor's key personnel, including Project Manager, Superintendent, and Supervisor highlighting experience with similar size active landfill gas construction projects.
 3. The Landfill Gas Contractor and SubContractor shall submit OSHA Certifications and resume for the proposed Site Safety Officer.

1.02 CONSTRUCTION SAFETY PROGRAM

- A. The Contractor is advised that decomposing refuse produces landfill gas which is approximately 50 percent methane by volume. The Contractor is advised of the need for precautions against fire, explosion and asphyxiation when working in or near excavations which are in or near refuse-filled areas.
- B. The Contractor shall perform all work in a fire-safe manner. He shall supply and maintain, on the site, adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall develop and maintain, for the duration of the Contract, a Health and Safety Plan that will effectively incorporate and implement all required safety provisions for work in or near refuse-filled areas including complying with all federal, state and local safety codes, ordinances and regulations, including the requirements of the United States Occupational Safety and Health Administration (OSHA), in accordance with 29 CFR 1910, OSHA Standards and other such safety measures as may be required by the above mentioned regulatory agencies. Where these regulations do not apply, applicable parts of the National Fire Prevention Standards for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program. This person should be present at all times during construction and should be trained in the use of all of the recommended safety equipment.
- C. All excavation shall comply with the applicable requirements as stated in the following:
1. OSHA excavation safety standards 29 CFR, 1926-650, subpart P.

2. State (Trench Safety Act Section 553.60-553.64 Florida Statutes) and Owner construction safety regulations.
 3. Trench safety guidelines as specified in “*A Compilation of Landfill Gas Field Practices and Procedures*” developed by the Landfill Gas Division of SWANA.
- D. The duty of the Engineer or the Owner to conduct review of the Contractor’s performance is not intended to include a review or approval of the adequacy of the Contractor’s safety supervisor, the safety program, or any safety measures taken in, on, or near the project construction site. The Contractor has complete responsibility of the construction safety program based on all applicable federal, state, and local codes, ordinances, and regulations.
- E. The Contractor shall make all reports as are, or may be, required by any authority having jurisdiction and permit all safety inspections of the work being performed under this Contract. Before proceeding with any construction work, the Contractor shall take necessary action to comply with all provisions for safety and accident prevention.
- F. Payment for complying with the additional Safety Requirements for Construction on the work shall be included in the Contract price, and no separate payment will be made therefore.
- G. The Contractor shall prepare a written site-specific Health and Safety Plan (Plan) for use by the Contractor and SubContractor site workers. This plan must be prepared to meet the 29 CFR 1910.120 OSHA regulations and shall include as a minimum, the following:
1. Organizational Structure to include general supervision, Health and Safety officer, lines of authority, and responsibility and communication. The Health and Safety Officer shall be a worker who will always be present during site construction, in addition to his/her other site duties.
 2. Comprehensive Work Plan to include the work tasks and objectives, resources needed, and training requirements for workers (health and safety, machine operations license, etc.). This shall also include a section on safety procedures to be followed for excavation and well drilling.
 3. Asbestos Work Plan to include approach for workers to excavation and drilling in environments with asbestos containing materials present. Plan shall include the Work tasks and objective and resources needed.
 4. Health and Safety to include identification of possible site hazards, training levels for each category of site workers, personal protective equipment and medical surveillance needed, site control measures, and confined space entry procedures.
 5. Emergency Response Plans to include all emergency telephone numbers, a highlighted map showing the quickest route to the nearest emergency care facility, and directions to such facility.
 6. Air Monitoring Procedures to include frequency and type of air monitoring of exposed refuse and site worker areas, calibration of air monitoring equipment, and action levels of air contaminants for site worker protection. All equipment calibration and field gas measurements shall be recorded with the date and time of sample, and the sampler’s name.

Sampling shall be done by a Contractor worker trained in the use of the gas sampling equipment. These trained workers shall be designated in the Contractor's Plan.

7. Respiratory Protection Program to include written documentation of the Contractor's respiratory program.
8. A signature page for all site workers covered by the Plan (Contractor and SubContractor site workers).

1.03 ENVIRONMENTAL PROTECTION

- A. Excavations: All excavations shall be confined to the immediate area of the drilling rig and/or active lateral and header piping installation. No exposed solid waste shall be allowed at the end of the day. All solid waste shall be covered and prevented from mixing with storm water run-off.
- B. Environmental Constraints:
 1. Dust Control: Trucked water shall be used if necessary to prevent dust. The Contractor may obtain water for dust control from the on-site stormwater ponds or adjacent ditches.
 2. Explosion Protection: It is expected that combustible, asphyxiating, and hazardous gases will be venting from boreholes drilled to install LFG extraction wells and trenches excavated to install header piping. Contractor shall provide for all equipment and procedures necessary to safely install wells and header piping under this condition(s). Cautions shall be exercised on overnight stoppages to prevent methane accumulation. All work shall be performed by qualified workers in accordance with the best standards and practices available. Contractor shall be responsible for enforcing all additional explosion protection precautions according to "A *Compilation of Landfill Gas Field Practices and Procedures*" developed by the Landfill Gas Division of SWANA .
 3. Fire Control: Contractor shall be responsible for fire control and shall include fire control procedures (which will be adhered to during the entire contract time) in the Health and Safety Plan required in the above section.
 4. Litter: The Contractor shall be required to control, collect, and truck all litter excavated or exposed by the work to an on-site location designated by the Owner. Any litter generated by the Contractor must be collected within 24 hours.
 5. Erosion Protection: Contractor is responsible for designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary to protect the work, prevent sedimentation from the Contractor's activities from entering water bodies or entering other parts of the Owner's site outside the construction limits, and maintain sedimentation within acceptable limits as established by agencies having jurisdiction.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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. Resident project representative (RPR).
 - 3. Engineer and their professional consultants.
 - 4. CQA Inspector.
 - 5. Contractor's representative.
 - 6. Subcontractor's representative.
 - 7. Supplier's representative.
 - 8. Others, as appropriate.
 - 9. 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.
 - 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 note 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 ten 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/her 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 blueprint shop drawings shall be submitted with one (1) set of mylar reproducibles or electronic files (in AutoCAD[®] format) and four (4) sets of prints. The Engineer will review the blueprints and return to the Contractor the set of marked-up drawings with appropriate review comments. All blueprint shop drawings, when practical, shall be 22 inch by 34 inch 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 Owner 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 Apparent Low Bidder's qualifications.
 - 2. Upon request of the Engineer or Owner, 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. Measurement and Payment: Section 01025.
 - 3. 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 Owner. 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. The schedule shall be organized based on the categories included in the bid.

- C. 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.

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

- E. For each major line item, list sub-values of major products or operations under the item.

F. 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.

G. The total 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 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:

Application for the Renewal and Modification of a Construction and Operation Permit for a Class III Landfill: Permit Nos: 0128169-035-SC/T3 and 0128169-036-SO/T3, pending issuance by the Florida Department of Environmental Protection.

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 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 01650

START-UP DEMONSTRATION AND TESTING

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The work may be segmented into several phases of construction in a logical order to meet the project schedule. Portions of the work may be utilized prior to Substantial Completion of all the work. Also, certain items of equipment are to be temporarily utilized in a phased segment of the work and then relocated in a subsequent phase in a permanent installation.
- B. Related Requirements Described Elsewhere:
 - 1. Section 01010: Summary of Work
 - 2. Section 11200: Condensate Pumps
 - 3. Section 11930: Air Compressor

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PRELIMINARY MATTERS

- A. Start-up Certification: Prior to system start-up, successfully complete all testing required of the individual components of work. Submit five (5) copies of CHECK-OUT MEMO signed by Contractor, Subcontractor, and the Manufacturer's representative. All copies shall be provided with the respective Operation and Maintenance Manual. This form shall be completed and submitted before Instruction in Operation to Owner or a request for final inspection.
- B. Demonstrate to the Engineer that all temporary jumpers and/or bypass have been removed and that all components are operating under their own controls as designated.
- C. Coordinate start-up activities with the Owner's operating personnel at the site and with the Engineer prior to commencing system start-up.

