

4.20 Pressure Distribution System

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4.20.1 Description

A pressure distribution system is a low-pressure system of small-diameter perforated plastic pipe laterals, manifold, pressure transport line, dosing chamber, and a pump or siphon. The pressure distribution system is used when it is desirable to:

1. Maintain a uniform application of effluent across the drainfield.
2. Treat and dispose of effluent in the uppermost levels of the soil profile.
3. Aid in mitigating the potential contamination of ground water.
4. Improve the performance and increase the life span of a drainfield.

4.20.2 Approval Conditions

1. Pressure distribution shall be used in drip distribution, pressurized grey water systems, sand mounds, intermittent sand filters, recirculating gravel filters, drainfields that exceed 1,500 ft² in total trench bottom (IDAPA 58.01.03.008.4), and large soil absorption systems.
2. Pressure distribution may be used in in-trench sand filters to obtain a reduced separation distance to permeable limiting layers, standard or basic alternative systems at the applicant's request, and in environmentally sensitive areas.
3. Geotextile filter fabrics are required to be used for cover over drainfield aggregate in pressure distribution systems.
4. All design guidance related to dosing chambers, in-tank pumps, and pump to gravity distribution systems contained herein shall be followed for any alternative system using these components regardless of whether the drainfield is pressurized or not (IDAPA 58.01.03.004.10).
5. The design guidance provided herein for piping, pump, and dosage requirements is meant to be a simple design strategy and is not intended to supplant or limit engineering design for these components and systems.
6. Plans for systems with designs different than those provided herein and where daily wastewater flows exceed 2,500 gallons shall be reviewed by DEQ.
7. The system must be designed by a PE licensed in Idaho.
8. The design engineer shall provide an O&M manual for the system to the health district prior to permit issuance.
9. The following guides are recommended for use in pressure system design:
 - Otis, R.J. 1981. *Design of Pressure Distribution Networks for Septic-Tank Absorption Systems*. Madison, WI: University of Wisconsin. Small Scale Waste Management Project Publication No. 9.6. www.soils.wisc.edu/sswmp/pubs/9.6.pdf.
 - Converse, J.C. 2000. *Pressure Distribution Network Design*. Madison, WI: University of Wisconsin. Small Scale Waste Management Project Publication No. 9.14. www.soils.wisc.edu/sswmp/pubs/9.14.pdf.

4.20.3 Design

Many considerations need to be made in the design of a pressure distribution system based on site- and flow-specific characteristics. These characteristics will affect several system components depending on each specific design scenario. Typical system design should occur based on the following design procedures:

1. Layout the distribution lateral network.
2. Select the orifice size and spacing.
3. Determine the lateral diameter compatible with the orifice size and spacing.
4. Determine the lateral discharge rate.
5. Determine the manifold diameter based on the number, spacing, and discharge rate of the laterals.
6. All pipe velocities are recommended to be at least 2 feet per second.
7. Determine the total internal volume of the manifold and lateral.
8. Determine the desired dose volume and rate.
9. Calculate the static and dynamic pressure requirements of the piping network and document this in a system performance curve.
10. Select a pump based on the dose volume, discharge rate, friction losses, and total head of the system and the pump manufacturer's supplied performance curve.
 - a. Plot the pump performance curve on the system performance curve. The point where the pump curve crosses the system performance curve is where that pump will operate.
 - b. The crossing point must exceed the specified minimum operating system pressure and should occur near the center of the pump performance curve.
11. Select the correct size of dosing chamber based on the system design flow and pump selection.
12. Select the pump controls.

4.20.3.1 Piping

Pressure distribution system piping typically consists of several sections including transport piping, manifold, and laterals. Each of these piping selections have components and design factors that are unique to that particular section.

Lateral Piping

Lateral piping is placed within the drainfield and is used to evenly distribute wastewater effluent to the drainfield's infiltrative surface. To distribute the effluent, several small diameter orifices are drilled into each lateral. Recommendations for the design of lateral piping and the associated orifices are included below.

