



STATE OF DELAWARE  
**DEPARTMENT OF TRANSPORTATION**  
800 BAY ROAD  
P.O. BOX 778  
DOVER, DELAWARE 19903

JENNIFER COHAN  
SECRETARY

**VIA OVERNIGHT DELIVERY**

April 18, 2019

Contract No. T201880103.01  
North District Improvements, Phase I  
New Castle County

Ladies and Gentlemen:

Enclosed is Addendum No. 2 for the referenced contract consisting of the following:

1. The Bid Proposal Cover, revised, to be substituted for the same page of the Proposal.
2. One (1) page, Prospective Bidders Note, page ii, revised, to be substituted for the same page in the Proposal. . Paragraph 15 added a Site Visit has been scheduled. Paragraph 16 added, Subletting of the Contract, has been modified from 50% to 20%
3. One (1) page, Table of Contents, page iv revised, to be substituted for the same page in the Proposal.
4. Twenty seven (27) pages, Special Provision 711501 - Sanitary Sewer System, has been added to the Proposal.
5. Two (2) pages, Special Provision 763511 - Maintenance Buildings, has been revised and replaced with a one (1) page Special Provision, page 41A.
6. One (1) page, Special Provision 911500 - Plantings, Tubelings, page 49, has been deleted from the Proposal.
7. Three (3) pages, Bid Proposal Forms, pages 3, 4, and 8, revised, to be substituted for the same pages in the Proposal.

**The following Item Number has a revised quantity: 610009**

**The following Item Numbers have been deleted: 711002 and 911500**

**The following Item Numbers have been added: 711501 and 911000**

8. One (page), Breakout Sheet for 763511 - Maintenance Building, revised to be substituted for the same page in the Proposal.
9. Expedite File, Addendum No. 1.

Please note the revisions listed above and submit your bid based upon this information.

Sincerely,

*~signature on file~*

Connie Ivins  
Competitively Bid Contracts Coordinator  
Delaware Department of Transportation

STATE OF DELAWARE



DEPARTMENT OF TRANSPORTATION

BID PROPOSAL

for

CONTRACT T201880103.01

NORTH DISTRICT IMPROVEMENTS, PHASE 1

NEW CASTLE COUNTY

ADVERTISEMENT DATE: March 25, 2019

COMPLETION TIME: 376 Calendar Days

**THERE WILL BE A NON-MANDATORY PRE-BID MEETING IN THE BIDDERS ROOM  
AT THE DeIDOT ADMINISTRATION BUILDING, 800 BAY ROAD, DOVER, DE ON  
TUESDAY APRIL 9, 2019 AT 10:30 A.M.**

SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION  
DELAWARE DEPARTMENT OF TRANSPORTATION  
AUGUST 2016

Bids will be received in the Bidder's Room at the Delaware Department of Transportation's Administration Building, 800 Bay Road, Dover, Delaware prior to 2:00 P.M. local time April 30, 2019

\* Subcontractors - Contractors that employ Subcontractors on the job site may do so only after submitting a copy of the Subcontractor's Employee Drug Testing Program along with the standard required subcontractor information. A Subcontractor shall not commence work until **DelDOT** has approved the subcontractor in writing;

\* Penalties for non-compliance are specified in the regulation.

7. No RETAINAGE will be withheld on this contract unless through the Prequalification Requirements.
8. EXTERNAL COMPLAINT PROCEDURE can be viewed on DelDOT's Website [here](#), or you may request a copy by calling (302) 760-2555.
9. REMINDER; A copy of your firm's Delaware Business License must be submitted with your bid.
10. AUGUST 2016 STANDARD SPECIFICATIONS apply to this contract. The Contractor shall make himself aware of any revisions and corrections (Supplemental Specifications, if any) and apply them to the applicable item(s) of this contract. The 2016 Standard Specifications can be [viewed here](#).
11. FLATWORK CONCRETE TECHNICIAN CERTIFICATION TRAINING:  
Section 501.03, 503.03, 505.03, 610.03, 701.03 and 702.03 of the 2016 Standard Specifications require contractor's to provide an American Concrete Institute (ACI) or National Ready Mix Concrete Association (NRMCA) certified concrete flatwork technician to supervise all finishing of flatwork concrete. Concrete flatwork certification will be effective starting on June 1, 2018.
12. **BREAKOUT SHEETS MUST** be submitted either with your bid documents; or within seven (7) calendar days following the bid due date by the lowest apparent bidder. Refer to instructions adjacent to the Breakout Sheets in this document.
13. This project incorporates **Appendix A TECHNICAL SPECIFICATIONS**, which is a part of this contract. Appendix A contains additional specifications required for this project.
14. In accordance with 29 Del. C. §6962(d)(10), a **Pre-Bid Meeting** will be held to select the subcontractor categories to be included in the bids for performing the work required for this contract. A penalty of \$2,000.00 will be withheld from the successful bidder for each occurrence for the failure to utilize any or all of the Subcontractors submitted with the bid.

The Pre-Bid Meeting will be held Tuesday April 9, 2019 at 10:30 a.m. in the DelDOT Administration Building, 800 Bay Road, Dover, Delaware, 19901, unless changed via Addendum.

15. A site visit will be held on Monday, April 22, 2019, at 9:00 AM at the North District Administration Building, 39 East Regal Boulevard, Newark, Delaware 19713. Questions will not be addressed during the site visit. All questions are to be e-mailed to [dot-ask@state.de.us](mailto:dot-ask@state.de.us).
16. Standard Specification 108.01, Subletting of the Contract, first sentence, has been modified as follows: Perform Work with the Contractor's own organization amounting to not less than 20 percent of total original Contract Price, excluding any specialty Items designated by the Contract.

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## 711501 SANITARY SEWER SYSTEM

### **Description:**

This work consists of furnishing all materials including pipes with all required fittings, bends, wyes, clean-outs, etc., structures, pumping stations, installation, and testing of the sanitary sewer system in accordance with these Special Provisions, Delaware Standard Specifications, and requirements of the Standard Specifications of the Utility Owner (New Castle County). In case of any conflict between the notes and details on the Plans; Special Provisions; Standards and Specifications of the Utility Owner; the Standards and Specifications of the Utility Owner shall prevail. The Contractor shall obtain the Standards and Specifications of the Utility Owner and study for materials cost before submitting the bids. The Utility Owner of the sanitary sewer is New Castle County.

**General Requirements:** All work shall be subject to inspection and subsequent approval/disapproval of the engineer and the representative of the Utility Owner; and the contractor shall be required to correct the discrepancies at his/her expense.

Included in this work is the installation and connection of a new sanitary sewer service to the existing sanitary sewer system. All modifications to such services, as required by the present Standards and Specifications of the Utility Owner and all relocations of such services necessary to avoid conflicts with utilities and highway drainage facilities are included in the work. Since the exact locations of the conflicts cannot be determined prior to trench excavation operations, the Contractor must coordinate and schedule any required relocation efforts of each sanitary sewer connection on an individual basis with the Utility Owner and the property owner. The Contractor shall be responsible for locating all services and determining whether each service is active or abandoned. Locations shown on drawings were provided by the utility owner and may or may not reflect actual field conditions. All costs associated with determining locations and active/abandon status of the service laterals will be incidental to the contract.

It is of prime importance that the Contractor, in the performance of his/her work, does not disrupt the operation of the existing sanitary sewer facilities in any manner or at any time, without the expressed prior approval of the Utility Owner. The Contractor shall construct, maintain and remove, following construction, such temporary bypasses as may be required during construction to maintain sanitary sewer facilities in service.

Coordinate all sanitary sewer construction activities with the Owner including, but not limited to, requests for system shut downs and inspections. Provide the Owner with reasonable time to respond to requests for information and coordination. Submit (3 weeks prior to beginning any Work) for approval of a plan describing the logical sequence for sanitary sewer shut-downs and tie-ins.

If necessary, furnish, install and remove bypass and temporary service pipes to maintain sanitary sewer service to customers during the Work. Furnishing, installing services and other branches, maintaining, providing safety precautions and removal of temporary services is the responsibility of the Contractor. Obtain written approval from the utility owner prior to interrupting temporary connections or new facilities of existing sanitary or combined sewers.

Contractor is required to submit:

- a. Detailed drawings and data on piping, fittings, gaskets, and appurtenances
- b. Certified test results from the manufacturer demonstrating compliance with the requirements of this section.
- c. Pipe Layouts and Schedules
- d. Shop Drawings of Precast Manholes and Structures including evidence of compliance with ASTM standards.

- e. Submit shop drawings of the manhole O-ring gasket and joint sealant, resilient connector, manhole sealant, chimney seal, manhole frame and cover, and manhole step.

Any and all emergency repairs required are the responsibility of the Contractor. Upon notification via telecommunication from the Owner, attend to any repairs immediately. In the event the Owner is unable to contact the Contractor or the Contractor fails to make the emergency repairs in a length of time determined by the Owner, the Owner reserves the right to attend to any or all emergency repair work. In such a case, the Contractor is responsible for reimbursements due to the Owner for the costs of the repairs.

All Materials and Work are subject to inspection by the Owner and the Engineer. Remove and replace all unsatisfactory Materials, Work or parts thereof at the Contractor's expense.

The installation requirements for the sanitary sewer system shall be open-cut.

**Materials:**

Use Materials specified in the Contract Documents and as specified by the Owner's standard specifications. The Owner will have right to inspect Materials and reject any Materials that do not meet the applicable standards and specifications.

Provide all Materials to complete the Work including pipe, fittings and all other appurtenances necessary to make permanent connections to existing utility facilities of whatever material type encountered.

Use printed polyethylene plastic warning tape for sanitary sewer or force main with a metallic core, manufactured specifically for identifying buried utility lines. Use tape of a roll type, 6-inch minimum width and color coded for sewer (green) with warning and identification imprinted in bold black letters continuously and repeatedly over the entire length of the tape. Use code and letter color that is permanent and unaffected by moisture and other substances contained in trench backfill Materials. Imprint "Sanitary Sewer" on the tape or a similar message approved by the Engineer.

Use Class B Concrete for thrust blocks and clean-outs meeting the requirements of Section 1022.

Use Borrow, Type C for backfilling conforming to the requirements of Section 1001.

Use Graded Aggregate, Type B in accordance with Section 1005 to construct pipe bedding.

Unless shown otherwise in the Contract Documents or required by the Owner, use the same class of Material as the sewer mains to which they are connected for the construction of all commercial, industrial and residential connections.

Specific requirements for the materials as applicable to the Contract are as noted below, unless otherwise stated on the Plans and/or required by the Utility Owner of the sewer system. The Contractor shall verify the compatibility of these materials specifications with the Utility Owner before placing order for the Contract.

- A. The minimum gravity service lateral size is 6 inches.
- B. The minimum force main size is 1.5 inches.
- C. Maintain a minimum of 18 inches of vertical clearance where the water main crosses over the sanitary sewer or lateral; otherwise, a minimum of ten (10) foot long concrete encasement (centered at the crossing point) shall be provided around the sanitary sewer or lateral as per the standard detail. 6 inches of 3,500 psi concrete shall be provided all around the pipe.
- D. Sanitary laterals shall be placed on a minimum bed 4 inches of Delaware #57 stone to approximately 6 inches over the pipe.
- E. Sanitary Force main shall be placed on a minimum bed 3 inches of Delaware #57 stone to the spring line of the pipe.