3.02 START UP

- A. Confirm that all equipment is properly energized and that all switches are set to their normal operating condition.
- B. Initiate start up in accordance with the operation and maintenance manual.
- C. Observe the component operation and make adjustments as necessary to optimize the performance of the work.

- D. Coordinate with Owner before performing any adjustments desired or operational problems requiring debugging.
- E. Make adjustments as necessary.

3.03 START-UP DEMONSTRATION AND TESTING

- A. After all work components have been constructed, field tested and started-up in accordance with the individual specifications and manufacturer requirements, perform the Start-Up Demonstration and Testing in the presence of the Engineer and the Owner. The demonstration shall be held upon completion of all systems at a date to be agreed upon in writing with the Owner.
- B. The start-up testing shall be conducted for two consecutive days. The work must operate successfully during the two-day testing period in the manner intended. If the work does not operate successfully, or if the start-up is interrupted due to other contracts, the problems will be corrected and the test will start over from day one. The party causing the interruption will be subject to the assessment of actual damages due to delay.
- C. During the start-up, operate the work, instruct designated facility operating personnel in the function and operation of the work, and cause various operational circumstances to occur. Demonstrate the essential features of the equipment and its relationship to other equipment. Prior to the substantial completion, the Contractor shall submit a detailed schedule of operational circumstances. Coordination of the various contract schedules will be accomplished through the Engineer.
- D. Acceptability of the work's performance will be based on the work performing as specified, under these actual and simulated operating conditions as defined in the Contract Documents. The intent of the start-up demonstration and testing is for the Contractor to demonstrate to the Owner and the Engineer that the work will function as a complete and operable system under normal as well as emergency operating conditions and is ready for acceptance.
- E. Certificate of Completed Demonstration: Submit five (5) copies of Certificate of Completed Demonstration memo signed by the Contractor, Subcontractor and Owner and insert one copy in each Operation and Maintenance Manual.

MANUFACTURER'S CHECK-OUT CERTIFICATION

OWNER: _____	No. Copies _____
ENGINEER: <u>S2L, Incorporated</u>	No. Copies _____
ARCHITECT: _____	No. Copies _____ Check-out
CONTRACTOR: _____	No. Copies _____
FIELD: _____	No. Copies _____ Memo No. _____
OWNER: _____	No. Copies _____

PROJECT DATA

CONTRACT DATA

NAME: _____

LOCATION: _____
OWNER: _____

OTHER: _____

NUMBER: _____
DATE: _____
DRAWING NO: _____
SPECIFICATION SECTION: _____

Name of Equipment Checked: _____

Name of Manufacturer of Equipment: _____

1. The equipment furnished by us has been checked on the job by us. We have reviewed (where applicable) the performance verification information submitted to us by the Contractor.
2. The equipment is properly installed, except for items noted below.*
3. The equipment is operating satisfactorily, except for items noted below.*
4. The written operating and maintenance information (where applicable) has been presented to and reviewed in detail with the Contractor. Five (5) copies of all applicable operating and maintenance information and parts lists have been furnished to the Contractor for insertion in each of the Equipment Brochures.

Checked By _____
 Name of Manufacturer's Rep. _____

 Address and Phone No. of Rep. _____

 Signature/Title/Person Making Check _____

 Date Checked _____

_____ Name of General Contractor

 Authorized Signature/Title/Date _____

 Name of Subcontractor _____

 Authorized Signature/Title/Date _____

* Manufacturer's Representative Notations: Exceptions noted at time of check were:

Manufacturer's Representative to note adequacy of related equipment that directly affects operation, performance or function of equipment checked. (No comment presented herein will indicate adequacy of related systems or equipment):

DEMONSTRATION CERTIFICATION

<u> </u> OWNER: _____	No. Copies _____
<u> </u> ENGINEER: <u>S2L, Incorporated</u>	No. Copies _____
<u> </u> ARCHITECT: _____	No. Copies _____ Check-out
<u> </u> CONTRACTOR: _____	No. Copies _____
<u> </u> FIELD: _____	No. Copies _____ Memo No. _____
<u> </u> OWNER: _____	No. Copies _____

PROJECT DATA

CONTRACT DATA

NAME: _____

LOCATION: _____
OWNER: _____

OTHER: _____

NUMBER: _____
DATE: _____
DRAWING NO: _____
SPECIFICATION SECTION: _____

NOTE TO CONTRACTOR:

Submit five (5) copies of all information listed below for checking at least one week before scheduled demonstration of the work. After all information has been approved by the Engineer, give the Owner a Demonstration of Completed Systems as specified and have the Owner sign five copies of this form. After this has been done, a written request for a final inspection of the system shall be made.

MEMORANDUM:

This memo is for the information of all concerned that the Owner has been given a Demonstration of Completed Systems on the work covered under this Specification Section. This conference consisted of the system operation, a tour on which all major items of equipment were explained and demonstrated, and the following items were given to the Owner:

- (a) Owner's copy of Operation and Maintenance Manual for equipment or systems specified under this section containing approved submittal sheets on all items, including the following:
 - (1) Maintenance information published by manufacturer on equipment items.
 - (2) Printed warranties by manufacturers on equipment items.
 - (3) Performance verification information as recorded by the Contractor.
 - (4) Check-out Memo on equipment by manufacturer's representative.
 - (5) Written operating instructions on any specialized items.
 - (6) Explanation of guarantees and warranties on the system.
- (b) Prints showing actual "As-Built" conditions.
- (c) A demonstration of the System in Operation and of the maintenance procedures which will be required.

(Name of Contractor)

By: _____
(Authorized Signature, Title & Date)

(Name of Subcontractor)

By: _____
(Authorized Signature, Title & Date)

Operations and Maintenance Manual, Instruction Prints, Demonstration & Instruction in Operation Received:

(Name of Owner)

By: _____
(Authorized Signature, Title & Date)

END OF SECTION

SECTION 01669

TESTING HDPE PIPING SYSTEMS

PART 1 – GENERAL

1.01 GENERAL

- A. The landfill gas (LFG) header, air supply lines and condensate discharge line pipelines shall be subjected to pressure tests as described herein to detect any leaks in the piping. Testing shall be performed by the Contractor below grade (inside the trench) and the Contractor shall bear the expense. The Contractor shall accept the responsibility for locating, uncovering (if previously backfilled), and repairing any leaks detected during testing.

1.02 SUBMITTALS

- A. Test reports to be submitted in accordance with the Contract Documents.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PREPARATION

- A. Commence air testing procedures when the following conditions have been met.
 - 1. Pipe section to be tested is clean and free of dirt, sand or other foreign material.
 - 2. The segment to be tested shall be allowed time to reach constant and/or ambient temperature before initiating the test.
 - 3. Plug pipe outlets with test plugs or caps. Brace each plug securely to prevent blowouts.
 - 4. Add air safely.
 - 5. Pressurizing equipment shall include a regulator set to avoid over-pressurizing and damaging otherwise acceptable line.
- B. Pressure test in accordance with OSHA requirements.
- C. Provide necessary piping connections between the section of line being tested and the air supply. Provide test pressure equipment, meters, pressure gauge, and other equipment, materials, and facilities necessary to make specified tests.
- D. Provide bulkheads, flanges, valves, bracing, blocking or other temporary sectionalizing devices that may be required.
- E. Remove temporary sectionalizing device after tests complete.

3.02 TESTING EQUIPMENT

- A. Provide equipment for testing procedure.

- B. Testing Equipment:
1. Polyethylene flange adaptor with PVC blind flange(s) and/or polyethylene cap(s).
 2. Temperature gauge (0°C to 100°C) tapped and threaded into blind flange.
 3. Pressure gauge (0 to 15 pounds per square inch (psi)) for LFG header and condensate force main pipelines.
 4. Pressure gauge (0 to 125 psi) for air supply lines.
 5. Connector/valve to facilitate air pressure hose.
 6. Ball valve to release pipe pressure at test completion.
 7. Polyethylene reducers to adapt test flange to size of pipe being tested.
 8. Air compressor to provide adequate air supply for testing.
- C. Provide verification and results of pressure gauge calibration less than 60 days prior to testing and after Project completion.