Distribution Laterals

1. Lateral length should be shorter than the trench length by at least 6 inches but not more than 36 inches.

2. Laterals in trenches should be placed equidistant from each trench sidewall and from each other.
3. Lateral spacing in beds is recommended to be equal to orifice spacing.
 - a. The outside laterals should be placed at one-half the selected lateral spacing from the bed's edge.
 - b. Laterals should not be placed farther apart than 3 feet on center in bed designs and should not be placed farther than 1.5 feet from the bed's edge regardless of orifice spacing.
4. Determine the lateral diameter based on distribution lateral network design.
 - a. Lateral diameter typically ranges from 3/4 to 4 inches for most system applications.
 - b. Lateral diameter for typical individual dwelling systems range from 3/4 to 2 inches.
5. Lateral length should be selected based on the lateral diameter, orifice spacing, and piping schedule/class.
 - a. Lateral length is constrained by the minimum pressure at the distal end of the lateral, which shall not drop below 90% of the manifold pressure. This uniform pressure ensures relatively uniform effluent discharge down the length of the lateral.
6. Individual ball or gate valves shall be installed on each lateral to balance residual head on terraced systems.
7. Sweeping cleanouts should be placed at the terminal end of each lateral and accessible from grade.
 - a. Cleanout sweeps should be the same diameter piping as the main lateral.
 - b. A ball valve or threaded cap should be located on the end of the cleanout that allows the lateral to be flushed.
 - c. Prior to pressurization of the distribution laterals, the system should be flushed with clean water while all of the terminal ball valves are open or caps are removed.

Orifices

1. Orifice sizing, spacing, and quantity, coupled with each lateral's pressure, establish the flow rate of the distribution network.
2. Orifice placement should occur
 - a. Along the same axis of the distribution lateral.
 - b. In a staggered location between any two adjoining laterals so they are located half of the orifice spacing from one another along the drainfield length.
 - c. Orifices should be placed to serve a circular area as best as possible with limited overlap (e.g., 6-foot wide trench with two laterals and orifice placement to serve an area 3 feet in diameter).
3. Orifice orientation

- a. Is typically toward the bottom of the trench in aggregate-filled drainfields to facilitate lateral drainage and towards the top of the trench in gravelless trench component drainfields.
 - b. If the orifices in the distribution laterals are oriented up, the distribution lateral must slope back towards the manifold to aid in drainage. Sloping of the distribution lateral should be as minimal as possible.
4. Orifice diameter
- a. Typical orifice diameter is 1/4 inch but may be smaller or larger depending upon system design requirements.
 - b. Orifices smaller than 1/4 inch may lead to clogging, which should be considered in system design.
 - c. Typical discharge rates based on orifice size are provided in Table 4-13.
5. Orifice spacing should distribute effluent as evenly and uniformly as possible over the infiltrative surface.
- a. Typical orifice spacing is 30–36 inches but may be closer or farther apart depending upon system design requirements, system flow rate, and soil type.
 - b. For most installations, the spacing will be between 18–36 inches.
 - c. The maximum disposal area per orifice for sand mounds, intermittent and in-trench sand filters, and recirculating gravel filters is 4 ft².
6. Orifices should be drilled with a sharp bit, and any burs, chips, or cuttings from the drilling process should be removed from the piping prior to assembly.
7. Orifice shields are recommended to be used when orifices are oriented up.

Table 4-13. Orifice discharge rate in gallons per minute based on pressure.

Pressure (feet)	Orifice Diameter (inches)				
	1/8	3/16	1/4	5/16	3/8
2.5	0.29	0.66	1.17	1.82	2.62
3.0	0.32	0.72	1.28	2.00	2.87
3.5	0.34	0.78	1.38	2.15	3.10
4.0	0.37	0.83	1.47	2.3	3.32
4.5	0.39	0.88	1.56	2.44	3.52
5.0	0.41	0.93	1.65	2.57	3.71
5.5	0.43	0.97	1.73	2.7	3.89
6.0	0.45	1.02	1.8	2.82	4.06
6.5	0.47	1.06	1.88	2.94	4.23
7.0	0.4	1.1	1.95	3.05	4.39
7.5	0.5	1.14	2.02	3.15	4.54
8.0	0.52	1.17	2.08	3.26	4.69
8.5	0.54	1.21	2.15	3.36	4.83
9.0	0.55	1.24	2.21	3.45	4.97
9.5	0.57	1.28	2.27	3.55	5.11
10.0	0.58	1.31	2.33	3.64	5.24

Notes: Values were calculated as: $GPM = 11.79 \times d^2 \times h^{1/2}$; where d = orifice diameter in inches, h = head in feet.

Lateral Discharge Rate

Once the numbers of laterals, lateral diameter, orifice spacing, and orifice diameter have been selected, the individual lateral discharge rate and total distribution system discharge rate can be calculated. Individual lateral discharge rate is calculated by the following:

$$GPM = (\text{individual orifice discharge rate}) \times (\text{number of orifices per lateral})$$

The total distribution system discharge rate is calculated by the following:

$$GPM = (\text{individual lateral discharge rate}) \times (\text{total number of laterals})$$

4.20.3.1.1 Manifold Piping

The manifold is typically a larger diameter pipe that provides a uniformly pressurized effluent to the distribution laterals. The manifold is at the terminal end of the transport piping. There are three common manifold designs:

- End manifold
- Central manifold
- Offset manifold

End manifolds are located at one end of the distribution laterals. Central manifolds are located at the midpoint of the distribution laterals. Offset manifolds may be located at any point along the distribution laterals. Multiple manifolds may also be used in a system design as long as the

pressures at each manifold are equal. The following design elements for manifolds are recommended:

1. The manifold pipe diameter must accommodate the number, spacing, and discharge rate of the distribution laterals.
2. It is recommended that the outlet to the laterals occur at the crown of the manifold to minimize leakage from the distribution laterals prior to their complete pressurization.
3. The manifold should drain to either the pump chamber or the distribution laterals when the pump shuts off.
4. If the manifold cannot drain, it should be insulated to protect it from freezing.