## Open-Cut Materials

### Non-Pressure PVC

- A. The Polyvinyl Chloride Pipe (PVC) piping, fittings, and appurtenances shall be provided in the sizes indicated on the drawings.
- B. All PVC pipe and fittings intended for gravity, non-pressure drainage of sewage shall be manufactured in accordance with the latest version of the following ASTM Specifications:
  - 1. ASTM D3034, "Standard Specification for Type PSM PVC Sewer Pipe and Fittings."
  - 2. ASTM F679, "Standard Specification for PVC Large-Diameter Plastic Gravity Sewer Pipe and Fittings."
  - 3. ASTM F1336, "Standard Specification for PVC Gasketed Sewer Fittings."
  - 4. ASTM D3212, "Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals."
- C. All PVC pipe joints shall be gasketed, bell-and-spigot, push-on type. Gaskets shall be part of a complete pipe section and furnished as such. Gaskets may be factory installed or field installed as recommended by the pipe manufacturer. Lubricant shall be as recommended by the pipe manufacturer.
- D. All PVC non-pressure sewer pipe shall have a maximum standard dimension ratio (SDR) of 26.
- E. All PVC non-pressure sewer pipe shall have a pipe stiffness that equals or exceeds 115 lbs/in<sup>2</sup> (PSI).
- F. Provide elastomeric gasket joints in accordance with ASTM F477.
- G. Each pipe shall be marked at intervals of five (5) feet or less to designate compliance with applicable ASTM or AWWA specification.
- H. The pipe shall be as uniform as commercially practicable in color, capacity, density and other physical properties and provided by a single vendor.
- I. Lateral connection fittings shall be made using a manufactured "wye" connection, constructed of the same class and material as the gravity main to which they are connected.

### PVC Pressure Pipe and Gaskets

- A. The Polyvinyl Chloride Pipe (PVC) piping, fittings, and appurtenances shall be provided in the sizes indicated on the drawings.
- B. All PVC pipe, fittings, and appurtenances shall be suitable for pressure service of sewage and shall be manufactured in accordance with the latest version of the following ASTM Specifications:
  - 1. ASTM D2241, "Standard Specification for PVC Pressure-Rate Pipe (SDR Series)."
  - 2. ASTM F477, "Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe"
- C. All PVC pipe joints shall be gasketed, bell-and-spigot, push-on type. Gaskets shall be part of a complete pipe section and furnished as such. Gaskets may be factory installed or field installed as recommended by the pipe manufacturer. Lubricant shall be as recommended by the pipe manufacturer.
- D. All PVC pipe joints shall be push-on, gasketed-type joints unless otherwise specified. Gaskets shall be an integral part of a complete pipe section. Gaskets shall be factory installed, unless otherwise recommended by the pipe manufacturer. Lubricant shall be as recommended by the pipe manufacturer.
- E. All PVC pressure sewer pipe shall be Class 100 unless otherwise specified, with a dimension ratio (DR) of 21.
- F. Each pipe shall be marked at intervals of 5 feet or less to include the following designation(s):
  - a. Nominal size and/or outside diameter base
  - b. Material code designation or cell classification
  - c. Schedule or dimension ratio number
  - d. AWWA pressure class

- e. AWWA and/or ASTM designation number
  - f. Manufacturer's name or trademark
  - g. Seal of testing agency verify potable water service
- H. Each pipe shall be marked at intervals of 5 feet or less to include the following designation(s):  
The pipe shall be as uniform as commercially practicable in color, capacity, density, and other physical properties and provided by a single vendor.  
8Detectable tape shall be aluminum foil tape, encapsulated in a plastic jacket. Tape shall be a minimum of three (3) inches wide. Tape shall be a high visibility, "Safety Green" with continuous imprinted identification label of "CAUTION – BURIED SEWER LINE BELOW", in accordance with APWA's color code and legend.  
9Detectable wire shall be insulated (green color) solid copper, #14 AWG, 600-volt wire, or not less than 90% conductivity. Wire shall conform to ASTM Designation 6.58. Splicing of wires shall be by a solderless, split-bolt lug connector, suitable for direct burial in soil or concrete, manufactured from high strength copper alloy, UL Listed and CSA Certified for 2,000 volts.

Pre-cast Manholes

- A. Pre-cast cleanout manholes for the pressure piping shall be provided in the sizes indicated on the drawings. Install per standard details as provided on plans.
- B. Precast cleanout manholes shall be placed at all pipe junctions and at a maximum of 400 linear feet on straight length sections as shown on plans
- C. Pre-cast manholes shall be provided as specified herein and as depicted on the Contract Drawings. References of specific product manufacturers may be used to depict a material style and quality expected for this project.
- D. Locations, sizes, depths and all other attributes of each manhole shall be confirmed by the Contractor prior to ordering.
- E. Provide reinforced concrete, cementitious materials, aggregates and steel reinforcement conforming to the requirements of ASTM C 478 for constructing sewer manholes.
- F. Provide manholes of 4,500 psi concrete, reinforced as shown on the Contract Drawings.
- G. Manhole sections shall include lifting holes that are formed, tapered, or drilled. After placement, lift holes shall be repaired in a clean, workmanlike manner using a conical shaped pre-cast plug, properly sealed in place using non-shrink cement grout or an expanding Portland Cement mixture.
- H. Pipe to Manhole Connectors
  - a. The design of the connector shall provide a flexible, watertight seal between the pipe and concrete structure and shall be integrally cast into the manhole unless otherwise specified.
  - b. The connector shall be made from materials that conform to Section 4, "Materials and Manufacture" of ASTM C-923 and F-2510 "Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Laterals", and the overall design will meet or exceed Section 7, "Test Methods and Requirements" of ASTM C-923.
  - c. The connector shall be sized specifically for the type of pipe being used and shall be installed in accordance with the recommendations of the manufacturer.
  - d. Any metal elements of the connector shall be non-magnetic Series 300 stainless steel.
  - e. "Boot-type" connectors shall not be used unless specified or reviewed by the Engineer.
- I. Grade Adjustment Rings
  - a. Grade adjustment rings used in the public road right of way must be approved by DELDOT.
  - b. Precast concrete adjusting rings shall meet or exceed ASTM C478.
  - c. Rubber composite adjustment rings shall meet or exceed the following:
    - (1) Density – 64 lbs/ft<sup>3</sup>, ASTM D3574-05 Test A
    - (2) Durometer Hardness - 77 A ± 5, ASTM D2240-05
    - (3) Tensile Strength –Not less than 145 psi, ASTM D412-06
    - (4) Heat Ages Properties – 70 hours @ 158 °F, 3 hours @ 300 °F, ASTM D573-04
  - d. Expanded polypropylene adjustment rings shall meet or exceed ASTM D3575.
  - e. High density polyethylene (HDPE) adjustment rings shall meet or exceed ASTM D4976 and ASTM D1248.
- J. Manhole Frames and Covers
  - a. Provide standard manhole frames and covers labeled "SANITARY SEWER" conforming to ASTM A 48, Class 35B.

K. Manhole Steps and Ladders

- a. Provide manhole steps or ladders as depicted on the contract drawings as conforming “to ASTM C478.
- b. Unless otherwise specified, provide polypropylene steps with a reinforced 3/8-inch minimum diameter reinforcing steel, grade 60. Do not use cast iron steps.

Concrete for the thrust blocks and clean-outs shall meet the requirements of Section 812, Class B of Standard Specifications. Thrust blocks and clean-outs shall be constructed in accordance with the Standard Detail Drawings of the Owner or as directed.

Unless shown otherwise on the Plans or required by the owner, all commercial, industrial, and residential connections shall be constructed of the same class of material as the sewer mains to which they are connected. Minimum grade and size of the lateral pipes shall be as required by the Owner's Standards and Specifications.

Sanitary Sewer Lift Station

1.01 General Description: The Manufacturer shall furnish complete factory-built and tested Wetwell/Drywell Grinder Pump Station(s), each consisting of grinder pump(s) suitably mounted in a basin constructed of high density polyethylene (HDPE) for simplex stations and HDPE or Fiberglass Reinforced Polyester Resin for duplex stations with dimensions and capacities as show on the Contract Drawings, NEMA 6P electrical quick disconnect (EQD), pump removal system, stainless steel discharge assembly/shut-off valve, anti-siphon valve/check valve, each assembled in the basin, electrical alarm panel and all necessary internal wiring and controls. Component type grinder pump systems that require field assembly will not be acceptable due to the potential problems that can occur during field assembly. All components and materials shall be in accordance with section 2.0 of this Product Specification. For ease of serviceability, all pump, motor/grinder units shall be of like type and horsepower throughout the system.

1.02 Submittals: After receipt of notice to proceed, the Manufacturer shall furnish a minimum of six sets of shop drawings detailing the equipment to be furnished including dimensional data and materials of construction. The Engineer shall promptly review this data, and return two copies as accepted, or with requested modifications. Upon receipt of accepted shop drawings, the Manufacturer shall proceed immediately with fabrication of the equipment.

1.03 Manufacturer: Grinder pump stations, complete with all appurtenances, form an integral system, and as such, shall be supplied by one grinder pump station manufacturer. The Contractor shall be responsible for the satisfactory operation of the entire system. The equipment specified shall be a product of a company experienced in the design and manufacture of grinder pumps for specific use in low pressure sewage systems. The company shall submit detailed installation and user instructions for its product, submit evidence of an established service program including complete parts and service manuals, and be responsible for maintaining a continuing inventory of grinder pump replacement parts. The Manufacturer shall provide, upon request, a reference and contact list from ten of its largest contiguous grinder pump installations of the type of grinder pumps described within this specification.

The Manufacturer of the grinder pump station shall be Environment One Corporation (or Proposed Alternate).

Attention is directed to the fact that the drawings and overall system design are based on a particular piece of equipment from a particular manufacturer. These specifications are intended to provide guidelines for standard equipment of a recognized manufacturer who already meets all the requirements of this specification.

1.03a Alternate Equipment: In the event that the Contractor or another supplier proposes an Alternate to the specified Manufacturer, the Engineer recognizes that it will be difficult to conform to certain details of this

Specification due to different manufacturing techniques or grinder pump station designs. If proposing an Alternate, the Contractor (supplier) must submit, no less than 15 business days in advance of the bid date, a complete description of any changes that will be necessary to the system design, a complete submittal package as outlined in Section 1.02 Submittals, a system hydraulic analysis based on the proposed pump (including pipe sizes, flows, velocities, retention times and number and location of recommended valves and cleanouts, if any), a list of exceptions to this specification, and demonstration of compliance to Section 1.04 Experience Clause of this specification. The Contractor (supplier) must also complete the Manufacturer Disclosure Statement found at the end of this specification. This information must be submitted to the Engineer for pre-approval of the alternate equipment being proposed and determination of compliance with these Contract Documents. If the equipment differs materially or differs from the dimensions given on the Drawings, the Contractor (supplier) shall submit complete drawings showing elevations, dimensions, or any necessary changes to the Contract Documents for the proposed equipment and its installation. Pre-approval, if granted, will be provided in writing by the Engineer to the Contractor (supplier) at least five business days in advance of the bid date. If the Engineer's approval is obtained for Alternate Equipment, the Contractor (supplier) must make any needed changes in the structures, system design, piping or electrical systems necessary to accommodate the proposed equipment at the expense of the Contractor (supplier).

