4.20 Pressure Distribution System

Revision: ~~April 19~~February 6, 2014~~2013~~

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.
~~b~~2. Treat and dispose of effluent in the uppermost levels of the soil profile.
~~c~~3. Aid in mitigating the potential contamination of ground water.
~~d~~4. Improve the performance and increase the life span of a drainfield.

4.20.2 Approval Conditions

1. ~~a.~~ Pressure distribution ~~may~~ shall be used in drip distribution, grey water systems, sand mounds, intermittent sand filters, ~~sand-filled trenches,~~ recirculating gravel filters, ~~and standard trenches in aquifer-sensitive areas or in large~~ drainfields that exceed 1,500 ft^2 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.

   ~~Low-pressure distribution systems are required for systems that exceed 1,500 ft^2 in total trench bottom (IDAPA 58.01.03.008.4)~~.
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 drop box systems contained herein shall be followed for any alternative system utilizing these components regardless of whether the drainfield is pressurized or not (IDAPA 58.01.03.004.10).
7. The~~se guidelines~~ design guidance provided herein for piping, pump, and dosage requirements is meant to be a simple design strategy ~~to assist the nonengineer. They~~and ~~are~~ is not intended to supplant or limit engineering design ~~or other low-pressure systems~~ for these components and systems.
9. Plans for systems with designs different than those provided herein and where daily wastewater flows exceed 2,500 gallons shall be reviewed by DEQ.
10. The system must be designed by a PE licensed in Idaho.
11. The design engineer shall provide an operation and maintenance manual for the system to the health district prior to permit issuance.
12. The following guides ~~is~~ are recommended for use in pressure system design ~~outside of these guidelines~~:

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 dependent upon 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. 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 like 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 sections have components and design factors that are unique to that particular section.

4.20.3.1.1 Laterals

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.

4.20.3.1.1.1 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 further apart than 3 feet on center in bed designs and should not be placed further 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 - 4 inches for most system applications.
   b. Lateral diameter for typical individual dwelling systems range from ¾ - 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 assures relatively uniform effluent discharge down the length of the lateral.
6. Individual ball 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 be 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.

4.20.3.1.1.2 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 ¼ inch, but may be smaller or larger depending upon system design requirements.
   b. Orifices smaller than ¼ 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.

Table 4-13. Orifice discharge rate in GPM based on pressure.

	Orifice Diameter (in.)				
Pressure (ft.)	**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	1.00	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

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

5. Orifice spacing should distribute effluent as uniformly as possible over the infiltrative surface.
   a. Typical orifice spacing is 30-36 inches but may be closer or further 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 6 ft^2.
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.

4.20.3.1.1.3 Lateral Discharge Rate

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

GPM = (individual orifice discharge rate) x (number of orifices per lateral)

The total distribution system discharge rate is calculated by:

GPM = (individual lateral discharge rate) x (total number of laterals)

4.20.3.1.2 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: (1) an end manifold, (2) a central manifold, and (3) an offset manifold. End manifolds are located at one end of the distribution laterals. Central manifolds are located at the mid-point 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 to be followed:

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.

4.20.3.1.3 Transport Piping

The transport piping, or line, is the piping that connects the pump in the pump chamber and the 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. There are several design recommendations that 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 5-9.
2. Transport piping should be sloped to drain back into the dosing chamber when the pump shuts off. A small drain hole (1/4 in.) may be drilled in the transport pipe inside the dosing chamber to aid the pipe in 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 pump 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. These losses must be included in the system performance curve in order to properly select a suitable pump.

4.20.3.2 Pressurization Unit

Pressurization of the piping network occurs through a pressurization unit. This 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:

$$H_{total} = E + T + R$$

Equation 4-15. Total head.

where:

H_{total} = total head

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

T = ~~transport pressure line~~ piping network's friction head

R = residual head (~~2.~~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 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. ~~Using~~ 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 pump rate (maximum gallons per minute rating).

   ~~a.~~b. For example, a pump with a maximum capacity of 80 GPM should only be used if the operational requirement is greater than 80 GPM x 0.15 or 12 GPM.

3~~4~~. 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.

~~c~~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.