4.20.3.1.2 Transport Piping

The transport piping, or line, is the piping that connects the pump in the dosing chamber and manifold. The length and diameter of this piping varies based upon pump selection, wastewater flows, transportation distance, and elevation difference between the pump and drainfield. Several design recommendations should be followed for this section of piping:

1. The transport pipe exiting the dosing chamber should have a minimum strength equivalent meeting the specifications in Table 5-10.
2. Transport piping should be sloped to drain back into the dosing chamber when the pump shuts off. A small drain hole (one-quarter inch) may be drilled in the transport pipe inside the dosing chamber to aid in the pipe draining. This drain hole must be taken into account in pressure distribution design and pump selection.
3. If the transport pipe cannot be sloped back to the dosing chamber, the piping should be buried below the site-specific frost line to prevent freezing.
4. Friction loss should be considered when selecting the diameter of the transport piping.
 - a. The material and diameter of the transport pipe will influence the friction loss.
 - b. The friction increases with increasing flow rates.
 - c. Friction losses must be included in the system performance curve to properly select a suitable pump.

4.20.3.2 Pressurization Unit

Pressurization of the piping network occurs through a pressurization unit, which may be an electrically driven pump or a gravity charged siphon. Electrically driven pumps may be used in any pressurized design regardless of the site layout. Siphons are limited to pressurized designs where all of the piping components are located below the siphon discharge invert. A critical component of either pump selection or siphon design is the total head the pressurization unit must operate against. Total head can be calculated using Equation 4-15.

Calculate the total head using Equation 4-15:

$$H_{total} = E + T + R \quad \text{Equation 4-15. Total head.}$$

where:

H_{total} = total head

E = elevation difference between the pump or siphon bell opening and manifold

T = piping network's friction head

R = residual head (5 feet)

4.20.3.2.1 Pumps

Pumps used in the pressure distribution design are either centrifugal effluent pumps or turbine effluent pumps. Centrifugal pumps are typically a high capacity/low-head pump with a relatively flat performance curve. Turbine pumps are typically a low capacity/high-head pump with a relatively steep performance curve. The type of pump that is selected should be based on the point where the pump's performance curve intersects the system's performance curve. A pump is suitable for a particular system if the middle of its performance curve intersects the system performance curve at an acceptable pressure and flow value. Specific pump selection factors are discussed below:

1. Use the pump head discharge rate curves supplied by the manufacturer to select a pump that will perform at the required head.
2. To help maximize pump efficiency, pump selection should also address maximum usable head.
 - a. Select pumps where the operating point will be greater than 15% of the maximum discharge rate (maximum gallons per minute rating).
 - b. For example, a pump with a maximum discharge rate of 80 GPM should only be used if the operational requirement is greater than 80 GPM x 0.15 or 12 GPM.
3. Other pump considerations:
 - a. Pump should be specified for effluent.
 - b. Pump should transfer solids as large as orifice diameter.
 - c. Pumps must be kept submerged.
 - d. Pump should be serviceable from ground level without entering the pump chamber. PVC unions are available to assist in the easy removal of pumps.
 - e. Pumps and electrical connections shall conform to the requirements of the Idaho Division of Building Safety, Electrical Division.
 - i. Electrical permits are required for installing all pumps, and the applicant, responsible contractor, and/or the responsible charge engineer are responsible for obtaining the proper electrical permits.
 - ii. Installation of all electrical connections is required to be performed by a licensed electrician. The applicant, responsible contractor, and/or the responsible charge engineer are responsible for ensuring that the installation is performed by a properly licensed individual.

- iii. Subsurface sewage disposal installer registration permits are not equivalent to, or substitutes for, a proper electrical license.
- f. Impellers shall be cast iron, bronze, or other corrosion-resistant material. Regardless of the material, the impeller may freeze if the pump remains inactive for several months.
- g. If a check valve is used, a bleeder hole should be installed so the volute is kept filled with effluent. Some pumps may run backwards if the impeller is in air.
- h. Siphon (vacuum) breakers should be used in pressure distribution networks where the low water level in the dosing chamber is above the lateral inverts in the drainfield.