3.03 PRE-INSTALLATION TESTING

- A. Notify Owner and Engineer 72 hours prior to test to give Engineer option of being present during testing.
- B. Pipe Test Segments:
1. Butt weld.
 2. Less than 2,000 feet long.
 3. Fitted with cap or flange on one end and test apparatus on the other end.
- C. Environment:
1. Lay test segment on ground surface and allow to reach constant or ambient air temperature before test.
 2. Perform test during a period when pipe segment will be out of direct sunlight to minimize pressure changes as a result of temperature fluctuations, i.e., early morning, late evening, or cloudy days. No testing will be allowed during the middle of the day or when pipe segments are exposed to sunlight.
- D. Test:
1. Apply a test pressure of 4 pounds per square inch gauge (psig) for LFG laterals, header, and condensate pipes to test segment. Apply a test pressure of 100 psig for air supply line to test segment..
 2. Observe pressure for 1 hour.
 3. Pressure drop over 1-hour period shall not exceed 1% as calculated on Attachment 1, this Section.
 4. Correct pressure drop for temperature (See Attachment 1, this Section).
- E. Test Failure:
1. Perform the following when pipe segment fails pre-installation test:
 - a. Check the entire length of pipe and fusions for cracks, pinholes, perforations or

- other possible leakage points.
 - b. Check blocked risers and capped end for leakage.
 - c. Verify leaks by applying soapy water solution and observe for bubble formation.
- 2. Repair pipe and fused joint leaks by cutting out leaking area and rebutting weld suitable segments.
- 3. Retest after leaks are repaired in accordance to Section 3.03D.

3.04 FINAL TEST

- A. Notify Owner and Engineer 72 hours prior to test.
- B. Pressure test shall be performed in the presence of the Engineer or a representative of the Engineer.
- C. Perform final test on installed pipeline.
 - 1. Perform final test in accordance with procedures for pre-installation testing.
 - 2. Temporarily cap driplegs and perforated segments with fused polyethylene cap. Do not test against closed wellhead or system valves. All valves must be in the open position when tested, and alternative temporary caps in place.
 - 3. Locate test apparatus at the inlet for the blower, or other suitable location as approved by the Engineer.
- D. Correct and retest leaks or defects.
- E. Engineer reserves the right to require destruction testing of any fusion weld.

3.05 TEST REPORTING

- A. Each test (pass or failure) shall be reported in writing, on Attachment 1 included with this section.
- B. Include the following information if failure occurs:
 - 1. Location of failure segment.
 - 2. Nature of leaks.
 - 3. Details of repairs performed.
 - 4. Retest results.

**ATTACHMENT 1 TO SECTION 01669C
HDPE PIPE PRESSURE TEST REPORT FORM**

PROJECT NAME/NO:		TIME:		
CONTRACTOR:		DATE:		
PERSON PERFORMING TESTS:				
DESCRIPTION/LOCATION OF TEST SEGMENT (Pipe Diameter, Length, and SDRs):				
<p> T_i = Initial temperature in °C - _____ °C P_i = Initial test pressure in psig - _____ psig P_c = Initial pressure in psig corrected for temperature (T_i) at time 't' t = Time in minutes from initiation of test T_t = Temperature in °C at time 't' P_t = Test pressure in psig at time 't' P_c = $\frac{(P_i + 14.7)(T_t + 273)}{(T_i + 273)} - 14.7$ </p> <p>Percent Pressure Drop = $\frac{P_c - P_t}{P_c} \times 100$</p>				
TIME (min.)	T_i, T_t TEMP READING (°C)	P_i, P_t GAUGE READING (psig)	P_i, P_t CORRECTED PRESSURE (psig)	P_c PRESSURE DROP (%)
0				
20				
30				
40				
50				
60				
PASS/FAILURE:		RETEST (yes/no):		
DESCRIPTION/NATURE OF LEAKS AND REPAIRS OF RETEST SEGMENT:				

EXAMPLE CALCULATION SHEET

GIVEN:

$$P_i = 10 \text{ psig}$$
$$T_i = 21.1^\circ\text{C} = 70^\circ\text{C}$$

and at times t = 60 minutes

$$P_t = 10.05 \text{ psig}$$
$$T_t = 23.0^\circ\text{C} = 73^\circ\text{F}$$

Calculated Corrected Initial Pressure

$$P_c = \frac{(10.0 + 14.7)(23.0 + 273)}{(21.1 + 273)} - 14.7$$

$$P_c = 24.85 - 14.7 = 10.15 \text{ psig}$$

Calculate Percent Pressure Loss

$$\% \text{ Pressure Loss} = \frac{10.15 - 10.05}{10.15} \times 100 = 0.98\% < 1\% \text{ok}$$

NOTE: The difference between the corrected pressure reading (P_c) and the gauge reading (P_t) cannot differ by more than 1% of the corrected pressure reading (P_c)(i.e., .105 @ 10.5 psig) over a time interval of 60 minutes.

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, the following shall be submitted 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 does not consider the work substantially complete:
 - 1. The Engineer will promptly notify the Contractor in writing, listing the reasons for determining that the work is not 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, the Engineer 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, the Engineer 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, the Contractor 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. At Substantial Completion the Contractor shall:
1. Deliver five review sets of record documents to the Engineer. Each set of record documents shall consist of: one (1) set of: 1) 22 x 34-inch drawings, 2) copy of the Operation and Maintenance manual, and 3) copy of the vendor and material supply information. The Engineer shall comment and return to Contractor.
- B. 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.
- C. At Owner's acceptance:
1. Upon receipt of Engineer's comments, Contractor shall deliver, within thirty days, to Engineer eight (8) final and completed sets of Record Documents incorporating Engineer's comments. Each set of final record documents shall consist of: 1) 22 x 34-inch drawings, 2) copy of the Operation and Maintenance manual, 3) copy of the vendor and material supply information, 4) a CD ROM or USB flash drive containing the project information. Documents shall be sealed by a Professional Engineer registered in the State of Florida and any documents containing survey points must also be sealed by a Professional Land Surveyor registered in the State of Florida.

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 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.
- B. The Contractor shall provide a series of digital color photographs, in print form and CD ROM or USB flash drive (2 megapixel resolution or better), documenting all aspects of construction. Record photographs shall be 4"x6", printed in color two per 8.5"x11" 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. Excavating to the tie-ins with the header.
 3. Installation of the gas header piping.
 4. Installation of the LFG System appurtenances.
 5. Installation of the condensate management system.
 6. Installation of force main and airline piping.
 7. Installation of condensate pump stations.
 8. Damage and repair of any existing utilities, appurtenances, or liner.
 9. 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. System Well and Header Layout (as-built)
 - c. Record Construction Well and Header Route Survey
 - d. Flare Station (as built)
 - e. Condensate Pump Stations (as built)
 - f. 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
 - Drilling Contractor
 - Pipe Contractor
 - Surveyor
 - Record Documenter
- g. Project Vendor List
- h. Project Record Drawing Summary
- i. Pump Stations
- Center line location
 - Bottom of SUMP elevation
 - Invert elevations of all pipes
 - Discharge elevation
- j. Force Main
- Route Survey Data
 - Surveyed Final Elevation
 - Discharge Elevations
 - Termination Locations
- k. Air Supply Lines
- Route Survey Data
 - Survey Final Elevations
 - Termination Location
- l. Header Route Survey Data – Referencing pipeline station with site grid coordinates, ground surface elevations, valves, tees, and other appurtenance and connection locations, top of pipe elevation at minimum of every 50-feet, and slope at all major line, angle, and grade change points, in accordance with Section 0222, if applicable.
- m. Pressure Test Reports
- n. Concrete Test Results, if applicable
- o. Contractor's Daily Work Logs
- p. Construction Meeting Notes/Status Reports

2. Project Document appendices shall include:

- a. HDPE Pipe Specifications
 - Pipe Material Data Sheet
 - Specialty fittings specification sheets
- b. Condensate Pump Station Specifications.
- c. Photographs

F. General File Requirements:

1. A CD ROM or USB flash drive with the Project Documentation text data (where applicable) saved for Microsoft Office compatibility.
2. A CD ROM or USB flash drive with the Project Documentation photos saved in jpeg format.
3. A CD ROM or USB flash drive with the AutoCAD files, saved for version 2013 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) with name, date, and file reference names.

