

Standard Specifications for On-Site Step Systems

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Section A - Introduction and General Description

A 1. General

This specification describes the requirements only with STEP (septic tank effluent pumping) sewer systems. For requirements not contained in this specification, the Standard Sewer Specifications of Friendsville Sewer shall apply. STEP systems are comprised of a baffled septic tank(s), screen and pump vault, pump(s), discharge piping, control panel, and level sensors. All materials and their installation shall meet all the requirements of the current Plumbing and Electrical Codes.

Inspections of private STEP equipment is required before connection. The water manager or staff shall inspect and approve all privately installed equipment before a connection to the public sewer can be made. Upon approval, the property owner's plumber may make the connection to the public sewer at the valve box.

A list of Component Suppliers with phone numbers and addresses are included in Appendix A. A list of Service Providers with phone numbers and addresses are included in Appendix B. These lists may be updated periodically by Friendsville Sewer current approved lists are available at the Friendsville Sewer office in City Hall, 213 West College Ave, Friendsville, Tennessee and on the City website, <https://www.friendsville.city/sewer>

A 2. Right of Entry

Authorized agents of Friendsville Sewer shall have the right to enter any lot for the purpose of sewer system facilities inspection, maintenance, and repair in accordance with the Friendsville Sewer Use Resolution.

A 3. Sewer Service Application and Requirements

Each property owner will be required to complete and submit an application from Friendsville Water & Sewer as a condition of connection to the public sewer system. All customers are required to adhere to the Resolutions and Policies of Friendsville Sewer relating to the public sewer system.

All requests for the major subdivision of property within the Friendsville Water & Sewer public sewer service area shall be required to obtain approval of the Engineer of Record of the Friendsville Sewer System.

A 4. Ownership, Operations, and Maintenance Responsibilities

It is the policy of Friendsville Water & Sewer that all sewer system components located on private property are owned, including maintenance and replacement, by the property owner. The isolation and check valve box located at the property right-of-way (ROW) boundary is the point of connection to and is part of the public sewer system.

The septic tank, pump, alarm/pump control panel, vault, screen, piping, and all appurtenances from the building to the service connection shall be installed and maintained by the property owner in accordance with the Friendsville Sewer Use Resolution as well as adopted policies and requirements. Maintenance shall include periodic pumping of the septic tanks as well as the replacement of any worn or broken components.

Each septic tank location will be required to be accessible year-round by maintenance vehicles for the purpose of inspection and maintenance including the periodic pumping of septic tanks. The septic tank, alarm/pump panel, and sewer clean-out locations shall be approved as part of the inspection process.

All sewer facilities that are to become the property of Friendsville Sewer shall be designed and constructed in accordance with the Standard Sewer Specifications of Friendsville Sewer. All sewer components constructed on private property that are to remain the responsibility of the property owner shall be designed, constructed, inspected, and tested in accordance with this Friendsville Wastewater Regulations Ordinance No. 2021-04.

Section B - Materials and Installation

B 1. General Installation Conditions

The installation of all on-site facilities shall be inspected and approved by Friendsville Sewer prior to connection to the wastewater system. The property owner shall be responsible for the installation of all on-site facilities including but not limited to the following:

- a. Building sewer to the septic tank(s)
- b. Precast concrete septic tank
- c. Tank risers and lids
- d. Pump vault and effluent screen
- e. Effluent pump and power cable
- f. Discharge piping

- g. Float controls and electrical connections
- h. Pump control panel
- i. Pressure sewer service lateral line to sewer main line connection at isolation and check valve box.

B 1.1 Electrical Requirements and Installation

It shall be the responsibility of the property owner to provide all wiring to the pump control panel. The property owner will supply a 115-volt single-phase service utilizing separate circuit, dual element fuses or circuit breakers at the distribution panel. The property owner will be responsible for the monthly electric bill for the on-site components.

The pump control panel and all associated electrical components shall be installed as per the National Electrical Code (NEC). All electrical components must be inspected and approved by the appropriate agency.