4.20.3.2.2 Siphons

Siphons operate by building up more head in the dosing chamber than the distribution piping network requires to operate correctly. The siphon flow rate must be greater than the discharge rate out of the distribution lateral orifices. Siphons only work in a demand dosing situation.

Recommendations for siphon dosing systems are included below:

1. Frequent maintenance checks should be performed on siphons to ensure they are operating properly and are not distributing effluent under *trickling* conditions.
2. High water audio and visual alarms should be placed in siphon dosing chambers above the operating point of the siphon and below the siphon vent.
3. Siphons must discharge to a piping network that allows steady flow. Piping networks that have abrupt bends or tees will create pressure oscillations that will disrupt the siphon flow, resulting in *trickling* flows.
4. Siphon trap diameter must be smaller than the piping network's transport pipe.
5. The dosing chamber must provide an overflow tee in case the siphon becomes plugged. This tee also allows gas in the drainfield to escape into the dosing chamber as the effluent displaces it.

4.20.3.3 Dosing

Dosing consists of the type of dosing that is selected for the system design and dosing volume (dose). Two types of dosing are available for system pressurization: demand dosing and timed dosing. These dosing parameters are discussed below.

4.20.3.3.1 Demand Dosing

Demand dosing can be performed using both electrically driven pumps and gravity driven siphons. In demand dosing, a specific volume of effluent is sent to the drainfield with each dose based on the specific system demand. This demand is triggered by the volume of effluent reaching a predetermined level within the dosing chamber. Once this level is reached, the entire predetermined volume of effluent is delivered to the drainfield. After a pumping cycle effluent will not be delivered to the drainfield until enough effluent has entered the dosing chamber to reach the predetermined pump-on level. This type of dosing leaves little control over how much effluent is delivered to the drainfield during high flow events.

4.20.3.3.2 Timed Dosing

Timed dosing can only be performed through the use of an electrically driven pump. Due to the more frequent start/stop cycling of the pump in timed dosing, a pump with good longevity is recommended. Turbine pumps are typically a good fit for this design based on their longevity relative to start/stop cycles. Timed dosing uses a timer to deliver effluent to the drainfield on a regularly timed schedule. Scheduling is done by setting an amount of time the pump is off between cycles and the amount of time the pump is on during the cycle. Advantages of this dosing method are listed below:

- Smaller and more frequent doses can be delivered to the drainfield.
- Peak and surge flows can be leveled out so the drainfield is not overloaded.
- A higher level of treatment is provided to the effluent at the infiltrative surface.
- Greater drainfield longevity.

With timed dosing, surge capacity should be taken into account when sizing the dosing chamber. The chamber should be large enough to handle peak and surge flows. A high level override switch may be used below the high level alarm to override the pump timer when large flows enter the dosing chamber. Controls can also be put in place to ensure that only full doses will be delivered to the drainfield preventing pump cycles that will not result in effluent reaching the drainfield.

4.20.3.3.3 Dose

The dose is the volume of effluent necessary to fill the entire pressurized piping network and the volume of effluent that is desired to be delivered to the infiltrative surface with each dose. The dose volume is based on the volume of the transport and distribution piping network and the frequency at which the drainfield is desired to be dosed throughout any given day. Dose volume is determined by the following sets of design criteria:

1. Determine the volume of all piping components including the transport piping, manifold, and distribution laterals. Only pipe volumes that drain between doses should be used in dosage calculations. Table 4-14 can be used to calculate distribution line, manifold, and transport line volumes.

Table 4-14. Gallons per foot of pipe length.

Diameter (inches)	Schedule 40	Class 200	Class 160	Class 125
1	0.045	0.058	0.058	—
1.25	0.078	0.092	0.096	0.098
1.5	0.105	0.120	0.125	0.130
2	0.175	0.189	0.196	0.204
3	0.385	0.417	0.417	0.435
4	0.667	0.667	0.714	0.714
6	1.429	1.429	1.429	1.667

2. Determine the dose volume delivered to the infiltrative surface by dividing the system design flow, in gallons per day.
3. The daily dose-volume ratio should be five to ten times the volume of the manifold and distribution lateral piping that drains between doses plus one time for the interior volume of the transport line.
4. Each dose delivered to the infiltrative surface of the drainfield should not exceed 20% of the estimated average daily wastewater flow. If the total dose volume is too small, then the pipe network will not become fully pressurized or may not be pressurized for a significant portion of the total dosing cycle and may need to be adjusted.

4.20.3.4 Dosing Chamber

Dosing chambers are tanks that contain a pump or siphon and their associated equipment. The dosing chamber is either a separate septic tank located after the septic tank or may be the last compartment of a multicompartment septic tank. If the dosing chamber is part of a multicompartment septic tank, it must be hydraulically isolated from the compartment(s) of the tank that comprise the septic tank portion of the tank. The construction of a dosing chamber shall meet the requirements of IDAPA 58.01.03.007 except as specified herein. Figure 4-17 provides a dosing chamber diagram with a pump and screen, and Figure 4-18 provides a dosing chamber diagram with a pump vault unit.

