

PUMP STATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
1. Demolition, excavation and backfilling required for the complete construction of a replacement recessed wet well sanitary sewer pump station.

1.02 GENERAL

- A. The Town's pressure sewer system has been standardized on the basis of factory built pumping stations of similar quality to those manufactured by Smith & Lovelless Inc. of Lenexa, Kansas or Pumping Systems Inc. of East Weymouth, Massachusetts.
B. The design of all pumping stations must be reviewed and approved by the Town Wastewater Department prior to construction.
C. Multiple pumps or ejector units shall be provided with each raw wastewater pumping station.

1.03 SUBMITTALS

- A. Shop drawings shall be submitted to the Engineer for approval prior to any equipment being delivered to the site. Shop drawings shall include all structural, mechanical and electrical components with detailed dimensions and specifications.

- B. Two complete operation and maintenance manuals shall be provided prior to final acceptance of the pump station by the Engineer.

1.04 QUALITY ASSURANCE

- A. All materials and construction of same shall be as shown on the contract drawings and shall meet the requirements of the Town Sewer Department.
B. The recessed wet well mounted pump station shall be supplied complete by an experienced pump station manufacturer.
C. All applicable regulations of the Occupational Health and Safety Administration should be followed when assembling, installing, or servicing this pump station.

1.05 REFERENCES

- A. The Standard Specifications shall refer to the Vermont Agency of Transportation Standard Specifications for Construction (1990 Edition).

1.06 WARRANTY

- A. The pump station manufacturer will take full responsibility for startup and operator training. The pump station manufacturer will warrant the station as a unit against defects in material and workmanship for one year from the date of startup.

PART 2 - PRODUCTS 2.01 GENERAL

- A. The Contractor shall provide all fittings, couplings and appurtenances to provide a complete and operable system.

2.02 WET WELLS

- A. A reinforced concrete foundation shall be provided for the wet well and pump chamber, designed by a structural engineer licensed in the State of Vermont.
B. The foundation and structure shall be designed to prevent flotation of the dry well and wet well under worst case conditions.
C. The effective volume of the wet well shall be established such that the filling time shall not exceed 30 minutes under design average flow conditions.
D. Suitable and safe means of access for persons wearing self-contained breathing apparatus shall be provided to both the dry well and to the wet well.

2.03 DRY PIT/RECESSED PUMPING STATION

- A. The station may be prefabricated and factory-built or built on the site. The foundation and structure shall be designed to prevent flotation of the dry well and wet well under worst case conditions.
B. As a minimum, the station shall include two vertical dry-pit submersible, non-clog sewage pumps, 3 phase motors (for pump motors over 5 HP in size), valves, internal piping, control panel with circuit breakers, variable frequency drives and automatic level controls, lighting, sump pump, ventilator, dehumidifier, heater with adjustable thermostat, wiring, elapsed time meters for each pump and a remote alarm system tied into the Town's radio telemetry system.
C. A dehumidifier assembly with a hermetically sealed Freon compressor, expansion coil, fan, and condenser coil shall be furnished which shall maintain the relative humidity of the air in the pump chamber low enough to prevent condensation on the walls.

- D. The station shall be provided with a 36" wide x 6'-10" insulated metal door hinged at one side to provide access to the equipment chamber.
E. A heavy synthetic rubber mat shall be cemented to the station floor in the walkway area after the final coat of paint has been applied.
F. Light fixture(s) shall be installed in the pump chamber to provide adequate illumination for the control panel and other areas.
G. Lifting points shall be installed for lifting pumps directly above each pump.
H. A ventilating blower shall provide air circulation to the floor of the pump chamber.
I. Fresh air to the pump chamber shall be drawn from the surface.
J. The heater will be provided with an automatic circulating fan, thermostatic control and an ON-OFF switch.
K. A mercury float switch shall not be used.

1. DRY PIT

- i. Dry wells, including the associated superstructure, shall be completely separated from the wet well.
ii. The station shall be prefabricated and factory-built in one complete assembly.
iii. Two 17-pound magnesium anodes shall be provided as cathodic protection and shall include 30" long insulated copper leads.

2. RECESSED UNIT

- i. The equipment chamber shall be provided with a split fiberglass cover hinged at the partition wall separating the equipment chamber from the access man way to the wet well.
ii. The station shall be prefabricated and factory-built in one complete assembly.
iii. Two 17-pound magnesium anodes shall be provided as cathodic protection and shall include 30" long insulated copper leads.

2.04 SEWAGE PUMPS

- A. The sewage pumps shall be designed such that, with any one pump out of service, the remaining unit(s) will have capacity to handle the design peak hourly flow.
B. Each pump shall be of heavy cast iron construction.
C. The pump shall be designed such that the rotating element can be easily removed from the volute, without disconnecting the seal system.