B 1.2 Inspections

The property owner shall be responsible for scheduling inspections with Friendsville Sewer for the installation of all on-site sewer facilities. The following inspections are required:

- a. Prior to and while the septic tanks are being set.
- b. Water tightness testing of the septic tanks, pressure testing of all piping, and pump testing.
- c. After final grading and clean-up of job site.

To schedule inspections call (865) 995-0243. All inspections by Friendsville Sewer shall be scheduled. Inspections shall be provided in accordance with Friendsville Sewer standard policies.

B 1.3 Submittals

The property owner is responsible for submitting the following information for review and approval by Friendsville Sewer prior to installation:

- a. A completed application for installation of on-site sewer facilities.
- b. Site sketch showing the location of the building(s), septic tank, piping, conduit, and alarm/pump panel.

B2. Building Sewer

B 2.1 General

The building sewer is the line between the building(s) served and the septic tank. Pipe materials and installation of the building sewer shall meet all the requirements of the Uniform Plumbing Code and Friendsville Sewer Standard Sewer Specifications. Work under this section shall include furnishing all labor, materials, tools, and equipment necessary for the installation and testing of the building sewer line.

B3. Septic Tanks

B 3.1 General

This section describes the septic tank as required for all single-family residential services. For all other classifications of service, consult with Friendsville Sewer. In general, multi-family (duplex) and small commercial connections require the use of duplex pumps. All food service establishments shall consult with Friendsville Sewer. Larger water usage customers (defined as greater than 10,000 gallons per month usage) and food service establishments shall be reviewed on a case-by-case basis.

All septic tanks shall be manufactured and furnished with two access openings 18 inches in diameter and of the configuration shown on the standard drawings. Tanks shall have a 24-inch diameter by 1-inch-deep groove formed in the top of the tank at the access opening for installation of 24-inch diameter riser. Tanks shall be installed in strict accordance with the manufacturer's recommended installation instructions. Modification of completed tanks shall not be permitted unless approved in writing by Friendsville Sewer. Fiberglass or plastic septic tanks shall not be allowed unless approved by Friendsville Sewer.

B 3.2 Septic Tank

The septic tank shall be a nominal 1,500-gallon, two-compartment baffled style septic tank as shown on the standard details. The tank shall be precast concrete and shall have the floor and walls of the tank monolithically poured. The inlet to the primary septic tank from the building sewer line shall penetrate 18-inches into the liquid from the inlet flow line.

B 3.3 Outlet Risers

Two outlet risers shall be provided for each tank. Risers shall be at least 12 inches high, shall have a minimum nominal diameter of 24 inches. Outlet risers shall be provided for the following locations.

Traffic Rated (Improved) Areas

- a. Outlet risers shall be pre-cast concrete.
- b. Risers shall be installed on the septic tank with a watertight seal. A 6-inch square non-shrink concrete ring shall be poured around the joint between the outlet riser and the septic tank, for stabilization of the riser.
- c. Asphaltic sealant shall be used to provide a watertight seal between the tank, risers, and grade rings.

Non-Traffic (Unimproved) Areas

- a. Outlet risers shall be ribbed PVC and shall be factory equipped with two neoprene grommets, one for the splice box and one for the pump discharge, installed as shown on the drawing.
- b. Riser with Butyl tape and tank adapter. All joints must be watertight.

B 3.4 Lids

One frame and lid shall be furnished with each riser. Traffic rated lids shall be 24 inch cast iron frame and cover with gas tight gasket. Non-traffic lids shall be fiberglass with green aggregate finish, and provided with a neoprene gasket, and stainless-steel bolts. The riser and lid combination shall be able to support a 2,500 pound wheel load.

B 3.5 Installation

All septic tank locations are to be a minimum of 10-feet from the dwelling or other structures. Septic tanks shall be set level and to uniform bearing on a minimum 6 inches thick layer of bedding material compacted to 95 percent relative maximum density, over a firm and uniform base.