1. Dosing chambers must be listed on the approved list of dosing chambers (section 5.3), or must be listed on the approved list of septic tanks (section 5.2).
2. Any system using a pump located after the septic tank to deliver effluent to the drainfield (pressurized or nonpressurized) or a nonpackaged alternative pretreatment component shall locate the pump in a dosing chamber meeting the minimum requirements herein.
3. Dosing chamber must be watertight, with all joints sealed. Precautions must be made in high ground water areas to prevent the tank from floating.
4. Effluent must be screened or filtered prior to the pump.
 - a. A screen must be placed around the pump with one-eighth inch holes or slits of noncorrosive material and have a minimum area of 12 ft².
 - b. Screen placement must not interfere with the floats and should be easily removable for cleaning.
 - c. An effluent filter placed on the outlet of the septic tank, designed with a closing mechanism when the filter is removed, is a suitable alternative to screens around pumps. An access riser to grade should be installed over the septic tank outlet manhole to provide access to the filter for maintenance.
5. The volume of the dosing chamber should be equal to at least two times the system design flow when a single pump is used.
 - a. If duplex pumps are used, the volume of the dosing chamber may be reduced to equal the system design flow. The dosing chamber must come from the approved septic tank or dosing chamber list.
 - b. The volume of the dosing chamber must be sufficient enough to keep the pump covered with effluent, deliver an adequate dose based on the system design, and store 1 day of design flow above the high level alarm.

- c. Additional dosing chamber capacity may be necessary if the pressurized system is designed to have surge capacity.
6. The dosing chamber manhole located above the pump shall be brought to grade using a rise. Access to the pumps, controls, and screen is necessary.
7. A high level audio and visual alarm float switch shall be located within the dosing chamber 2–3 inches above the pump-on level to indicate when the level of effluent in the dosing chamber is higher than the height of the volume of one dose.
8. A low level shutoff float switch shall be connected to the pump and be set to a height that is 2–3 inches above the top of the pump. This ensures the pump remains submerged.
9. If a differential control float is used to turn the pump on and off, care must be exercised to ensure the float will effectively deal with the required dose based on the inches of drop in the dosing chamber.