1.04 Experience Clause: The equipment furnished hereunder shall be the product of a company experienced in the design and manufacture of grinder pumps specifically designed for use in low pressure systems. All manufacturers proposing equipment for this project shall have at least 10 years of experience in the design and manufacture of units of identical size(s) and performance to the specified units. All manufacturers proposing equipment for this project must also have not less than 500 successful installations of low pressure sewer systems utilizing grinder pumps of like type to the grinder pumps specified herein. An installation is defined as a minimum of 25 pumps discharging into a common force main which forms a low-pressure sewer system. The Contractor (supplier) proposing alternate equipment shall also submit, as part of the bid schedule, an installation list with contact person(s), phone number(s) and date(s) of at least 10 installations of the type of pump specified herein that have been in operation for at least 10 years.

In lieu of this experience clause, the Contractor (supplier) of alternate equipment will be required to submit a 5-year performance bond for 100 percent of the stipulated cost of the equipment as bid and as shown in the Bid Schedule. This performance bond will be used to guarantee the replacement of the equipment in the event that it fails within the bond period.

1.05 Operating Conditions: The pumps shall be capable of delivering 15 GPM against a rated total dynamic head of 0 feet (0 PSIG), 11 GPM against a rated total dynamic head of 92 feet (40 PSIG), and 7.8 GPM against a rated total dynamic head of 185 feet (80 PSIG). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s). Under no conditions shall in-line piping or valving be allowed to create a false apparent head.

1.06 Warranty: The grinder pump Manufacturer shall provide a part(s) and labor warranty on the complete station and accessories, including, but not limited to, the panel for a period of 24 months after notice of Owner's acceptance, but no greater than 27 months after receipt of shipment. Any manufacturing defects found during the warranty period will be reported to the Manufacturer by the Owner and will be corrected by the Manufacturer at no cost to the Owner.

1.07 Warranty Performance Certification: As a bid certification requirement, each bidder shall provide with their bid schedule a Warranty Performance Certification statement executed by the most senior executive officer of the grinder pump Manufacturer, which certifies a minimum of a 24-month warranty. They must further detail any exclusions from the warranty or additional cost items required to maintain the equipment in warrantable condition, including all associated labor and shipping fees, and certify that the Manufacturer will bear all costs to correct any original equipment deficiency for the effective period of the warranty. All preventive maintenance type requirements shall be included in this form as exclusions. These requirements include, but are not limited to, unjamming of grinder mechanism, periodic motor maintenance, and periodic cleaning of liquid level controls. Should the Contractor (supplier) elect to submit a performance bond in lieu of the experience clause outlined above, this Warranty Performance Certification shall also be used as a criterion to evaluate the Contractor's (supplier's) performance over the warranty period. A Warranty

Performance Certification form is included with the bid schedule and must be completed and submitted as part of the bid package. Bids with incomplete forms or missing forms will be considered nonresponsive.

## 2.0 Product

2.01 Pump: The pump shall be a custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressing cavity type with a single mechanical seal. Double radial O-ring seals are required at all casting joints to minimize corrosion and create a protective barrier. All pump castings shall be cast iron, fully epoxy coated to 8-10 mil Nominal dry thickness, wet applied. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. This material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, excellent aging properties, and outstanding wear resistance. Buna-N is not acceptable as a stator material because it does not exhibit the properties as outlined above and required for wastewater service.

2.02 Grinder: The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece motor shaft. The grinder impeller (cutter wheel) assembly shall be securely fastened to the pump motor shaft by means of a threaded connection attaching the grinder impeller to the motor shaft. Attachment by means of pins or keys will not be acceptable. The grinder impeller shall be a one-piece, 4140 cutter wheel of the rotating type with inductively hardened cutter teeth. The cutter teeth shall be inductively hardened to Rockwell 50–60c for abrasion resistance. The shredder ring shall be of the stationary type and the material shall be white cast iron. The teeth shall be ground into the material to achieve effective grinding. The shredder ring shall have a staggered tooth pattern with only one edge engaged at a time, maximizing the cutting torque. These materials have been chosen for their capacity to perform in the intended environment as they are materials with wear and corrosive resistant properties.

This assembly shall be dynamically balanced and operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to minimize clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour the tank free of deposits or sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following, in conjunction with the pump:

1. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.
2. The maximum flow rate through the cutting mechanism must not exceed 4 feet per second. This is a critical design element to minimize jamming and as such must be adhered to.
3. The inlet shroud shall have a diameter of no less than 5 inches. Inlet shrouds that are less than 5 inches in diameter will not be accepted due to their inability to maintain the specified 4 feet per second maximum inlet velocity which by design prevents unnecessary jamming of the cutter mechanism and minimizes blinding of the pump by large objects that block the inlet shroud.
4. The impeller mechanism must rotate at a nominal speed of no greater than 1800 rpm.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of “foreign objects,” such as paper, wood, plastic, glass, wipes, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4" diameter stainless steel discharge piping.

2.03 Electric Motor: As a maximum, the motor shall be a 1 HP, 1725 RPM, 240 Volt 60 Hertz, 1 Phase, capacitor start, ball bearing, air-cooled induction type with Class F installation, low starting current not to exceed 30 amperes and high starting torque of 8.4 foot pounds. The motor shall be press-fit into the casting

for better heat transfer and longer winding life. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal overload protector incorporated into the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application. Non-capacitor start motors or permanent split capacitor motors will not be accepted because of their reduced starting torque and consequent diminished grinding capability. The wet portion of the motor armature must be 300 Series stainless. To reduce the potential of environmental concerns, the expense of handling and disposing of oil, and the associated maintenance costs, oil-filled motors will not be accepted.

2.04 Mechanical Seal: The pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless steel spring.

2.05 Tank And Integral Accessway: (Model DH071) High Density Polyethylene Construction. The tank shall be a Wetwell/Drywell design made of high density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. The corrugations of the outside wall are to be a minimum amplitude of 1-1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250" thick (minimum). All seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. The tank capacities shall be as shown on the contract drawings.

The Drywell accessway shall be an integral extension of the Wetwell assembly and shall include a lockable cover assembly providing low profile mounting and watertight capability. The accessway design and construction shall enable field adjustment of the station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations will be acceptable.

All discharge piping shall be constructed of 304 stainless steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1-1/4" Female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P Electrical Quick Disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with 32', 25' of useable Electrical Supply Cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD shall require no tools for connecting, seal against water before the electrical connection is made, and include radial seals to assure a watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway due to the large number of potential leak points. The EQD shall be so designed to be conducive to field wiring as required. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.06 Tank & Integral Accessway: (Models DH151 150 Gallon Simplex & DH152 150 Gallon Duplex) High Density Polyethylene Construction. The tank shall be a Wetwell/Drywell design made of high density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally

smooth to promote scouring. The corrugations of the outside wall are to be a minimum amplitude of 1-1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250" thick (minimum). All seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. The tank capacities shall be as shown on the contract drawings.

The Drywell accessway shall be an integral extension of the Wetwell assembly and shall include a lockable cover assembly providing low profile mounting and watertight capability. The cover shall be high density polyethylene, green in color, with a load rating of 150 lbs per square foot. The accessway design and construction shall enable field adjustment of the station height in increments of 3" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations will be acceptable.

All discharge piping shall be constructed of 304 stainless steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1-1/4" Female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P Electrical Quick Disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with 32', 25' of useable Electrical Supply Cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD shall require no tools for connecting, seal against water before the electrical connection is made, and include radial seals to assure a watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway due to the large number of potential leak points. The EQD shall be so designed to be conducive to field wiring as required. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.07 Tank & Integral Accessway: (DH272, 275-Gallon Duplex & DH502, 500-Gallon Duplex) Fiberglass reinforced polyester resin. The tank shall be a Wetwell/Drywell design custom molded of fiberglass reinforced polyester resin with a high density polyethylene accessway. Accessway corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. The corrugations of the outside wall are to be a minimum amplitude of 1-1/2" to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250" thick (minimum). All polyethylene seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept a 4.50" OD DWV or Schedule 40 pipe. The tank capacities shall be as shown on the contract drawings.

The Drywell accessway shall be an integral extension of the Wetwell assembly and shall include a lockable cover assembly providing low profile mounting and watertight capability. The cover shall be high density polyethylene, green in color, with a load rating of 150 lbs per square foot. The accessway design and

construction shall enable field adjustment of the station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation no field penetrations will be acceptable.

All discharge piping shall be constructed of 304 stainless steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1-1/4" Female NPT fitting. The discharge piping shall include a stainless steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The accessway shall include a single NEMA 6P Electrical Quick Disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. The EQD will be supplied with 32', 25' of useable Electrical Supply Cable (ESC) outside the station, to connect to the alarm panel. The ESC shall be installed in the basin by the manufacturer. Field assembly of the ESC into the basin is not acceptable because of potential workmanship issues. The EQD shall require no tools for connecting, seal against water before the electrical connection is made, and include radial seals to assure a watertight seal regardless of tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. A junction box shall not be permitted in the accessway due to the large number of potential leak points. The EQD shall be so designed to be conducive to field wiring as required. The accessway shall also include an integral 2-inch vent to prevent sewage gases from accumulating in the tank.

2.08 Check Valve: The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless steel discharge piping. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Moving parts will be made of a 300 Series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back-pressure. The valve body shall be an injection molded part made of an engineered thermoplastic resin. The valve shall be rated for continuous operating pressure of 235 psi. Ball-type check valves are unacceptable due to their limited sealing capacity in slurry applications.

2.09 Anti-Siphon Valve: The pump discharge shall be equipped with a factory-installed, gravity-operated, flapper-type integral anti-siphon valve built into the stainless steel discharge piping. Moving parts will be made of 300 Series stainless steel and fabric-reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly, providing a maximum degree of freedom to ensure proper operation even at a very low pressure. The valve body shall be injection-molded from an engineered thermoplastic resin. Holes or ports in the discharge piping are not acceptable anti-siphon devices due to their tendency to clog from the solids in the slurry being pumped. The anti-siphon port diameter shall be no less than 60% of the inside diameter of the pump discharge piping.

2.10 Core Unit: The grinder pump station shall have a cartridge type, easily removable core assembly consisting of pump, motor, grinder, all motor controls, check valve, anti-siphon valve, level controls, electrical quick disconnect and wiring. The core unit shall be installed in the basin by the manufacturer. Field assembly of the pump and controls into the basin is not acceptable because of potential workmanship issues and increased installation time. In some cases, stations taller than 96" may be shipped on their side without the cores assembled in the basin for freight purposes but this is the only exception. The core unit shall seal to the tank deck with a stainless steel latch assembly. The latch assembly must be actuated utilizing a single quick release mechanism requiring no more than a half turn of a wrench. The watertight integrity of each core unit shall be established by a 100 percent factory test at a minimum of 5 PSIG.