Bedding material shall be #57 clean washed stone. Backfill should be select native material with all rocks and debris over 3-inches removed and free from organic or deleterious material. The property owner (or Service Provider) shall be responsible for establishing the tank elevation. Tanks shall be placed at such depth to facilitate a minimum ¼-inch per foot slope of the building sewer.

Soil cover over the top of the tank shall be a minimum of 12-inches deep, with the top 6-inches being replaced with topsoil. If the tank is in a traffic area, then the tank shall have a traffic rated lid and the tank shall be rated for the traffic loading, or it shall be fenced and protected from traffic.

B 3.6 Septic Tank Hydrostatic Testing

The concrete septic tanks shall be tested with water for leakage. All tests shall be performed in the presence of the inspector. The following procedure shall be used:

- a. Plug all inlets and outlets.
- b. Fill tank with water to full height, including 2-inch depth in lid.
- c. Allow water to stand for 24-hours.
- d. Any loss of water or leakage in a 24-hour period constitutes failure.
- e. Repair and retest all tanks that do not pass hydrostatic test.

B 4. Effluent Pump and Appurtenances

B 4.1 Effluent Pump

The effluent pump shall be of the submersible type capable of delivering a flow and total dynamic head (TDH) sufficient to pump effluent to the public sewer system. The pump TDH shall be 140 feet of water (60 psi) at 10 gallons per minute (GPM). Provide a flow-control orifice as required. Pump shall comply with the following:

- a. Pump shall be specifically designed and rated to pump sewage effluent into pressure wastewater collection systems.
- b. All residential effluent pumps shall be on the Friendsville approved list of suppliers.
- c. All pumps supplied must be constructed and bear the label of Underwriter's Laboratories, Inc. (UL) for effluent duty.
- d. Pumps shall have a 50-foot long heavy-duty (SO) electrical cord with ground to motor plug for new development installations. Pumps cords may be shorter for existing structures and where an external junction box is utilized.
- e. Pump shall be constructed of non-corrosive materials such as stainless steel and thermoplastic.
- f. Pump motor shall be of the submersible type. Motor shall be single-phase, 115 Volts, 60 Hertz, and 3,500 RPM. Motors shall be thermally protected with an automatic reset feature.

B 4.2 Check Valves

Pump discharge check valves shall be true-union PVC ball check valves designed for wastewater effluent pump applications and rated for 150 psi, 1-inch minimum diameter.

B 4.3 Ball Valves

Ball valves shall be true-union PVC ball, quarter turn shut-off valves, 1 ¼ inch minimum diameter. Ball valves shall be located downstream of disconnect for pump removal. Ball valves shall be located where they can be easily operated from the ground surface.

B 4.4 Pump Vault and Screen Assembly

All pump vault and screen assemblies' systems shall be on the Friendsville Sewer approved list of suppliers. Installation shall be in accordance with these standard specifications and drawings and in accordance with the manufacturer's instructions.

B 4.5 Pump Discharge Pipe Assembly

The rigid PVC pipe on the pump discharge shall be PVC Type 1, Grade 1, and Schedule 80. Fittings shall be PVC Type 1, Schedule 80 solvent weld fittings and comply with ASTM D2466. The pump discharge pipe assembly shall comply with the following:

- a. Discharge hose and valve assembly shall be 1-inch.
- b. Flex hose shall be made of Schedule 80 PVC with a rigid PVC inner helix and shall have a working pressure rating of 250 psi.
- c. PVC ball valve shall be rated for 250-psi service.
- d. Insert fittings and hose clamps shall not be used for discharge hose and valve assembly.
- e. 12-inches of the flex hose shall be installed outside the riser with an appropriate adapter for connection to the 1-inch, Schedule 40, sewer service lateral piping.