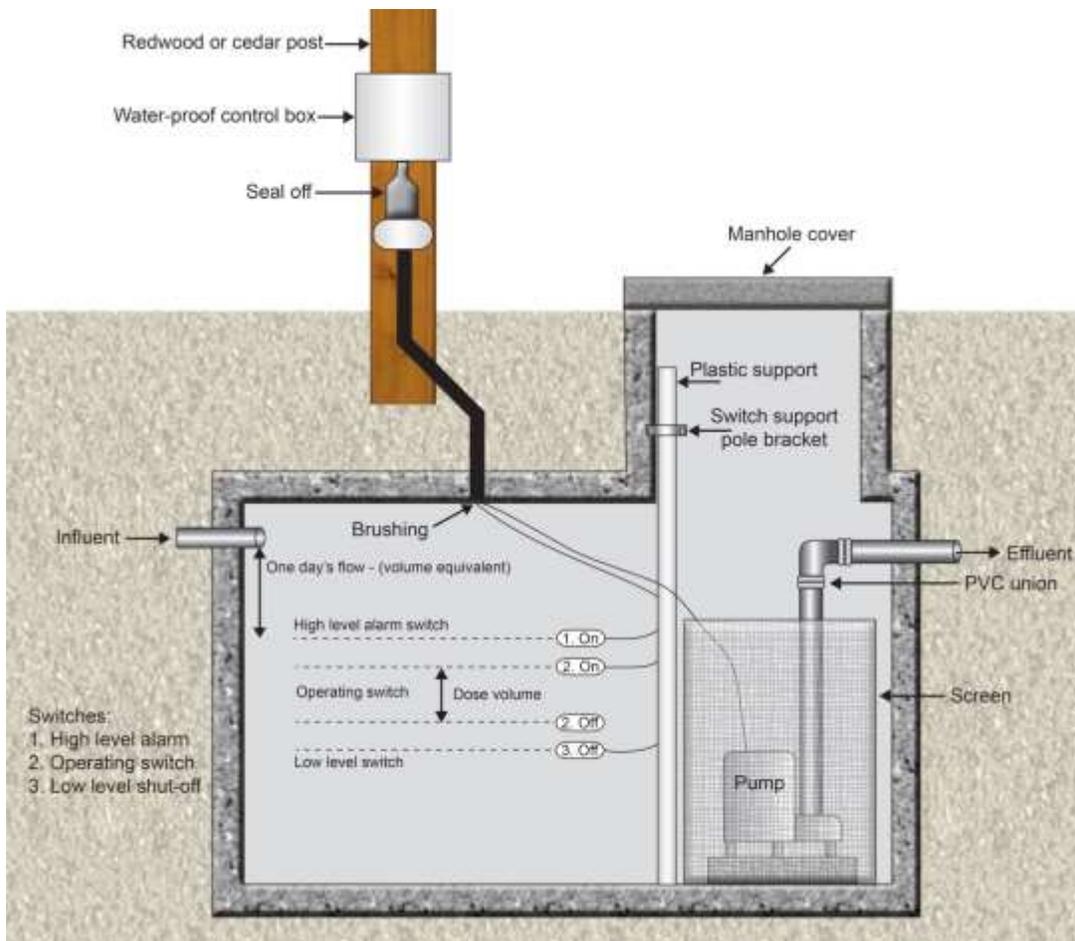


Figure 4-17. Dosing chamber with a pump and screen.

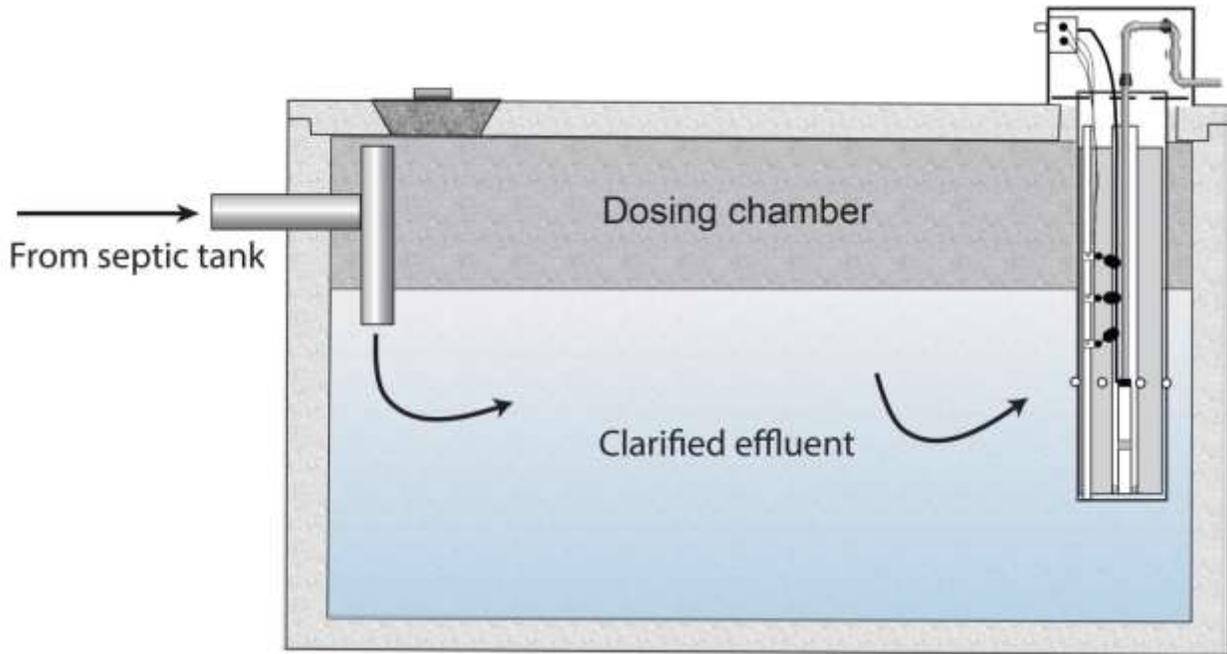


Figure 4-18. Dosing chamber with a pump vault unit.

10. Dosing chamber electrical requirements:

- a. All electrical system designs and installations must be approved by the Idaho Division of Building Safety, Electrical Division.
- b. Electrical permits are required for installing all electrical components and the applicant, responsible contractor, and/or the responsible charge engineer are responsible for obtaining the proper electrical permits.
- c. Installation of all electrical connections is required to be performed by a licensed electrician. The applicant, responsible contractor, and/or the responsible charge engineer are responsible for ensuring that the installation is performed by a properly licensed individual.
- d. Subsurface sewage disposal installer registration permits are not a substitute for an electrical installer license.
- e. Visual and audible alarms should be connected to a separate circuit from the pump. It is recommended that a DC battery backup power source be considered for the visual and audible alarm.

4.20.3.5 In-Tank Pumps

Placement of sewage effluent pumps in a septic tank is an acceptable practice under the following conditions:

1. The site is too small for the installation of a dosing chamber or a septic tank with a segregated dosing chamber compartment, or the flows are less than 100 GPD.
2. Sewage effluent pumps must be placed in an approved pump vault (section 5.8).