~~d~~e. Pumps and electrical connections shall conform to the requirements of the Idaho Division of Building Safety, Electrical Bureau. ~~Pumps must be kept submerged.~~

i. *For multiple residential and commercial installations* all electrical connections must be made outside the chamber in an explosion proof box.

ii. *For individual residential systems*, the electrical connections may be made in a weatherproof box.

~~i.~~iii. *Both systems require the use of a seal off.* See Figure 4-19, Figure 4-20, Figure 4-21, and accompanying text for details.

~~e~~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.

~~f~~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 in order 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). There are two types of dosing available for system pressurization. The first is demand dosing and the second is 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 pre-determined 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 utilizes a timer to deliver effluent to the drainfield on a regularly timed schedule. This 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. Some of the 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 ~~Dosage~~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. This 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. ~~Determine the dose~~ 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-~~18~~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 ~~average daily flow~~system design flow, in gallons per ~~minute~~day.

~~**Table 4-17. Minimum dosing per soil type.**~~

~~Soil Texture at Drainrock Interface~~	~~Doses per Day~~
~~Medium and fine sand~~	~~4~~
~~Loamy sand, sandy loam~~	~~1–2~~
~~Loam and finer soils~~	~~1~~

~~a~~3. ~~Daily~~ The daily dose-volume ratio should be ~~at least seven~~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 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 tank located after the septic tank or may be the last compartment of a multi-compartment septic tank. If the dosing chamber is part of a multi-compartment 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 4-19 provides a dosing chamber diagram.

1. Any system utilizing a pump located after the septic tank to deliver effluent to the drainfield (pressurized or non-pressurized) or a non-packaged alternative pretreatment

component shall locate the pump in a dosing chamber meeting the minimum requirements herein.

2. Dosing chamber must be watertight, with all joints sealed. Precautions must be made in high ground water areas to prevent the tank from floating.
3. 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 ft^2.
   b. Screen placement must not interfere with the floats and should be easily removable for cleaning.
   c. ~~Effluent~~ An effluent filter placed on the outlet of the septic tank designed~~s~~ with ~~fitted with~~ a closing mechanism when the filter is removed ~~are~~ is a suitable alternative to screens around pumps. An access riser to grade should be installed over the septic tank outlet manhole.
4. The volume of the dosing chamber should be equal to at least ~~a 2-day flow~~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 one-day's 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. Systems designed with surge capacity should be limited to facilities with varying daily wastewater flows over the period of one week (e.g., churches, golf courses, etc.).
5. The dosing chamber manhole located above the pump shall be brought to grade using a riser. Access to the pumps, controls, and screen is necessary.
6. A high level audio and visual alarm 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.
7. A low level off 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.
8. If a differential control float is used to turn the pump on and off, care must be exercised to be sure the float will effectively deal with the required dose in inches of drop in the dosing chamber.

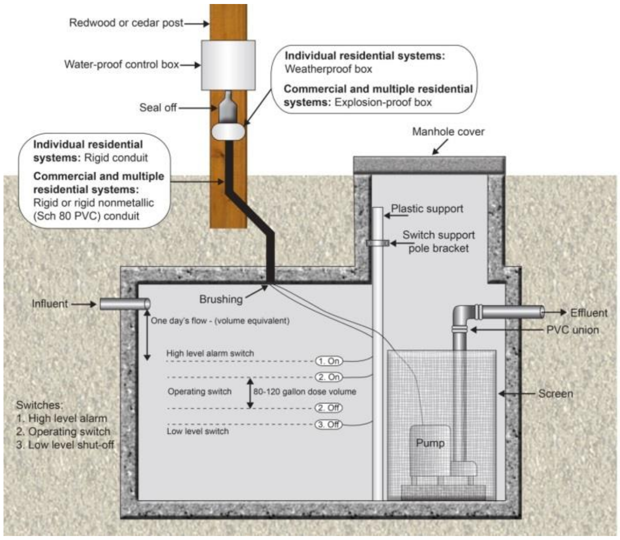

Figure 4-19. Dosing chamber with screen.