END OF SECTION

SECTION 02221

TRENCHING AND TRENCH BACKFILLING

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 trenching and trench backfilling, removal of unsuitable material, and grading required to complete the work and activities associated with installation of the landfill gas (LFG) header, condensate pump stations, air supply lines, condensate lines, and force main pipelines 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; disposal of waste, leachate, and surplus materials; and all related work such as sheeting, bracing, dewatering, all earthwork and all other requirements shown on the drawings and specified herein.
- 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 and Section 01030.
- D. All work shall be performed in strict accordance with all local, State of Florida; United States Occupational Safety and Health Administration (OSHA); other applicable Federal regulations regarding trenching operations and trench safety and trench safety guidelines; and as specified by the Landfill Gas Division of the Solid Waste Association of North America (SWANA).
- 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.

1.02 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).
- C. Related Work
1. Section 01030 - Special Provisions
 2. Section 01720 - Project Record Documents
 3. Section 01669 – Testing HDPE Piping Systems
 4. Section 02422 - Landfill Gas, Airline, and Forcemain Piping
 5. Section 15103 – Butterfly Valves

1.03 SUBMITTALS

- A. Health and Safety Plan, as described in Section 01030 of the Technical Specifications.
- B. Borrow Source or Source of Backfill Materials.
- C. Independent testing laboratory name and qualifications.
- D. Results of sieve analysis and calcium carbonate test for stone backfill.
- E. Pipe slope calculations and survey notes for pre-construction layout, including lateral route, horizontal collector layout (including transition point of solid-wall to perforated pipe), and air supply/dewatering discharge lines.
- F. Pipe survey notes for installed pipe pursuant to Part 3.06 of this Section.
- G. Proposed stationing and pipeline identification procedures. Prior to the start of any pipe installation, Contractor shall supply an example layout drawing showing how the header and laterals will be marked with stations for the conformance surveys.
- H. Contractor daily logs detailing length of trench excavated and backfilled, with reference to pipe stationing and details sufficient to properly describe the Work completed to date.
- I. The Contractor shall notify the Engineer, in writing, of the material source for each of the soils specified within Part 2 of this Section at least 14 calendar days prior to the date of anticipated use of such material. Notification shall include:
 1. Supplier's name.
 2. Borrow location.
 3. Documentation confirming adequate quantities are available to complete the work.
 4. Soil field-moisture, laboratory proctor-density tests, and field compaction test results as required within Part 2 of this Section.

5. Certification from the independent testing laboratory that the soil is not: a) petroleum-contaminated, and b) contaminated with other chemicals, compounds, or a pH that may be deemed hazardous or harmful to human health or the environment.

PART 2 – PRODUCTS

2.01 GENERAL BEDDING MATERIAL

- A. Contractor to provide pipe bedding material and backfill to at least 6 inches above the top of the installed pipe. Material 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 3/8-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. For excavations outside the limits of refuse, Contractor shall reuse excavated soils from trenching for backfilling around installed pipe, unless directed otherwise by Engineer. Reused soils shall conform to Part 2.01 C. and D. of this Section.
- B. Beyond the reusable quantities of soil described above, the Contractor shall use Contractor provided bedding and soil backfill material.
- C. General backfill soil shall be 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.
- D. 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.
- E. 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.

2.03 NON-CALCAREOUS STONE

- A. Stone backfill in a trench, borehole, under a structure, or any else as designated in the Documents shall be hard, durable non-calcareous rock. Stone shall be washed as a component of the manufacturing process and be free of organics, lumps or balls of clay, and other deleterious materials. Stone shall be Florida Department of Transportation (FDOT) No. 4 and conform to the following gradation requirements:

<u>Sieve Size</u>	<u>% Passing (by Weight)</u>
2-inch	100
1½-inch	90
1-inch	35
¾-inch	5
⅜-inch	0

PART 3 – EXECUTION

3.01 PRE-CONSTRUCTION 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 FIELD QUALITY CONTROL

- A. The Contractor shall place backfill and fill materials to achieve an equal or “higher” degree of compaction than undisturbed materials adjacent to the work; however, in no case shall the degree of compaction fall below minimum compaction specified in this Section.
- B. Where laboratory or field testing is specified herein to verify that the constructed, in-place work meets the specifications and quality control requirements herein, the Contractor shall employ and bear the expense for an independent testing laboratory to conduct such tests. The Contractor shall pay for the costs of all retests required due to the initial testing not passing the requirements herein. Laboratory shall be on the approved vendors list of the County.

Where laboratory testing is specified to verify that any individual material of construction or product meets certain quality control requirements (i.e. size, gradation, mix formula, hardness, shape, inherent strength, etc.), the Contractor shall employ and bear all expenses for an independent testing laboratory to sample the material or product and to conduct such tests and retests if necessary or required by the County.

- C. The minimum frequency of quality control testing is as provided in this specification, or as set during construction by the Owner. Frequency of testing for field Quality Control shall be the same as defined for conformance testing.
- D. 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.

- E. An increased testing frequency shall be used at the discretion of the Engineer when visual observations of construction performance indicate a potential problem.
- F. All perforations resulting from testing the subgrade or embankment shall be filled by the Contractor with soil compacted to the satisfaction of the Engineer.
- G. 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.
- H. 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.
- I. 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.

3.03 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.
- C. Waste materials that have been excavated from the trench evacuation, well boring, or any other type of excavation 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. No excavated waste shall be left overnight at any excavation at any time. At no time, shall excavated waste be stockpiled adjacent to the excavations. Excavated waste 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.
- D. Excavate to lines, grades, and dimensions necessary to complete the work.
- E. 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 the minimum landfill cover depth, protective sand over the top of the pipe, and

minimum trench width as detailed in the project design drawings.

- F. Contractor may not excavate more trench daily than can be completely backfilled after installation of the pipe. Excavations shall not be left open overnight. In the event that a trench must be left open overnight the Contractor must get permission from the Owner to leave trench open and trench must be encircled in safety/warning tape attached to stakes placed along the perimeter on all edges of the trench. In the event that the trench has exposed refuse, all refuse must be covered with a tarp that is secured on all corners and along its perimeter.
- G. Excavation may be made without sheeting and bracing if the Contractor is conducting the work within the limitations and requirements of the governmental agencies having jurisdiction. Failure of the Engineer to order the use of bracing or sheeting and shoring or direct changes to systems in place, shall not in any way or to any extent relieve the Contractor of any responsibility concerning the condition of excavations or of his obligations under the Contract. The Contractor shall be responsible for the condition of all excavations. All slides and caves shall be removed without extra compensation, at whatever time and under whatever circumstances that they may occur.

3.04 DEWATERING

- A. Contractor shall provide and maintain all pumps, well points, sumps, equipment, piping, suction and discharge lines, labor, facilities and other dewatering system components necessary to convey water away from excavations and trenching.
- B. 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. Contractor shall keep such excavations dry so as to obtain a satisfactory foundation condition for all work. Subgrade soils which become soft, loose, “quick”, or otherwise unsatisfactory for support of structure as a result of inadequate dewatering or other construction methods shall be removed and replaced by crushed stone or gravel as required by the Engineer at the Contractor’s expense. The bottom of excavations shall be firm and without standing water before placing structures or pipes. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- D. Liquids pumped from excavations inside the limits of refuse must be pumped via pipeline or tank truck to a location as designated by the Owner.
- E. 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.
- F. Protect adjacent properties, areas, and structures from damage resulting from dewatering operations or from uplift pressures resulting from dewatering activities.
- G. If pipe trench becomes watered-in after placement of pipe, but before backfilling, Contractor shall dewater the trench, demonstrate that the pipe bedding and pipe slope remain satisfactory, and upon approval by the Engineer, backfill the pipe with clean dry soil in accordance with Part

2.01 of this Section.