3. Effluent drawdown from the septic tank is limited to a maximum 120 gallons per dose with a maximum pump rate of 30 GPM.
4. Septic tanks must be sized to allow for 1-day flow above the high-water alarm, unless a duplex pump is used.
5. Pump vault inlets must be set at 50% of the liquid volume.
6. Pump vault placement inside the septic tank shall be in accordance with the manufacturer's recommendations.
7. Pump vault screens shall be one-eighth inch holes, or slits (or smaller); constructed of noncorrosive material; and have a minimum area of 12 ft².
8. Pump vault and pump placement must not interfere with the floats or alarm, and the pump vault should be easy to remove for cleaning (Figure 4-19).
9. The same electrical requirements that apply to both pumps and dosing chambers apply to in-tank pumps.

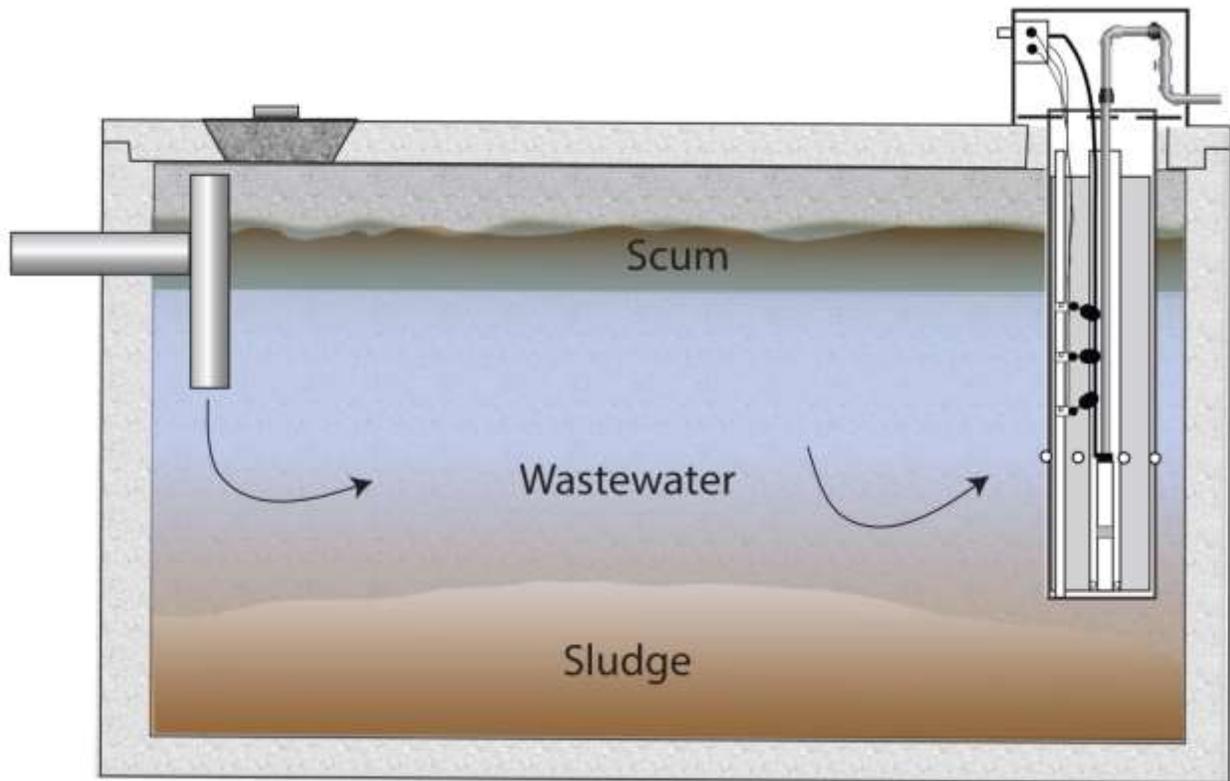


Figure 4-19. Example of effluent pump installed into single-compartment septic tank using a pump vault unit.

4.20.3.6 Pump to Gravity Distribution

A pump to drop box system may be used when an area for drainfield placement cannot be reached by standard gravity flow from the wastewater generating structure. Standard drainfields located at higher elevations than the septic tank are not required to be designed as a pressure distribution system unless the square footage of the disposal area exceeds 1,500 ft². When the drainfield is not pressurized, wastewater is conveyed by a pump through a transport (pressure) line to a drop box where effluent pressurization breaks to gravity distribution into the drainfield (Figure 4-20). For a description of a drop box, see section 3.2.6.2. Distribution boxes may be substituted as a drop box for the purpose of a pump to gravity distribution system. Alternating to larger diameter pipe to break pressurization and achieve gravity flow should not be used as a substitute for a drop box.