2.11 Controls: All necessary motor starting controls shall be located in the cast iron enclosure of the core unit secured by stainless steel fasteners. Locating the motor starting controls in a plastic enclosure is not acceptable. The wastewater level sensing controls shall be housed in a separate enclosure from motor starting

controls. The level sensor housing must be sealed via a radial type seal; solvents or glues are not acceptable. The level sensing control housing must be integrally attached to pump assembly so that it may be removed from the station with the pump and in such a way as to minimize the potential for the accumulation of grease and debris accumulation, etc. The level sensing housing must be a high-impact thermoplastic copolymer over-molded with a thermo plastic elastomer. The use of PVC for the level sensing housing is not acceptable.

Non-fouling wastewater level controls for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air column connected to a pressure switch. The air column shall be integrally molded from a thermoplastic elastomer suitable for use in wastewater and with excellent impact resistance. The air column shall have only a single connection between the water level being monitored and the pressure switch. Any connections are to be sealed radially with redundant O-rings. The level detection device shall have no moving parts in direct contact with the wastewater and shall be integral to the pump core assembly in a single, readily-exchanged unit. Depressing the push to run button must operate the pump even with the level sensor housing removed from the pump.

All fasteners throughout the assembly shall be 300 Series stainless steel. High-level sensing will be accomplished in the manner detailed above by a separate air column sensor and pressure switch of the same type. Closure of the high-level sensing device will energize an alarm circuit as well as a redundant pump-on circuit. For increased reliability, pump ON/OFF and high-level alarm functions shall not be controlled by the same switch. Float switches of any kind, including float trees, will not be accepted due to the periodic need to maintain (rinsing, cleaning) such devices and their tendency to malfunction because of incorrect wiring, tangling, grease buildup, and mechanical cord fatigue. To assure reliable operation of the pressure switches, each core shall be equipped with a factory installed equalizer diaphragm that compensates for any atmospheric pressure or temperature changes. Tube or piping runs outside of the station tank or into tank-mounted junction boxes providing pressure switch equalization will not be permitted due to their susceptibility to condensation, kinking, pinching, and insect infestation. The grinder pump will be furnished with a 6 conductor 14 gauge, type SJOW cable, pre-wired and watertight to meet UL requirements with a Factory Installed NEMA 6P EQD half attached to it.

2.12 Alarm Panel: Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic polyester to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The enclosure shall not exceed 10.5" W x 14" H x 7" D, or 12.5" W x 16" H x 7.5" D if certain options are included.

The alarm panel shall contain one 15-amp, double-pole circuit breaker for the pump core's power circuit and one 15-amp, single-pole circuit breaker for the alarm circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The alarm panel shall include the following features: external audible and visual alarm; push-to-run switch; push-to-silence switch; redundant pump start; and high level alarm capability. The alarm sequence is to be as follows when the pump and alarm breakers are on:

1. When liquid level in the sewage wet-well rises above the alarm level, the contacts on the alarm pressure switch activate, audible and visual alarms are activated, and the redundant pump starting system is energized.
2. The audible alarm may be silenced by means of the externally mounted, push-to-silence button.

3. Visual alarm remains illuminated until the sewage level in the wet-well drops below the “off” setting of the alarm pressure switch.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

The entire alarm panel, as manufactured and including any of the following options shall be listed by Underwriters Laboratories, Inc.

(Optional) Alarm Contacts Package – Note: The Alarm Contacts Package is included with Sentry Simplex PreSTAT Panels

- Alarm Activated Dry Contacts – Normally open relay contact closes upon alarm activation.
- Alarm Activated Contacts for Remote Sentry Indoor Alarm Module – Will work with or without power to the alarm panel and is designed to work with E/One’s Remote Sentry.

(Optional) Generator Receptacle and Auto Transfer – The alarm panel shall include a 20 amp, 250 VAC generator receptacle with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a NEMA 4X rating. An automatic transfer switch shall be provided, which automatically switches from AC power to generator power. Power shall be provided to that alarm panel through the generator receptacle whenever power is present at the receptacle, allowing the audible and visual alarms to function normally in generator mode. When power is no longer applied to the generator receptacle, the panel is automatically switched back to the AC Mains power. (No manual switching within the panel enclosure is necessary to switch from generator power back to AC Mains, so the mode cannot be inadvertently left in the generator position after pumping down the station in generator mode as is the case with a manual transfer switch).

(Optional) Service Equipment/Main Service Disconnect Breaker – A separate, internal breaker rated and approved for use as “service equipment” and acts as a main service disconnect of the grinder pump station shall be provided.

(Optional) Remote Sentry Indoor Alarm Module – A separate, remote indoor alarm module shall be provided to indicate a high level alarm with or without AC power to the grinder pump station. The Remote Sentry indoor alarm module shall have an internal power source enabling its continued operation without AC power. The Remote Sentry shall have an audible alarm and a visual alarm, both of which shall automatically reset if the high level alarm condition is eliminated. The Remote Sentry indoor alarm module shall include a Silence button for the audible alarm and a Test button.

(Optional) Run-time/Hour Meter – A run-time or hour meter to display the total run-time or operation time for the pump core shall be provided.

(Optional) Event/Cycle Counter – An event or cycle counter to display the number of operations of the pump core shall be provided.

(Optional) Sentry Simplex Protect  
Provides protection from the following operating conditions:

- Low Voltage (Brownout) Protection – A lockout cycle will prevent the motor from operating and will illuminate an LED if:
  - the incoming AC Mains voltage drops below a predetermined minimum, typically 12% of nameplate (211 volts for a 240 volt system) for 2 to 3 seconds, regardless of whether the motor is running

- the lockout cycle will end if the incoming AC Mains voltage returns to a predetermined value, typically 10% of nameplate (216 volts for a 240 volt system)

The system continues to retest the voltage every second indefinitely. If the lockout cycle has been initiated and the voltage comes back above the predetermined starting voltage, the system will function normally. The LED remains illuminated during a Brownout condition and remains latched until the pump breaker is turned off and then on again (reset). The audible and visual alarm will not be activated unless there is a high wastewater level in the tank.

- Run Dry Protection – A 20-minute lockout cycle will prevent the motor from operating and will illuminate an LED when the wastewater level in the tank is below the pump inlet level. The condition is rechecked every 20 minutes. If the lockout cycle has been initiated and the condition is satisfied, the pump is not allowed to cycle normally but the LED remains latched. The LED will remain latched until the pump breaker is turned off and then on again (reset). If the condition is not satisfied after 3 consecutive attempts, the visual alarm will be activated until the pump breaker is turned off and on (reset) or until there is one cycle of normal operation. If a high level condition is presented at any time, a pump run cycle will be activated.
- High System Pressure Protection – A 20-minute lockout cycle will prevent the motor from operating and will illuminate an LED when the pressure in the discharge line is atypically high (closed valve or abnormal line plug). The condition is rechecked every 20 minutes. If the condition is satisfied, the pump is allowed to cycle normally but the LED remains latched. If the condition is not satisfied after 3 consecutive attempts, the pump is locked out indefinitely until the condition is removed and power is reset. The LED will remain latched until the pump breaker is turned off and then on again (reset). The audible and visual alarm will be activated.

In all of the above cases, if more than one error condition is presented, the LED depicting the most recent error condition will be displayed.

Other included features:

- Alarm Activated Dry Contacts – Normally open relay contact closes upon alarm activation.
- Alarm Activated Contacts for Remote Indoor Alarm Module – Will work with or without power to the alarm panel and is designed to work with E/One's Remote Sentry.
- Includes Inner Door Dead Front
- Separate LED's for each condition

(Optional) SENTRY SIMPLEX PROTECT PLUS:

- All Sentry Protect features (as detailed above)
- High/Low Voltage monitoring with Trouble indication
- High/Low Wattage (wattage is used instead of current because it is a better indicator of pump performance) monitoring with Trouble indication
- Extended Run Time monitoring with Trouble indication
- Cycle/Event Counter
- Run Time Counter (Hour Meter)
- Run Time Limit — time adjustable, user-selected options: 10 minutes (default) to 120 minutes in 1-minute intervals
- Power-up Delay — time adjustable, user-selected options: None (default), to 300 minutes in 1-minute intervals
- Alarm Delay — time adjustable, user-selected options: None (default) or adjustable in 1-minute intervals
- System self-test diagnostic

- User-selectable Alarm latch
- User-selectable Protect Mode disable
- User-selectable buzzer timer

Specific Protect PLUS indicators and programming features shall include:

- Ready LED to indicate AC power to the station is satisfactory
- Pump Run LED to indicate pump is operating
- Trouble LED indicator and predictive Visual Alarm notification (“blinking” alarm lamp; clears on Normal cycle)
- High Level Alarm LED indicator
- Manual Run switch to manually activate pump
- Menu-driven programmable controller with navigation overlay-type buttons (Enter, Scroll, Up, Down)
- Normal Operation LED and Mode button for Mode status
- Pump Performance menu LED with LCD Display of the following pump performance statistics:
  - Real-time Voltage
  - Real-time Amperage
  - Real-time Wattage
  - Minimum/Maximum/Average Voltage
  - Minimum/Maximum/Average Amperage
  - Minimum/Maximum/Average Wattage
  - Minimum/Maximum Run-time
  - Average Run-time
  - Last Run-time
  - Cycle/Event Counter
  - Run Time Counter (Hour Meter)
- Diagnostics Menu LED
- Initialize System Menu LED
- Run Limit Menu LED
- Alarm Delay Menu LED
- Power Delay Menu LED

DUPLEX STATIONS

MOD T260 DUPLEX:

Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The standard enclosure shall not exceed 12.5" W x 16" H x 7.5" D.

The panel shall contain one 15-amp single pole circuit breaker for the alarm circuit and one 15-amp double pole circuit breaker per core for the power circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

The high-level alarm system shall operate as follows:

1. The panel will go into alarm mode if either pump's alarm switch closes. During the initial alarm mode both pumps will run and the alarm light and buzzer will be delayed for a period of time based on user settings (default is 3-1/2 minutes). If the station is still in high-level alarm after the delay, the light and buzzer will be activated.
2. The audible alarm may be silenced by means of the externally mounted push-to-silence button.
3. The visual alarm remains illuminated until the sewage level in the wet well drops below the "off" setting of the alarm switch for both pumps.

The entire alarm panel, as manufactured and including any of the following options shall be listed by Underwriters Laboratories, Inc.

(Optional) Generator Receptacle and Auto Transfer – The alarm panel shall include a 20 amp, 250 VAC generator receptacle with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a NEMA 4X rating. An automatic transfer switch shall be provided, which automatically switches from AC power to generator power. Power shall be provided to the alarm panel through the generator receptacle whenever power is present at the receptacle, allowing the audible and visual alarms to function normally in generator mode. When power is no longer applied to the generator receptacle, the panel is automatically switched back to the AC Mains power. (No manual switching within the panel enclosure is necessary to switch from generator power back to AC Mains, so the mode cannot be inadvertently left in the generator position after pumping down the station in generator mode as is the case with a manual transfer switch).