3.05 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.
- C. Corrugated Metal Pipe (CMP) shall be used as a casing to protect the gas pipe. The inner diameter of the CMP shall be a minimum of two (2) inches larger than the outside diameter of the gas pipe. For multiple pipe crossings adjust CMP size to accommodate all conduits within one CMP casing with the inner diameter of the casing shall be a minimum of 6 inches larger than the cumulative outside diameters of the HDPE pipes encased. Detail and material requirements are shown on the drawings.

3.06 PIPE SURVEY

- A. At the time of pipe placement, Contractor shall verify that pipe slope meets the requirements specified in this Section and on the Plans at no greater than 10-foot intervals along LFG laterals and header and record such information in the project notes. Station numbering shall be used and marked on the pipe.
 - 1. Contractor shall measure each length of installed pipe and mark the 10-foot stations.
 - 2. Survey equipment shall be used to measure the change in relative elevation between each 10-foot station.
 - 3. The change in elevation and slope for each 10-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.
 - 5. The project notes detailing the required pipe slope confirmation, station location, type of pipe, location of fittings, etc. shall be provided daily to and be checked by the Engineer prior to proceeding with backfilling.
- B. A conformance survey shall be conducted on all installed pipe prior to backfilling the trench.
 - 1. The survey shall document the horizontal and vertical location of the top of the landfill gas header, laterals, air supply lines, condensate discharge line pipes at minimum 50-foot intervals and at each change in pipe direction, ground surface grade break, change in pipe grade, fitting, connection, pipe crossover, and tie-in along the entire pipeline routes.
 - 2. If a run of pipe is 100 feet or less in length, Contractor shall provide survey shots at a 20-foot interval or less. For a run of pipe of 50 feet or less, Contractor shall provide survey shots at a 10-foot interval or less to document the pipe as-built conditions.
 - 3. The survey shall also document the type of pipe, location (horizontal and vertical coordinate) of structures and appurtenances such as, but not limited to road crossing

- casing, pipe crossing, and tie-ins.
4. Conformation survey must be sealed by a Professional Land Surveyor registered in the State of Florida. The survey information shall be incorporated into the record drawings described in Section 01720 - Project Record Documents.

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. Bedding material shall be granular fill, as described in Part 2, this Section.
 2. Place bedding material in trench to the lines and grades shown on the Drawings.
 3. Bedding material shall be placed in the trench ensuring material is placed under the haunches of the pipe. The bedding shall be placed and compacted using a mechanical compaction device such as a walk behind vibratory compactor or equal, in a loose lift not to exceed six (6) inches above the top of the pipe. Compaction shall be to a density where subsequent passes with the mechanical compaction device will not reduce the surface elevation of the bedding material by more than three-quarters of an inch.
 4. Backfilling procedures shall be modified as necessary to not displace (either horizontally or vertically) piping installed in trench during backfill or bedding placement.
 5. Place pipe bedding and compact to height of 6 inches above top of pipe.
 6. Place general backfill in maximum 12-inch lifts above pipe bedding to 2.5 feet below final grade.
 7. Place landfill cover to equal existing landfill cover compaction and thickness.
 8. Remove all excess material.

3.08 GRADING AND RE-ESTABLISHMENT OF DISTURBED AREAS

- A. Contractor shall regrade and return to their original condition, as determined by Owner, all areas disturbed by Contractor's work. This includes but is not limited to ruts caused by construction equipment; soil stockpile areas; landfill benches, terraces, and surfaces used for access and construction; and surface impact to existing vegetation requiring replacement or repair with new grass. All work must be completed by the Contractor to the Owner's satisfaction at no additional costs.

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 shown on the Drawings and 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.
- B. For any excavation, the Contractor shall include temporary controls for stormwater runoff and erosion control in full conformance with all existing facility permits and/or applicable regulations. Facility's current permits will be supplied at pre-construction meeting.

1.02 RELATED WORK

- A. Section 02221 – Trenching and Trench Backfilling

1.03 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.

1.04 START OF WORK

- A. Prior to starting, field survey and stake the limits of construction.
- B. Obtain the Owner's Representative's approval of the field survey.
- C. Install all silt fence, hay bales and enviro-fence along the limits of construction as indicated on the Drawings.
- 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 thirty (30) 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 sixty (60) 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 unstablized stockpile remain after thirty (30) calendar days.
- C. Protection of Existing Storm Sewer Systems: During construction, all storm sewer inlets 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.
- F. Underground Utility Construction: The construction of underground utility lines and other structures shall be done in accordance with the following standards:
 - 1. No more than 500 lineal feet of trench shall be open at any time;
 - 2. Wherever consistent with safety and space consideration, excavated material shall be cast to the uphill side of trenches. Trench material shall not be cast into or onto the slope of any stream, channel, road ditch or waterway.

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, diaphragms, jute mesh, filter fabric, hay bales, sandbags, etc., for turbidity control and to prevent erosion and surface degradation.

END OF SECTION

SECTION 02422

LANDFILL GAS, AIRLINE, AND FORCEMAIN PIPING

PART 1 – GENERAL

1.01 REFERENCES

- A. American Society for Testing and Materials (ASTM):
1. A536 - (1993) Ductile Iron Castings.
 2. D638 - Tensile Properties of Plastics.
 3. D790 - Flexural Properties of Reinforced Plastics and Electrical Insulating Materials.
 4. D1238 - Flow Rates of Thermoplastics by Extrusion Plastometer.
 5. D1248 - Polyethylene Plastics Molding and Extrusion Materials.
 6. D1505 - Density of Plastics by the Density-Gradient Technique.
 7. D1693 - Environmental Stress-Cracking of Ethylene Plastics.
 8. D2122 - Determining Dimensions of Thermoplastic Pipe and Fittings.
 9. D2513 - Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
 10. D2774 - Underground Installation of Thermoplastic Pressure Piping
 11. D2837 - Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
 12. D3261 - Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
 13. D3350 - Polyethylene Plastics Pipe and Fittings Material.
 14. F1055 - Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
- B. American National Standards Institute (ANSI):
1. B16.5 - Pipe Flanges and Flanged Fittings
 2. B31.8 - Gas Transmission and Distribution Piping Systems.
- C. American Water Works Association (AWWA):
1. C207 - Steel Pipe Flanges for Waterworks Service - Sizes 4 in. Through 144 in.

1.02 SUBMITTALS

- A. Contractor shall submit to the Engineer the pipe manufacturing test specification data listing resin type, cell classification, stock density, melt flow, flexural modulus, tensile strength, and coloration.
1. Include test results with shipment of materials, with 2 additional copies of test results furnished to Engineer.
 2. Include pipe Dimensions:
 - a. Average outside diameter.
 - b. Average inside diameter.
 - c. Minimum and average wall thickness.

- B. Submit in accordance with Section 01340.
- C. Record Drawings:
 - 1. Contractor shall prepare record drawings in accordance with Section 01720.

1.03 QUALITY ASSURANCE

- A. Source Quality Control:
 - 1. If manufacturer's test data is inadequate or unavailable, Owner and Engineer reserve the right to reject or require additional tests to satisfy material requirements. Costs of these tests shall be borne by Contractor.
- B. Work shall comply with appropriate codes and standards of the following organizations for handling, heat fusion, and underground installation of low-pressure polyethylene pipe.
 - 1. American Gas Association (AGA).
 - 2. Plastic Pipe Institute (PPI).

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Pipe Storage:
 - 1. Store or stack pipe to prevent damage from marring, crushing or puncture. Limit maximum stacking height to 6 ft.
 - 2. Store in accordance with manufacturer's recommendations.
- B. Pipe Handling:
 - 1. Protect pipe from excessive heat or harmful chemicals.

PART 2 – PRODUCTS

2.01 ALL PIPE AND FITTINGS MUST BE FROM ONE MANUFACTURER.

2.02 PHYSICAL PROPERTIES OF PIPE RESIN

- A. Density: ASTM D1505, not less than 0.941 - 0.955-gms/cu cm.
- B. Melt Index: ASTM D1238 - Flow rate not greater than 0.15 g/10mm.
- C. Flexural Modulus: ASTM D790, 110,000 to less than 160,000 psi.
- D. Tensile Strength at Yield: ASTM D638, 3,000 to less than 3,500 psi.