B 4.7 Pump Float Control Assembly

The float switch assembly shall utilize mechanical type float switches hermetically sealed in a solid corrosion and shock resistant material. All float switches shall be

UL listed. A float switch support bracket shall be attached to the side of the pump vault. Float switches shall not be attached to the pump discharge piping.

The float switch cables shall be terminated to a single "Quick-Connect" pin and sleeve connector for ease installation and service. The float assembly shall operate in a range of plus or minus 6-inches for ON/OFF and plus or minus 3inches above "pump on" for "alarm on."

The high-level alarms and on/off function shall be adjusted and tested in the presence of the inspector.

B 4.8 Pump Control Panel

The pump control panel shall be installed in line of sight to the septic tank. The pump control panel shall be a simplex pump control/alarm panel with the following features:

- a. OFF/ON Relay: 115V automatic, single pole.
- b. Audible Alarm: Panel mount with a minimum of 80 decibels sound pressure.
- c. Audio-Alarm Reset Relay: 115V, automatic, with DIN rail mounted socket base.
- d. Toggle Switch: 15-amp minimum motor rated, single-pole, double-throw with three positions: Manual (MAN), Off (OFF), and Automatic (AUTO).
- e. Fuse Disconnect: DIN rail mount socket base with a 2-amp slow blow fuse.
- f. Current-Limiting Circuit Breaker: Rated for 20 amps minimum OFF/ON switch, DIN rail mounting with thermal protection.
- g. Enclosure: NEMA 4x, fiberglass with stainless steel or nonmetallic hinges, stainless steel screws and pad-lockable latch.
- h. Alarm Circuit: Wired separately from the pump circuit so that, if the internal overload switch or current-limiting circuit breaker is tripped, the alarm system remains functional.
- i. Redundant off relay
- j. Elapsed Time Meter: 7-digit, non-resettable.

All wiring in the panel shall be MTW stranded. Wiring shall be routed, bundled, and secured in a neat manner. The control panel and its components shall be assembled in accordance with the National Electric Code, and all state and local codes. The assembled control panel shall be Underwriter's Laboratories, Inc. (UL) labeled.

The pump control panel shall be installed in accordance with the manufacturer's recommendations and the standard details.