1. Vacuum primed/self primed

- i. A separate and independent priming system shall be furnished for each main pump, providing complete standby operation.
ii. Vacuum pumps shall be constructed of corrosion resistant components and shall be capable of priming the main pump and suction piping in not greater than 60 seconds under rated static lift conditions.
iii. Unless self-priming sewage pumps are specified, multiple vacuum priming pumps shall be provided.

2.05 INTERIOR PIPING AND VALVES

- A. Pump suction and discharge piping shall be drilled and tapped for 125 pound American Standard flanges.
B. Pump suction lines protruding through the equipment chamber wall shall be sealed with multiple link seals or welded to create a gas-tight seal.
C. A dehumidifier assembly with a hermetically sealed Freon compressor, expansion coil, fan, and condenser coil shall be furnished which shall maintain the relative humidity of the air in the pump chamber low enough to prevent condensation on the walls.

2.06 EMERGENCY STORAGE AND PUMPING REQUIREMENTS

- A. All wastewater pumping stations shall include provision for emergency power to prevent flooding in the event of a power outage.
B. Emergency storage tanks shall have at least one manhole access to grade with aluminum or copolymer plastic ladder rungs at 8" on center.
C. The emergency storage system shall be free-draining toward the wet well with the fill/drain pipe invert elevation above the high water alarm level.
D. An emergency pumping connection shall be made to allow maintenance personnel to pump into the force main with a portable pump in the event of an emergency.

2.07 ELECTRICAL

- A. Variable Frequency Drives shall be used for all pumps.
B. Electrical systems and components (i.e. motors, lights, conduits, switch boxes, control circuits, etc.) shall not be installed in raw sewage wet wells.
C. All wiring shall meet the requirements of the National Electric Code and shall be color-coded as indicated on the wiring diagram.
D. The package pump station shall be completely pre-wired at the factory.
E. All material and equipment necessary for a complete and workable electrical system shall be furnished and installed including: conduit and fittings, wire and cable, service panel, grounding, alarm system, connections to pump station, power company connection fees, telephone service fees.
F. All materials and equipment shall meet the standards of the National Electrical Manufacturers' Association and Underwriters Laboratories, Inc.

2.08 CONTROLS

- A. Pumping sequence shall be arranged in an alternating lead/lag configuration.
B. A high level alarm condition shall occur if liquid level rises above the predetermined alarm level.
C. All circuit breakers, pump control switches shall be mounted so that they are operable without opening the cabinet.
D. An auxiliary control panel shall be provided immediately adjacent to the access door in the dry well and shall contain: pump control switches for each pump, runtime meters, and pump run lights.
E. All pump motors shall be provided with VFD control and a VFD bypass switch.

- G. A running time meter shall be supplied for each pump to record the hours of operation.
H. An automated generator start, alarm and transfer switch adequate for normal operation of the pump station.
I. All pump stations shall be equipped with a back-up control system in the event of a primary control failure.
L. The following secondary devices shall be considered acceptable for back-up control of the pumps and for activating alarms based on sewage level in the wet well:
1. Ultrasonic level sensors (Badger Meter Model 2100 or equal).
J. Submersible level transducers (Consolidated Electric Model 157SGC or equal).
K. Direct acting non-mercury float switches (Consolidated Electric Model 9G or equal).

2.09 RADIO TELEMETRY SYSTEM

- A. Each pump station shall be equipped with a radio telemetry unit (RTU) that is capable of being integrated with the Wastewater Department's current system.
B. Electrical systems and components (i.e. motors, lights, conduits, switch boxes, control circuits, etc.) shall not be installed in raw sewage wet wells.

2.10 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

- A. All Town owned pump stations shall be integrated into the Wastewater Department's SCADA system.
B. Two (2) spare volute gaskets shall be provided.

2.11 SPARE PARTS

- A. A complete replacement pump shaft seal assembly shall be furnished with each lift station.
B. Two (2) spare volute gaskets shall be provided.
C. A spare filter cone for the seal filter shall be provided in the same container as the pump shaft seal.
D. Provide 100%% spare lamps and fuses for control panel.
E. Provide all lubricants required for initial operation.
F. Provide one (1) spare input and output card, processor, and power supply for the Programmable logic controller (PLC) system.
G. Provide one (1) spare level transducer.

2.12 O & M MANUALS

- A. Installation of all mechanical equipment shall be done in accordance with written instructions provided by the manufacturer.
B. The manufacturer shall provide 5 copies of a complete and detailed operating and maintenance manual.
C. Completed electric work performed shall comply with the latest edition of the National Electric Code Underwriters Laboratories regulations and all Municipal, State and other public or private authorities having jurisdiction.