- E. Environmental Stress Crack Resistance (ESCR): ASTM D1693 - Condition C, shall be in excess of 5,000 hrs with zero failures.
- F. Hydrostatic Design Basis: ASTM D2837, 1,600 psi at 23° C.

2.03 PIPE

- A. Manufacturers:
 - 1. Phillips Driscopipe, Inc., Richardson, Texas.
 - 2. Isco Industries, Mulberry, Florida.
 - 3. Plexco, Amsted Industries, Franklin Park, Illinois.
 - 4. Or equal.
- B. High performance, high molecular weight, high-density polyethylene pipe (Type 3608 resin).
- C. ASTM D1248 (Type III, Class C, Category 5, P34).
- D. ASTM D3350, minimum cell classification value 345464C.
- E. Standard dimension ratio (SDR).
 - 1. Gas header piping is SDR 17.
 - 2. Airline piping is SDR 9
 - 3. Forcemain piping is SDR 11.
 - 4. Horizontal Gas Well Pipe is SDR 11.
- F. Marking: Intervals of 5 ft or less.
 - 1. Manufacturer's name or trademark.
 - 2. Nominal pipe size.
 - 3. Type of plastic pipe (i.e., PE 3608)
 - 4. Standard dimension ratio (SDR)
 - 5. ASTM designation (i.e. ASTM D2513).
 - 6. Airline with yellow striping.
- G. Dimensions:
 - 1. Conform to standard dimensions and tolerances of ASTM D2513.
 - 2. Airline piping shall be 2-inch nominal outside diameter.
 - 3. Forcemain piping shall be 3-inch nominal outside diameter.

2.04 FITTINGS

- A. All molded fittings and fabricated fittings shall be fully pressure rated to match the pipe SDR pressure rating to which they are made. All fittings shall be molded or fabricated by the manufacturer. No Contractor fabricated fittings shall be used unless approved by the Engineer.
- B. All fittings shall be installed using butt-fused fittings, thermo-fused fittings/couplings, or flanged adapters and must be approved by the Engineer. No taps shall be permitted.

- C. Fittings from polyethylene compound having cell classification equal to or exceeding compound used in pipe to ensure compatibility of polyethylene resins.
- D. All fittings 12 inches and smaller must be molded unless approved by Engineer.
- E. Be of same manufacturer as pipe being provided. Engineer may allow substitution for approved material with use of flanged joint sections.
- F. Flange Joints:
 - 1. Ductile iron backup flanges that have been thoroughly coated with Sherwin Williams Macropoxy 646 Fast Cure Epoxy per manufacturer's recommendations or approved equal.
 - 2. Stainless Steel Type 316 nuts, bolts, studs, and washers. Stud lengths shall accommodate the required distance between flanges including valve spacers, if necessary.
 - 3. Flanges and bolt patterns consistent with ANSI B16.5, AWWA C207, ASTM A536, and as recommended by manufacturer.
 - 4. Below grade flanges shall be wrapped in 5-mil polyethylene sheeting just after installation and prior to backfilling to help prevent corrosion.
- G. Fitting dimensions shall conform to standard dimensions and tolerances in accordance with ASTM D3261.
- H. Markings:
 - 1. Manufacturer's name or trademark.
 - 2. Nominal size.
 - 3. Type of plastic pipe (i.e., PE 3608).
 - 4. Standard dimension ratio SDR.
 - 5. ASTM designation (i.e. ASTM D2513).
- I. Fittings must have an SDR ratio at least one size smaller (thicker) than the pipe (i.e., SDR 17 pipe - SDR 15.5 fittings or smaller, SDR 11 pipe - SDR 9 fittings or smaller).

PART 3 – EXECUTION

3.01 GENERAL

- A. Pipe shall be stored or stacked so as to prevent damage by marring, crushing, or piercing. Maximum stacking height shall be limited to 6 feet.
- B. Pipe and pipe fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skidways in such a manner as to avoid shock. Derricks, ropes, or other suitable equipment shall be used for lowering the pipe into the extraction well borings. Pipe and pipe fittings shall not be dropped or dumped.

3.0 FIELD QUALITY CONTROL

- A. Pipe may be rejected for failure to conform to the Specifications or for the following reasons.
 - 1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 inches in length at either end of the pipe which could be cut off and discarded. Pipes within one shipment shall be rejected if defects exist in more than 5% of shipment or delivery.
 - 2. Cracks sufficient to impair strength, durability or serviceability of pipe.
 - 3. Defects indicating improper proportioning, mixing, or molding.
 - 4. Damaged ends, where such damage prevents making a satisfactory joint.
- B. Acceptance of fittings, stubs or other specially fabricated pipe sections shall be based on visual inspection at job site and documentation of conformance to these Specifications.
- C. Owner and Engineer reserve the right to require destruction testing of any fusion weld.

3.0 INSTALLATION

- A. Trenching and trench backfilling in accordance with Section 02221.
- B. Heat fusion welding of pipe:
 - 1. Weld in accordance with manufacturer's recommendation for butt fusion methods. Provide qualified fusion operators.
 - 2. Butt fusion equipment for joint procedures shall be capable of meeting conditions recommended by pipe manufacturer including, but not limited to, temperature requirements, alignment, and fusion pressures. Heater plates shall be free from scrapes, gouges, and have a consistent clean coated surface. The pressure gage and thermometer should be checked for accuracy.
 - 3. For cleaning pipe ends, solutions such as detergents and solvents, when required, shall be used in accordance with manufacturer's recommendations.
 - 4. Do not bend pipe to greater degree than minimum radius recommended by manufacturer for type and grade.
 - 5. Do not subject pipe to strains that will overstress or buckle piping or impose excessive stress on joints.
 - 6. Branch saddle fusions shall be joined in accordance with manufacturer's recommendations and procedures. Branch saddle fusion equipment shall be of size to facilitate saddle fusion within the trench.
 - 7. Before butt fusing pipe, inspect each length for presence of dirt, sand, mud, shavings, and other debris or animals. Remove debris from pipe.
 - 8. Cover at end of each working day open ends of fused pipe. Cap to prevent entry by animals or debris.
 - 9. Use compatible fusion techniques when polyethylenes of different melt indexes are fused together. Refer to manufacturer's specifications for compatible fusion.
- C. Flange Jointing:
 - 1. Use on flanged pipe connection sections.

2. Connect slip-on coated ductile iron backup flanges with stainless steel type 316 nuts and bolts.
3. Butt fuse fabricated flange adapters to pipe.
4. Observe following precautions in connection of flange joints:
 - a. Align flanges or flange/valve connections to provide tight seal. Require full-faced 1/8" thick neoprene gaskets. Gaskets are required for flange/valve connections.
 - b. Place U.S. Standard round washers as required in accordance with manufacturer's recommendations. Bolts shall be lubricated in accordance with manufacturer's recommendations.
 - c. Tighten flange bolts in sequence and accordance with manufacturer's recommendations. Do not over-torque bolts.
5. Pull bolt down by degrees to uniform torque in accordance with manufacturer's recommendations.
6. Below grade flanges shall be wrapped in 5-mil polyethylene sheeting just after installation and prior to backfilling to help prevent corrosion.

D. Pipe Placement:

1. Grade control equipment shall be of type to accurately maintain design grades and slopes during installation of pipe. Laser grade control preferred.
2. Dewatering: Remove standing water in trench before pipe installation.
3. Unless otherwise specifically stated, install pipe in accordance with manufacturer's recommendations.
4. Maximum lengths of fused pipe to be handled as one section shall be placed according to manufacturer's recommendations as to pipe size, pipe SDR, and topography so as not to cause excessive gouging or surface abrasion.
5. Cap pipe sections longer than single joint (usually 40 feet) on both ends during placement except during fusing operations.
6. Prevent migration of dirt and debris through perforations during placement. Remove dirt or debris from pipe before backfilling.
7. Notify Engineer prior to installing pipe into trench and allow time for Engineer's inspection. Place bedding in trench in accordance with Section 02221 before installing pipe into trench. Correct irregularities found during inspection.
8. Complete tie-ins within trench whenever possible to prevent overstressed connections.
9. Complete flanged and branch saddle connections within trench.
10. Allow pipe sufficient time to adjust to trench temperature prior to testing, segment tie-ins, or backfilling activity.
11. Install reducers adjacent to laterals and tees.
12. To reduce branch saddle stress, install saddles at slope equal to and continuous with lateral piping.
13. Place in trench by allowing minimum 12-in./100 feet for thermal contraction and expansion.