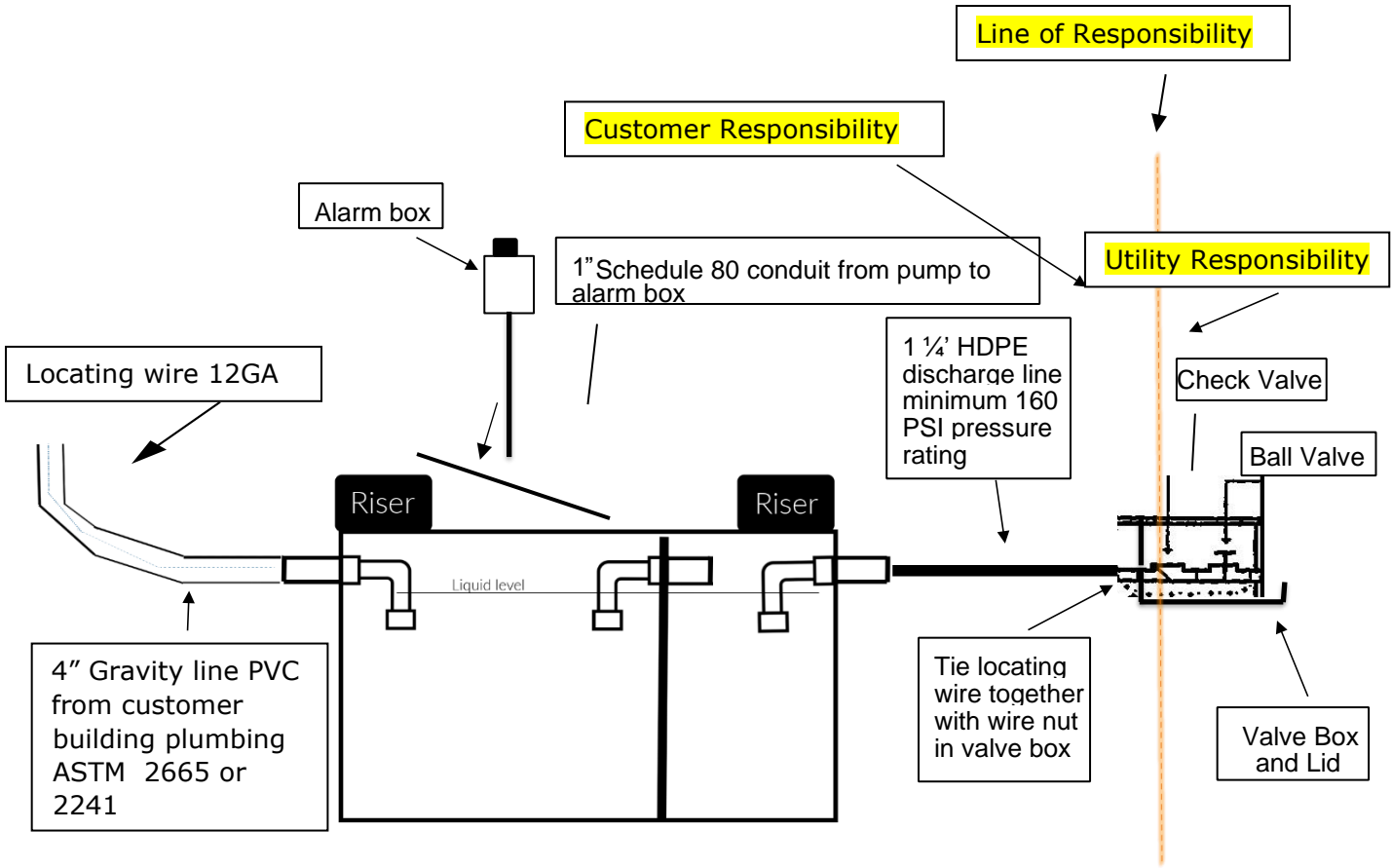
B 4.9 Pump Power Cable

Power cable motor-end terminations shall enter the submersible pump assembly by quick connect fittings that are watertight. Cable shall be SO type and rated for 600-volt service.

