Technical Guidance Committee Meeting

Agenda*

Thursday June 5, 2014

8:15 a.m. – 4:45 p.m.

Department of Environmental Quality
Conference Room B
1410 N. Hilton
Boise, Idaho

8:15 AM Call to Order/Roll Call
- Sign in sheet for attendees who wish to comment or present to the committee members
- Introduction of committee members, guests, and attendees

8:20 AM Open to Public Comment – ½ hour reserved for public to provide comments to the TGC on subjects not on the agenda, if no public comment is presented at start of comment period the agenda will move forward

8:50 AM February 6, 2014 Draft TGC Meeting Minutes: Review, Amend, or Approve (**Appendix A**)

8:55 AM 4.10.3 Extended Treatment Package System Operation, Maintenance, and Monitoring (**Appendix B**)**
- Review for final approval

9:15 AM 4.10.8 Extended Treatment Package System Construction (**Appendix C**)
- Review for final approval

9:25 AM 4.9 Experimental System (**Appendix D**)
- Review for final approval

9:40 AM 3.2.7 Drainfield Cover (**Appendix E**)
- Review for final approval

9:55 AM 4.28 Two-Cell Infiltrative System (**Appendix F**)
- Review for final approval

10:10 AM 4.5 Capping Fill (**Appendix G**)
- Review for final approval

10:25 AM 4.7 Drip Distribution (**Appendix H**)
- Review for final approval

10:40 AM Break – Ten Minutes

10:50 AM 3.2.8 Drainfield Excavation Backfilling Materials and Alternative System Construction (**Appendix I**)
- Review for final approval

11:10 AM 2.2 Separation Guidelines (**Appendix J**)
- Review for final approval

11:30 AM 4.25 Sand Mound (**Appendix K**)
- Review for final approval

12:00 to 1:00 P.M. Lunch

1:00 PM 4.20 Pressure Distribution System (**Appendix L**)
- Review for final approval

1:30 PM 4.22 Recirculating Gravel Filter (**Appendix M**)
- Review for final approval

2:15 PM 4.1 General Requirements (**Appendix N**)
- Review for preliminary approval

2:45 PM 1.5 Installer Registration Permits (**Appendix O**)
- Review for preliminary approval

3:10 PM Break – Ten Minutes

3:20 PM 4.17 Lagoon (**Appendix P**)
- Review for preliminary approval

3:50 PM 4.3 Existing and Approved System Rights, Abandoned and Unapproved Systems, and Nonconforming Uses (**Appendix Q**)
- Review for preliminary approval

4:20 PM 3.2.3.1 Conversion of a Septic Tank to a Lift Station (**Appendix R**)
- Review for preliminary approval

4:45 PM Adjourn
- Meeting may adjourn early dependent upon discussion, interest, and participation for each agenda item
- If needed meeting will run until 4:45 PM to resolve any lingering discussions or issues on the agenda items

*Begin and end time will be observed. Agenda items and their allotted times my vary dependent upon the amount of interest and participation for each item.

** Agenda appendices starting at Appendix B are color coded to track changes. Blue text indicates changes that were made in previous Technical Guidance Committee (TGC) meetings. Red text indicates changes that are newly proposed for this TGC meeting. All green text indicates text that was moved from one area of a section to the new area. ~~All text with strikeout markings regardless of color is either proposed to be deleted from the guidance or moved to another location within that section.~~

The call in number is (208) 373-0101 Bridge # 2

To Join a Conference Call

1) Auto-Attendant Transfer Option

Conference Call Auto-Attendant Number:

- Extension 0101: Inside DEQ phone system
- (208) 373-0101: Outside callers

Participants call auto-attendant number and are then prompted to enter their pre-arranged conference call bridge number and in this case press the number **2**. Once the bridge number has been entered, callers are automatically connected to their conference call.

Notification

As participants are added to a conference call, an audible chime is heard by participants already connected to the call. If the conference is in progress when the chime is sounded, it is advisable to acknowledge the new participant and ask who has joined the call. This will ensure that the new caller has gained access to the proper call.

HP Rooms Instructions

To Join HP Rooms

This will allow users joining the meeting via conference call to view the same computer material that the subcommittee members are seeing at the meeting location. To hear audio users will still need to call the conference call number above from their telephone.

Due to the time limitations of this program there are two sessions that must be attended. The morning session runs from 8:15 a.m. – 12:00 p.m. (Mountain Time) and the afternoon session runs from 1:00 p.m. – 4:45 p.m. (Mountain Time). Each user must log in to each session individually once the session time begins. Login information is below.

1) Visit the Website Below

- rooms.hp.com/attend
- Enter your first and last name in the area provided
- Enter the meeting key

Meeting Keys:

- EPDCAD9D8K (morning)
- EPSWBW6HRE (afternoon)

Appendix A

Technical Guidance Committee Meeting

Draft Minutes

Thursday, February 6, 2014

Department of Environmental Quality
Conference Room C
1410 N. Hilton
Boise, Idaho

TGC ATTENDEES:

Tyler Fortunati, R.E.H.S., On-Site Wastewater Coordinator, DEQ
Joe Canning, P.E., B&A Engineers
Bob Erickson, Senior Environmental Health Specialist, South Central Public Health District
David Loper, Environmental Health Director, Southwest District Health Department
Michael Reno, Environmental Health Supervisor, Central District Health Department
George Miles, P.E., Advanced Wastewater Engineering, Inc.

GUESTS:

Chas Ariss, P.E., Wastewater Program Manager, DEQ
Ryan Spiers, Alternative Wastewater Systems, LLC
Allen Worst, R.C. Worst & Co.
Matt Gibbs, Infiltrator Systems, Inc.
AJ Maupin, P.E., Wastewater Program Lead Engineer, DEQ
Kellye Eager, Environmental Health Director, Eastern Idaho Public Health Department (via telephone and HP rooms)
Nathan Taylor, Environmental Health Supervisor, Eastern Idaho Public Health Department (via telephone and HP rooms)
Janette Young, Administrative Assistant, DEQ

CALL TO ORDER/ROLL CALL:

Meeting called to order at 9:15 a.m.
Committee members and guests introduced themselves.

OPEN PUBLIC COMMENT PERIOD:

This section of the meeting is open to the public to present information to the TGC that is not on the agenda. The TGC is not taking action on the information presented.
No public comments were submitted during the allotted agenda timeframe.

MEETING MINUTES:

October 31, 2013 Draft TGC Meeting Minutes: Review, Amend, or Approve

The minutes were reviewed and amendment was made to the meeting adjournment time.

Motion: George Miles moved to approve the minutes as amended.

Second: Michael Reno.

Voice Vote: Motion carried unanimously.

Minutes will post as final. See DEQ website and **Appendix A**

Action Item: Request by Michael Reno to have a color code key to track dates of revisions made to materials provided to TGC members.

OLD BUSINESS/ FINAL REVIEW:

4.24 In-Trench Sand Filter

This TGM Section was posted for public comment. There were no public comments received on this section.

Joe Canning and George Miles asked for clarification on the soil application rates provided in the TGM for this section. Tyler Fortunati provided clarification on why the application rates were set at the specified rates.

Joe Canning requested that a statement be included under the pressurized in-trench sand filter design that the pressure distribution system design meets the guidance in section 4.20 of the Technical Guidance Manual (TGM). This statement was added to the pressurized in-trench sand filter section.

Discussion was held regarding the proposal to require that the permit applicant provide a copy of their electrical permit prior to septic permit issuance. The committee was split 3-2 over accepting this approval. There was concern regarding liability to the health districts if this step was forgotten on a permit. Additionally, enforcement of compliance with the electrical code is not under the health district's jurisdiction. This proposal was removed from the system guidance.

Motion: Joe Canning moved that the TGC recommend final approval to DEQ for Section 4.24 In-Trench Sand Filter as amended.

Second: George Miles.

Voice Vote: Motion carried unanimously.

Section will post to TGM as final. See DEQ website and **Appendix B.**

4.4 Easement

This TGM Section was posted for public comment. There were no public comments received on this section.

Discussion was held on Section 4.4.1 Easement Restrictions. There is concern over the application of easement restrictions for multiple transport pipes in a single trench or easement. The committee requested that this particular restriction be tabled to ensure consistency between DEQ's wastewater plan and specification guidance related to collection systems and this particular easement restriction. The remainder of the guidance will move forward for final approval.

Motion: Michael Reno moved that the TGC recommend final approval to DEQ for Section 4.4 Easement with elimination of restriction number 1 relating to multiple transport pipes in a single trench or easement under Section 4.4.1 Easement Restrictions.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

Action Item: George Miles requested that DEQ reintroduce an easement restriction related to multiple transport pipes in a single trench or easement for further discussion at the next meeting once consistency between DEQ's programs is achieved.

Section will post to TGM as final. See DEQ website and **Appendix C.**

NEW BUSINESS/DRAFT REVIEW

4.25 Sand Mound

The committee removed the proposed requirement that electrical and plumbing permits must be provided by the applicant prior to septic permit issuance.

Tyler Fortunati brought the issue of sand mound loading rates up to the committee. The intermittent sand filter has a loading rate of 0.7 gallons/ft^2 and the 24 inch sand mound has a loading rate of 1.0 gallons/ft^2. Both system designs receive the same reduction in separation distance from limiting layers. The committee determined that the application rates were probably not that different when you take into account the sand mound is designed with a safety factor of 1.5 applied to the daily flow. This ensures that effluent is distributed over a larger area making up for the difference in loading rates.

Tyler Fortunati presented several amendments that update the sand mound guidance to more closely match the design used for sand mounds in several other jurisdictions around the United States. The amendments also match the design recommendations of the Wisconsin Mound Manual and the associated university research on this type of system design. Discussion on the amendment ensued.

Motion: Joe Canning moved that the TGC recommend preliminary approval to DEQ of Section 4.25 Sand Mound with the noted action items.

Second: George Miles.

Voice Vote: Motion carried unanimously.

Action Items:

1. Move H in Figure 4-33 to a more visible location on the figure.
2. Adjust the design checklist and add back in items 7 and 8.
3. Look into suggested ripping/scarification widths and depths.
4. Move the 15 foot description in Figure 4-34 so it is not split by the arrow and make this dimension a minimum.

See **Appendix D** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

10:47 a.m. Break

10:57 a.m. Meeting Resumed

2.2 Separation Guidelines

The committee reviewed the proposal on the TGM guidance for implementation of the Drainfield to Surface Water Setback Distance guidance and model.

There was discussion on the minimum phosphorous sorption site life of each drainfield. The proposal was initially set at 200 years as the site life for each drainfield in relation to the soil's ability to sorb phosphorous. Tyler Fortunati stated that this was just an initial proposal to start discussions. AJ Maupin provided testimony that there is no recommended site life for this type of situation in the literature and that this guidance and model are unique to Idaho. The committee discussed what their views of an acceptable site life are. There was not a consensus so the committee took a vote on the various site life proposals. The vote resulted in 3 committee members for a 100 year site life, 1 committee member for a 200 year site life, and 1 committee member abstained. The site life requirement was amended to 100 years.

Motion: George Miles moved that the TGC recommend preliminary approval to DEQ of Section 2.2 Separation Guidelines with the amendments made today.

Second: Michael Reno.

Voice Vote: 4 ayes, 1 opposed. Motion carries.

See **Appendix E** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

11:40 a.m. Break for Lunch
12:40 p.m. Meeting resumed

4.20 Pressure Distribution System

Tyler Fortunati presented extensive revisions to this section of the TGM. The committee reviewed and discussed the proposed revision.

The proposal to require the applicant to provide a copy of the electrical permit prior to septic permit issuance was removed. Several other minor amendments were made to the proposed revision. The committee provided a couple action items for DEQ prior to the next review of this section.

Motion: Michael Reno moved that the TGC recommend preliminary approval to DEQ of Section 4.20 Pressure Distribution System as amended today and with the noted action items.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

Action Items:

1. Create a new subsection that includes minimum operation and maintenance and inspection requirements.
2. Develop a new figure that depicts a dosing chamber with an in-tank pump installation.

See **Appendix F** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

4.5 Capping Fill Trench

The committee reviewed the proposed revision to this section of the TGM.

Motion: Michael Reno moved that the TGC recommend preliminary approval to DEQ of Section 4.5 Capping Fill Trench.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

See **Appendix G** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

4.9 Experimental System

The committee reviewed the proposed revision to this section of the TGM.

The proposed requirement for the applicant to provide a copy of the electrical or plumbing permit prior to septic permit issuance was removed.

The proposed requirement that the site of the experimental system installation meet the site requirements for installation of a basic alternative system was amended to allow for sites suitable for any alternative system.

Motion: Bob Erickson moved that the TGC recommend preliminary approval to DEQ of Section 4.9 Experimental System as amended.

Second: George Miles.

Voice Vote: Motion carried unanimously.

See **Appendix H** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov.

4.7 Drip Distribution System

Tyler Fortunati stated that this section was revised to reorganize the continuous and non-continuous flush system and to provide clarification that pre-treatment of effluent must occur prior to effluent discharge to the drip distribution system.

The proposed requirement for the applicant to provide a copy of the electrical or plumbing permit prior to septic permit issuance was removed.

The committee reviewed the other minor amendments made to the guidance for this alternative system design.

Motion: Michael Reno moved that the TGC recommend preliminary approval to DEQ of Section 4.7 Drip Distribution System as amended.

Second: Bob Erickson.

Voice Vote: Motion carried unanimously.

See **Appendix I** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

3.2.7 Drainfield Cover and 3.2.8 Drainfield Excavation Backfilling Materials and Alternative System Construction Media

The committee reviewed the proposed amendment to section 3.2.7 and the addition of section 3.2.8. Tyler Fortunati identified to the committee that the proposal in section 3.2.7.1 will require that all drainfields installed as part of an alternative system must be covered by geotextile fabric. Straw and building paper would only be allowed for cover over a standard drainfield, absorption bed, or seepage pit as allowed by IDAPA 58.01.03.008. Tyler Fortunati also identified that the creation of section 3.2.8 moved all of the construction media (i.e., medium sand, drainfield aggregate, pea gravel, and pit run) specification to this section. It also creates a standardized system for source approval by the health districts for these types of material.

The committee reviewed the proposed revision. Discussion was held regarding the changes made to the material specifications for pea gravel. Tyler Fortunati explained that this change was made to bring the material in conformance with the Environmental Protection Agency's guidance on recirculating gravel filter construction and so that the media fit the TGM's textural classifications as presented in section 2.1.1 of the current TGM. The committee requested that DEQ contact gravel pits to determine how difficult this media size change would be to comply with.

Motion: George Miles moved that the TGC recommend preliminary approval to DEQ of Section 4.7 Drip Distribution System as amended.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

Action Item: Call gravel pits to determine how hard it will be for them to produce 1/8 inch pea gravel instead of 3/8 inch pea gravel and if the cost difference will be significant.

See **Appendix J** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

4.28 Two-Cell Infiltrative System

The committee reviewed the proposed revision to this section of the TGM.

Motion: Joe Canning moved that the TGC recommend preliminary approval to DEQ of Section 4.28 Two-Cell Infiltrative System.

Second: George Miles.

Voice Vote: Motion carried unanimously.

See **Appendix K** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

4.22 Recirculating Gravel Filter

Tyler Fortunati explained that this alternative system guidance was revised to better align with the Environmental Protection Agency's recommended design standards. This will allow the design engineer more options in the design of this system, but will not load the filter at a rate higher than 25 gallons/ft^3 per day as the existing guidance already allows. The committee reviewed the proposed amendments.

The proposed requirement for the applicant to provide a copy of the electrical or plumbing permit prior to septic permit issuance was removed. The committee provided several action items for DEQ and George Miles committed to emailing his design recommendations to DEQ.

Motion: Bob Erickson moved that the TGC recommend preliminary approval to DEQ of Section 4.22 Recirculating Gravel Filter as amended.

Second: George Miles.

Voice Vote: Motion carried unanimously.

Action Items:

1. Look into covering the gravel filter with soil or another material to allow adequate oxygen infiltration as part of the construction requirements.
2. Include a construction requirement for a vent on the filter box for oxygen infiltration and include this element on the system figures.
3. George Miles will email DEQ his design element details.

See **Appendix L** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

2:35 p.m. Break

2:45 p.m. Meeting Resumed

4.10.3 Extended Treatment Package System: Operation, Maintenance, and Monitoring

The committee reviewed the proposed amendment to this section that increases the amount of time for servicing and resampling an ETPS unit that has failed its initial effluent testing. The timeframe is increased from 30 to 45 days.

Motion: Michael Reno moved that the TGC recommend preliminary approval to DEQ of Section 4.10.3 Operation, Maintenance, and Monitoring.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

See **Appendix M** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov .

4.10.8 Construction

The committee reviewed the proposed amendment to this section that requires the health districts to record the installed ETPS unit's manufacturer, product, and model number upon final inspection.

Motion: Michael Reno moved that the TGC recommend preliminary approval to DEQ of Section 4.10.8 Construction.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

See **Appendix N** and provide public comment to Tyler Fortunati at 208-373-0140 or by email at tyler.fortunati@deq.idaho.gov

Failure to Resample Letter and Failure to Submit Annual Report

Tyler Fortunati provided new letters that will be used in the ETPS Education and Enforcement efforts for feedback or proposed amendments from the committee. No changes were made. These letters are not part of the TGM and therefor will not be provided for public comment.

See **Appendix O** and **P**.