All excavated waste shall be transported and disposed as described in Part 3.02, Section 02221. Contractor shall take all necessary precautions to prevent litter blown from the excavation area. Contractor shall clean up litter blown from the excavation area.

E. Detectable Marker Tape:

1. Yellow plastic marker tape shall be 5 mil minimum thickness with a solid aluminum core of .35mil minimum thickness and a minimum width of 2 inches.
2. The background of the tape shall be colored based on pipe service with black lettering continuously printed.
3. Marker tape shall have a minimum 35 pounds/inch tensile strength.
4. The installation of the tape shall be at 18 inches below finish grade.

3.0 PIPE TESTING

- A. Test pipe sections in accordance with Section 01669.

END OF SECTION

SECTION 02922

HYDROSEEDING AND MULCHING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. Scope of Work: The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to finish grade, hydroseed and mulch areas of construction, and maintain all seeded areas as specified herein including all areas disturbed by the Contractor's operations.

1.02 GUARANTEE

- A. All restoration and revegetation work shall be subject to the one (1) year guarantee period of the Contract.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Lime.
 - 1. Composition: Ground limestone with not less than 85 percent total carbonate ASTM C602-90.
 - 2. Gradation:
 - a. Minimum 50 percent passing No. 100 sieve.
 - b. Minimum 90 percent passing No. 20 sieve.
 - c. Coarser material acceptable, provided rates of application are increased proportionately on basis of quantities passing No. 100 sieve.
- B. Fertilizer shall be complete commercial fertilizer, 10-10-10 grade. It shall be delivered to the site in the original unopened containers, each showing the manufacturer's guaranteed analysis. Store fertilizer so that when used it shall be dry and free flowing.
- C. Seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity not less than 85, and shall have not more than one percent weed content.
- D. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Seed shall be a Scarified Argentine Bahia applied at a rate of 400 pounds per acre.
- B. Lime shall be applied at the rate necessary to achieve a pH of 5.5 to 6.5.
- C. Fertilizer shall be applied at the rate of 800 pounds per acre.

- D. The subgrade of all areas to receive seed shall be raked and all rubbish, sticks, roots, and stones larger than 2 inches shall be removed.
- E. Lime shall be spread and incorporated into soil in sufficient quantity to provide a soil pH of 5.5 to 6.5. If pH is above limits, apply a suitable soil amendment to bring pH into compliance.
- F. Fertilizer shall be uniformly spread and immediately mixed with the upper 2 inches of soil.
- G. Immediately following this presentation, the seed shall be uniformly applied and lightly raked into the surface. Lightly roll the surface and water with fine spray.
- H. All seeded areas shall be mulched with clean small-grain straw at a rate of 1-1/2 to 2 tons per acre.
- I. The Contractor shall keep all seeded areas watered and in good condition, reseeding if and when necessary, until a good, healthy, uniform growth is established over the entire area seeded, and shall maintain these areas in an approved condition until final acceptance of the Contract.
- J. On slopes, the Contractor shall provide against washouts by an approved method. Any washout which occurs shall be regraded and reseeded at the Contractor's expense until good sod is established.
- K. The Contractor shall maintain the areas in grass in a neat manner by watering, mowing, raking clippings and leaves, and appurtenances until the project is completed, as required.

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 in the location shown on the Drawings and in those areas where construction activity has disturbed the ground cover.
- 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 Engineer reserves the right to test, reject, or accept all materials before application.
- B. Sod shall be provided in accordance with Section 981-3, placed and maintained in accordance with Sections 570-3 and 570-4 of the Florida Department of Transportation (FDOT) – Standard Specifications for Road and Bridge Construction 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 Engineer 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 TOPSOIL

- A. Material shall be fertile, natural soil, typical of the locality, free from MSW, stones (exceeding 2-inch in any dimension), roots or sticks (exceeding 1-inch diameter), clay, and weeds, and obtained from naturally well drained areas. It shall not be excessively acid or alkaline nor contain material harmful to plant growth. The material shall comply with the requirements of FDOT's Standard Specifications for Road and Bridge Construction, Section 987.

2.02 LIME

- A. Composition: Ground limestone with not less than 85 percent total carbonate ASTM C602-90.
- B. Gradation:

1. Minimum 50 percent passing No. 100 sieve.
2. Minimum 90 percent passing No. 20 sieve.
3. Coarser material acceptable, provided rates of application are increased proportionately on basis of quantities passing No. 100 sieve.

2.03 SOD

- A. Sod shall be Bahia with well matted roots. If pH of the topsoil exceeds the enclosed requirements, then a more pH tolerant sod may be substituted.
- B. The sod shall be supplied in commercial size rolls.
- C. 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.
- D. 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.
- E. The source of the sod may be inspected and accepted by the Engineer prior to construction.

2.04 FERTILIZER

- A. The material shall comply with the requirements of FDOT's Standard Specifications for Road and Bridge Construction, Section 982.
- B. The fertilizer shall be a commercial granular type with a chemical designation of 12-8-8.
- C. 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.
- D. Commercial fertilizers shall comply with the State fertilizer laws.
- E. Fertilizer may, at the discretion of the Engineer, upon satisfactory evidence of its feasibility from the manufacturer, be applied in liquid form.

2.05 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.
- D. Effluent water shall meet all Federal, State and local requirements

PART 3 – EXECUTION

3.01 GENERAL

- A. The order of work for sod installation shall be as follows:
 - 1. Fine grading
 - 2. Removal of debris
 - 3. Placement of topsoil
 - 4. Application of fertilizer
 - 5. Placement of sod
 - 6. Clean-up
 - 7. Watering

3.02 SOIL MANIPULATION

- A. 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 1-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 PLACEMENT OF TOPSOIL

- A. Topsoil shall be placed to a minimum depth of 4.5 inches for sod. Testing needs to be conducted on the topsoil to determine the required preparation prior to the placement of sod.

3.06 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 pounds 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.

3.07 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 Engineer 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 Engineer upon delivery of the sod to the job site.

3.08 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.

3.09 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.

3.10 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.

3.11 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

SECTION 11200

CONDENSATE PUMPS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Provide all materials, equipment, and labor needed to install the condensate pneumatic pumps, valves, counters, regulators, hoses and appurtenances in accordance with the Plans.
 - 1. Related Work Described Elsewhere
 - a. Section 02422 – Landfill Gas, Airline, and Forcemain Piping
- B. Pumps operating under vacuum and corrosive conditions to manage landfill gas condensate.

1.02 SUBMITTALS

- A. Contractor shall submit Shop Drawings for pneumatic condensate pumps, counters, air regulators, and gauges in accordance with Section 01340, Shop Drawings.

PART 2 – MATERIALS

2.01 MANUFACTURERS

- A. Pumps: Q.E.D. Environmental Systems, Model AP4+B, or approved equal.
- B. Air Regulators: Q.E.D. Environmental Systems, Speedaire Model No. 4ZK82 or approved equal.
- C. Pressure Gauges: NoShok 100 series, Model 25.110.160-PSI, or approved equal.
- D. Pump Cycle Counters: Q.E.D. Environmental Systems part no. 39196 or approved equal.