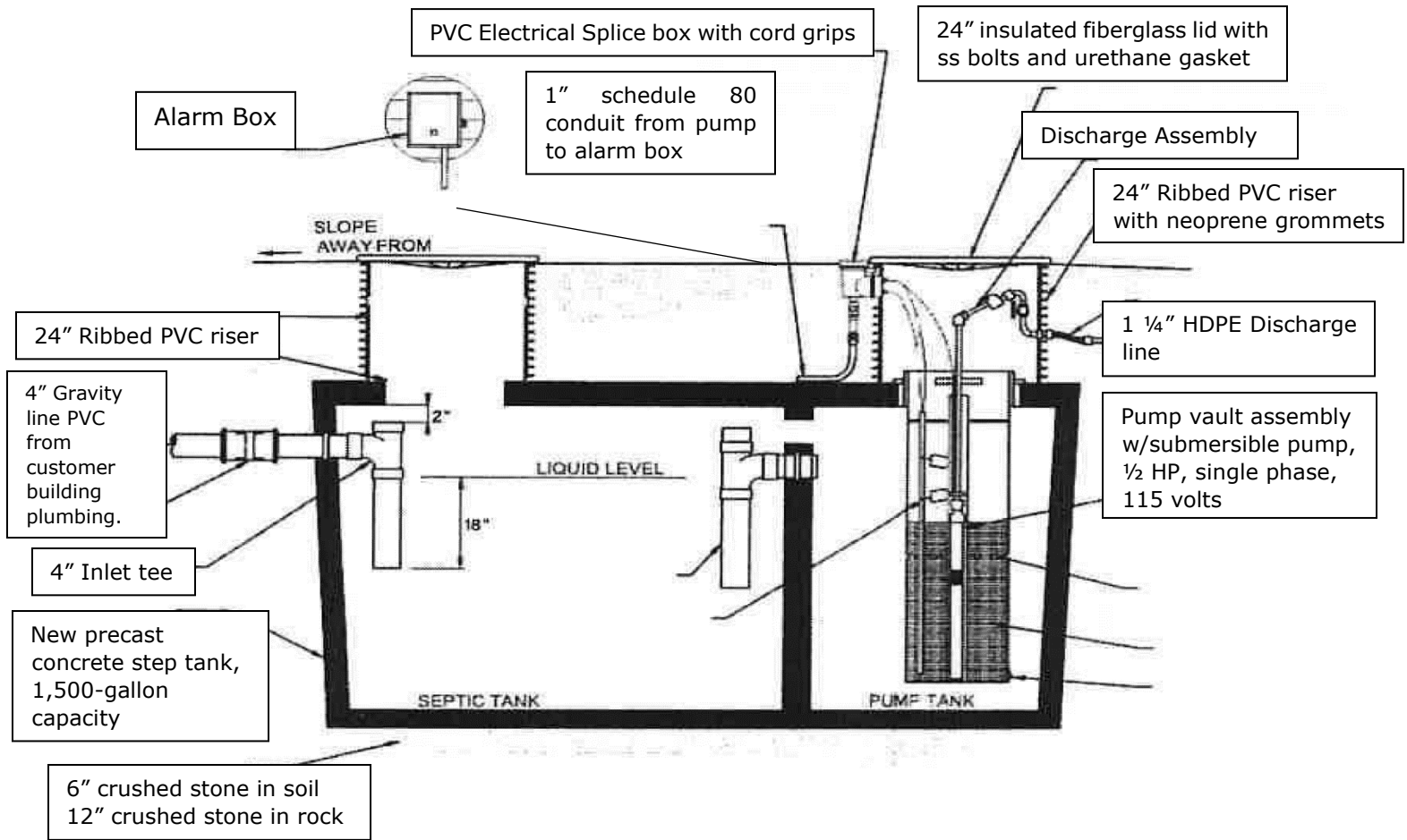
B 4.10 Junction Boxes

External Splice boxes shall be provided where necessary for installation on existing buildings and structures or as required. Splice boxes shall be external to and attached to the riser, watertight, and suitably sized. Splice boxes internal to the risers are not allowed.

Box shall be equipped with four (4) electrical cord grips and at least one $\frac{3}{4}$ -inch outlet fitting. Cord grips shall be corrosion resistant. Waterproof silicone grease shall be applied to the cords, plugs and cord grip plate to ensure a leak-proof seal. All wire connections shall use UL-listed heat shrink and butt connections. All conduits shall be sealed with conduit seals.



Note: Septic tank locations are to be a minimum of 10-feet from the dwelling or other structures.



Notes:

1. Septic Tank, inspection ports, access risers and tank connections shall be watertight. Tank shall be field tested for water tightness.
2. Septic Tanks within traffic loading conditions shall be designed by an engineer to meet anticipated loading. Depth of burial and traffic or non-traffic loading shall be considered.
3. Building sewer between the structure and septic tank and sewer service lateral accordance with the specifications for on-site.
4. All electrical work shall be installed by a licensed electrician and installed in accordance with state and local codes.
5. Pump designed for flow of 10 GPM @ 140 FT.TDH (60 PSI)

Appendix A - Material Suppliers

Septic Tanks

C.R. Barger & Son, Inc.
123 Pawnook Farm Rd, Lenoir City, TN, 37771
865-270-8080

Appendix B - Service Providers

Plumbers & Electricians

Fred Weston Plumbing
75 East Lincoln Rd, Alcoa, TN 37707
865-983-4434

Pipe Doctor, 865-494-0691
75 East Norris Rd, Norris, TN 37828