NEXT MEETING:

The next committee meeting is scheduled to be on June 5th, 2014, 9:15 a.m. – 4:30 p.m. at the DEQ State Office building.

Motion: George Miles moved to adjourn the meeting.

Second: David Loper.

Voice Vote: Motion carried unanimously.

The meeting adjourned at 3:12 p.m.

Appendix B

4.10.3 Operation, Maintenance, and Monitoring

Procedures relating to operation, maintenance, and monitoring are required by IDAPA 58.01.03 (section 8.1) or may be required as a condition of issuing a permit, per IDAPA 58.01.03.005.14 (section 8.1) to ensure protection of public health and the environment.

1. Operation and maintenance

   a. Annual maintenance shall be performed on the ETPS unit as described in the ETPS manufacturer's O&M manual for the ETPS model as submitted under section 4.2.

   b. Additional maintenance not specified in the O&M manual may be required to ensure the ETPS functions properly.

   c. Records of each maintenance visit shall be kept and should include the following information for the primary maintenance visit:

      1) Date and time.
      2) Observations for objectionable odors.
      3) Observation for surfacing of effluent from the treatment unit or drainfield.
      4) Notation as to whether the system was pumped since the last maintenance visit including the portions of the system pumped, pumping date, and volume.
      5) Sludge depth and scum layer thickness in the primary septic tank and treatment unit.
      6) If responding to an alarm event, provide the cause of the alarm and any maintenance necessary to address the alarm situation.
      7) Field testing results for any system effluent quality indicators included in the approved sampling plan as submitted under section 4.2.4 or as recommended in item 2(b) below.
      8) Record of any cleaning and lubrication.
      9) Notation of any adjustments to control settings or equipment.
      10) Test results for pumpers, switches, alarms, and blowers.
      11) Notation of any equipment or component failures.
      12) Equipment or component replacement including the reason for replacement.
      13) Recommendations for future service or maintenance and the reason for the recommendations.
      14) Any maintenance occurring after the primary annual maintenance visit should only record and address the reason for the visit and the associated activities that occur.

2. Monitoring

a. Annual effluent monitoring will be required for all ETPS units that discharge to a reduced size drainfield, to a drainfield with a reduced separation distance to limiting layers, and/or to a drainfield located in an environmentally sensitive area (area of concern).

Annual monitoring included in the annual report must occur within the reporting period (Figure 4-8).

b. DEQ recommends prior to collecting effluent samples from the treatment unit for laboratory analysis that effluent quality indicators be field tested as described in the approved sampling plan for the O&M entity. Recommendations included in this section are recommendations only and should be verified with the treatment technology manufacturer as acceptable with their field sampling plan and as suitable effluent quality indicators. Field testing is recommended to include, but may not be limited to the following:

1) Visual examination for wastewater color, odor, and effluent solids

2) Constituents shown in Table 4-5:

Table 4-5. Recommended field testing constituents for effluent quality indication.

Constituent	Acceptable Range
pH	6 to 9
Dissolved oxygen	≥ 2 mg/L
Turbidity	≤ 40 NTU

Notes: milligram per liter (mg/L); nephelometric turbidity unit (NTU)

c. Monitoring samples provided to a laboratory will analytically quantify that the units are operating in compliance if samples do not exceed 40 mg/L (40 ppm) for $CBOD_5$ and 45 mg/L (45 ppm) for TSS.

Results for $CBOD_5$ and TSS that exceed these levels indicate the ETPS unit is not achieving the required reduction levels.

d. For those systems installed in areas of concern, including nitrogen sensitive areas, or are used to fulfill NP evaluation results and requirements, the following additional constituents may be monitored as stipulated on the permit:

1) Total Kjeldahl nitrogen (TKN)

2) Nitrate-nitrite nitrogen (NO3+NO2-N)

3) Results for total nitrogen (TN = TKN + [NO3+NO2-N]) that exceed the levels stipulated on the installation permit, in the subdivision approval for sanitary restrictions release, or the approved NP evaluation, indicate that the device is failing to achieve the required reductions.

e. Samples will be collected, stored, transported, and analyzed according to the latest version of *Standard Methods for the Examination of Water and Wastewater* (Rice et al. 2012) and other acceptable procedures.

   1) Each sample will have a chain-of-custody form, identifying, at a minimum, the sample's source (street address or installation permit number), date and time of collection, and the person who extracted the sample.

   2) Chain-of-custody form should also specify the laboratory analyses to be performed on the sample.

   3) Sample storage and transport will take place in appropriate containers under appropriate temperature control.

f. Sample analysis will be performed by a laboratory capable of analyzing wastewater according to the acceptable standards identified in Table 4-6, and the monitoring results will be submitted as part of the annual report to the local health district.

   1) ETPS effluent analysis shall be performed using the standards in Table 4-6 from the *Standard Methods for the Examination of Water and Wastewater* (Rice et al. 2012) or the equivalent standards from the Environmental Protection Agency (EPA). NSF uses the same standards in their Standard 40 and 245 evaluations.

   2) Annual reports submitted with laboratory analysis results differing from these standard methods will be rejected.

Table 4-6. Standard methods required for the analysis of ETPS effluent in annual testing.

Analysis	Standard Method Number	EPA Method Equivalent to Standard Method
Total suspended solids (TSS)	SM 2540 D	-
Carbonaceous biological oxygen demand ($CBOD_5$)[a]	SM 5210 B	-
Total Kjeldahl nitrogen (TKN)	SM 4500-N_{org} ~~H3~~ ~~C~~B	351.2
Nitrate-nitrite nitrogen (NO_3 + NO_2-N)	SM 4500-NO_3^- F	353.2

a. Person requesting the analysis from the laboratory must specify the $CBOD_5$ on the chain-of-custody form.

g. Samples failing to achieve the required effluent constituent levels shall require the following:

   1) Additional operation and maintenance within 15 days of the failed sample results as determined by the date provided on the laboratory form.

   If additional operation and maintenance or component replacement is necessary as determined from this service; the reason, maintenance necessary, and dates must be provided as part of the service record.

2) Additional sampling to demonstrate the operation and maintenance performed successfully restored the treatment system to proper operation.

3) Sample extraction and analysis ~~should~~ needs to occur within 30 days after servicing the system (as determined in item 1 above).

The 30 day timeframe for sample extraction will begin based on the last documented operation and maintenance visit required under item 1 above.

4) A maximum of three sampling events, within 90 days (as determined from the last documented operation and maintenance visit from item 1 above), will be allowed to return the system to proper operation. Failure to correct the system within this time frame will result in the system being classified as a *failing system* (Figure 4-9).

5) If an annual report as described in section 4.10.4 for a system identifies that an effluent sample fails to meet the limits provided in item 2.c and .d above and the required resampling of the system did not occur, the regulatory authority will issue the Failure to Resample letter provided in the DEQ program directive, "Extended Treatment Package System Education and Enforcement Letters."

    i) If resampling as described in this section does not occur by the date provided in the Failure to Resample letter the actions will be considered a refusal of service as described in section 4.10.6 and the enforcement procedures provided in section 4.10.6 shall be followed by the regulatory authority.

Appendix C

4.10.8 Construction

Procedures relating to construction are required by IDAPA 58.01.03 (section 8.1) or may be required as permit conditions, as appropriate, to ensure the protection of public health and the environment.

1. Installation

a. A licensed complex system installer shall be required to install an ETPS unit and all other portions of the septic system connected to the ETPS unit or that the ETPS unit discharges to (IDAPA 58.01.03.006.01.b).

b. A public works contractor may install an ETPS unit if they are under the direct supervision of a PE licensed in Idaho.

c. Licensed plumbers and electricians will be required to install specific devices and components for proper system operation. If the device requires any on-site fabrication or component assembly, a public works contractor should be used.

d. A sample port will be installed in the effluent line after the aerobic treatment unit. Figure 4-11 shows the placement of a sampling port after the ETPS unit, and Figure 4-12 shows the sample port and drainfield after the septic and treatment tank.

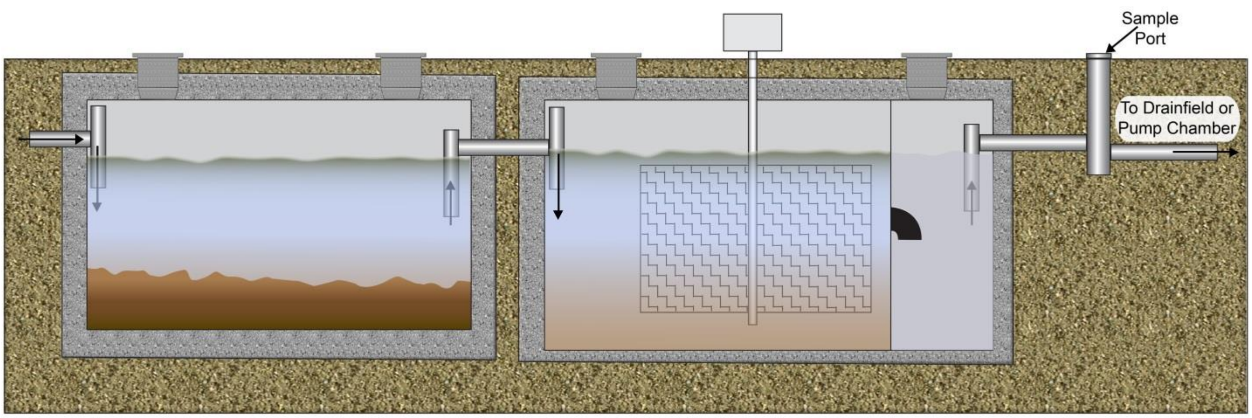
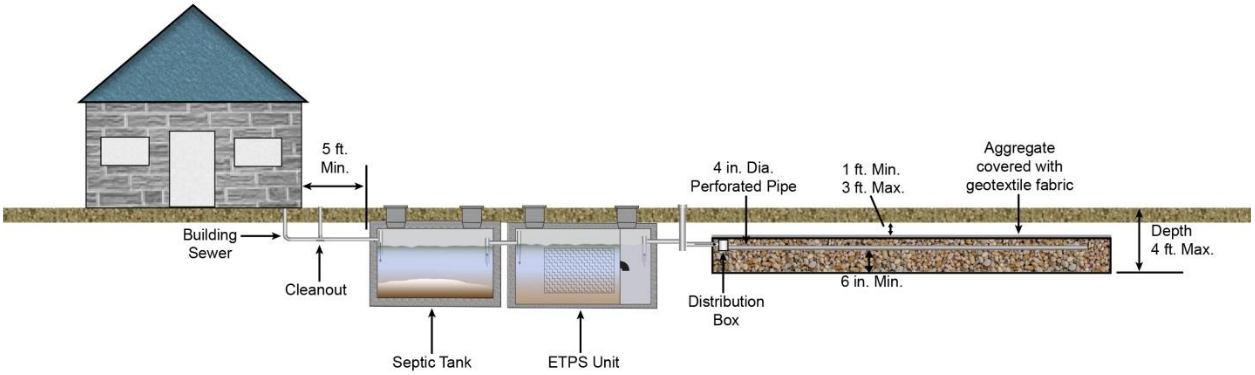


Figure 4-11. Sampling port example.



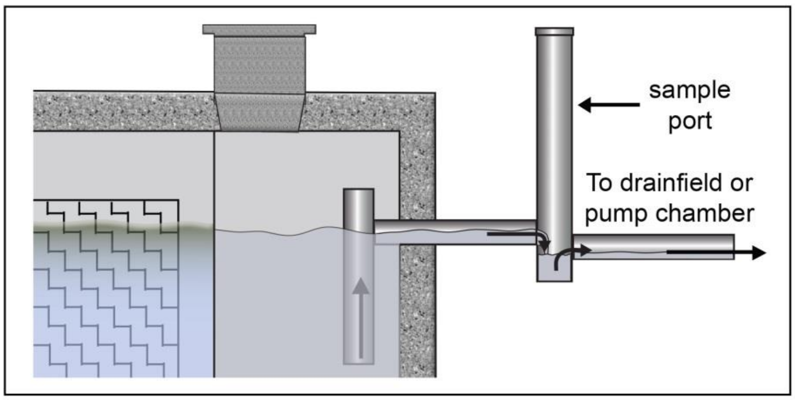


Figure 4-12. Sampling port and drainfield.

2. Within 30 days of completing the installation, the property owner shall provide certification to the regulatory authority, from their O&M entity, that the system has been installed and is operating in accordance with the manufacturer's recommendations (IDAPA 58.01.03.005.15).
    a. A statement requiring the submission of the installation verification form described above shall be written on the face of the subsurface sewage disposal permit.
    b. The regulatory authority shall not finalize the subsurface sewage disposal permit until the certification of proper installation and operation is received.
3. Upon ETPS unit installation the health district shall record the installed unit's manufacturer, product, and model number on the final inspection form.

Appendix D

4.9 Experimental System

Revision: ~~April 21, 2000~~June 5, 2014

4.9.1 Description

An experimental system includes an individual or subsurface sewage disposal system or component that has not been previously used in Idaho or one that requires field review before approval as an alternative system or subsurface sewage disposal system component.

4.9.2 Approval Conditions

1. If produced by a manufacturer, the experimental system should remain in the ownership of that manufacturer until ~~the alternative status~~approval of the system or component has been ~~assigned~~provided as described by IDAPA 58.01.03.009 or section 1.4 of this manual.

2. All information required by IDAPA 58.01.03.009.02-.03 regarding the system or component shall be provided to DEQ prior to subsurface sewage disposal permit issuance.

3. The manufacturer and property owner must hold DEQ and the health district harmless from any liability arising from use of the system.

4. A variance ~~is required for use of an~~must be approved by DEQ as described in IDAPA 58.01.03.010 prior to permit issuance by the health district for the experimental system the petition for variance should be submitted to DEQ's On-Site Wastewater Coordinator.

   a. The variance hearing committee shall be composed of DEQ Wastewater Program and health district staff.

   b. A subsurface sewage disposal permit application must be submitted to the health district that the experimental system is intended to be installed within prior to submission of the petition for variance to DEQ.

5. The site for system or component installation must otherwise be acceptable for a standard system or approved alternative system.

~~4.~~6. The property owner must ~~also~~ agree to replace the experimental system with a standard system or approved alternative system that meets the requirements of IDAPA 58.01.03 should DEQ or the health district determine that the system is a failing system (IDAPA 58.01.03.004.05).

~~5.~~7. Conditions for use of the system should be contained in the permit, including, if necessary, operation and maintenance requirements and conditions for abandonment (IDAPA 58.01.03.005.13 and 58.01.03.005.14).

6.8. It is recommended that the property owner or manufacturer secure a performance bond in the amount of the replacement system.

4.9.3 Design

1. The design of the system should shall be provided by a PE licensed in Idaho, unless the design is a pre-manufactured and packaged system or component.

2. All components in contact with wastewater, effluent, or treated wastewater must be compatible with those waters. Such products should not decompose, dissolve, or otherwise contaminate processed waters at the point of discharge from the unit.

3. All components subject to wear or maintenance must be easily accessible and replaceable.

4.9.4 Construction

1. Installation instructions provided by the manufacturer should be used when installing the system.

2. Licensed public works contractors, plumbers, or electricians may be required to install respective components of experimental systems.

4.9.5 Operation and Maintenance

1. An operation and maintenance manual shall be provided by the system or component's design engineer or manufacturer to DEQ and the health district prior to permit issuance.

1.2. All operation and maintenance specified by the design engineer or manufacturer and DEQ or the health district shall be contained in the manual and provided as part of the permit application (IDAPA 58.01.03.005.14).

Appendix E

3.2.7 Drainfield Cover

Drainfield cover consists of two components. These are the soil barrier and the soil placed over the soil barrier as final cover. There are several elements to consider for both components that are discussed below.

3.2.7.1 Soil Barrier

IDAPA 58.01.03.008.07 requires that drainfield aggregate must be covered throughout the drainfield by a soil barrier. For standard subsurface sewage disposal systems, standard absorption beds, and seepage pits the soil barrier may consist of untreated building paper, synthetic filter fabric (geotextile), or a 3 inch layer of straw or other acceptable permeable material. Other permeable materials proposed for use as a soil barrier will be considered on a case-by-case basis and must be approved by the health district prior to installation in the standard subsurface sewage disposal system. Although straw and untreated building paper may be used to cover ~~drainrock~~drainfield aggregate, geotextiles of greater than 1 ounce per square yard weight are recommended. These materials are particularly recommended in soils that may flow when wet, such as uniform fine sands or silts ~~and in pressure distribution systems~~.

Soil barriers used for all basic and complex alternative systems not listed within IDAPA 58.01.03.008 ~~should~~ shall use geotextile filter fabric to cover the drainfield aggregate. Additionally, all large soil absorption systems shall also utilize geotextile filter fabric as the soil barrier (IDAPA 58.01.03.013.04.i). Some approved gravelless trench components used for drainfield aggregate replacement may not need to be covered with a soil barrier. The soil barrier requirements for each gravelless trench component should be based on the product manufacturer's recommendations.

3.2.7.2 Soil Cover

Every drainfield must have a soil cover installed after the system's installation and subsequent final inspection by the health district. The minimum depth of soil that must be placed over the top of a drainfield is 12 inches (IDAPA 58.01.03.008.04). The maximum depth of soil that may be placed over the top of a drainfield is 36 inches (IDAPA 58.01.03.008.04). These depths are intended to keep effluent from reaching the ground surface through the drainfield, mitigate ~~the rise of~~ nuisance odors from the drainfield, and allow oxygen to reach the drainfield and its surrounding soils.