2.02 PNEUMATIC PUMPS

- A. Pumps shall be 3.6 inch diameter, long-body, positive air displacement, self contained pump, with internal float system, bottom inlet leachate screen, and magnetic air control valve.
- B. Pump shall have fiberglass casing and stainless-steel fittings. Internal components made of stainless steel with non-metallic parts made of PVDF.
- C. Pump shall have a rated capacity of 6 gpm and 80 ft @ 70 psi inlet pressure for a 24-inch minimum submergence.
- D. Pump accessories to include vacuum fit cap and hose set, including the discharge hose (1” inch O.D. Nylon Tube) from the pneumatic pump to the force main and the 150 PSIG rated, 1/4-inch I.D. air hose to the 2-inch HDPE airline.
- E. Fittings (316 SS, unless otherwise noted) as shown on the drawing and as necessary to connect the pneumatic pump to 2-inch HDPE air supply line, including:

1. Pipe Nipples
 2. Ball Valve (Vacuum service, FNPT connections, and PTFE seats)
 3. HDPE-threaded transition fitting
 4. Camlock type coupling for quick disconnect
- F. Pneumatic operated counters, air filter/regulators, and gauges shall be installed at each pump station.
- G. Fittings (316 SS, unless otherwise noted) as shown on the drawing and as necessary to connect the pneumatic pump to 3-inch HDPE force main, including:
1. Ball Valve (200 psi min. pressure rating, FNPT connections, PTFE seats, and vertical mounting)
 2. Check Valve (200 psi min. pressure rating, FNPT connections, PTFE seats)
 3. Camlock type coupling for quick disconnect

2.03 PRESSURE GAUGES

- A. Gauges to be installed on the pump air regulators shall have a 2.5-inch diameter stainless steel body with glass face. The gauges shall be rated for 0-160 psi range.

PART 3 – EXECUTION

3.01 PUMP INSTALLATION

- A. Contractor shall install equipment at pump station locations in accordance with manufacturer's written instructions and approved Shop Drawings.

END OF SECTION

SECTION 11930

AIR COMPRESSOR

PART 1 – GENERAL

1.01 REFERENCES

- A. American Society of Mechanical Engineers (ASME)

1.02 SYSTEM DESCRIPTION

- A. Design Requirements:

1. Orange County currently has an Ingersoll- Rand, Model 2340L5-V two stage cast iron air compressor, housed in an open faced sheet metal enclosure, designed for year-round operation.
2. Supply and install a second unit in the same location to provide redundancy and additional air capacity.
3. Compressor design capacity shall be a minimum of 14 ACFM at 125 PSIG delivery pressure
4. Design shall be suitable for ambient air temperatures ranging from 32° F to 120° F.
5. Supply and install a control system to allow for automatic alternation of the two compressor system.

1.03 SUBMITTALS

- A. General:

1. Submit in accordance with Section 01340.
2. Submit Product Data and Shop Drawings in sufficient detail to confirm compliance with requirements of this Section. Submit Product Data and Shop Drawings in one complete submittal package. Partial submittals are unacceptable.

- B. Shop Drawings:

1. Installation drawings and specifically prepared technical data, including design capacities.
2. Specially prepared wiring diagrams unless standard wiring diagrams are submitted with Product Data.
3. Shop Drawings for control equipment. Include narrative functional description.
4. Contractor shall verify characteristics of available electrical power and supply that information with the shop drawing.

- C. Product Data:

1. Catalog cuts and product specifications for each product component specified in Part 2.

2. Standard wiring diagrams unless wiring diagrams are specially prepared and submitted with Shop Drawings.
 3. Catalog cuts and product specifications for control equipment.
 - a. Outline dimensions.
 - b. Electrical schematics.
 - c. External and internal connection diagram showing external mounted items, incoming and outgoing contacts, and terminals as specified.
 - d. Integrated terminal to terminal wiring schematic and composite electrical diagrams, including control interconnection diagrams of entire system assemblies. Include the following:
 1. Elementary schematic design.
 2. Wiring and interconnection diagram.
 3. Frontal elevation drawing.
 4. Bill of material listing components.
 5. Schedule of nameplates furnished with unit.
- D. Operation and Maintenance (O&M) Data:
1. Submit in accordance with Section 01340.

1.04 QUALITY ASSURANCE

- A. System Responsibility:
1. To ensure proper operating system, the manufacturer/supplier of the air compressor shall also be responsible for supplying a complete and operable system including controls.

PART 2 – PRODUCTS

2.01 MANUFACTURERS:

- A. Ingersoll- Rand, Model 2340L5-V
- B. Or equal.

2.02 AIR COMPRESSOR

- A. Provide an air compressor with the following features:
1. Two-stage reciprocating compressor mount on a vertical receiver with common receiver.
 2. Compressor shall have cast iron frame and cylinders.
 3. V-Belt drive and metal guard.
 4. 60 gallon ASME Sec VIII & CRN Code vertical pressure tank, with pressure gauge, pressure switch and pressure relief valve.

5. Connection size: ½” NPT.
6. Full voltage magnetic starter and phase monitor relay.
7. Automatic alternating control system for the two (2) air compressors.
8. 5 HP electric motor shall be a single-phase, 60-Hz, 230. Electrical characteristics shall meet existing conditions and may be modified based on shop drawing review.

2.03 CONTROL EQUIPMENT

A. Alternator Control System

1. System shall include an alternator switch to allow for alternating and duplexing control functionally. Control system shall allow both units to operate at the same time.
2. Control equipment shall be housed in a UL/CUL approved NEMA 4 control panel.
3. Contractor shall install and connect the unit to both the existing and new compressor system. All electrical work shall be by a licensed electrician and in accordance with NEC.
4. System shall be supplied by the compressor manufacturer.

B. Filter/Regulator

1. Minimum pressure rating: 250 psi
2. Minimum adjustment range: 5 to 125psi.
3. Filter Size: 40 micron.
4. Pressure Gauge: 2.5-inch diameter stainless steel body with glass face. The gauges shall be rated for 0-160 psi range and shall be a NOSHOK 100 series, model 25.110.160-psi, or approved equal.
5. Units shall be Speedaire Model No. 4zk82 or approved equal

2.04 AIR COMPRESSOR FOUNDATION/ENCLOSURE

- A. Foundation is an existing reinforced concrete slab with an existing three-sided metal enclosure with the back panels capable of being removed to allow for servicing of the air compressor.

2.05 COATING

- B. Manufacturer is responsible for surface preparation, priming and finish coating of equipment either in plant or field.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Set, anchor, and pipe in new compressor.
- B. Upgrade electrical wiring (if required) and connections, route and install new conduit, install new

surge protector and panel, wire to new equipment, complete, in place, meeting code requirements, and ready for operation use by the COUNTY.

- C. Install equipment according to manufacturer's written instructions and approved submittals.

3.02 FIELD QUALITY CONTROL

- A. Functional Test.

1. Prior to system startup, the Contractor shall inspect for proper connection. Perform initial equipment startup and system adjustment as per equipment manufacturer's recommendations.
2. Conduct Engineer/Owner-witnessed field demonstration tests on the completed system to demonstrate the system's ability to perform specified functions. Measure and record air compressor outlet pressure in PSIG.
3. The test shall demonstrate the functions and features of the controls under actual operating conditions.

END OF SECTION

SECTION 15103

BUTTERFLY VALVES

PART 1 – GENERAL

1.01 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit product data in accordance with Section 01340.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Asahi/America Type 56 or approved equal.

2.02 BUTTERFLY VALVES

- A. General:
 - 1. Proportion parts of valve for stresses occurring during continuous operation, and additional stresses occurring during fabrication or erection.
 - 2. Provide tight-closing, rubber seat type valve, with seats fastened to valve body or valve disk.
- B. Valve Bodies:
 - 1. Valves shall be wafer style and the short-bodied pattern.
 - 2. Thermoplastic Materials (PVC).
- C. Valve Shafts: Type 304 stainless steel.
- D. Valve Seats:
 - 1. Nitrile
 - 2. Replaceable valve seats.
 - 3. Valve Seat in-place: ASTM 0429, Method A or B.
 - 4. Do not use metal to metal.
- E. Valve Discs:
 - 1. Thermoplastic material - Polypropylene.
- F. Valve Shaft Seals:
 - 1. Same material as used for the Valve Seat.

2.03 VALVE OPERATORS

- A. Manual Valve Operators:
 - 1. Provide lever or worm gear actuators, stem extensions, and carbon steel stem housings as indicated on the drawings.
 - 2. Actuator:
 - a. Gear actuators and handwheels.
 - b. Enclose gearing in semi-steel housing suitable for running in lubricant with seals provided on shafts to prevent entry of dirt and water into actuator.
 - c. Furnish removable operator lever with each valve specified with lever actuator.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with manufacturer's written instructions and approved submittals.

END OF SECTION