1. Pump selection, transport (pressure) line design, dosage, and dosing chamber or in-tank pump design shall follow the procedures in Section 4.20, “Pressure Distribution System.”
2. A drop box should be installed that allows gravity distribution to all drainfield trenches.
3. Upon entry into the drop box, the effluent line should be angled to the bottom of the box with the effluent line terminating above the high water level of the drop box.

A one-quarter inch hole may need to be drilled in the top of the angle connection to prevent a potential siphon.

4. A complex installer’s permit shall be required for installation.
5. Pump and transport pipe design/selection may require engineering based upon the regulatory authority’s judgment. Pump design/selection should be performed by an engineer licensed in Idaho when elevation gains of greater than 100 feet or lengths of 500 feet are exceeded in effluent transport.

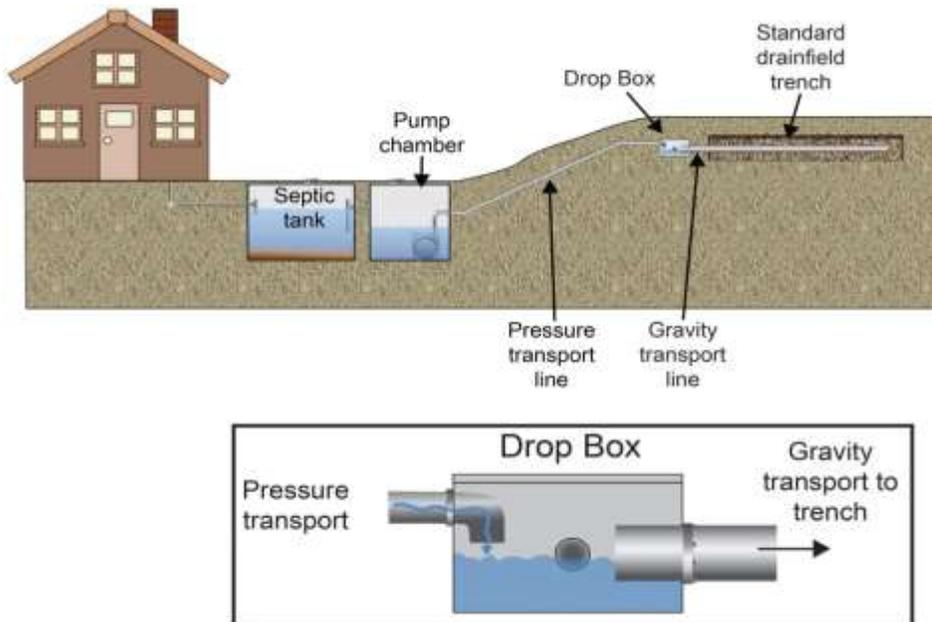


Figure 4-20. Example of pump to drop box installation.

4.20.4 Inspections

1. Site inspections shall be conducted by the health district at the following minimum intervals (IDAPA 58.01.03.011.01):
 - a. Preconstruction conference that should be conducted with the health district, responsible charge engineer (except for the pump to gravity distribution system designs that do not require engineering), complex installer, and property owner (if available) present.
 - b. During construction as needed.
 - c. Final construction inspection that includes a pump drawdown/alarm check and pressure test of the distribution network.
2. The responsible charge engineer (except for the pump to gravity distribution system designs that do not require engineering) shall provide the health district with a written statement that the system was constructed and functions in compliance with the approved plans and specifications. Additionally, the responsible charge engineer shall provide as-built plans to the health district if any construction deviations occur from the permitted construction plans. (IDAPA 58.01.03.005.15).

4.20.5 Operation and Maintenance

An O&M manual shall be developed by the system's design engineer that contains the following minimum requirements and shall be submitted as part of the permit application (IDAPA 58.01.03.005.14).

1. Operation and maintenance is the responsibility of the system owner.
2. Sludge depth in the septic tank should be checked annually and the tank should be pumped when the sludge exceeds 40% of the liquid depth.
3. All pump and pump chamber alarm floats and controls should be inspected on a regular schedule to ensure proper function.
4. Drainfield laterals should be flushed annually to ensure any biomat buildup is removed from the distribution lateral. Lateral flushing procedures should be described.
5. The system's residual head should be tested at the distal end of the drainfield annually after lateral flushing. Residual head testing procedures should be described.
6. Pump screens and effluent filters should be inspected regularly and cleaned. All material created from cleaning the screen or filter should be discharged into the septic tank.
7. All manufactured components of the pressure distribution system should be maintained according to the manufacturer's recommendations.
8. Any other operation and maintenance as recommended by the system design engineer.