Soil used to cover the drainfield should be the same as or one soil group finer than that of the native site material around and above the drainfield. Cover soil should be consistent with one of the approved soil design groups provided in Table 2-4. No soil finer than clay loam should be used as cover over the drainfield. All soil used as cover shall be free of debris, stones, frozen clods, and ice or snow.

Care should be taken to account for settling of the cover soil. Extra cover may be necessary to achieve the desired fill depth after the cover soil settles. All cover placed over the drainfield should be placed in a manner that prevents the blockage and accumulation of surface runoff over the drainfield. Cover that is placed above grade should not exceed a 3:1 slope. Mechanical compaction of the drainfield cover is not allowed. The drainfield and the associated soil cover shall not be covered by any impermeable surface barriers (IDAPA 58.01.03.008.09).

Appendix F

4.28 Two-Cell Infiltrative System

Revision: ~~April 21, 2000~~June 5, 2014

4.28.1 Description

Domestic sewage is discharged into a two-cell infiltrative system (TCIS). The cells provide sewage storage during wet seasons. The second cell provides very slow infiltration into the surrounding soils. Evaporation and more rapid infiltration occur during dry seasons, reducing the liquid volume and replenishing the cell's storage capacity.

4.28.2 Approval Conditions

1. Cells may not be placed within 100 feet of the owner's property line and may not be placed within 300 feet from a neighboring dwelling.
2. Bottom of the finished cells must meet the effective soil depths for a design group C soil.
3. Soil design group must be C or *unsuitable clays*.
4. Site must be located in an area of maximum exposure to the sun and wind.
5. Slope must not be greater than 6%.
6. System cannot be placed on fill.
7. Source of make-up water with a backflow prevention system between the source and the TCIS must be readily available.
8. ~~7.~~ Lot size shall be at least 5 acres.
9. This design is for an individual residential dwelling with up to six bedrooms and is not to be used for commercial or industrial nondomestic wastewater.
10. In areas of Idaho where the precipitation exceeds evaporation by more than 6 inches, this design would be considered experimental.
11. A reserve area equal to the size of the second cell shall be required.

4.28.3 Design ~~Volume~~

1. The first cell is approximately 32,100 gallons at a liquid depth of 4 feet~~. The first cell~~ and should operate full or nearly full at all times.
2. If the water level of the first cell drops below 2 feet, make-up water is added to raise the ~~first cell~~ water level up to the 2-foot minimum pool.
3. The second cell is approximately 51,000 gallons at a liquid depth of 4 feet~~. This~~ which provides 182 days or about 6 months storage when this cell is dry.
4. Total minimum volume of both cells combined is 83,100 gallons at a liquid depth of 4 feet.

4.28.4 Construction

1. Shallow permeable topsoils shall be removed before starting excavation and construction (topsoils may be saved and used to provide vegetative cover on the dike embankments).
2. Dike levees, embankments, and inlet piping trenches shall be compacted to 95% standard proctor density.
3. No vehicles with pneumatic tires shall be permitted on the basal area or inside slope of the second cell.
4. Sewage discharge inlet must be placed in the center of the basal area of both~~the first~~ cells.
5. Concrete splash pad must be constructed around the discharge inlets.
6. Water depth gauges clearly visible from the edge of ~~the~~ both cells shall be installed.
7. ~~8.~~7. Cleanout must be placed on the gravity effluent lines at a point above the maximum liquid elevation.
8. If the sewage is pumped to the system, a check valve, and a shutoff valve must be placed between the pump and system so that repairs can be completed without draining the cells.
9. Excavation must provide the following dike and embankment details: ~~listed in Table 4-28.~~
    a. Inner slope – 3:1
    b. Outer slope – 2:1 or flatter
    c. Embankment width – 4 feet minimum

~~**Table 4-28. Dike and embankment slope minimums.**~~

~~Dike and Embankment~~	~~Minimum Slopes~~
~~Inner slopes~~	~~3:1~~
~~Outer slopes~~	~~2:1~~
~~Embankment width (top)~~	~~4 feet minimum~~

10. System must be fenced to exclude children, pets, and livestock. A sign on the fence indicating *Danger—Human Sewage* shall be erected.
11. ~~9.~~11. Diversion ditches or curtain drains must be installed on sloping terrain to prevent surface runoff from entering the system.

    ~~A reserve area equal to the size of the second cell shall be required.~~

12. ~~10.~~12. Before operation of the system, the first cell shall be filled with 2 feet of make-up water.

    ~~Shallow permeable topsoils shall be removed before starting excavation and construction (topsoils may be saved and used to provide vegetative cover on the dike embankments).~~

Dike levees and embankments shall be adequately compacted. Inlet piping trenches shall be compacted to 90% standard proctor density.

No vehicles with pneumatic tires shall be permitted on the basal area or inside slope of the cells.

13. Top and outer embankment shall be seeded or adequately protected from erosion.

4.28.5 Inspection

Inspections may be required during construction and after completion. Inspections shall include slope verification, interior and exterior dimensions, splash pads, clean outs, signs, fencing, O&M manual, and embankment seeding.

1. A preconstruction conference should be held between the health district and installer.
2. 11.2. Site must be inspected at the time the cells are excavated.
3. All required system components and design elements shall be inspected.
4. 12.4. Inspections may beis required during embankment construction to ensure verify that all fill materialadequacy of fill compaction is compacted to 95% proctor density.
5. 13.5. Prior to operation and before filling the first cell with make-up water, a final inspection shall be completed.

4.28.6 Operation and Maintenance

O&M procedures shall be followed as outlined in the approval conditions in section 4.28.2.

1. The first cell must be kept filled with at least 2 feet of liquid.
2. Annual maintenance and testing of the backflow prevention device installed on the makeup water supply line shall be performed at least annually and be done according to the manufacturer’s recommendations.
3. Permanent vegetation should be maintained on the top and outer slopes of the embankment except where a foot or vehicle path is in use.
4. Woody vegetation should be removed from the embankments, grasses should be mowed, and other vegetation should be maintained regularly.
5. Weeds and other vegetation should not be allowed to grow in either of the cells.
6. Floating aquatic weeds must be physically removed on a regular basis.
7. The fence and all gates surrounding the system must be maintained to exclude animals, children, and other unwanted intrusion.

Figure 4-33 shows a cross-sectional view of a two-cell infiltrative system. Figure 4-34 provides an overhead view of a two-cell infiltrative system.

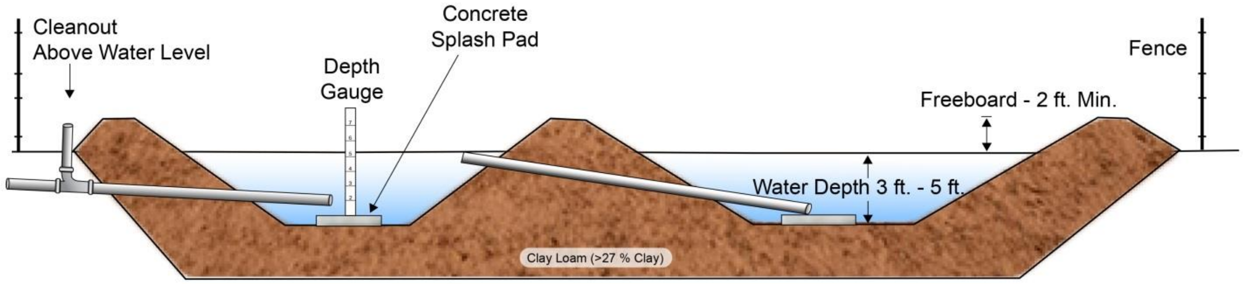


Figure 4-33. Cross-sectional view of a two-cell infiltrative system.

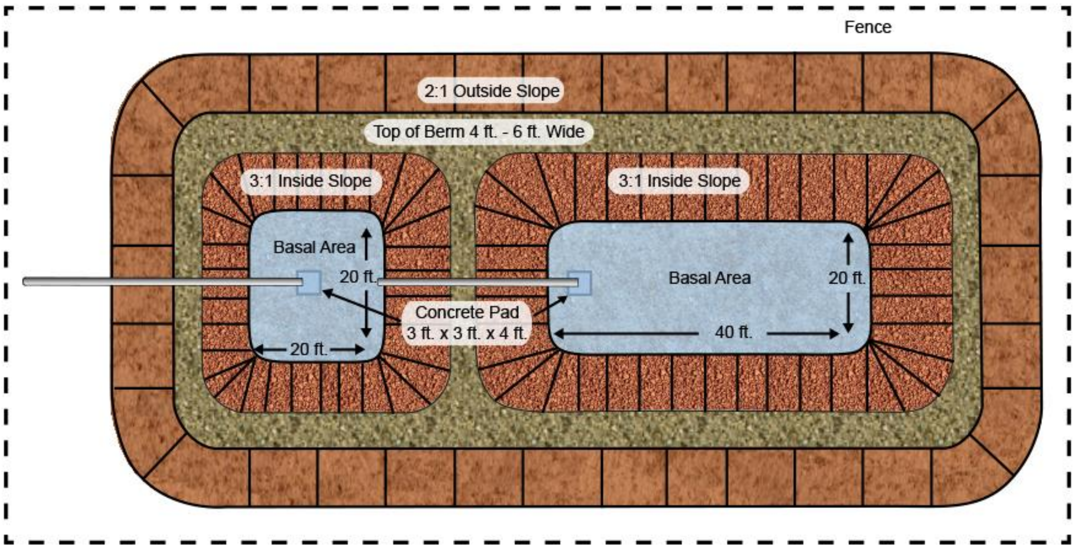


Figure 4-34. Overhead view of a two-cell infiltrative system.

Appendix G

4.5 Capping Fill Trench

Revision: ~~April 21, 2000~~June 5, 2014

4.5.1 Description

A capping fill trench is a ~~standard~~ drainfield trench constructed so that its bottom is at least 3 inches into the natural soil but less than 2 feet deep in the natural soil. A selected fill material caps the trench to provide cover. There are two subcategories of a capping fill trench. The standard capping fill trench and the extreme capping fill trench. Capping fill trenches may be installed by any installer with a basic installer's permit unless a complex component is used in conjunction with the capping fill trench design.

4.5.2 Standard Capping Fill Trench

A standard capping fill trench is constructed so that its bottom is less than 24 inches deep in the natural soil but deep enough in the natural soil to keep the invert of the drainfield pipe below the natural soil. The installation depth is deeper than 6 inches for a standard drainrock and perforated pipe drainfield. The bottom depth of the drainfield necessary to keep the invert of the drainfield pipe below the natural soil may be deeper for gravelless trench products or combination extra drainrock and capping fill systems.

4.5.2.1 Standard Capping Fill Trench Approval Conditions

1. ~~Capping fill trench may be considered for a site if the effective depth below the trench bottom, as specified in section 2.2, Table 2-6 and Table 2-7, can be met.~~Effective soil depths below the drainfield bottom must be met as required by IDAPA 58.01.03 or as allowed in section 2.2 of this manual following the separation distance hierarchy.
2. Site may not exceed 12% slope if the ~~drainrock~~ drainfield extends above natural soil.
3. If the ~~drainrock~~ drainfield is at or below natural soil, the site may not exceed 20% slope.
4. ~~2.~~The soil cap shall be constructed prior to trench excavation but after natural soil scarification if the drainfield extends above the natural soil.

~~Bottom of a capping fill trench must be below the organic soil layer.~~

4.5.3 Extreme Capping Fill Trench

An extreme capping fill trench is constructed so that the invert of the drainfield pipe is above the natural soil. This is typically 6 inches deep or less for a standard drainrock and perforated pipe drainfield. The bottom depth of the drainfield that results in the invert of the drainfield pipe being above the natural soil may be deeper for gravelless trench products or combination extra drainrock and capping fill systems.

4.5.3.1 Extreme Capping Fill Trench Approval Conditions

1. Effective soil depth below the drainfield bottom must be met as required by IDAPA 58.01.03 or as allowed in section 2.2 of this manual following the separation distance hierarchy.

2. Site may not exceed 12% slope.
3. The soil cap shall be constructed prior to trench excavation but after natural soil scarification.
4. The soil cap shall be compacted to 90% of the existing soils which shall be verified by a soil compaction test after cap construction.
5. The drainrock below the perforated pipe in a combination extra drainrock and extreme capping fill trench shall not extend more than 3 inches above the natural soil.
6. The bottom of the drainfield shall be installed no shallower than 3 inches below the natural soil.

~~4.5.3~~4.5.4 Fill Material

The capping fill drainfield must meet the minimum (12 inches) and maximum (36 inches) cover requirements of IDAPA 58.01.03.008.04. Fill material must be imported or removed from a location greater than 6 feet away from the edge of the drainfield cap to meet the texture requirements of the cap. The material requirements for the cap are:

1. The upper layer of the natural site soil must be one of the approved effective soil design subgroups as described in Table 2-4.
2. The texture of the fill material used for the soil cap shall be the same as or one soil design subgroup finer than that of the ~~site material~~upper layer of the natural site soil, except that no fill material finer than clay loam may be used.
3. Fill material shall be free of debris, stones, frozen clods, or ice.

~~4.5.4~~4.5.5 Construction

1. ~~Fill~~ The entire cap area is plowed or scarified to disrupt the vegetative mat. Smearing of the soil during scarification shall be avoided.
2. Site soil should not be removed during the scarification process unless heavy vegetation (e.g., bushes) or a heavy vegetative mat is present. Any site soil that is removed should be replaced with medium sand prior to cap placement.
3. Construction related requirements in section4.5.2.1 and 4.5.3.1 shall be followed.
4. Trenches shall be installed to a depth below the natural soil surface according to the specifications outlined on the permit~~, as if the top of the fill was the natural soil surface~~.

~~If the trenches are constructed entirely within the natural soil, the trenches will be constructed first. The site will then be scarified, and the cap installed after the trenches are in place.~~

~~2. When the invert of the pipe is at or above the original soil, the fill material should be compacted to 90% of the existing soils.~~

5. Edges of the finished cap fill should be at least 10 feet beyond the nearest trench sidewall.

6. Finished side slopes of the fill are to be evenly graded from the outer edges of the trenches to the natural soil surface with a slope of 3:1 or less (three horizontal to one vertical).

7. Compaction of the scarified area must be prevented. Use of equipment with pneumatic tires is prohibited on the fill or cover.

8. At least 12 inches of fill must be applied to cover the trenches.

9. Typical lawn grasses and other appropriate low-profile vegetation should be established on the fill soil cap after placement and final grading. Trees, shrubs, or other aggressive water seeking plants should not be planted on the soil cap.

4.5.6 Inspections

1. Site soil texture, fill soil texture, and the scarification or vegetative mat disruption process will be inspected by the Director.
2. Installed trenches will be inspected by the Director prior to cover.
3. Final inspection after covering may be conducted by the Director to ~~investigate the degree of incorporation of fill soil with the original soil~~ensure proper cap placement and slope.

Figure 4-1 shows a cross section of a capping fill trench.

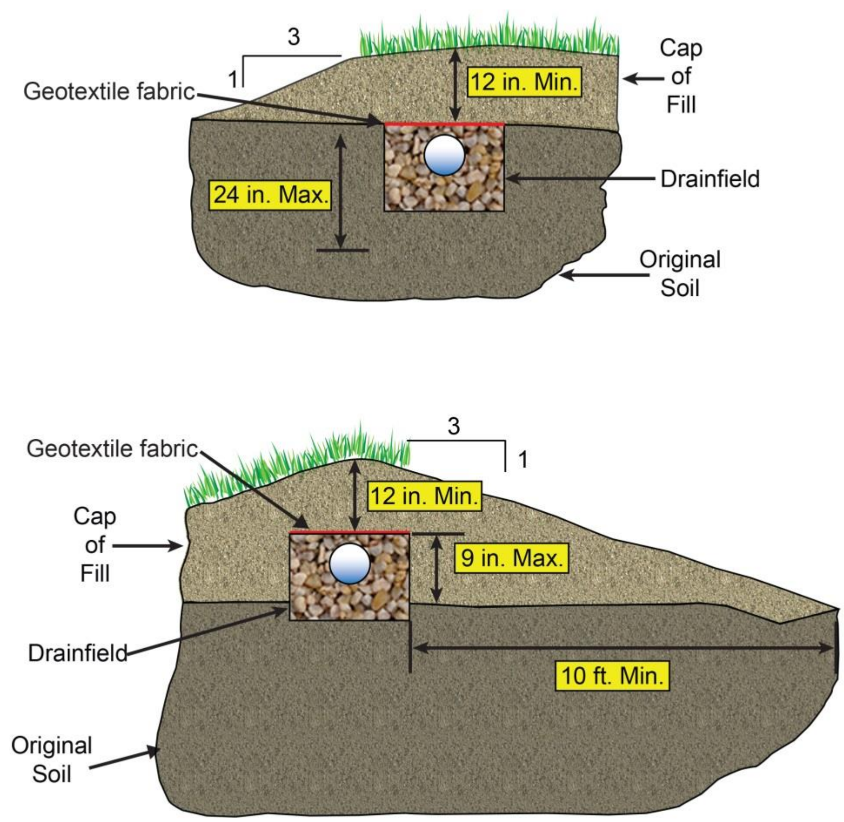


Figure 4-1. Cross-sectional view of a capping fill trench.