9~~3~~. Electrical requirements (contact the Idaho Division of Building Safety, Electrical Bureau):

a. Visual ~~or~~ and ~~audio~~ audible alarms should be connected to~~on~~ a separate circuit from the pump~~ must be provided to indicate when the level of effluent in the pump or siphon chamber is higher than the height of the volume of one dose~~.

b. All electrical connections must be made outside of the chamber in either an approved weatherproof box or an explosion-proof junction box (Crouse-Hind Type EAB or equivalent).

c. The lines from the junction box to the control box must pass through a sealing fitting (seal-off) to prevent corrosive gases from entering the control panel.

d. All wires must be contained in solid conduit from the dosing chamber to the control box.

~~c. Minimum effluent level must be above the pump. This is the level that the low-level off switch is set and should be 2–3 inches above the pump.~~

e~~d~~. An acceptable circuit is shown in Figure 4-20.

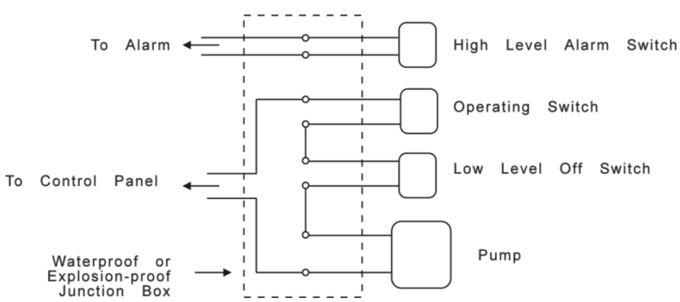

Figure 4-20. Example of float configuration.

~~e~~f. Plans and schematics for the electrical installation should be approved by the Idaho Division of Building Safety, Electrical Bureau before installation and at the same time the permit is issued.

~~f~~g. An alternative to placing the electrical connections on a pole is to place them in a dry well over the dosing chamber. The diagram in Figure 4-21 shows an arrangement acceptable to the Electrical Bureau.

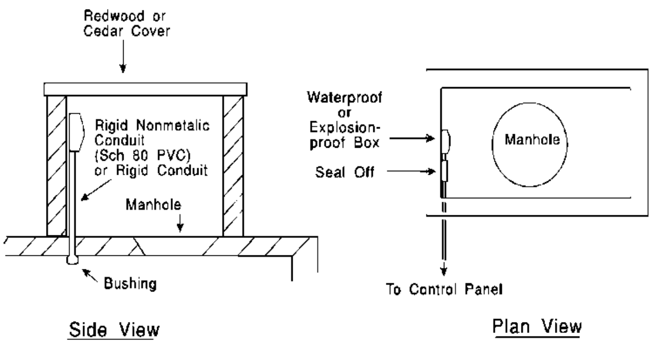

Figure 4-21. Dosing chamber drywell.

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.
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); be constructed of noncorrosive material; and have a minimum area of 12 ft^2.
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 4-22).