(Optional) Service Equipment/Main Service Disconnect Breaker – A separate, internal breaker rated and approved for use as "service equipment" and acts as a main service disconnect of the grinder pump station shall be provided.

(Optional) Remote Sentry Indoor Alarm Module – A separate, remote indoor alarm module shall be provided to indicate a high level alarm with or without AC power to the grinder pump station. The Remote Sentry indoor alarm module shall have an internal power source enabling its continued operation without AC power. The Remote Sentry shall have an audible alarm and a visual alarm, both of which shall automatically reset if the high level alarm condition is eliminated. The Remote Sentry indoor alarm module shall include a Silence button for the audible alarm and a Test button.

(Optional) Run-time/Hour Meter – A run-time or hour meter to display the total run-time or operation time for the pump core shall be provided.

(Optional) Event/Cycle Counter – An event or cycle counter to display the number of operations of the pump core shall be provided.

(Optional) External Autodialer –

- : Four separate voice message alarm zones
- : Calls up to 8 telephones, cell phones or pagers
- : Built-in line seizure
- : Remote Turn Off feature allows termination of activated channel
- : EEPROM Memory retains program despite power loss
- : Listen-in verification and communication
- : Universal dial tone
- : Built-in auxiliary output to drive external siren, strobe or relay
- : Five optional settings for notifications of a power loss occurrence — instantaneous, 15 minutes, 2 hours, 12 hours or 24 hours
- : One channel for power-loss sensing, three hardwired channels for additional input
- : Dialer senses loss of power and based on setting; will notify parties of loss condition

- only when specified time has elapsed
- : If power restores before set time has elapsed, no call will be made
- : Package includes battery backup and transformer

#### DUPLEX PROTECT PLUS:

Each grinder pump station shall include a NEMA 4X, UL-listed alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The standard enclosure shall not exceed 12.5" W x 16" H x 7.5" D.

The panel shall contain one 15-amp single pole circuit breaker for the alarm circuit and one 15-amp double pole circuit breaker per core for the power circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain NEMA 4X rating. The audible alarm shall be externally mounted on the bottom of the enclosure, capable of 93 dB @ 2 feet. The audible alarm shall be capable of being deactivated by depressing a push-type switch that is encapsulated in a weatherproof silicone boot and mounted on the bottom of the enclosure (push-to-silence button).

The high-level alarm system shall operate as follows:

1. The panel will go into alarm mode if either pump's alarm switch closes. During the initial alarm mode both pumps will run and the alarm light and buzzer will be delayed for a period of time based on user settings (default is 3-1/2 minutes). If the station is still in high-level alarm after the delay, the light and buzzer will be activated.
2. The audible alarm may be silenced by means of the externally mounted push-to-silence button.
3. The visual alarm remains illuminated until the sewage level in the wet well drops below the "off" setting of the alarm switch for both pumps.

The entire alarm panel, as manufactured and including any of the following options shall be listed by Underwriters Laboratories, Inc.

Contains the following features:

- Alarm Activated Dry Contacts – Normally open relay contact closes upon alarm activation.
- Alarm Activated Contacts for Remote Indoor Alarm Module – Will work with or without power to the alarm panel and is designed to work with E/One's Remote Sentry.
- Includes Inner Door Dead Front
- Separate LED's for each condition

Provides protection from the following operating conditions:

- Low Voltage (Brownout) Protection – A lockout cycle will prevent the motor from operating and will illuminate the Trouble LED if:
  - the incoming AC Mains voltage drops below a predetermined minimum, typically 12% of nameplate (211 volts for a 240 volt system) for 2 to 3 seconds, regardless of whether the motor is running
  - the lockout cycle will end if the incoming AC Mains voltage returns to a predetermined value, typically 10% of nameplate (216 volts for a 240 volt system).

The system continues to retest the voltage every second indefinitely. If the lockout cycle has been initiated and the voltage comes back above the predetermined starting voltage, the system will function normally. The Trouble LED remains illuminated during a Brownout condition and a corresponding Brownout message will be displayed on the LCD screen. The LED will turn off when the Brownout condition ends and the LCD message remains latched until the panel is reset. The audible and visual alarm will not be activated unless there is a high wastewater level in the tank.

- Run Dry Protection – A 20-minute lockout cycle will prevent the motor from operating and will illuminate the Trouble LED when the wastewater level in the tank is below the pump inlet shroud. A corresponding Run Dry message will be displayed on the LCD screen. The condition is rechecked every 20 minutes and the LCD message remains latched. If the condition is satisfied, the pump is allowed to cycle normally and the Trouble LED will go out, but the LCD message remains latched. The LCD message will remain latched until the panel is reset. If the condition is not satisfied after 3 consecutive attempts, the visual alarm will be activated until the panel is reset or until there is one cycle of normal operation. If a high level condition is presented at any time, a pump run cycle will be activated.
- High System Pressure Protection – A 20-minute lockout cycle will prevent the motor from operating and will illuminate the Trouble LED when the pressure in the discharge line is atypically high (closed valve or abnormal line plug). A corresponding Overpressure message will be displayed on the LCD screen. The condition is rechecked every 20 minutes. If the condition is satisfied, the pump is allowed to cycle normally and the Trouble LED will turn off, but the LCD message remains latched. The LCD message will remain latched until the panel is reset. If the condition is not satisfied after 3 consecutive attempts, the pump is locked out indefinitely and the audible and visual alarm will be activated. The LCD message and alarms will remain latched until the condition is removed and the panel is reset.

In all of the above cases, if more than one error condition is presented, the LCD message depicting the most recent error condition will be displayed.

#### PROTECT PLUS FEATURES:

- High/Low Voltage monitoring with Trouble indication
- High/Low Wattage (wattage is used instead of current because it is a better indicator of pump performance) monitoring with Trouble indication
- Extended Run Time monitoring with Trouble indication
- Cycle/Event Counter
- Run Time Counter (Hour Meter)
- Run Time Limit — time adjustable, user-selected options: 10 minutes (default) to 120 minutes in 1-minute intervals
- Power-up Delay — time adjustable, user-selected options: None (default), to 300 minutes in 1-minute intervals
- Alarm Delay — time adjustable, user-selected options: zero to 10 minutes in 30-second increments; 4 minutes is default
- System self-test diagnostic
- User-selectable Alarm latch
- User-selectable Protect Mode disable
- User-selectable buzzer timer

Specific Duplex Protect PLUS indicators and programming features shall include:

- Ready LED to indicate AC power to the station is satisfactory
- Pump Run LED to indicate pump is operating (LCD indicates which pump is running)

- Trouble LED indicator and predictive Visual Alarm notification (“blinking” alarm lamp; clears on Normal cycle)
- High Level Alarm LED indicator (LCD indicates which pump is in alarm)
- Manual Run switch to manually activate pumps
- Lead/Lag indication (LCD indicates which pump is lead)
- Menu-driven programmable controller with navigation overlay-type buttons (Enter, Scroll, Up, Down)
- Normal Operation LED and Mode button for Mode status
- Pump Performance menu LED with LCD display of the following pump performance statistics:
  - Real-time Voltage
  - Real-time Amperage
  - Real-time Wattage
  - Minimum/Maximum/Average Voltage
  - Minimum/Maximum/Average Amperage
  - Minimum/Maximum/Average Wattage
  - Minimum/Maximum Run-time
  - Average Run-time
  - Last Run-time
  - Cycle/Event Counter
  - Run Time Counter (Hour Meter)
- Diagnostics Menu LED
- Initialize System Menu LED
- Run Limit Menu LED
- Alarm Delay Menu LED
- Power Delay Menu LED
- Pump alternating options (no alternation, adjustable time based and test)
- Pump alternating time options — 24 hours to 72 hours in 12-hour increments

(Optional) Generator Receptacle and Auto Transfer – The alarm panel shall include a 20 amp, 250 VAC generator receptacle with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a NEMA 4X rating. An automatic transfer switch shall be provided, which automatically switches from AC power to generator power. Power shall be provided to the alarm panel through the generator receptacle whenever power is present at the receptacle, allowing the audible and visual alarms to function normally in generator mode. When power is no longer applied to the generator receptacle, the panel is automatically switched back to the AC Mains power. (No manual switching within the panel enclosure is necessary to switch from generator power back to AC Mains, so the mode cannot be inadvertently left in the generator position after pumping down the station in generator mode as is the case with a manual transfer switch).

(Optional) Service Equipment/Main Service Disconnect Breaker – A separate, internal breaker that is rated and approved for use as “service equipment” and acts as a main service disconnect of the grinder pump station shall be provided.

(Optional) Remote Sentry Indoor Alarm Module – A separate, remote indoor alarm module shall be provided to indicate a high level alarm with or without AC power to the grinder pump station. The Remote Sentry indoor alarm module shall have an internal power source enabling its continued operation without AC power. The Remote Sentry shall have an audible alarm and a visual alarm, both of which shall automatically reset if the high level alarm condition is eliminated. The Remote Sentry indoor alarm module shall include a Silence button for the audible alarm and a Test button.

(Optional) External Autodialer –

- : Four separate voice message alarm zones
- : Calls up to 8 telephones, cell phones or pagers

- : Built-in line seizure
- : Remote Turn Off feature allows termination of activated channel
- : EEPROM Memory retains program despite power loss
- : Listen-in verification and communication
- : Universal dial tone
- : Built-in auxiliary output to drive external siren, strobe or relay
- : Five optional settings for notifications of a power loss occurrence — instantaneous, 15 minutes, 2 hours, 12 hours or 24 hours
- : One channel for power-loss sensing, three hardwired channels for additional input
- : Dialer senses loss of power and based on setting; will notify parties of loss condition only when specified time has elapsed
- : If power restores before set time has elapsed, no call will be made
- : Package includes battery backup and transformer

2.13 SERVICEABILITY: The grinder pump core, including level sensor assembly, shall have two lifting hooks complete with lift-out harness connected to its top housing to facilitate easy core removal when necessary. The level sensor assembly must be easily removed from the pump assembly for service or replacement. All mechanical and electrical connections must provide easy disconnect capability for core unit removal and installation. Each EQD half must include a water-tight cover to protect the internal electrical pins while the EQD is unplugged. A pump push-to-run feature will be provided for field trouble shooting. The push-to-run feature must operate the pump even if the level sensor assembly has been removed from the pump assembly. All motor control components shall be mounted on a readily replaceable bracket for ease of field service.

2.14 OSHA CONFINED SPACE: All maintenance tasks for the grinder pump station must be possible without entry into the grinder pump station (as per OSHA 1910.146, permit-required confined spaces). “Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant’s body breaks the plane of an opening into the space.”

2.15 SAFETY: The grinder pump shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled and wired grinder pump station shall be listed by Underwriters Laboratories, Inc. to be safe and appropriate for the intended use. UL listing of components of the station, or third-party testing to UL standard are not acceptable.