State of Idaho
Department Of Environmental Quality
Technical Guidance Committee

Appendix H

4.7 Drip Distribution System

Revision: ~~March 30, 2012~~June 5, 2014

4.7.1 Description

Drip distribution systems ~~may or may not be continuously flushed and~~ are comprised of a shallow network of thin-walled, small-diameter, flexible tubing with self-cleaning emitters to discharge filtered effluent into the root zone of the receiving soils. The drip system is flushed either continuously or noncontinuously depending upon the system design. ~~Typical~~Minimum system components include, but are not limited to, the following:

1. Septic tank
2. Pretreatment system (not required in grey water system designs):
    a. Intermittent sand filter
    b. Recirculating gravel filter
    c. ~~ETPS~~Extended treatment package system
3. Filtering system: cartridge or disk filters (flushable filter cartridge)
4. Effluent dosing system: pump tank and dose pump
5. Process controller: programmable logic controller (PLC)
6. Flow meter
7. Drip tubing network and associated valving

4.7.2 Approval Conditions

1. Drip distribution systems shall only be installed at locations that meet the criteria in the site suitability subsection of IDAPA 58.01.03.008.02 and 58.01.03.013 (section 8.1).
2. The effective soil depths that are established for the alternative pretreatment systems listed in section 4.7.1(2) may be applied to drip distribution systems when they are utilized in the system design.
3. All pressurized distribution components and design elements of the drip distribution system that ~~are~~ do not have design critertia specified within section 4.7 shall follow the design guidance provided in section 4.20.
4. Pretreatment system design, installation, operation, and maintenance will follow the specific pretreatment system guidance provided in this manual.
5. ~~1.~~ System must be designed by a PE licensed in Idaho.

4.7.3 Design

The following minimum design elements apply to both continuous and noncontinuous flush drip systems:

1. Application areas up to 2 square feet per foot (ft^2/ft) of drip irrigation line may be used.

2. Drip ~~lines~~ tubes may be placed on a minimum of 2-foot centers.

3. Drip ~~lines~~ tubes are placed directly in native soil at a depth of 6–18 inches with a minimum final cover of 12 inches.

4. The design application rate is based on the most restrictive soil type encountered within 2 feet of the drip ~~lines~~tubes.

~~3.~~5. The effective soil depth to limiting layers below the drip tubes should meet the depths specified in Table 4-19.

~~4.~~6. Effluent is required to be filtered with a 100 micron or smaller disc or flushable filter cartridge before discharge into the drip tubing network.

~~In noncontinuous flush systems, drip laterals are flushed at least once every 2 weeks to prevent biofilm and solids buildup in the tubing network. Minimum flushing velocity is based on the tubing manufacturer's recommendations for the return ends of the distribution lines and in the drip irrigation tubing during field flush cycles. The minimum flushing duration is long enough to fill all lines and achieve several pipe volume changes in each lateral.~~

7. A minimum of two vacuum relief valves are required per zone.

   a. The valves are located at the highest points on both the distribution and return manifolds.

   ~~a.~~b. Vacuum relief valves are located in a valve box that is adequately drained and insulated to prevent freezing.

8. Pressure regulators and pressure compensating emitters should be used on sloped installations.

~~5.~~9. Pressure ~~is to~~should be between 25 and 40 psi unless pressure compensating emitters are used.

~~6.~~10. Timed dosing is required in all drip distribution systems.

~~7.~~11. ~~In noncontinuous flush systems, filters, flush valves, and a pressure gauge may be placed in a head works (between the dose pump and drip field).~~Each valve, filter, pressure regulator, and any other non-drip tube component is required to be accessible from grade and insulated to prevent freezing.

~~8.~~12. ~~System must be designed by a PE licensed in Idaho.~~

4.7.3.1 Additional Design Elements for Noncontinuous Flush Drip Systems

The following additional minimum design elements apply only to noncontinuous flush drip systems:

1. In noncontinuous flush systems, drip laterals are flushed at least once every 2 weeks to prevent biofilm and solids buildup in the tubing network.

   a. Minimum flushing velocity is based on the tubing manufacturer's recommendations for the return ends of the distribution lines and in the drip irrigation tubing during field flush cycles.

   b. The minimum flushing duration is long enough to fill all lines and achieve several pipe volume changes in each lateral.

2. In noncontinuous flush systems, the return manifold is required to drain back to the septic tank.
3. In noncontinuous flush systems, timed or event-counted backflushing of the filter is required.
4. In noncontinuous flush systems, filters, flush valves, and a pressure gauge may be placed in a head works (between the dose pump and drip field).

4.7.3.2 Additional Design Elements for Continuous Flush Drip Systems

The following additional minimum design elements apply only to continuous flush drip systems:

1. Filter must be a flushing type.
   a. The filter is required to be backwashed according to the manufacturer's recommendations and the process must be automated unless the automated backwashing requirement has been waived.
   b. The automated backwashing requirement may be waived if the filter is configured with an alarm to indicate when velocity is reduced below the manufacturer's minimum recommended flow velocity.
2. Drip laterals are flushed during the dosing cycle.
   a. The continuous flush system must be designed to the manufacturer's minimum recommended flow velocity.
   b. The dose duration must be long enough to achieve several pipe volume changes in each drip tube lateral to adequately accomplish flushing the drip tubing lines.

~~2.~~3. Filters and pressure gauges may be placed in a head works (between the dose tank and drip field), and supply and return pressure gauges are needed to ensure that the field pressurization is within the required range specified by the drip tube manufacturer.

4. In continuous flush systems, both supply and return manifolds are required to drain back to the dose tank.
5. Due to the nature of the continuous flush process, the filter shall be examined after initial start-up and cleaned if necessary to prevent incorrect rate of flow readings for the controller.

~~3.~~6. The drip distribution system will operate to the manufacturer's minimum recommended flow velocity for the duration of each cycle, and the total flow minus the emitter uptake flow would be the return and flushing flow.

4.7.4 Construction

1. No wet weather installation is allowed.
2. Excavation and grading must be completed before installing the subsurface drip distribution system.

3. Drip distribution systems may not be installed in unsettled fill material.

4. No construction activity or heavy equipment may be operated on the drainfield area other than the minimum to install the drip distribution system.

4.5. Do not park or store materials on the drainfield area.

5.6. For freezing conditions, the bottom drip tube line must be higher than the supply and return line elevation at the dosing tank.

7. All PVC pipe and fittings shall be PVC schedule 40 type 1 or higher rated for pressure applications.

6.8. All glued joints shall be cleaned and primed with purple (dyed) PVC primer before being glued.

9. All cutting of PVC pipe, flexible PVC, or drip tubing should be completed using pipe cutters, unless the following requirements for sawing are complied with.

7.10. Sawing PVC, flexible PVC, or drip tubing is allowed only if followed by cleaning off any residual burs from the tubing or pipe and removing all shavings retained in the tubing or pipe.

11. All open PVC pipes, flexible PVC, or drip tubing in the work area shall have the ends covered during storage and construction to prevent construction debris and insects from entering the pipe.

8.12. Prior to gluing, all glue joints and tube or pipe interior shall be inspected and cleared of construction or foreign debris.

13. Dig the return header manifold ditch along a line marked on the ground and back to the septic dosing tank.

    a. Start tThe return header manifold ditch should start at the farthest end of the manifold from the dosing tank.

    a.b. The return line manifold must slope back to the treatment tank or septic dosing tank.

814. Prior to start-up of the drip distribution system, the air release valves shall be removed and each zone in the system shall be flushed as follows:

    a. System flushing is accomplished by the manufacturer or engineer using the control panel's manual override.

    b. Using an appropriate length of flexible PVC pipe with a male fitting and attach to the air release connection to direct the flushing away from the construction area.

    c. Flush the zone with a volume of water (clean water to be provided by contractor) equal to at least 1.52 times the volume of the pipes from the central unit to the air release valve or the equivalent of 5 minutes of flushing.

    d. Repeat this procedure for each zone.

    Note: filters are not backflushed during start-up as any clogging could cause incorrect rate of flow readings for the controller.

15. If existing septic tanks are to be used, they shall be pumped out by a ~~commercial~~ permitted septic tank pumper, checked for ~~leakage or other~~structural or component problems, and repaired or replaced if necessary.

    a. After the tank is emptied, the tank shall be rinsed, pumped, ~~and~~ refilled with clean water, and leak tested.

    b. Debris in the septic tank ~~shall~~ should be kept to a minimum because it could clog the filter during start-up.

    Note~~: filters are not backflushed during start-up as any clogging could cause incorrect rate of flow readings for the controller.~~

~~10~~16. Once completed, cap drainfield areas for shallow installations (less than 12 inches) with 6–8 inches of clean soil and suitably vegetate.

    a. Cap fill material shall be the same as or one soil group finer than that of the site material, except that no fill material finer than clay loam may be used.

    b. Cap fill shall be free of debris, stones, frozen clods, or ice.

    c. Suitable vegetation should consist of typical lawn grasses or other appropriate low-profile vegetation.

    d. Trees, shrubs, and any other vegetation that aggressively seeks water should not be planted within 50 feet of the drip tubing network.

4.7.5 Inspection

1. A preconstruction meeting between the health district, design engineer, and installer should occur prior to commencing any construction activities.
2. The health district shall inspect all components and fill material used in the construction of the drip distribution system prior to backfilling or cap fill placement.
3. ~~System must be inspected and approved by a PE licensed in Idaho.~~The ~~design~~ responsible charge engineer should conduct as many inspections as necessary for verification of system and component compliance with the engineered plans.
4. The ~~design~~ responsible charge engineer shall provide the health district a written statement that the system was constructed and functions in compliance with the approved plans and specifications. Additionally, the ~~design~~ 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)
5. ~~Turn on the pump and check pressure at the air vacuum breaker.~~
6. ~~Check the system for leaks and record flow measurements and pressure readings at start-up.~~

4.7.6 Operation and Maintenance

1. The drip distribution system design engineer shall provide a copy of the system's operation, maintenance, and monitoring procedures to the health district as part of the

permit application and prior to subsurface sewage disposal permit issuance (IDAPA 58.01.03.005.04.k).

2. Minimum operation, maintenance, and monitoring requirements should follow each system component manufacturer's recommendations.
3. Additional operation, maintenance, and monitoring may be required for the pretreatment component of the drip distribution system.
   a. The minimum operation, maintenance, and monitoring of the pretreatment component will be based off of the manufacturer's recommendations and the minimum requirements specified within this manual for the specific pretreatment system.
   b. Additional operation, maintenance, and monitoring may be based on specific site conditions or pretreatment component type.

~~4.7.6~~4.7.7 Suggested Design Example

1. Determine square feet needed for the drip distribution system, as follows.
   a. Wastewater flow in GPD is divided by the soil application rate (based on the soil classification from an on-site evaluation).
   b. Result is the square feet (ft^2) needed for the system.

   Example conditions: three-bedroom home in subgroup C-2 soils.

   Example calculation: (250 GPD)/(0.2 gallons/ft^2) = 1,250 ft^2
2. System design will use an application area of 2 ft^2/ft of drip ~~line~~tube. Divide the required square feet by the drip ~~line~~ tube application area (2 ft^2/ft). This will determine the total length of drip ~~line~~ tube needed for the system.

   Example: (1,250 ft^2)/(2 ft^2/ft) = 625 feet of drip ~~line~~tube
3. ~~Determine the size of pump based on gallons per minute (GPM) (step 3 of suggested design example) and total head (step 4 of suggested design example) needed to deliver dose to system.~~ Determine pumping rate by finding the total number of emitters and multiplying by the flow rate per emitter (1.32 gallons/hour/emitter at 20 psi). Adjust output to GPM and add 1.5 GPM per connection for flushing to achieve, for example, a 2 feet/second flushing velocity. *Note:* For continuous flush systems, the number of emitters will vary depending on the product selected.

   Example: (625 feet)/(2 emitters/foot) = 312.5, use 313 emitters

   (313 emitters) x (1.32 gallons/hour/emitter) = 413.2 gallons/hour

   (413.2 gallons/hour)/(60 minutes/hour) = 6.89 GPM, or 7 GPM

   10 connections at 1.5 GPM per connection = 15 GPM

   Pumping rate: 7 GPM + 15 GPM = 22 GPM
4. Determine feet of head. Multiply the system design pressure (20 psi is standard, but values can ~~be between 10 and 60 psi~~vary depending on the drip ~~line~~ tube used) by 2.31 feet/psi to get head required to pump against.

Example: (20 psi) x (2.31 feet/psi) = 46.2 feet of head

Add in the frictional head loss from tubing

5. Select a pump. Determine the size of pump based on gallons per minute (GPM) (step 3 of suggested design example) and total head (step 4 of suggested design example) needed to deliver a dose to the system. ~~Pump~~ The pump selected for this example must achieve a minimum of 22 GPM plus the flush volume at 46.2 feet of head.

Figure 4-2 shows an overhead view of a typical drip distribution system. Figure 4-3 shows a potential layout of a filter, valve, and meter assembly, and Figure 4-4 illustrates a cross-sectional view of the filter, valve, and meter assembly. Figure 4-5 provides a view of the continuous flush system filter and meter assembly.

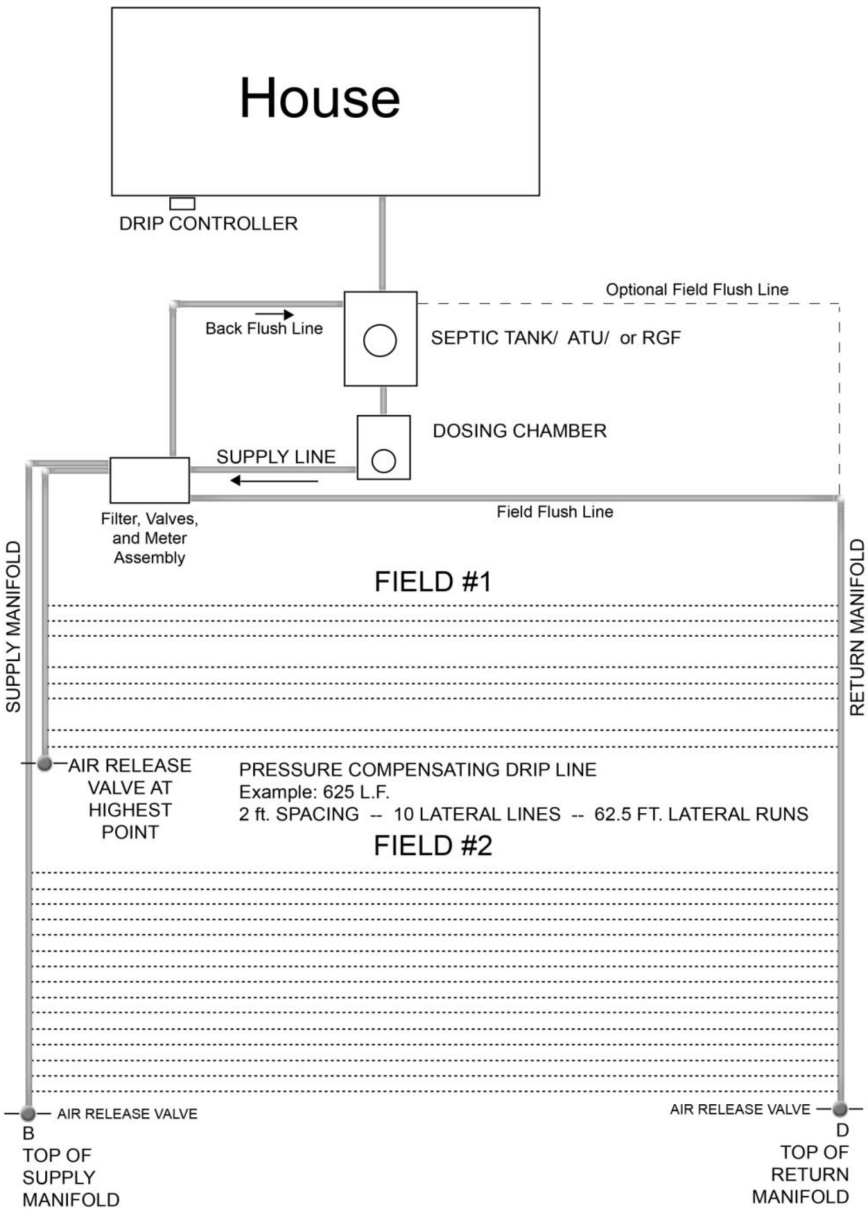


Figure 4-2. Overhead view of typical drip distribution system.