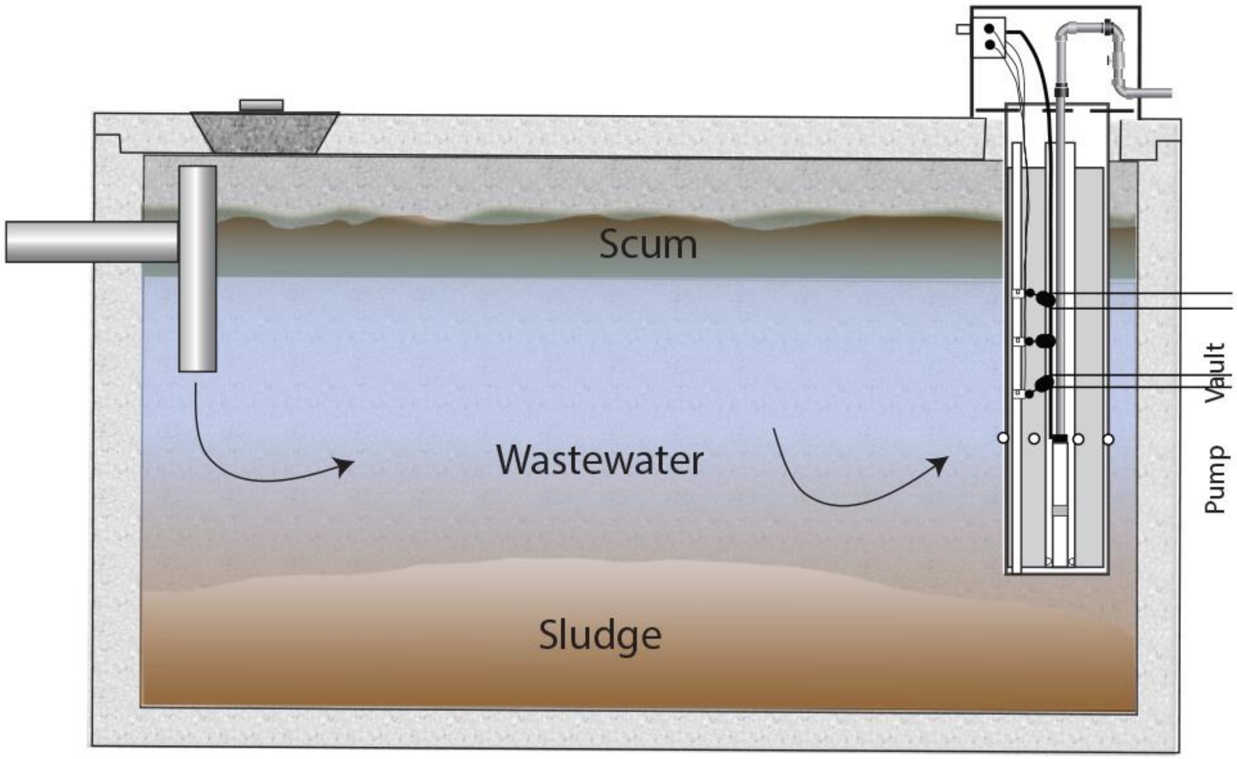

Figure 4-22. Example of effluent pump installed into single-compartment septic tank.

4.20.3.6 Pump to Drop Box

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 ft^2. 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 4-23).

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.

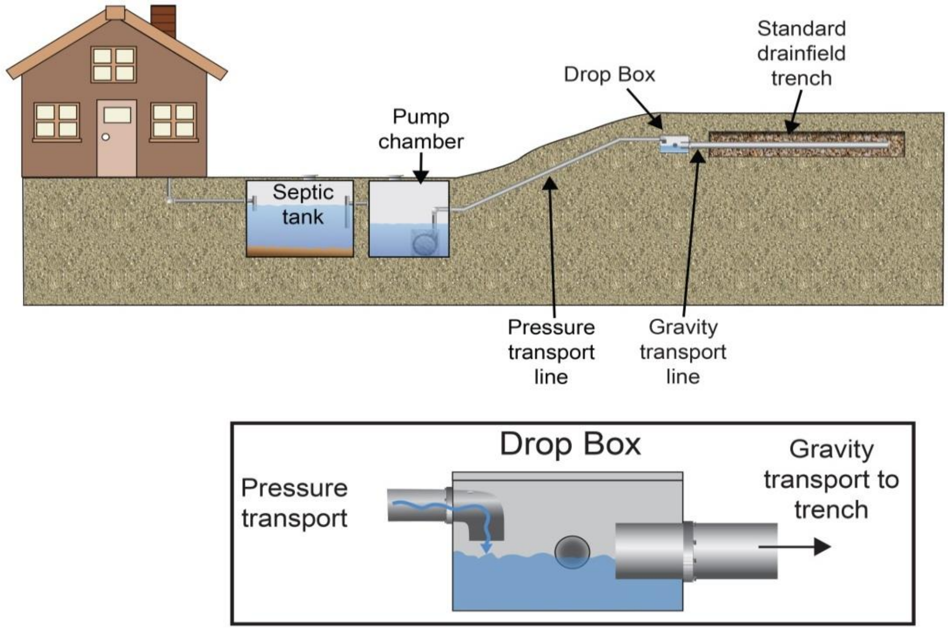

Figure 4-23. Example of pump to drop box installation.