The grinder pump shall meet accepted standards for plumbing equipment for use in or near residences, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the seal of NSF International. Third-party testing to NSF standard is not acceptable.

### **Special Requirements:**

The Contractor's attention is directed to the following special requirements:

#### **A. Service Connection**

1. Connections to the new service pump shall be made using flexible couplings. All flexible couplings shall conform to ASTM C425. Joint deflection limits and lateral connections shall meet the maximums indicated in ASTM C12 and C425.
2. The slope of the new laterals toward the newly installed service pump shall be at a minimum slope of two percent (2%) or as specified by the Utility Owner is required.

3. Connection of new service to the existing manhole shall be made by coring through the existing Utility Owner's manhole and installing proper drop connection as detailed in the plan set.

## B. Restoration

### 1. Restoration of Manholes

- a. The Contractor shall restore all manholes and associated surface areas to their original condition or as required by the Utility Owner and specified in the description of work.
- b. The newly installed pipe shall be restrained and sealed at the manhole in accordance with the manufacturers recommended procedures and with a material approved by the Utility Owner.
- c. Restoration of the bottom of the Manhole shall be done as follows:
  - i. For restorations less than or equal to three inches grout shall be used. The grout design mix shall meet or exceed 500 psi (3,447 kPa) compressive strength at 28 days.
  - ii. The Contractor may, with the approval of the Utility Owner, incorporate grout additives to improve flow properties, provided that the minimum compressive strength requirements are met.
  - iii. For restorations greater than three inches concrete shall be used. Concrete shall be as specified in the Contract Documents.

### Construction Methods:

Perform the excavation and backfill for sanitary sewer pipe and connections in accordance with the applicable requirements of Section 207 including backfill requirements of Section 207.03.D. Backfill using Borrow, Type C or existing Material meeting Borrow, Type C the entire depth of trench up to the bottom of patching Materials under existing and proposed roadways and shoulders. In areas, outside of the roadway or proposed roadway including shoulders, place Borrow, Type C Material at least one foot above the top of the sewer line. Excavated Material may be used for backfill above the Borrow, Type C in areas outside of roadway and shoulders provided that the excavated Material is dry and free of organic material.

Lengths of pipes shown in the Contract Documents are estimated only. The Contractor is responsible to layout the tie-in areas in the field and fabricate the bends and pipe lengths required to properly tie-in to other pipes, fittings and/or manholes as required and approved by the Engineer.

If there is a conflict between the Delaware Standard Specifications (including these Special Provisions) and the Specifications of the Utility Owner, the latter will prevail. The Contractor is advised to obtain and be fully acquainted with the applicable specifications of the Utility Owner. The pipe shall be installed at the locations and to the lines, grades, and dimensions shown on the Plans or as directed by the Engineer.

All pipes shall be thoroughly cleaned before they are laid and shall be kept clean until the completed work is accepted.

No pipe shall be laid upon a foundation into which frost has penetrated nor at any time when the Engineer shall deem that there is danger of the formation of ice or the penetration of frost at the bottom of the excavation, unless the minimum length of open trench and promptness of backfilling are observed.

Sheeting and bracing required for trenches shall be removed to the elevation of the conduit, but no sheeting will be allowed to be pulled, removed, or disturbed below the conduit. Sheeting and bracing shall meet OSHA requirements.

Before lowering into the trench, the pipe shall be inspected for defects. All cracked, chipped, or broken pipe shall be discarded. The ends and interior of the pipe shall be clean. Belled ends shall be laid upgrade. Handling of the pipe shall be accomplished in a manner that will not damage the pipe. The joint shall be made in the manner recommended by the manufacturer. Care shall be taken not to buckle or disturb previously laid pipe.

Pipe shall be laid accurately to the staked line and grade. All service connections shall be installed as

indicated on the Drawings right-of-way. Where existing service sewers are to be connected, suitable fittings and adapters shall be provided by the Contractor.

Pipe shall be cleaned of all foreign matter, and water shall be kept out of trenches until joints have been completed. When work is not in progress, open ends of pipe and fittings shall be securely closed to keep foreign matter and animals from entering.

Each joint shall be inspected to ensure that it is properly made before backfilling is done. Care shall be taken to prevent any dirt or foreign matter from entering the open end of the pipe. Where it is necessary to cut pipe, such cuts shall be neatly made in an approved manner. The laid pipe shall be true to line and grade and, when completed, the sewer shall have a smooth and uniform invert. No section of gravity sewer, including service connections shall have an adverse grade which would pond water in the invert or any other portion of the sewer.

Prior to constructing the tie-ins under this Section, coordinate with the Owner and, if required by the Owner, be prepared with tanker trucks and pumps to handle any excess flow during the transition. The Owner must be satisfied with the Equipment and tanker trucks provided on site before allowing the actual tie-in. Pump all excess flow into the tankers and properly dispose of the excess flow at an approved location.

Connections to existing sewer mains, service connections, and manholes shall be made in such a manner so as to not damage the existing facility. Such connections shall be made so that no projections or rough surfaces occur within the pipe.

Locations of the sewer laterals are approximate and may be changed by the Engineer. Relocating of the sewer lateral will not add extra cost to the State or New Castle County, unless either of the following conditions result:

1. The relocation results in an increase in the length of the lateral; or,
2. A change in construction methods is required from the change in lateral location

If the Contractor believes that the work at the new location(s) will result in a substantive change, the Contractor shall notify the Engineer prior to beginning the changed work. The Engineer will evaluate the request and if the relocation is warranted, the change in work shall be authorized.

Lateral connections to existing sewer mains shall not obstruct flow.

Pressure piping shall be installed with a minimum of forty-two inches of cover. Contractor shall install the PVC pressure pipe in accordance with ASTM D2774-12, "Standard Practice for Underground Installation of Thermoplastic Pressure Pipe", the Contract Documents or as directed by the engineer.

Concrete thrust blocks or anchors shall be provided on all buried lines at bends, tees, capped or valved ends, fittings, and as directed by the Engineer. Blocks or anchors shall be poured against undisturbed earth and shall be in accordance with these contract documents.

Place pipeline detectable wire along the full length of the installed pipe, including encased road crossings. Remove the insulation at the splices so a metal to metal connection is made. Place the wire in the bottom of the trench prior to any backfilling such that it and the forcemain are separated by no more than 3 inches. Bring the wire up to the surface of the ground at the beginning and termination of the pipe, and inside any valve box, manhole, or any other appropriate location, or as directed by the Engineer. Place pipeline detectable tape between 18 and 24 inches above the force main. At no time shall detectable tape be placed at a depth of less than 6 inches.

Place and connect air and/or vacuum release valves, and cleanouts in pre-cast concrete manholes of the size and location shown on the Contract Drawings, and with appurtenances depicted.

For precast cleanout manholes, set cones or flattops as determined by the depth of the manhole, so that no more than 12 inches of reinforced concrete adjusting rings are required to adjust the top of the manhole casting to grade. Provide a soil-tight seal between the precast manhole and adjusting ring, and each adjoining adjusting ring, and between the adjusting ring and casting by the use of two (2) rows of 1/2 inch extrudable preformed gasket material or trowelable grade butyl rubber or an approved equal. After butyl rubber is applied to exterior of adjustment rings, install exterior chimney seal if specified.

Set manhole frame on 1/2 inch extrudable preformed gasket material or trowelable grade butyl rubber or an approved equal. In paved areas, match top of casting with finished grade; in unpaved/grassy areas, install casting so that the top extends at least six inches above finished grade, and grade surface to provide positive surface drainage away from manhole. Install manhole steps with non-shrink mortar or epoxy grout.

Acceptance Testing:

A. Quality Assurance:

The Contractor is solely responsible for quality assurance during the length of the project. The contractor is responsible for any costs associated with corrective measures required to replace or repair items not meeting the quality standards specified by the Utility Owner or Engineer.

B. Submittals:

The Contractor shall submit the following items for review and approval by the Utility Owner or Engineer in accordance with the Contract Documents. Approval of the submittals by the Utility Owner or Engineer shall be obtained prior to ordering pipe materials and/or the start of the pipe replacement process.

1. Detailed construction procedures, and layout plans to include sequence of construction.
2. Sewer bypass plans, methods and list of equipment to be utilized.
3. Description of the method to remove and dispose of the host pipe, if required.
4. The safety plan in conformance with the Contract Documents and OSHA regulations.
5. Traffic control plans.
6. Project schedule.

A. Material Testing:

1. The Contractor shall notify the Utility Owner and Engineer at the completion of each segment.
2. The Utility Owner or Engineer may, at its option, conduct an inspection of the new pipe to determine the condition of the pipe.
3. Defects, which in the opinion of the Utility Owner or Engineer affect the integrity of strength of the pipe, shall be repaired or replaced by the Contractor at no additional cost to the Utility Owner.

B. Locating Utilities:

1. The Utility Owner or as shown on the drawings shall provide the Contractor with available information relating to the location of utilities adjacent to the pipe to be replaced. The Contractor shall, prior to starting work, verify the location of all adjacent utilities. The minimum clearance from other utilities shall be approximately 18-inches. The Utility Owner may at its discretion reduce the minimum clearance.
2. The Contractor shall expose all interfering and crossing utilities by spot excavating at the intersection of the pipe and removing the soil from around the utility. The cost of exposing these utilities shall be borne by the Contractor.

A. Emergency Repairs to Damaged Utilities:

1. Known or Field Located Utilities - In the event that the Contractor or his Subcontractor during the execution of the work breaks any known or field located pressure or gravity main causing the disruption of service and/or an eminent hazard, it shall be the responsibility of the Contractor/Subcontractor to immediately notify the Utility Owner at the designated emergency telephone number and immediately undertake measure to repair the damaged utility. To that effect, the Contractor/Subcontractor shall ascertain

- prior to initiating the work that the necessary repair parts, tools, equipment, and labor are on ready and available onsite to complete the repair work without delays. The Utility Owner personnel and Engineer shall witness the repair work.
2. If the Contractor/Subcontractor estimates or determines that he is not going to be able to restore service within a less than two-hour period, the Contractor shall immediately contact the Utility Owner's manager to initiate repair.
  3. The Utility Owner will undertake the repair work and will back charge the Contractor. The Utility Owner will submit an itemized bill within 30 calendar days from the occurrence of the event.
  4. Unknown or Inaccurately Located Utilities - If the utility was not field located or it was inaccurately located in accordance with the prescribed procedures under the One-Call guidelines and the Contractor/Subcontractor cause a line break during the execution of the work, the same notification procedure as above must be followed. The Utility Owner will undertake the repair work at no cost to the Contractor.

A. Field Testing:

1. After the existing pipe is completely replaced the Contractor and Utility Owner shall perform inspections of the pipe. The newly installed pipe shall be visibly free of defects, which may affect the integrity or strength of the pipe. If in the opinion of the Utility Owner such defects exist, the pipe shall be repaired or replaced at the Contractor's expense.
2. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness shall not be used and must be removed from the site.