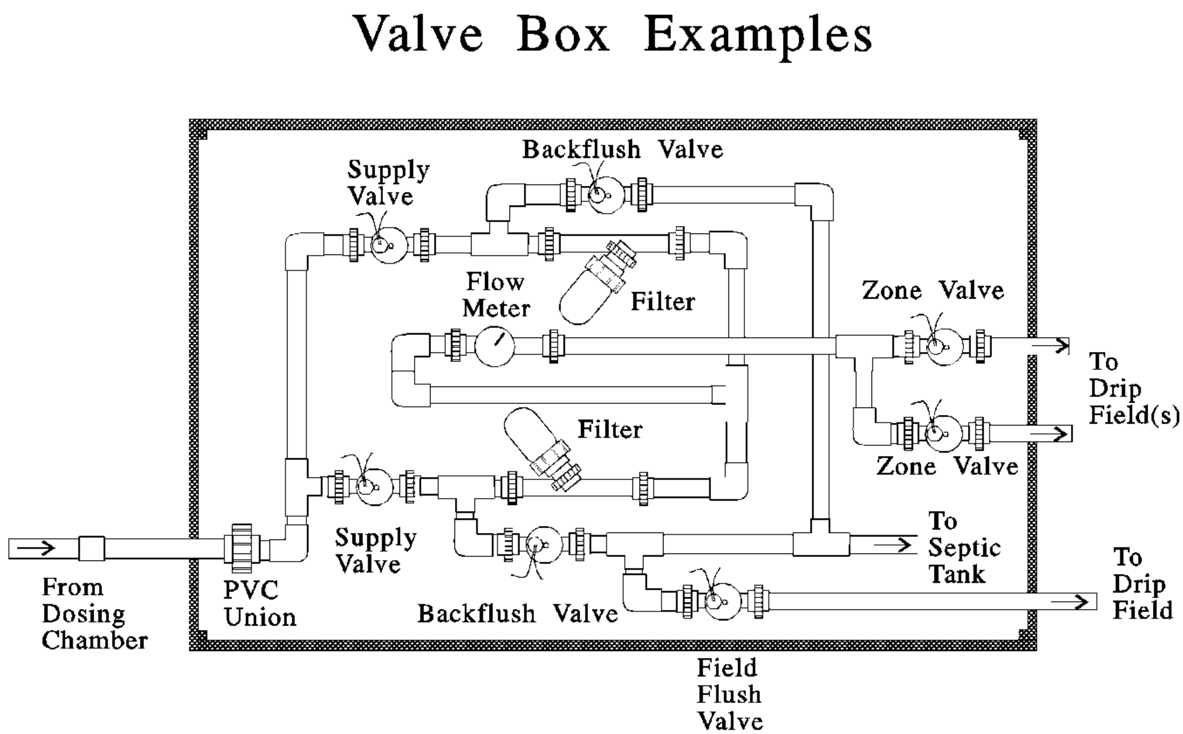


Figure 4-3. Overhead view of filter, valve, and meter assembly.

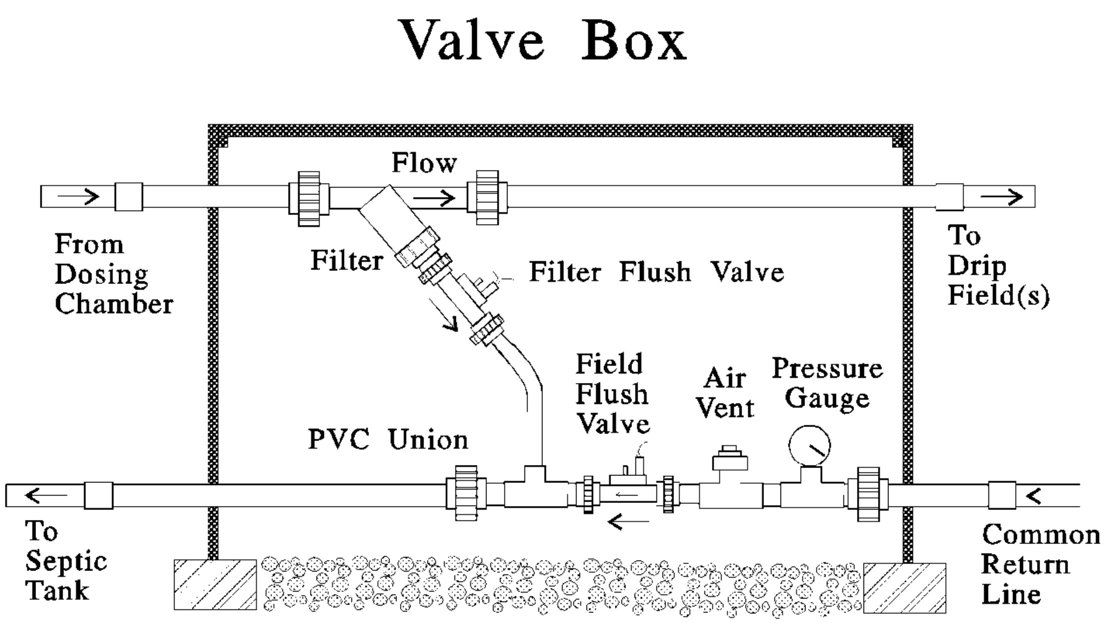


Figure 4-4. Cross-sectional view of typical filter, valve, and meter assembly.

4.7.7 Continuous Flush Systems

The requirements for continuous flush systems are different than for the rest of the drip distribution systems. All other requirements described in section 4.7 apply to continuous flush systems along with the following sections. Figure 4-5 provides a view of the continuous flush system filter and meter assembly.

4.7.7.1 Filter Type

Filter must be a flushing type.

4.7.7.2 Filter Backwashing

The filter is required to be backwashed according to the manufacturer's recommendations and the process must be automated unless the automated backwashing requirement has been waived. The automated backwashing requirement may be waived if the filter is configured with an alarm to indicate when velocity is reduced below the manufacturer's minimum recommended flow velocity.

4.7.7.3 Flushing

Drip laterals are flushed during the dosing cycle. The continuous flush system must be designed to the manufacturer's minimum recommended flow velocity with a dose duration long enough to achieve several pipe volume changes in each lateral to adequately accomplish flushing the drip lines.

4.7.7.4 Filter and Gauge Locations

Filters and pressure gauges may be placed in a headworks (between the dose tank and drip field), and supply and return pressure gauges are needed to ensure that the field pressurization is within the required range specified by the drip tube manufacturer.

4.7.7.5 Manifold Drain Routing

In continuous flush systems, both supply and return manifolds are required to drain back to the dose tank.

4.7.7.6 Examination and Cleaning of Filter during Start-up

Due to the nature of the continuous flush process, the filter shall be examined after initial start-up and cleaned if necessary to prevent incorrect rate of flow readings for the controller.

4.7.7.7 Determining Required Pump Size and Total Head

The drip distribution system will operate to the manufacturer's minimum recommended flow velocity for the duration of each cycle, and the total flow minus the emitter uptake flow would be the return and flushing flow.

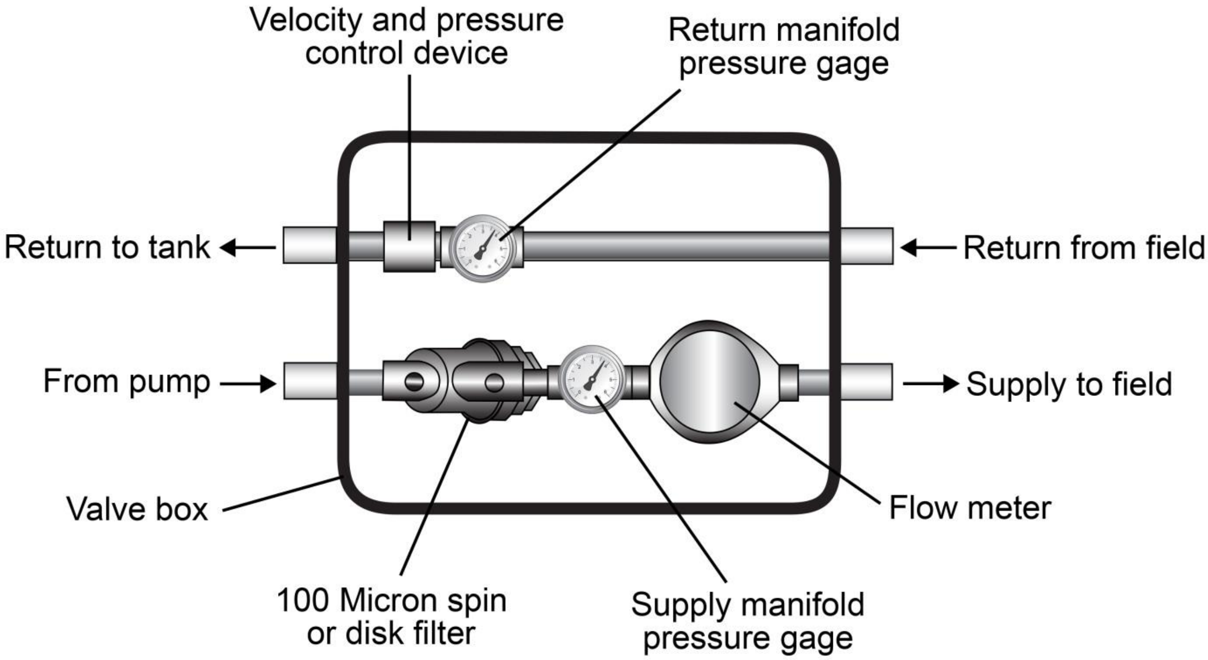


Figure 4-5. Overhead view of continuous flush system filter and meter assembly.

Appendix I

3.2.8 Drainfield Excavation Backfilling Materials and Alternative System Construction Media

Installation of a drainfield or the construction of several alternative systems requires that the drainfield excavation or alternative system be constructed with some type of media or aggregate. For any media used in a basic or alternative system it is important that the media or aggregate meet certain size and cleanliness specifications to ensure the system's functionality and longevity. To ensure proper media or aggregate sizing and material cleanliness it is necessary for the health districts to verify and inspect the media or aggregate installed in subsurface sewage disposal systems. Media and aggregate inspection and approval processes are discussed further below.

Upon excavation, native site soils are considered the same as fill material. For subsurface sewage disposal systems, excavation is considered any disturbance of the native site soils that causes the soil to lose its original compaction. Native site soils excavated for any portion of a subsurface sewage disposal system shall not be left in place or backfilled below a drainfield unless the material has successfully completed the evaluation process outlined in section 2.4. Scarification of soils as described in certain alternative system guidance is the only excavated native soil that is approved to be left below a drainfield. Scarification should only occur for the approved alternative systems in this manual that it is specified for. Manual raking of a drainfield excavation to alleviate soil smearing is not considered scarification.

3.2.8.1 Drainfield Aggregate and Construction Media Approval Process

Drainfield aggregate is any crushed rock or gravel that is durable, inert, free of fines, and has an effective diameter of ½ to 2 ½ inches (IDAPA 58.01.03.008.08). Construction media is considered any earthen material specified for use in the construction of an alternative system. The following construction media is currently specified for use in alternative systems:

- Medium sand (also referred to as ASTM C-33 sand)
- Pea gravel
- Pit run material (consisting of clean sand and gravel)

Aggregate and construction media must come from an approved source before installation in any subsurface sewage disposal system. To become an approved source a supplier (typically a material pit or storage yard) shall submit an annual sieve analysis for each source of drainfield aggregate or construction media that they would like to obtain approval of for the purpose of installation in a standard or alternative subsurface sewage disposal system. The sieve analysis verifies compliance with material sizing and cleanliness specifications as specified in IDAPA 58.01.03.008.08 or verifies compliance with the recommendations for an approved alternative system (IDAPA 58.01.03.004.10). The sieve analyses from each source shall be submitted to the local health district for review and aggregate or construction media approval. Each health district shall maintain an approved source and materials list for their district and will provide a copy of this list to DEQ.

Health district approval of an aggregate or construction media source only provides verification that the source is capable of producing these materials in conformance with the material specifications. The health district may still disapprove drainfield aggregate or construction media if it becomes contaminated during processing, loading, transport, storage, or installation either at the source location or at a subsurface sewage disposal installation site. It is the responsibility of those processing, providing, transporting, storing, or installing the aggregate or media to ensure the drainfield aggregate or construction media maintains its approved characteristics (i.e., size and cleanliness).

The size and cleanliness characteristics of drainfield aggregate and construction media shall be evaluated utilizing standard sieve analysis. The sieve sizing shall conform to the standards of the American Society for Testing and Materials (ASTM). The size and cleanliness characteristics for each material are provided below.

3.2.8.1.1 Drainfield Aggregate

Drainfield aggregate is commonly referred to as drainrock. The dimensions of this material are specified in IDAPA 58.01.03.008.08. The material is typically comprised of crushed rock or gravel and the rock or gravel is of a durable and inert type. Other materials meeting the size and cleanliness specifications may be considered for use as drainfield aggregate if it can be shown that the material is both durable and inert. Consideration of alternative drainfield aggregate sources will be made on a case by case basis. To determine if a drainfield aggregate is suitable it must be passed through a sieve to ensure that 100% passes a 2.5 inch sieve and that ≤ 2% passes through a 0.5 inch sieve for size and less than 2% passes a #200 sieve for cleanliness (Table 3-3).

Table 3-3. Drainfield aggregate allowable particle size percent composition.

Sieve Size	Passing (%)
2.5 inch	100
0.5 inch	≤ 2
200	< 2

3.2.8.1.2 Medium Sand (will replace section 2.1.4)

~~The following definition may be used t~~To determine if a ~~soil texture~~construction media is ~~a~~ medium sand~~:~~ the sand is passed through a sieve to ensure that it ~~Conforms~~ conforms to the gradation requirements of ~~American Society for Testing and Materials (~~ASTM~~)~~ C-33 for size and less than 2% passes a #200 sieve for cleanliness (Table ~~2-5~~3-4).

~~A sand with a mean particle size (D_{50}) of no more than 0.5 millimeter (mm) and a coefficient of uniformity (C_u) of 8 or greater has been shown to sustain a biological mat and will be acceptable in systems under continual use.~~

Table ~~2-5~~3-4. ~~Modified ASTM C-33 medium~~ Medium sand (modified ASTM C-33) allowable particle size percent composition.

Sieve Size	Passing (%)
4	95-100
8	80-100
16	50-85
30	26-60
50	10-30
100	2-10
200	< 2

3.2.8.1.3 Pea Gravel

To determine if a construction media is pea gravel the media is passed through a sieve to ensure that it conforms to the gradation requirements of 100% passing the ~~1~~3/8 inch sieve, less than 2% passing the #7 sieve, and that less than 1% passes the #50 sieve for size and cleanliness (Table 3-5). Additionally, the media must have a uniformity coefficient of less than 2.

Table 3-5. Pea gravel allowable particle size percent composition.

Sieve Size	Passing (%)
~~1~~3/8 inch	100
7	< 2
50	< 1

3.2.8.1.4 Pit Run

Pit run construction media is composed of clean cobble, gravel, and sand. To determine if a construction media is suitable pit run it shall be passed through a sieve to ensure that it conforms to the gradation requirements of 100% passing a 10 inch sieve, 66-100% passing a #50 sieve and 2-10% passing a #100 sieve for size. Additionally, less than 2% shall pass a #200 sieve for cleanliness. See Table 3-6.

Table 3-6. Pit run allowable particle size percent composition.

Sieve Size	Passing (%)
10 inch	100
50	66-100
100	2-10
200	< 2

3.2.8.2 Substantiating Drainfield Aggregate and Construction Media Installation

After delivery of the drainfield aggregate or construction media to a subsurface sewage disposal system installation site the health district shall verify that the aggregate and/or media was obtained from an approved source as described in section 3.2.8.1. The permitted installer, property owner, or licensed public works contractor under the direction of a P.E. licensed in Idaho performing the subsurface sewage disposal system installation shall provide the drainfield aggregate or construction media receipts to the health district for verification of source and volume (IDAPA 58.01.03.011.04). The health district shall record the volume of drainfield aggregate or construction media on the final inspection form for the installation permit. The volume of drainfield aggregate and construction media may also be used to verify the excavation depth of drainfield trenches.

Example (verification of excavation depth of an in-trench sand filter drainfield trench):

The drainfield covers a disposal area of 420 ft^2 and was installed with two 6 foot wide trenches that are each 35 feet long. The excavation depth of the system was required to be 7 feet with a maximum drainfield installation depth of 4 feet. To meet the excavation depth and install the drainfield no deeper than 4 feet approximately 47 cubic yards ~~or~~ of medium sand must be installed below the drainfield aggregate. Another 15.6 cubic yards of drainfield aggregate should be installed to ensure that a minimum of 12 inches of aggregate is in place and that it is installed no deeper than 4 feet. This is determined by:

Medium Sand Volume

(420 ft^2 of disposal area) x (3 ft. of medium sand) = 1,260 ft^3 of medium sand.

(1,260 ft^3 of medium sand)/(27 ft^3/yd^3) = 46.67 yd^3 of medium sand

Drainfield Aggregate

(420 ft^2 of disposal area) x (1 ft. of drainfield aggregate) = 420 ft^3 of drainfield aggregate.

(420 ft^3 of drainfield aggregate)/(27 ft^3/yd^3) = 15.56 yd^3 of drainfield aggregate

Appendix J

2.2 Separation Guidelines

Revision: ~~October 31, 2013~~June 5, 2014

2.2.1 Separation Distance Hierarchy

Separation distances to features of concern or interest are required by IDAPA 58.01.03. Separation distances include both vertical and horizontal separation distances, including effective soil depths, to features of concern, interest or limiting layers. Section 2.2 of this manual ~~also~~ provides guidance on the reduction of separation distances based on site specific conditions. The guidance on the reduction of separation distances is in place to help find permitting solutions for difficult sites that may not be able to meet the full separation distances required by IDAPA 58.01.03. These reductions will only be granted after it is documented that the site cannot meet the separation distances required by IDAPA 58.01.03. When performing a site evaluation for the issuance of a subsurface sewage disposal permit the following separation distance hierarchy should be followed:

1. IDAPA 58.01.03
2. Technical allowance (IDAPA 58.01.03.010.01)
3. TGM Guidance
4. Variance (IDAPA 58.01.03.010.02-.06)

This hierarchy does not apply to specific alternative system guidance for the reduction of effective soil depth to limiting layers. If the guidance from section 2.2 of this manual is utilized for any new or replacement subsurface sewage disposal permit, then complete justification must be included in the permit documentation explaining why this guidance was used over the requirements of IDAPA 58.01.03.