PART 3 - EXECUTION

3.01 EXCAVATIONS

- A. Excavations shall be made to a point at least 6 inches below the existing structures to accommodate the new pump station.
B. Backfill shall consist of materials meeting the granular borrow requirements of the Backfill Section.

3.02 BACKFILL

- A. Backfill shall consist of materials meeting the granular borrow requirements of the Backfill Section.

3.03 FIELD TEST

- A. Upon completion of installation, the Contractor shall conduct a field test in the presence of the Engineer to demonstrate that the pumping units and all appurtenances are properly installed and deliver the specified flow/head requirements.

EXCAVATION AND BACKFILLING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

- 1. Trench, backfill, and compact as specified herein and as needed for installation of underground utilities and the pump station.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

1.03 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil Aggregate Mixtures using 5.5 pound rammer and 12 inch drop.

1.04 SUBMITTALS

- A. Testing laboratory reports indicating that material for backfill meets requirements of this Section.
B. Field density test reports of backfill in place.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Compacted Fill/Granular Borrow: Free of shale, clay, friable material, debris, and organic matter, graded in accordance with ANSI/ASTM C136 within the following limits:
Sieve Size Percent Passing
3/4 Inch 75 - 100
No. 4 20 - 100
No. 100 0 - 20
No. 200 0 - 6

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.03 PROCEDURES

- A. Existing Utilities:
1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to excavations.
2. When existing underground utilities, which are not scheduled for removal or abandonment, are encountered in the excavation, they shall be adequately supported and protected from damage.
3. If the service is interrupted as a result of work under this section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
4. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the Engineer and secure his instructions.
5. Do not proceed with permanent relocation of utilities until instructions are received from the Engineer.
B. Protection of persons and property:
1. Barricade open holes and depressions occurring as part of the work, and post warning lights or signs.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this section.

- C. Dewatering: The Contractor, at all times, shall conduct his operations so as to prevent the accumulation of water, ice, and snow in excavations or in the vicinity of excavated areas, and to prevent water from interfering with the progress of quality of the work.
D. Accumulated water, ice, and snow shall be promptly removed and disposed of by pumping or other approved means.

3.04 EXCAVATION

- A. Care shall be exercised by the Contractor to avoid disrupting the operation of existing facilities to remain in place.
B. Provide sheeting and shoring necessary for protection of the work and for the safety of personnel.
C. Excavation shall not interfere with normal 45° bearing splay of foundations.
D. All excavations shall be in accordance with the latest OSHA requirements.
E. Where utility runs traverse public property or are subject to governmental or utility company jurisdiction, provide depth backfilling cover, and other requirements as set forth by legally constituted authority having jurisdiction, but in no case less than the depth shown in the Contract Documents.
F. Where excavations occur in existing lawns, remove turf or plantings in sections and keep damp. Replace upon completion of the backfilling.

3.05 BACKFILLING

- A. Backfilling shall not be done in freezing weather, with frozen materials, or when materials already placed are frozen.
B. Backfill material shall be evenly spread and compacted in lifts not more than 12 inches thick or as approved by the Engineer.
C. Take special care that backfilling operations do not damage the pump station or pump station coatings.
D. Backfill material shall be compacted to the following percentages of maximum dry density and the in-place moisture content shall not be more than 2% above the optimum moisture content, as determined by Standard Proctor ASTM D698.
1. Around all structures, under roadway paving, shoulder and embankments - 95%.
2. All other areas - 90%.

SITE ENGINEER:



CIVIL ENGINEERING ASSOCIATES, INC.
10 MANSFIELD VIEW LANE, SOUTH BURLINGTON, VT 05403
802-864-2323 FAX: 802-864-2271 web: www.ces-vc.com

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DRAWN

SAL

CHECKED

DSM

APPROVED

DSM

OWNER:

HAYSTACK CROSSING, LLC
c/o JOSEPH BISSONETTE

68 RANDALL STREET
SOUTH BURLINGTON, VT 05403

APPLICANT:

BLACKROCK CONSTRUCTION, LLC

68 RANDALL STREET
SOUTH BURLINGTON, VT 05403

PROJECT:

HAYSTACK CROSSING

SHELburnE FALLS ROAD
VERMONT ROUTE 116
HINESBURG, VERMONT 05461

Table with 3 columns: DATE, CHECKED, REVISION. Contains revision history for the drawing.

PUMP STATION SPECIFICATIONS

DATE: OCT. 4, 2019
SCALE: AS SHOWN
PROJ. NO.: 13127
DRAWING NUMBER: C9.9