A. Pressure Testing:

1. Sanitary sewer mains shall be air tested after all laterals, have been installed. The Contractor shall furnish all labor, materials, tools and equipment necessary to perform all tests as directed by, or under the direction of the Engineer/Utility Owner. The Contractor shall repair or replace all sections of sanitary sewer failing to meet testing requirements. The sanitary sewer shall be air tested holding 5 p.s.i. for 15 minutes with no allowable leakage. Sanitary force mains shall be air tested holding 50 p.s.i. for 5 minutes with no allowable leakage, or may be determined by Engineer.

B. CCTV Inspections:

1. The Contractor shall perform post installation internal television inspections of the installed gravity sanitary sewer. Each reach of sewer shall have audio description with appropriate stationing of services indicated. The data and stationing are to be on the video. All such inspections shall be performed by personnel trained in locating breaks, obstacles and service connections by closed circuit color television.
2. Post construction video tapes are to be submitted to the Engineer and Utility Owner for review prior to final payment. Should any portion of the inspection tapes be of inadequate quality or coverage, as determined by the Utility Owner, the Contractor will have that portion video-taped at no additional expense to the State or Utility Owner. All original video tapes remain property of the Utility Owner. The Contractor may, at the discretion of the Utility Owner retain second copy.

The Contractor shall not make connections to existing sanitary sewers until after the final inspection and tests have been approved. All material and labor required for tests shall be furnished by the Contractor and the cost thereof included in the prices bid for installing sanitary pipe.

## Sanitary Sewer Lift Station

1.01 Factory Test: Each grinder pump shall be submerged and operated for 1.5 minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge assembly and each unit's dedicated level controls and motor controls. All factory tests shall incorporate each of the above listed items. Actual appurtenances and controls which will be installed in the field shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps is not acceptable. Certified test results shall be available upon request showing the operation of each grinder pump at two different points on its curve. Additional validation tests include: integral level control performance, continuity to ground and acoustic tests of the rotating components. The Engineer reserves the right to inspect such testing procedures with representatives of the Owner, at the GRINDER PUMP Manufacturer's facility.

1.02 Certified Service Program: The grinder pump Manufacturer shall provide a program implemented by the Manufacturer's personnel as described in this specification to certify the service company as an authorized serviced center. As evidence of this, the Manufacturer shall provide, when requested, sufficient evidence that they have maintained their own service department for a minimum of 30 years and currently employ a minimum of five employees specifically in the service department.

As part of this program, the Manufacturer shall evaluate the service technicians as well as the service organization annually. The service company will be authorized by the Manufacturer to make independent warranty judgments. The areas covered by the program shall include, as a minimum:

1. Pump Population Information — The service company will maintain a detailed database for the grinder pumps in the territory that tracks serial numbers by address.
2. Inventory Management — The service company must maintain an appropriate level of inventory (pumps, tanks, panels, service parts, etc.) including regular inventory review and proper inventory labeling. Service technicians will also maintain appropriate parts inventory and spare core(s) on service vehicles.
3. Service Personnel Certification — Service technicians will maintain their level-specific certification annually. The certifications are given in field troubleshooting, repair, and training.
4. Service Documentation and Records — Start up sheets, service call records, and customer feedback will be recorded and available by the service company.
5. Shop Organization — The service company will keep its service shop organized and pumps will be tagged with site information at all times. The shop will have all required equipment, a test tank, and cleaning tools necessary to service pumps properly.

1.03 Delivery: All grinder pump units will be delivered to the job site 100 percent completely assembled, including testing, ready for installation. Field installation of the pump in tanks under 96 inches is not allowed. Field installation of the level sensor into the tank is not allowed. Grinder pump stations will be individually mounted on wooden pallets.

1.04 Installation: Earth excavation and backfill are specified under Site Work, but are also to be done as a part of the work under this section, including any necessary sheeting and bracing.

The Contractor shall be responsible for handling ground water to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding.

The grinder pump stations shall not be set into the excavation until the installation procedures and excavation have been approved by the Engineer.

Remove packing material. Users instructions MUST be given to the Owner. Hardware supplied with the unit, if required, will be used at installation. The basin will be supplied with a standard 4" inlet grommet (4.50" OD) for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.

Installation shall be accomplished so that 1" to 4" of accessway, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the excavated hole must be large enough to allow for the concrete anchor.

A 6" inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8" or more than 3/4" shall be used as bedding material under each unit.

A concrete anti-flotation collar, as detailed on the drawings, and sized according to the manufacturer's instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. Each grinder pump station with its pre-cast anti-flotation collar shall have a minimum of three lifting eyes for loading and unloading purposes.

If the concrete is poured in place, the unit shall be leveled, and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.

The Contractor will provide and install a 4-foot piece of 4-inch SCH 40 PVC pipe with water tight cap, to stub-out the inlet for the property owners' installation Contractor, as depicted on the contract drawings.

The electrical enclosure shall be furnished, installed and wired to the grinder pump station by the Contractor. An alarm device is required on every installation, there shall be No Exceptions. It will be the responsibility of the Contractor and the Engineer to coordinate with the individual property owner(s) to determine the optimum location for the Alarm Panel.

The Contractor shall mount the alarm device in a conspicuous location, as per national and local codes. The alarm panel will be connected to the grinder pump station by a length of 6-conductor type TC cable as shown on the contract drawings. The power and alarm circuits must be on separate power circuits. The grinder pump stations will be provided with 32', 25' of useable, electrical supply cable to connect the station to the alarm panel. This cable shall be supplied with A Factory Installed EQD half to connect to the mating EQD half on the core.

1.05 BACKFILL REQUIREMENTS: Proper backfill is essential to the long-term reliability of any underground structure. Several methods of backfill are available to produce favorable results with different native soil conditions. The most highly recommended method of backfilling is to surround the unit to grade using Class I or Class II backfill material as defined in ASTM 2321. Class 1A and Class 1B are recommended where frost heave is a concern, Class 1B is a better choice when the native soil is sand or if a high, fluctuating water table is expected. Class 1, angular crushed stone offers an added benefit in that it doesn't need to be compacted.

Class II, naturally rounded stone, may require more compactive effort, or tamping, to achieve the proper density. If the native soil condition consists of clean compactible soil, with less than 12 percent fines, free of ice, rocks, roots and organic material, it may be an acceptable backfill. Soil must be compacted in lifts not to exceed one foot to reach a final Proctor Density of between 85 percent and 90 percent. Heavy, non-compactible clays and silts are *not* suitable backfill for this or any underground structure such as inlet or discharge lines.

If you are unsure of the consistency of the native soil, it is recommended that a geotechnical evaluation of the material is obtained before specifying backfill.

Another option is the use of a flowable fill (i.e., low slump concrete). This is particularly attractive when installing grinder pump stations in augured holes where tight clearances make it difficult to assure

proper backfilling and compaction with dry materials. Flowable fills should not be dropped more than 4 feet from the discharge to the bottom of the hole to avoid separation of the constituent materials.

Backfill of clean native earth, free of rocks, roots, and foreign objects shall be thoroughly compacted in lifts not exceeding 12" to a final Proctor Density of not less than 85 percent. Improper backfilling may result in damaged accessways. The grinder pump station shall be installed at a minimum depth from grade to the top of the 1 1/4" discharge line, to assure maximum frost protection. The finish grade line shall be 1" to 4" below the bottom of the lid, and final grade shall slope away from the grinder pump station.

All restoration will be the responsibility of the Contractor. Per unit costs for this item shall be included in the Contractor's bid price for the individual grinder pump stations. The properties shall be restored to their original condition in all respects, including, but not limited to, curb and sidewalk replacement, landscaping, loaming and seeding, and restoration of the traveled ways, as directed by the Engineer.

1.06 Start-Up And Field Testing: The Manufacturer shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the Owner's personnel in the operation and maintenance of the equipment before the stations are accepted by the Owner.

All equipment and materials necessary to perform testing shall be the responsibility of the Installing Contractor. This includes, as a minimum, a portable generator and power cable (if temporary power is required), water in each basin (filled to a depth sufficient to verify the high level alarm is operating), and opening of all valves in the system. These steps shall be completed prior to the qualified factory trained technician(s) arrival on site.

The services of a trained factory-authorized technician shall be provided at a rate of 40 hours for every 100 grinder pump stations supplied.

Upon completion of the installation, the authorized factory technician(s) will perform the following test on each station:

1. Make certain the discharge shut-off valve in the station is fully open.
2. Turn ON the alarm power circuit and verify the alarm is functioning properly.
3. Turn ON the pump power circuit. Initiate the pump operation to verify automatic "on/off" controls are operative. The pump should immediately turn ON.
4. Consult the Manufacturer's Service Manual for detailed start-up procedures.

Upon completion of the start-up and testing, the Manufacturer shall submit to the Engineer the start-up authorization form describing the results of the tests performed for each grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed and any installation deficiencies corrected.

## 2.0 OPERATION AND MAINTENANCE

2.01 Spare Core: The Manufacturer will supply one spare grinder pump core for every 50 grinder pump stations installed, complete with all operational controls, level sensors, check valve, anti-siphon valve, pump/motor unit, and grinder.

2.02 Manuals: The Manufacturer shall supply four copies of Operation and Maintenance Manuals to the Owner, and one copy of the same to the Engineer.

### **Method of Measurement and Basis of Payment:**

Price and payment for sanitary sewer system Items, including adjustment of sanitary sewer laterals, includes

furnishing, transporting and installing the materials; the pumping station; testing of the sanitary sewer system; connecting to existing sanitary sewer systems and services; maintaining service as required; excavating; disposing of excess excavated material; backfilling; furnishing material for backfilling; furnishing and placing warning tape; furnishing and installing concrete thrust blocks, joint restraints, aggregate pipe bedding, sheeting and shoring, temporary support of existing Utilities, dewatering, furnishing and using tanker trucks for excess flow, disposing of excess flow at an approved location; abandoning existing pipes including filling such pipes with flowable fill, cutting and capping new or existing lines and for all labor, Equipment, tools and necessary incidentals to achieve and accept an operational sanitary sewer system.

All lump sum pay items will be prorated for each pay estimate. A percentage of the lump sum item will be paid, on a monthly basis, based upon the amount of work completed and accepted by the Engineer.

4/16/19

**763511 – MAINTENANCE BUILDINGS****Description:**

This bid item shall consist of furnishing and installing materials and constructing the hopper racks as indicated on the Contract Drawings. The work shall include the concrete footers and piers (including anchor bolts), steel columns, steel beams, wood trusses, roofing, gutters, downspouts, chains and/or winches and all else necessary to provide the hopper racks complete per the contract drawings. This contract may be awarded to multiple contractors. Work included as part of the buildings specification breakout pay items shall be as described below.

This open-end contract includes 1 known location (Middletown) with detailed drawings. This contract also calls for hopper racks at sites to be determined in 3 counties. The sites to be determined may include covered roofing. Cost proposal shall assume hopper rack bays and optional roofing are constructed in units of 5 or more bays at a time. All bid breakout items shall include the concrete footers and piers (including anchor bolts), steel columns, steel beams, chains/winches, and all miscellaneous items necessary to install the hopper racks complete without a roof for the amount of bays required for each site.