~~2.2.1~~2.2.2 Effective Soil Depth to Porous Layers or Ground Water

Table 2-6 provides guidance for determining effective soil depth from the bottom of absorption fields to very porous layers or to normal high ground water.

Table 2-6. Minimum effective soil depth (feet) by soil design subgroup to the limiting layer.

Limiting Layer	Soil Design Subgroup (feet)					
	A-1	A-2	B-1	B-2	C-1	C-2
Fractured bedrock or other porous layer	6	5	4	3	3	2.5
Normal high ground water	6	5	4	3	3	2.5
Seasonal high ground water	1	1	1	1	1	1

~~2.2.2~~2.2.3 Effective Soil Depths to Impermeable Layers

Table 2-7 may be used to determine the effective soil depth below absorption fields to impermeable layers, such as dense clays, bedrock, or caliche if the approval conditions contained in this section are able to be met.

Table 2-7. Effective soil depth (feet) to impermeable layers on sloped terrain.

Slope (%)	Acres (feet)				
	1	2	3	4	5 or more
20	3.0	2.8	2.5	2.3	2.0
16	3.2	2.9	2.6	2.4	2.0
12	3.4	3.1	2.7	2.4	2.0
8	3.6	3.2	2.8	2.5	2.0
4	3.8	3.4	2.9	2.5	2.0
0	4.0	3.5	3.0	2.5	2.0

Approval Conditions:

1. Impermeable layer is that soil or geological feature less permeable than a subgroup C-2 soil. The layer must be contiguous and unbroken beneath the absorption field and its replacement area for at least 10 feet in any direction from these sites.
2. Adjacent lots are of equal size or larger.
3. This guidance is applicable to standard systems and capping fill trench alternatives.
4. Minimum distance to a property line on the downslope side of the absorption field and its replacement area must be at least 10 feet.
5. Lateral hydraulic conductivity of the effective soil should be able to transport the combined precipitation and wastewater flow through the soil without surfacing.

2.2.4 Effective Separation Distance to Surface Water

Reduction in separation distances to surface water from the requirements of IDAPA 58.01.03 are allowed as provided in section 2.2.4 as long as the hierarchy and documentation practices described in section 2.2.1 of this manual are followed. Each site should be reviewed on its own merits. Additional criteria, such as population density and, watershed characteristics, and reasonable access to municipal sewer -must be examined before an allowance for the reduction of separation distance to surface water is granted. The following conditions are in place for all surface water reduction allowances:

1. Separation distance to surface water shall not be less than 100 feet.
2. Alternative systems may be required as part of the reduction allowance.
3. No additional technical allowance may be granted to the reductions included in the sections below without following thea formal variance procedure outlined in IDAPA 58.01.03.010.

3.4. Application for a variance under IDAPA 58.01.03.010 does not guarantee that a reduction in separation distance will be allowed.

2.2.4.1 Reduction in Separation Distance to Surface Water without a Variance

Table 2-8 shows the criteria for reducing separation distances to permanent or intermittent surface water based on soil design subgroups, vertical soil depth above surface water, and the vertical soil depth above any limiting layers.

Table 2-8. Criteria for reducing separation distances to permanent or intermittent surface water.

Setback Separation Distance (feet)[a]	Soil ~~Class~~Design Subgroup	Soil Reduction (feet)	Vertical Soil Depth Above Water: > 25 feet; and Depth to Limiting Layer: > 10 feet	Maximum ~~Setback~~ Separation Reduction (feet)	Minimum Separation Distance to Surface Water (feet)
300	A-1	0	25	25	275
300	A-2	25	25	50	250
200	B-1	0	25	25	175
200	B-2	25	25	50	150
100	C-1	0	0	0	100
100	C-2	0	0	0	100

The distance to permanent surface water may also be reduced to not less than 100 feet for all soil types when it can be demonstrated that

1. Either:
    a. The surface water is sealed so there is no movement of ground water into the surface water body, or
    b. The surface water body is discharging into the ground water, and
2. There are no limiting layers between the drainfield elevation and the surface water elevation.

~~Each site should be reviewed on its own merits. Additional criteria, such as population density and watershed characteristics, must be examined before an allowance is granted. Alternative systems may be required.~~

~~No additional technical allowance may be granted without a formal variance procedure.~~

2.2.4.2 Reduction in Separation Distance to Surface Water with a Variance

The separation distances to surface water are in place to protect the beneficial uses of the surface water. Septic tank effluent carries both nitrogen and phosphorous constituents that pose a threat to surface water. If a separation distance from a drainfield to surface water is to be reduced further than the reductions outlined in section 2.2.4.1 it must be done through a variance supported by models that evaluate the potential effects that the total nitrogen and phosphorus may have on the surface water body.

2.2.4.2.1 Supporting Variance Documentation for a Reduced Separation Distance to Surface Water

The minimum requirements for the supporting variance documentation are included below.

1. The variance must follow all requirements provided in IDAPA 58.01.03.010 and be filed with the health district along with a subsurface sewage disposal permit application.
2. The necessary site evaluation process must be followed to obtain the minimum information necessary to support a subsurface sewage disposal permit and the required effluent nutrient evaluations.
3. A Nutrient-Pathogen (NP) evaluation must be performed for the site and be acceptable based on the required minimum system designs, proposed system placement, and model outputs as outlined below.
4. A phosphorous evaluation must be performed as outlined in the DEQ guidance *Drainfield to Surface Water Setback Determination Guidance and Model* and be acceptable based on the required minimum system designs, proposed system placement, and model outputs as outlined below.

2.2.4.2.2 Drainfield Design Requirements for a Reduced Separation Distance to Surface Water

A drainfield proposed with a reduced separation distance to surface water as allowed under this variance procedure must meet the following minimum design requirements:

1. The drainfield shall be pressurized and designed based on section 4.20 of this manual.
2. The maximum installation depth of the drainfield in the native soil profile shall be 6 inches.
3. Two full sized drainfields shall be installed under the initial permit and alternating dosing between each drainfield shall be included in the system's pressurized design.
4. Replacement area for a third drainfield must be reserved on the property.
5. No separation distance to surface water shall be reduced to less than 100 feet.
6. An alternative pretreatment system shall be installed after the septic tank that is capable of reducing total nitrogen to at least 27 mg/L. A greater total nitrogen reduction level may be required dependent upon the outcome of the NP Evaluation.

2.2.4.2.3 Nutrient Evaluation Model Outputs for a Reduced Separation Distance to Surface Water

To support a variance for a reduced separation distance to surface water, two nutrient evaluations must be performed based on the following specific effluent nutrient values and minimum model outputs:

2.2.4.2.3.1 Nutrient-Pathogen Evaluation

1. The maximum total nitrogen concentration of the effluent discharged to the drainfield shall be 27 mg/L.

2. All other standard NP Evaluation criteria and output requirements apply.

2.2.4.2.3.2 Drainfield to Surface Water Setback Determination Guidance and Model

1. The average phosphorous output from the septic tank shall be 8.6 mg/L.
2. The minimum phosphorous site life of receiving soils shall be 100 years.
3. All other standard Drainfield to Surface Water Setback Determination Model criteria and output requirements apply as described in the DEQ guidance *Drainfield to Surface Water Setback Determination Guidance and Model*.

2.2.4.2.3.3 Restrictions on Drainfields Designs Necessary to Obtain Successful Outputs in Nutrient Evaluation Models

IDAPA 58.01.03 specifies the minimum drainfield area required to adequately handle the specified volume of wastewater generated in the structure being permitted. It is acceptable for a system design to be in excess of the drainfield area required by IDAPA 58.01.03. In order to reduce a drainfield's separation distance to permanent or intermittent surface water it may require that the drainfield area is in excess of the minimum requirements stipulated in IDAPA 58.01.03. This may be due to the surface area and volume of soil below the drainfield necessary to sequester phosphorous constituents in the wastewater and reduce the potential impacts on surface water. If it is necessary to expand the drainfield in order to obtain successful outputs for the models described in section 2.2.4.2.3, then the drainfield area in excess of the minimum requirements provided in IDAPA 58.01.03 is strictly limited to the original wastewater flows evaluated for the original permit application and cannot be used in the future for additional structures or existing structure expansion.

2.2.5 Method of 72 to Determine Effective Soil Depths to Porous Layers and Ground Water

Often, effective soil depths, as required by IDAPA 58.01.03.008.02.c, are not achievable due to various site conditions. In response to this issue, section ~~2.2.1~~2.2.2 provides guidance for reducing separation distances to limiting layers based upon soil design subgroups. In some situations, this guidance does not go far enough to address these site limitations, nor does it provide guidance on how to approach separation distances to limiting layers when the soil profile is variable and does not meet the minimum effective soil depths as described in IDAPA 58.01.03.008.02 or Table 2-6, or when the in-trench sand filter system design is used. To address these situations, use the method of 72.

The method of 72 assigns treatment units to soil design subgroups. Treatment units assigned to soil design subgroups are extrapolated from the effective soil depths required by IDAPA 58.01.03.008.02.c. Based on this rule, it can be determined that 72 treatment units are necessary from the drainfield-soil interface to the porous layer/ground water to ensure adequate treatment of effluent by the soil. Table 2-9 provides the treatment units assigned to each soil design subgroup.

Table 2-9. Treatment units assigned to each soil design subgroup per foot and per inch.

Soil Design Subgroup	A-1/ Medium Sand	A-2	B-1	B-2	C-1	C-2
Treatment units per 12 inches of soil	12	14.4	18	24	24	28.8
Treatment units per inch of soil	1	1.2	1.5	2	2	2.4

~~2.2.3.1~~2.2.5.1 *Native Soil Profiles and the Method of 72*

When the soil profile contains multiple suitable layers, but no layer is thick enough to meet the separation guidance provided in IDAPA 58.01.03.008.02.c or Table 2-6, use the method of 72 to determine the suitable separation distance for the proposed drainfield site. The following example is based on the soil profile identified in Figure 2-3.

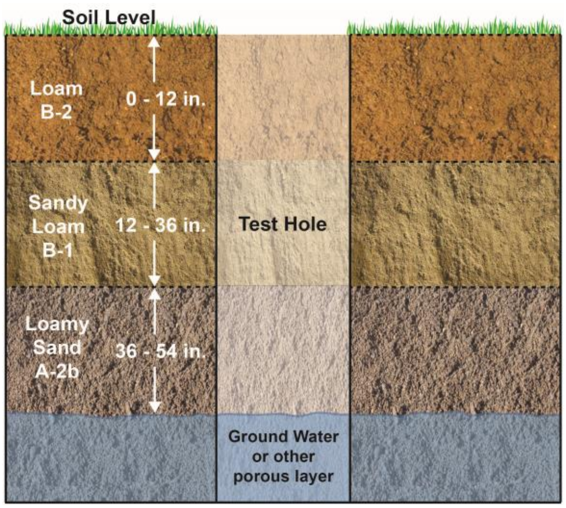


Figure 2-3. Test hole profile used in example 1.

Example 1:

Based upon the soil profile in Figure 2-3 and treatment units from Table 2-9, the following treatment unit equivalent would be ascribed:

Treatment units = 24 + 36 + 21.6 = 81.6

Since this is the treatment unit equivalent from grade to the porous layer or normal high ground water level, the installation depth must still be determined. In this example, the soil profile has 9.6 treatment units more than the minimum necessary to be considered suitable for a standard alternative drainfield. To determine installation depth, use the upper layer of the soil profile where the system will be installed and determine the treatment units per inch of soil. Once the treatment units per inch are known, the depth of allowable installation can be determined.

24 treatment units /12 inches of B-2 soil = 2 treatment units per inch
Installation depth = 9.6 excess treatment units /2 treatment units per inch
Installation depth = 4.8 inches

In this example, a standard basic alternative system can be permitted. The system design would be a capping fill trench with a maximum installation depth of 4.5 inches below grade.

~~2.2.3.2~~2.2.5.2 *In-Trench Sand Filters and the Method of 72*

The method of 72 may also be used in determining the necessary depth of medium sand required for installation between a drainfield and the native soils overlying a porous limiting layer or normal high ground water. Installation of medium sand may be necessary to access suitable soils below an unsuitable layer. The following example is based on the soil profile identified in Figure 2-4.

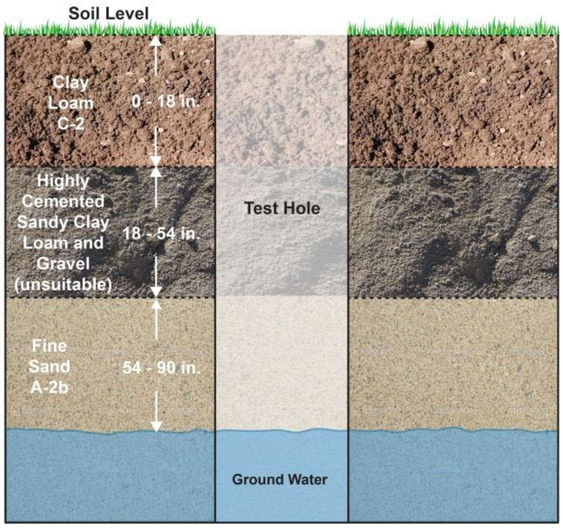


Figure 2-4. Test hole profile used in example 2.

Example 2*:*

In this example, the site soils must be excavated down to 54 inches to access suitable soils. This leaves 36 inches of A-2b soils, providing 43.2 treatment units. The amount of medium sand required to be backfilled prior to system installation would be determined as follows:

Remaining treatment units = 72 – 43.2 = 28.8

Depth of medium sand required = 28.8 treatment units remaining/1 treatment unit per inch

Depth of medium sand required = 29 inches

Thus the medium sand would be backfilled to a depth of 25 inches below grade. The drainfield would then be installed on top of the leveled medium sand.

Note: Regardless of the soil profile and treatment units needed, drainfields must be installed no deeper than 48 inches below grade per IDAPA 58.01.03.008.04. Drainfield depth restrictions only apply to the aggregate as defined in IDAPA 58.01.03.008.08 or the gravelless trench components approved in section 5.6. Medium sand may be installed to any depth necessary to reach suitable soils as long as the excavation and installation of the medium sand meet the requirements in section 4.24.

Appendix K

4.25 Sand Mound

Revision: ~~October 23~~June 5, 2014~~2~~

4.25.1 Description

A sand mound is a soil absorption facility consisting of a septic tank, ~~pumping~~ dosing chamber ~~or dosing siphon and chamber~~, mound ~~fill~~ constructed of ~~selected~~ medium sand, ~~with~~ a pressurized small-diameter pipe distribution system, ~~cap,~~ and topsoil cap. ~~Figure 4-26~~Figure 4-30 provides a diagram of a sand mound.

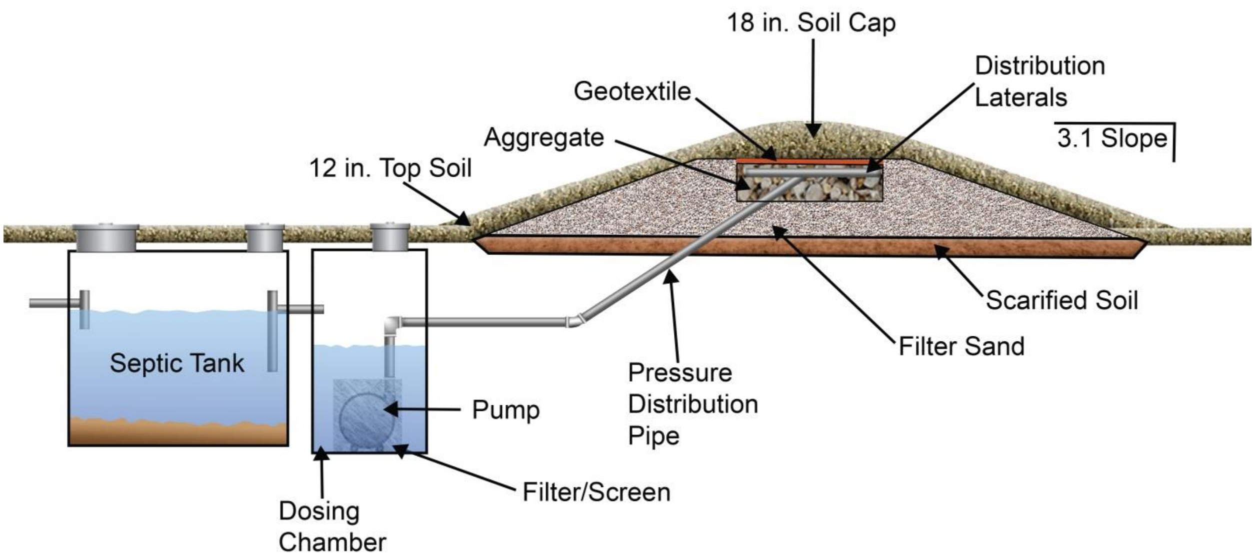


Figure 4-30. Cross sectional view of sand mound.

4.25.2 Approval Conditions

1. Effective soil depth to limiting layers may vary depending upon thickness of filter sand beneath the absorption bed:

   a. If 12 inches of filter sand is placed beneath the absorption bed, then Table 4-23 lists the minimum depth of natural soil to the limiting layer.

   b. If 24 inches of filter sand is placed beneath the absorption bed~~, and the dosing recommendations in section 4.20,~~ then Table 4-21 in Section 4.23 "Intermittent Sand Filter," identifies the effective soil depth to limiting layers.

2. The soil application rate used in the sand mound design is based on the most restrictive soil layer within the soil profile's effective soil depth as determined based on approval condition 1 except that the effective sizing depth shall not be less than 18 inches.

3. ~~For soil textural classifications of sandy clay, silty clay, clay, or coarser-textured soils with percolation rates from 60 to 120 minutes/inch, the minimum depth of natural soil to the limiting layer shall conform to soil design group C.~~

~~4.~~3. Table 4-24 shows the maximum slope of natural ground, listed by soil design group.

~~5.~~4. Sand mound must not be installed in flood ways, areas with large trees and boulders, in concave slopes, at slope bases, or in depressions.

~~6.~~5. Minimum pretreatment of sewage before disposal to the mound must be a septic tank sized according to IDAPA 58.01.03.007.07.

~~7.~~6. The maximum daily wastewater flow to any mound or absorption bed cell must be equal to or less than 1,500 GPD.

~~8.~~7. Multiple mounds, or absorption bed cells, may be used to satisfy design requirements for systems larger than 1,500 GPD.

   a. Appropriate valving should be used in the design to ensure that flows are evenly divided between all of the mounds or absorption bed cells.

   b. Valving should be accessible from grade and insulated from freezing.

~~9.~~8. Design flow must be 1.5 times the wastewater flow.

9. Pressure distribution system and associated component design shall conform to section 4.20 of this manual.

Table 4-23. Minimum depth of natural soil to limiting layer.

Soil Design Group	Extremely Impermeable Layer (feet)	Extremely Permeable Layer (feet)	Normal High Ground Water (feet)
A, B	3	3	3
C	3	2	2

Table 4-24. Maximum slope of natural ground.

Design Group	A	B	C-1	C-2
Slope (%)	20	20	12	6

4.25.3 Design

The sand mound has three different sections with different design criteria. The sections are the absorption bed cell, medium sand fill, and soil cap. The minimum design criteria for each section are provided in the following subsections.

4.25.3.1 Absorption Bed Cell Design

1. ~~Absorption Bed bed design:~~

    1. ~~Only absorption beds may be used.~~ The maximum absorption bed cell disposal area should be 2,250 ft^2 (A x B). Beds ~~in commercial or large systems~~ should be a maximum of ~~15 feet wide (B ≤ 15 feet), and beds for individual dwellings a maximum of~~ 10 feet wide (B ≤ 10 feet). Beds should be as long and narrow as practical, particularly on sloped ground, to minimize basal loading. It is recommended that beds be less than 10 feet wide if site conditions will allow.
    2. If multiple absorption bed cells are used in a sand mound design a separation distance of 10 feet should be maintained between each cell (see Figure 4-31).
    3. Absorption bed cells should only be placed end to end in a single mound design.

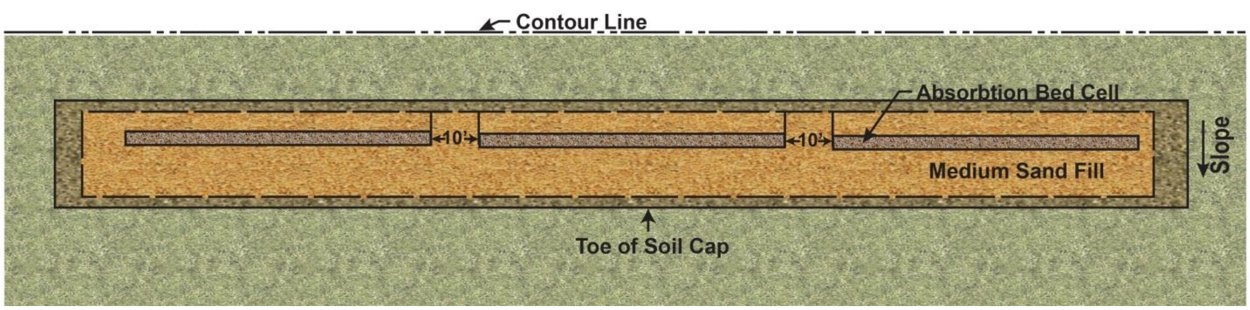


Figure 4-31. Multiple absorption bed cells installed in one sand mound.

4. Application rate of effluent in the sand bed should be calculated at 1.0 gallon/ft^2 (sand HAR = 1.0 gallon/ft^2).
5. ~~Absorption beds for commercial establishments that discharge other than normal strength domestic waste should be sized at 0.5 gallon/ft^2 or 40 pounds BOD/acre/day, whichever is greater.~~
6. ~~6.~~5. Absorption bed must be filled with 9 inches of clean drainrock, 6 inches of which must be below the pressurized distribution pipes.
7. 6. ~~Drainrock portion of the sand mound~~The absorption bed drainrock must be covered with a geotextile after installation and testing of the pressure distribution system.
8. 7. Two observation ports should be installed extending from the drainrock/medium sand interface through the soil cap at approximately the ¼ and ¾ points along the absorption bed. The observation ports should contain perforations in the side of the pipe extending up 4 inches from the bottom of the port. Observation ports must be capped.

~~7.~~8. Absorption bed disposal area or dimensions may not be reduced through the use of extra drainrock, pretreatment, or gravelless drainfield products.

9. Pressurized laterals within the absorption bed should not be further than 24 inches from the absorption bed sidewall and should not be spaced farther than 48 inches between each lateral within the absorption bed.

10. Orifice placement should be staggered between neighboring laterals.

4.25.3.2 Medium Sand Fill Design

2. ~~Medium Sand sand fill design:~~

1. ~~Filter~~ Mound sand fill must conform to ~~ASTM C-33, with less than 2% passing the #200 sieve~~the medium sand definition provided in section 2.1.4 of this manual. ~~A manufactured sand is recommended.~~

2. Minimum depth of medium sand below the absorption bed shall be 1 foot.

3. Medium sand fill shall extend out a minimum of 24 inches level from the top edge of the absorption bed on all sides (medium sand fill absorption perimeter), and then uniformly slope as determined by the mound dimensions and the slope limitations as described in 4.25.3.2.~~f~~(6). This is dimension H in Figure 4-32.

~~2.~~4. Flat sites: The effective area will be A x (C+B+D+2(H)).

~~3.~~5. Sloped sites: The effective area will be A x (B+D+H).

Equation 4-16 shows the calculation for the absorption bed area.

$$\frac{\text{Design Flow (GPD)}}{\text{Soil Application Rate}\left(\text{GPD}/\text{ft}^2\right)}$$

Equation 4-16. Effluent application area.

6. Slope of all sides must be 3 horizontal to 1 vertical (3:1) or flatter.

~~4.~~7. Sand fill area must be as long and narrow as practical, with plan view dimension G exceeding dimension F (Figure 4-31).

~~5.~~8. Slope correction factors as provided in Table 4-25 should be used to determine the downslope width of the medium sand fill for sloped sites.

~~6.~~9. Slope correction factors as provided in Table 4-26 should be used to determine the upslope width of the medium sand fill for sloped sites.

Table 4-25. Down slope correction factors (DCF) for sloped sites.

Slope (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Correction Factor	1.03	1.06	1.10	1.14	1.18	1.22	1.27	1.32	1.38	1.44	1.51	1.57	1.64	1.72	1.82	1.92	2.04	2.17	2.33	2.50

Table 4-26. Up slope correction factors (UCF) for sloped sites.

Slope (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Correction Factor	0.97	0.94	0.91	0.89	0.87	0.85	0.83	0.81	0.79	0.77	0.75	0.73	0.72	0.70	0.69	0.67	0.66	0.65	0.64	0.62

Figure 4-32 and Figure 4-33 can be used with Table 4-27 and Table 4-28 (sand mound design checklist) for flat and sloped sites.

4.25.3.3 Soil Cap Design

3. Soil cap design:

1. Sand mound must be covered with a minimum topsoil depth of 12 inches. The soil cap at the center of the mound must be crowned to 18 inches to promote runoff.
7.2. Topsoil and soil cap must be a sandy loam, loamy sand, or silt loam. Soils meeting the soil design group classifications of A and C shall not be used for the topsoil and soil cap cover.
8.3. Mound should be protected to prevent damage caused by vehicular, livestock, or excessive pedestrian traffic. The toe of the mound must be protected from compaction.
9.4. Mounds on slopes should have design considerations taking surface runoff diversion into account.
10.5. Sand fill area must be as long and narrow as practical, with plan view dimension G exceeding dimension F (Figure 4-27).

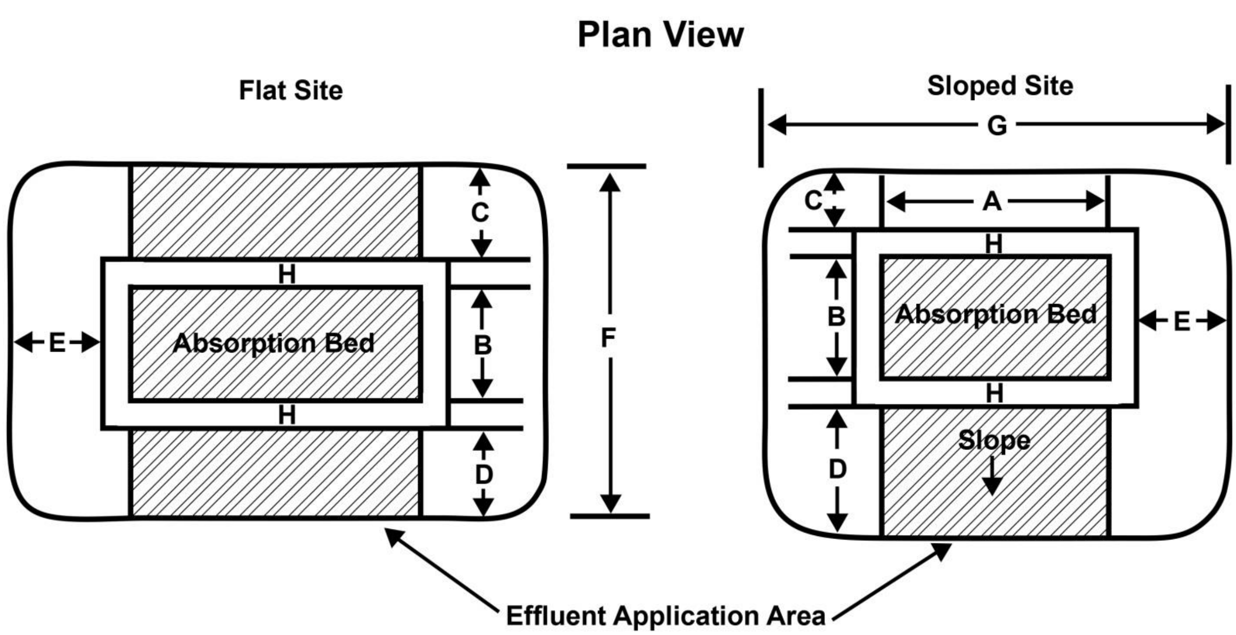


Figure 4-32. Design illustrations for sand mound installation on flat and sloped sites (use with sand mound design checklist).

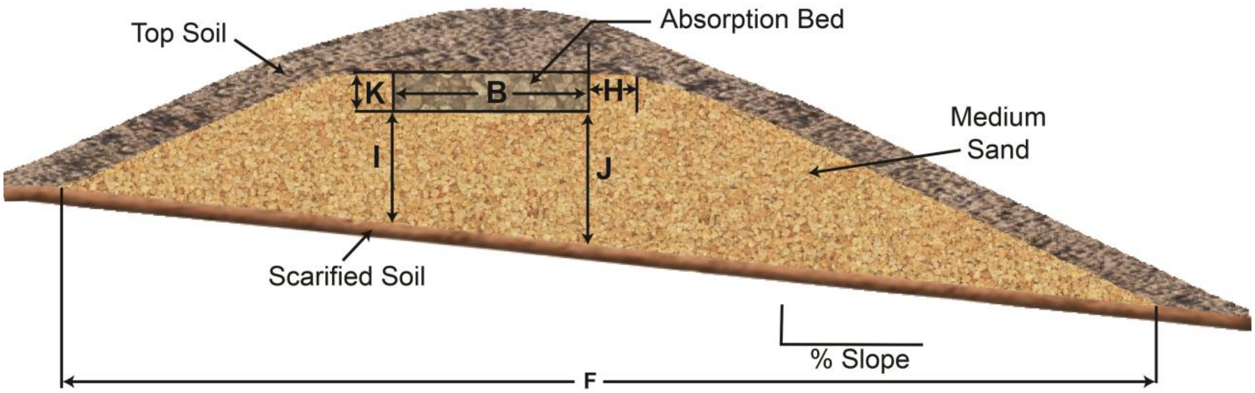


Figure 4-33. Design dimensions for use with the sand mound design checklist.

Table 4-27. ~~Sample~~ Example sand mound design checklist (use with Table 4-25 and 4-26 and Figure 4-32 and 4-33).

Sand Mound Design Checklist
(Example for a three-bedroom house on soil design subgroup B-2 soils, flat site, 12 inch medium sand fill depth below absorption bed cell)

1	Determine soil application rate (AR) (Example: B-2 soil)	AR = GPD/ft^2 (Example: 0.45 GPD/ft^2)
2	Determine daily flow rate (DFR) (Example: 250 GPD x 1.5 safety factor)	DFR = GPD x 1.5 (Example: 375 GPD)
	Absorption Bed Cell Design	
3	$Area = \frac{Daily\_Flow\_Rate\_GPD(\#2)}{Sand\_Application\_Rate\_{GPD}/_{ft^2}(1.0\_{GPD}/_{ft^2})}$	Area = ft^2 (Example: 375 ft^2)
4	Width (B): $Width\_(B) = \sqrt{\frac{Area\_(\#3) \times Soil\_AR\_(\#1)}{Sand\_Application\_Rate\_(1.0\,{GPD}/_{ft^2})}}$ ~~Maximum bed width: Commercial = 15 feet~~ ~~Residential~~ = 10 feet *Beds may be designed narrower than determined by this equation if desired. Beds are recommended to be as long and narrow as site conditions allow.* Example: $Width\_(B) = \sqrt{\frac{(\#3 \times \#1)}{1.0\,{GPD}/_{ft^2}}} \approx 13\,ft$	Width (B) = feet (Example: 13 feet or 10 feet max) (Example: use 10 feet)
5	Length (A): $Length\_(A) = Area\_(\#3)/Width\_(\#4)$ (Example: 375 ft^2/10 feet)	(A) feet (Example: 37.5 feet)

Sand Mound Design

2	Total area (TA): $TA = DFR\_(\#2)/soil\_AR\_(\#1)$ (Example: 375 gallon/0.45 gallon/ft^2)	TA = ft^2 (Example: 833 ft²)
7	Medium sand fill absorption bed perimeter area (SFAP): Flat Site: SFAP = 2 x [2 feet x length (#5)] Sloped Site: SFAP = 2 feet x length (#5) (Example: 2 x [2 feet x 37.5 feet])	SFAP = ft^2 (Example: 150 ft^2)
87	Effluent application area (EAA) = Total area–(bed area + SFAP): EAA = TA (#6) – [Area (#3) + SFAP (#7)] = (Flat Site Example: 833 ft^2 – [375 ft^2 + 150 ft^2] = 458 308 ft^2); (Sloped Site Example: 833 ft^2 – [375 ft^2 + 75 ft^2] = 383 ft^2)	(Flat Site Example: 458 308 ft²; Sloped Site Example: 383 ft^2)
98	Flat site perimeter (C,D): 0.5 x [EAA (#78)/length (#5)] *Perimeter must maintain a maximum slope of 3:1.* *Perimeter width must result in a disposal area that meets or exceeds the minimum Total Area (#6). This will be verified in step 14.* (Example: 0.5 x [458 308 ft^2/37.5 feet] = 64.1 feet)	(C) = (D) = feet (5.25 feet minimum for 3:1 slope in 12 in. mound, 8.25 feet minimum for 3:1 slope in 24 in. mound) (Example: 64.1 feet, use default of 5.25 feet to meet minimum slope)
109	Sloped site: Downslope length (D) = [EAA (#78)/length (#5)] x DCF *Downslope length must result in a maximum slope of 3:1.* *Downslope length must result in a disposal area that meets or exceeds the minimum Total Area (#6). This will be verified in step 14.* *Example based on 5% slope:* (Example: D = [458 383 ft^2/37.5 feet] x 1.18 = 12.1 feet)	(D) = feet (Example: 12.110.2 feet)
110	Sloped site: Upslope (C) = (Bed depth + max. sand depthK + I) x 3] x UCF *Downslope length must result in a maximum slope of 3:1.* Example based on 5% slope: (Example: C = [(0.75 ft + 1.0 feet) x 3] X 0.87 = 5.254.6 feet)	(C) = feet (Example: 5.254.6 feet)
121	Flat site: End slope (E) = (Bed depth + max. sand depth K + I) x 3 *End slope length must result in a maximum slope of 3:1.* (Example: [1.0 foot + 0.75 feet] x [3] = 5.25 feet)	(E) = feet (Example: 5.25 feet)