Location number 1 (Middletown) shall include all labor, materials, and equipment necessary to furnish and provide the 12 bay hopper racks for 6 wheeled vehicles and 6 bay hopper racks for 10 wheeled vehicles. Middletown hopper racks will utilize chains. These hopper racks shall be furnished with the roof system (trusses, sheathing, asphalt shingles, gutters, and downspouts). Include all earthwork, select fill, seeding and mulching, and grading necessary to bring the subgrade to the proper grade under stone/pavement areas, or to final grade when not under impervious surface. The scope shall include all work identified in Middletown Location 1 plans.

New Castle County shall include all labor, materials, and equipment necessary to furnish and provide an estimated 30 bay hopper racks for 6 wheeled vehicles and 20 bay hopper racks for 10 wheeled vehicles. Optional roof system (trusses, sheathing, asphalt shingles, gutters, and downspouts) pricing shall be provided. Earthwork, saw-cutting, any pavement repair necessary to install the racks to be evaluated at each location.

Kent County shall include all labor, materials, and equipment necessary to furnish and provide an estimated 15 bay hopper racks for 6 wheeled vehicles and 10 bay hopper racks for 10 wheeled vehicles. Optional roof system (trusses, sheathing, asphalt shingles, gutters, and downspouts) pricing shall be provided. Earthwork, saw-cutting, any pavement repair necessary to install the racks to be evaluated at each location.

Sussex County shall include all labor, materials, and equipment necessary to furnish and provide an estimated 10 bay hopper racks for 6 wheeled vehicles and 15 bay hopper racks for 10 wheeled vehicles. Optional roof system (trusses, sheathing, asphalt shingles, gutters, and downspouts) pricing shall be provided. Earthwork, saw-cutting, any pavement repair necessary to install the racks to be evaluated at each location.

In addition, a unit price to add-on an extra hopper rack bay is requested for the possible event where 1 or more bays are added to an existing rack. This will require 1 less side and 2 less support beams. A unit price will be requested for each county.

**Materials and Construction Methods:**

All materials and construction shall conform to the requirements of the Contract Drawings, DelDOT Standard Specifications and the technical specifications included as part of Appendix A.

**Method of Measurement:**

Payment for this item will be made on a lump sum basis wherein no measurement will be made.

**Basis of Payment:**

Payment will be made at the Lump Sum price bid for this item. The price bid shall include the cost for performing the work specified and furnishing all labor, materials, tools, equipment and incidentals necessary to provide a complete, working and usable facility acceptable to the Engineer.

**Note:**

The breakout sheet attached to the proposal shows the proposed Bays for this Contract. The Contractor shall fill in a price per each bid item number. The lump sum price bid for item 763511 – Maintenance Buildings shall be the sum of the total cost for all bid item number listed.

The Department reserves the right to delete from the Contract. The lump sum to be paid will be adjusted in accordance with the Contractor's unit prices as required above. There will be no extra compensation to the Contractor if such additions and/or deletion are made

10/10/17

## 763511 – MAINTENANCE BUILDINGS

### **Description:**

This work consists of the construction of a new Crew Operations Building at the Chapman Maintenance Yard site as indicated in the Contract Drawings and in accordance with North District Maintenance Yard – Phase 1 Site Design Appendix A – Technical Specifications.

### **Materials and Construction:**

All materials and construction shall conform to the requirements of the Contract Drawings and in accordance with North District Maintenance Yard – Phase 1 Site Design Appendix A – Technical Specifications.

### **Pre-Bid Meeting:**

Pre-Bid Meeting(s) are not mandatory for this contract. The meeting information is provided on the first page of this contract (page i). The bidder's representatives who do attend must sign-in and identify the name of the bidder they represent.

### **Method of Measurement:**

Payment for this item will be made based upon an agreed upon Schedule of Values.

### **Bases of Payment:**

Payment will be made based upon an agreed upon Schedule of Values. The price bid shall include the cost for performing the work specified and furnishing all labor, materials, tools, equipment and incidentals necessary to provide a complete, working and usable facility acceptable to the engineer.

**911500 - PLANTINGS, TUBELINGS****Description:**

This work shall consist of furnishing and installation of tubelings of the species specified and at locations as shown on the Contract Documents.

Tubelings shall be installed from March 1 to May 15 or from September 1 to November 30. Installation of live materials outside of this planting window may only occur during the dormancy season at the approval of the engineer.

**Materials:**

Tubelings shall consist of grown cuttings of *Cornus amomum* (Silky Dogwood) and *Viburnum dentatum* (Southern Arrow-wood). Materials shall be purchased from a nursery specializing in the production of similar materials and shall include confirmation of species. Each tubeling shall have a minimum root volume of 6 to 10 cubic inches.

**Construction:**

**Handling.** Tubelings shall be transported in climate-controlled conditions to ensure against temperatures greater than 50°F. Tubelings stored on site shall be kept moist, shaded, and protected against desiccation. Materials stored offsite shall be refrigerated and kept moist. In no case shall non-refrigerated materials be stored longer than five (5) calendar days.

During installation, tubelings shall be kept damp by heeling into moist mulch until ready for use. Cuttings shall be inspected for signs of desiccation, including but not limited to blackening of cut ends and lengthwise wrinkling of bark, and all unsuitable materials shall be appropriately discarded.

**Installation.** Tubelings shall be installed by alternating between the two species, in rows along the channel banks as shown in the Contract Documents. Tubelings shall be installed in one row along channel banks with coir blanket/mat encapsulated soil over furnished cascade material, and three rows along channel banks with a floodplain terrace as shown in the construction plan details. All tubelings shall be placed at a spacing of 1.5 feet on center. On banks with three rows, the row closest to the channel thalweg shall be planted at the top of the low bank in the soil adjacent to the cascade material. The second row shall be planted along the outside edge of the floodplain terrace (toe of slope). The third row shall be placed 1 vertical foot from the second row in a staggered pattern to the second row. With the approval of the Engineer, the Contractor shall achieve the specified spacing by preparing holes using a pointed digging bar, rebar, or other similar implements to achieve both the 6-10 inches of depth as well as the diameter required for each cutting. Tubelings shall be installed vertically into the bank with the root crown level with existing ground or slightly higher. The Contractor shall firmly backfill by hand, all voids surrounding all tubelings, hand tamping the soil tightly against each cutting without damaging the roots or plant. Tubelings shall be watered the equivalent of a 3 inch diameter container at 0.15 gallon per event.

**Method of Measurement:**

Tubelings shall be measured per each live tubeling planted.

**Basis of Payment:**

Tubelings will be paid for at the Contract unit price per each live tubeling installed. The payment will be full compensation for furnishing, transporting, storing, watering, and planting, and for all material, labor, equipment, tools, and incidentals necessary to complete this work.

6/20/17

DELAWARE DEPARTMENT OF TRANSPORTATION  
 SCHEDULE OF ITEMS

PAGE: 3  
 DATE:

CONTRACT ID: T201880103.01 PROJECT(S): T201880103

All figures must be typewritten.

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0200	601053 REINFORCED CONCRETE PIPE, 15", CLASS V	53.000 LF				
0210	601140 REINFORCED CONCRETE FLARED END SECTION, 12"	2.000 EACH				
0220	601141 REINFORCED CONCRETE FLARED END SECTION, 15"	3.000 EACH				
0230	601142 REINFORCED CONCRETE FLARED END SECTION, 18"	1.000 EACH				
0240	601191 PVC PIPE, 6"	248.000 LF				
0250	602003 DRAINAGE INLET, 34" X 24"	6.000 EACH				
0260	602030 MANHOLE, 48" X 30"	3.000 EACH				
0270	602130 ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	1.000 EACH				
0280	610009 PORTLAND CEMENT CONCRETE MASONRY, CLASS B	15.000 CY				
0290	701013 PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	353.000 LF				

DELAWARE DEPARTMENT OF TRANSPORTATION  
 SCHEDULE OF ITEMS

PAGE: 4  
 DATE:

CONTRACT ID: T201880103.01 PROJECT(S): T201880103

All figures must be typewritten.

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0300	701505 PORTLAND CEMENT CONCRETE PARKING BUMPER	EACH 30.000				
0310	705001 PORTLAND CEMENT CONCRETE SIDEWALK, 4"	SF 1620.000				
0320	705002 PORTLAND CEMENT CONCRETE SIDEWALK, 6"	SF 277.000				
0330	705007 SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	SF 20.000				
0340	707001 RIPRAP, R-4	SY 45.000				
0350	707010 RIPRAP, R-4	CY 12.000				
0360	708002 GEOTEXTILES, SEPARATION	SY 57.000				
0370	708003 GEOTEXTILES, RIPRAP	SY 45.000				
0380	710500 INSTALLATION OF WATERMAIN AND ACCESSORIES	LUMP	LUMP			
0390	711501 SANITARY SEWER SYSTEM	LUMP	LUMP			
0400	720556 BOLLARD	EACH 2.000				

DELAWARE DEPARTMENT OF TRANSPORTATION  
 SCHEDULE OF ITEMS

PAGE: 8  
 DATE:

CONTRACT ID: T201880103.01 PROJECT(S): T201880103

All figures must be typewritten.

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0710	910010 BIORETENTION AREA	CY 757.000				
0720	910011 BIOSOIL MIX	CY 186.000				
0730	911000 PLANTINGS	LUMP	LUMP			
0740	911502 DECORATIVE STONE MULCH	SY 189.000				
	SECTION 0001 TOTAL					
	TOTAL BID					

CONTRACTOR \_\_\_\_\_

<b>BREAKOUT SHEET - 1</b>						<b>CONTRACT NO. T201880103.01</b>	
<b>Item 763511 – MAINTENANCE BUILDING</b>							
ITEM NO.	APPROX QTY.	UOM	DESCRIPTION	UNIT PRICE	AMOUNT		
1	1	LS	DIVISION 03 - CONCRETE	\$	\$		
2	1	LS	DIVISION 05 - METALS	\$	\$		
3	1	LS	DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES	\$	\$		
4	1	LS	DIVISION 07 - THERMAL AND MOISTURE PROTECTION	\$	\$		
5	1	LS	DIVISION 08 - OPENINGS	\$	\$		
6	1	LS	DIVISION 09 - FINISHES	\$	\$		
7	1	LS	DIVISION 10 - SPECIALTIES	\$	\$		
<del>8</del>	<del>1</del>	<del>LS</del>	<del>DIVISION 12 – FURNISHINGS</del>	<del>\$</del>	<del>\$</del>		
9	1	LS	DIVISION 22 - PLUMBING	\$	\$		
10	1	LS	DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING	\$	\$		
11	1	LS	DIVISION 26 - ELECTRICAL	\$	\$		
<del>12</del>	<del>1</del>	<del>LS</del>	<del>DIVISION 27 – COMMUNICATIONS</del>	<del>\$</del>	<del>\$</del>		
13	1	LS	DIVISION 28 - ELECTRONIC SAFETY AND SECURITY	\$	\$		
<p><b>TOTAL ITEM 763511 – MAINTENANCE BUILDING \$ _____</b></p> <p><b>(LUMP SUM BID PRICE FOR ITEM 763511 – MAINTENANCE BUILDING)</b></p>							