13	Sloped site: End slope (E) = (J + K) x 3	(E) = feet
	End slope length must result in a maximum slope of 3:1.	
	Example based on 5% slope: (Example: [1.5 feet + 0.75 feet] x [3] = 6.75 feet)	(Example : 6.75 feet)
14~~2~~	Total width (F) = B + C + D + 2(H)	(F) = feet
	(Flat site example: 10 feet + ~~6.1~~5.25 feet + ~~6.1~~5.25 feet + 4 feet = 2~~2~~4.~~2~~5 feet)	(Example: ~~22.2~~24.5 feet)
	(Sloped site example (5%): 10 feet + ~~5.25~~4.6 feet + 12.1 feet + 4 feet = ~~27.45~~30.7 feet)	(Example: ~~27.45~~30.7 feet)
15~~3~~	Total length (G) = A+(2 x E) + 2(H) (G > F)	(G) = feet
	(Flat site example: [G] = 37.5 feet + [2 x 5.25 feet] + 4 feet = ~~48~~52 feet)	(Example: ~~48~~52 feet)
	(Sloped site example (5%): [G] = 37.5 feet + [2 x 6.75 feet] + 4 feet = 55 feet)	(Example : 55 feet)

Total Area Verification

16	Flat site: Design area (DA) = A x F [DA ≥ TA(#6)]	DA = ft^2
	(Example: [37.5 feet x 24.5 feet] = 918.75 ft^2; (918.75 ft^2 ≥ 833 ft^2)	Example: 919 ft^2
17	Sloped site: Design area (DA) = A x (B + D + H) [DA ≥ TA(#6)]	DA = ft^2
	(Example (5%): 37.5 feet x [10 feet + 12.1 feet + 2 feet] = 903.75 ft^2); (903.75 ft^2 ≥ 833 ft^2)	Example: 903.75 ft^2

Finished Mound Dimensions (Sand Mound + Soil Cap)

1~~4~~8	Sand mound length + 6 feet min. (G + 6)	(G+6) = feet
	(Flat site example: ~~48~~52 feet + 6 feet = 5~~4~~8 feet)	(Example: 5~~4~~8 feet)
	(Sloped site example: 55 feet + 6 feet = 61 feet)	(Example: 61 feet)
1~~5~~9	Sand mound width + 6 feet min. (F + 6)	(F+6) = feet
	(Flat site example: ~~22.2~~24.5 feet + 6 feet = ~~28.2~~30.5 feet)	(Example: ~~28.2~~30.5 feet)
	(Sloped site example: ~~27.45~~30.7 feet + 6 feet = ~~33.45~~36.7 feet)	(Example: ~~33.45~~36.7 feet)

Note: gallons per day per square foot (GPD/ft^2), downslope correction factor (DCF), upslope correction factor (UCF), total area (TA), design area (DA), effluent application area (EAA), sand fill absorption perimeter (SFAP), daily flow rate (DFR), soil application rate (AR)

4.25.4 Construction

1. Pressure transport line from the dosing chamber should be installed first~~ and should be located upslope of the mound~~.
   a. The pressure transport line should slope down to the pump so that the pressure line will drain between discharges.
   b. If a downward slope from the mound to the pump chamber is not practical due to length of run, then the pressure transport line should be laid level below the anticipated frost line for that region.
   ~~b.~~c. On sloped sites the pressure transport line should enter the absorption bed from the end of the bed or upslope side of the mound, do not enter the absorption bed from the downslope side.
   ~~c.~~d. ~~If located downslope, consider using anti-seep collars on the trench. If a pump is to be used, the pressure line should slope down to the pump so that the pressure line will drain between discharges.~~
2. Grass~~,~~ and shrubs~~, and trees~~ must be cut close to ground surface and removed from the mound site.
   a. If extremely heavy vegetation or organic mat exists, these materials should be removed before scarification and replaced with filter sand (typically 3 or 4 inches of filter sand is added~~.~~).
   b. Larger than two inch caliper trees or shrubs and large boulders are not to be removed. Trees should be cut as close to ground level as possible and the stumps left in place. If stumps or boulders occupy a significant area in the mound placement area, additional area should be calculated into the total basal area of the mound to compensate for the lost infiltrative area.
~~2.~~3. When the soil is dry, and site vegetation has been cut or removed the ground in the basal placement area of the sand ~~fill~~ mound should ~~then~~ be scarified or ripped to a depth of 6–8 inches. ~~Scarification/ripping is important to provide vertical windows in the soil. Tree stumps are not to be removed. If stumps are numerous, additional area should be calculated into the total sand area to compensate for the lost area.~~
~~3.~~4. Sand fill will then be placed and shaped before it freezes or rains. No vehicles with pneumatic tires should be permitted on the sand or ~~plowed~~ scarified area to prevent the soils from being compacted. For sloped sites, all work ~~is~~ should be done from the upslope side or ends of the mound placement area if possible.
~~4.~~5. Absorption bed will be shaped and filled with clean drainrock. The bottom of the absorption bed should be constructed level on all sites regardless of slope.
~~5.~~6. After leveling the drainrock, the low-pressure distribution system manifold and laterals will be installed. The system should be tested for uniformity of distribution.
7. Geotextile fabric must be placed over the absorption bed and backfilled with 12 inches of soil on the sides and shoulders, and 18 inches of soil on the top center. Soil types must be sandy loam, loam~~y sand~~, or silt loam.

6.8. Typical lawn grasses and or other appropriate low-profile vegetation should be established on the mound cap as soon as possible, preferably before the system is put into operation. Do not plant trees or shrubs on the mound, or within the mature rooting radius of the tree or shrub. Trees with roots that aggressively seek water must should be planted at least 50 feet from the mound (e.gi.e., poplar, willow, cottonwood, maple, elm, etc.).

7.9. Mounds placed up and down slope from each other should maintain a mound-toe to mound-toe separation distance of 35 feet (Figure 4-34).

   a. The first 15 feet below the upslope mound should remain free of traffic and other activities resulting in soil compaction.

   b. The 20 feet above the downslope mound should be maintained for construction of the downslope mound.

8.10. A separation distance of 15 feet should be maintained from the toe of each mound when multiple mounds are constructed on the same elevation contour.

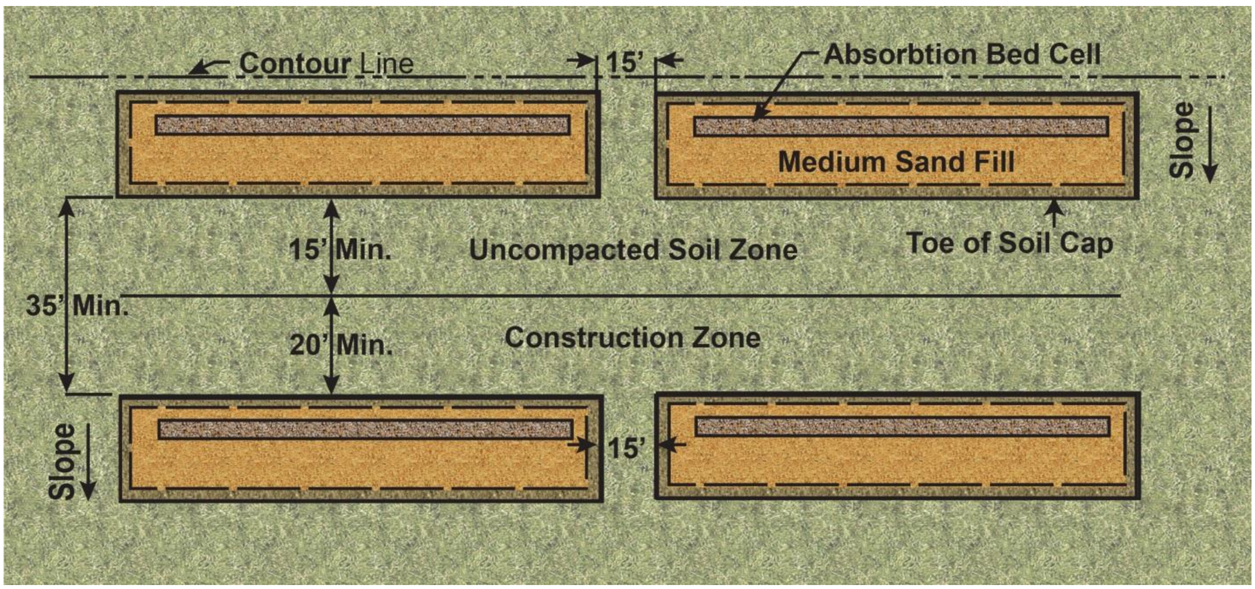


Figure 4-34. Mounds placed up- and downslope of one another.

9. A standpipe must be installed within the bed, down to the fill sand, so that ponding water can be measured periodically.

4.25.5 Inspections

1. Site inspections must be made by the Director before, during, and after constructionshall be conducted by the Director at the following minimum intervals (IDAPA 58.01.03.011.01):

   a. Pre-construction

      i. Recommended that pre-construction conference be conducted with the Director, design responsible charge engineer, complex installer, and property owner (if available) present.

b. During construction as needed

i. Scarification, pressure line installation, medium sand mound construction, absorption bed construction, pressure distribution piping

c. Final construction inspection

~~ii.~~i. Pump drawdown/alarm check, pressure test of distribution network, soil cap material and placement

2. The ~~dDesigner~~ responsible charge engineer ~~or owner~~ shall provide the health district a written statement that the system was constructed and functions in compliance with the approved plans and specifications. Additionally, the ~~design~~ 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).

4.25.6 Operation and Maintenance

An operation and maintenance 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. Pump screens and effluent filters should be inspected regularly and cleaned. All material created by cleaning of the screen should be discharged to the septic tank.
5. Sand mound observation port caps should be removed and the monitoring ports observed for ponding. Corrective action should be taken, if excessive ponding is present, as specified by the system design engineer.
6. Observation ports for testing of residual head should be inspected regularly to ensure the residual head meets the system design minimum residual head.
7. Lateral flushing should occur annually to ensure any biomat buildup is removed from the distribution lateral. Lateral flushing procedures should be described.
8. Any valving for sand mounds containing multiple absorption bed cells should be inspected and verified to be functioning properly on a regular schedule.
9. Any other operation and maintenance as recommended by system component manufacturers and the system design engineer.

Table 4-27 is a sample sand mound design checklist, and Table 4-28 is a blank checklist for sand mound design.

State of Idaho
Department Of Environmental Quality
Technical Guidance Committee

Table 4-28. Sand mound design checklist (use with Table 4-25 and 4-26 and Figure 4-32 and 4-33).

	Sand Mound Design Checklist	
1	Determine soil application rate (AR)	AR = ________GPD/ft^2
2	Determine daily flow rate (DFR) *DFR = GPD x 1.5*	DFR = ________GPD
	Absorption Bed Design	
3	$Area = \frac{Daily\_Flow\_Rate\_GPD(\#2)}{Sand\_Application\_Rate\_{}^{GPD}/_{ft^2}\left(1.0\_{}^{GPD}/_{ft^2}\right)}$	Area = ________ft^2
4	Width (B): $Width\_(B) = \sqrt{\frac{Area\_(\#3)\times Soil\_AR\_(\#1)}{Sand\_Application\_Rate\_\left(1.0\,{}^{GPD}/_{ft^2}\right)}}$ Maximum bed width: ~~Commercial = 15 feet~~ ~~Residential =~~ 10 feet	Width (B) = ________ft
5	Length (A): $Length\_(A) = Area\_(\#3)/Width\_(\#4)$	(A) ________ft
	Sand Mound Design	
6	Total area (TA): $EAA = DFR\_(\#2)/soil\_AR\_(\#1)$	TA = ________ft^2
7	Medium sand fill perimeter area (SFAP) Flat site: SFAP = 2 x [2 feet x length (#5)] Sloped site: SFAP = 2 feet x length (#5)	SFAP = ________ft^2
~~7~~8	Effluent application area (EAA) = Total area – (Bed area + SFAP): EAA = TA (#6) – [Area (#3) + SFAP (#7)]	EAA = ________ft^2
~~8~~9	Flat site perimeter (C,D): 0.5 x [EAA (#~~7~~8)/length (#5)] (5.25 feet minimum for 12 in. mound, 8.25 feet minimum for 24 in. mound)	(C) = (D) = ________ft
~~9~~10	Sloped site: Downslope length (D) = [EAA (#~~7~~8)/length (#5)] x DCF	(D) = ________ft
~~10~~11	Sloped site: Upslope (C) = [(~~Bed depth + max. sand depth~~K + I) x 3] x UCF	(C) = ________ft
~~11~~12	Flat site: End slope (E) = (~~Bed depth + max. sand depth~~K + I) x 3	(E) = ________ft
13	Sloped site: End slope (E) = (J + K) x 3	(E) = ________ft
~~12~~14	Total width (F) = B + C + D + 2(H)	(F) = ________ft
~~13~~15	Total length (G) = A+(2 x E) + 2(H) (G > F)	(G) = ________ft
	Total Area Verification	
16	Flat site: Design area (DA) = A x F [DA ≥ TA(#6)]	DA = ________ft^2 ≥ #6
17	Sloped site: Design area (DA) = A x (B + D + H) [DA ≥ TA(#6)]	DA = ________ft^2 ≥ #6
	Finished Mound Dimensions (Sand Mound + Soil Cap)	
~~14~~18	Sand mound length + 6 feet min. (G + 6)	(G+6) = ________ft
~~15~~19	Sand mound width + 6 feet min. (F + 6)	(F+6) = ________ft

Note: gallons per day per square foot (GPD/ft^2), downslope correction factor (DCF), upslope correction factor (UCF), total area (TA), design area (DA), effluent application area (EAA), sand fill absorption perimeter (SFAP), daily flow rate (DFR), soil application rate (AR)

Appendix L

4.20 Pressure Distribution System

Revision: April 19June 5, 20142013

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.
b2. Treat and dispose of effluent in the uppermost levels of the soil profile.
c3. Aid in mitigating the potential contamination of ground water.
d4. 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, pressurized 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 boxgravity distribution 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).
5. These guidelines design guidance provided herein for piping, pump, and dosage requirements is meant to be a simple design strategy to assist the nonengineer. Theyand are is not intended to supplant or limit engineering design or other low-pressure systems 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 operation and maintenance manual for the system to the health district prior to permit issuance.

~~1~~9. 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 3/4 - 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 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.

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~~ 4 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~~ discharge rate (maximum gallons per minute rating).
    b. For example, a pump with a maximum ~~capacity~~ 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~~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~~Division. ~~Pumps must be kept submerged.~~

i. *Subsurface sewage disposal installer registration permits are not equivalent to, or substitutes for, a proper electrical license.*

ii. *Electrical permits are required for the installation of all pumps and are the responsibility of the applicant, responsible contractor, and/or the responsible charge engineer's responsibility to obtain the proper electrical permits.*

iii. *Installation of all electrical connections is required to be performed by a licensed electrician. It is the applicant, responsible contractor, and/or the responsible charge engineer's responsibility to ensure that the installation is performed by a properly licensed individual.*

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

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

~~i.~~vi. ~~*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~~

a3. ~~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 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 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. 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).

1.2. 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.

2.3. 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 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 designeds 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.

3.5. The volume of the dosing chamber should be equal to at least a 2-day flowtwo 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.).

6. 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.

~~4.~~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.

~~5.~~8. A low level off 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.

~~6.~~9. 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~~ based off of the inches of drop in the dosing chamber.

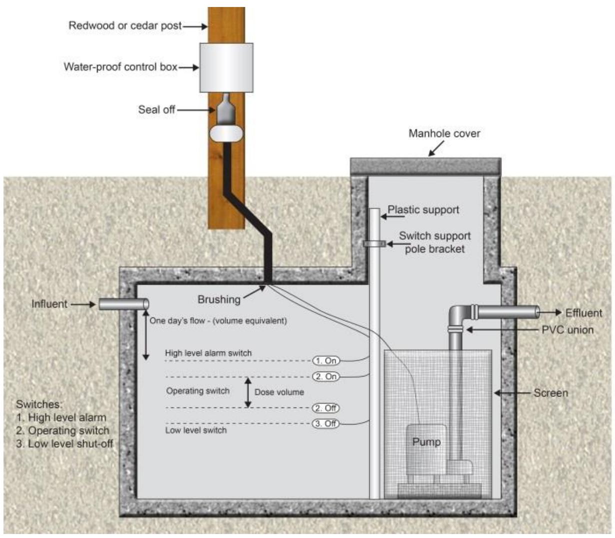


Figure 4-19. Dosing chamber with a pump and screen.

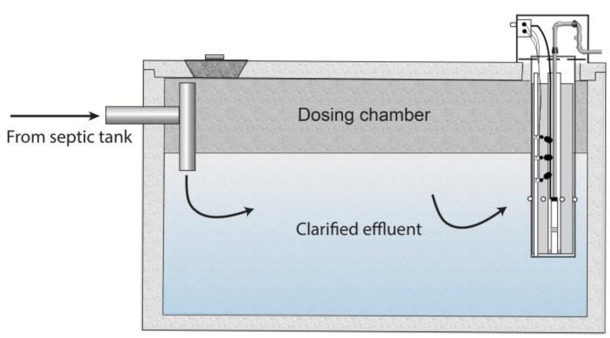


Figure 4-20. Dosing chamber with a pump vault unit.

10~~3~~. ~~Electrical~~ Dosing chamber electrical requirements ~~(contact the Idaho Division of Building Safety, Electrical Bureau)~~:

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 the installation of all electrical components and are the responsibility of the applicant, responsible contractor, and/or the responsible charge engineer's responsibility to obtain the proper electrical permits.*

c. *Installation of all electrical connections is required to be performed by a licensed electrician. It is the applicant, responsible contractor, and/or the responsible charge engineer's responsibility to ensure 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 ~~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~~. It is recommended that a DC battery backup power source be considered for the visual and audible alarm.

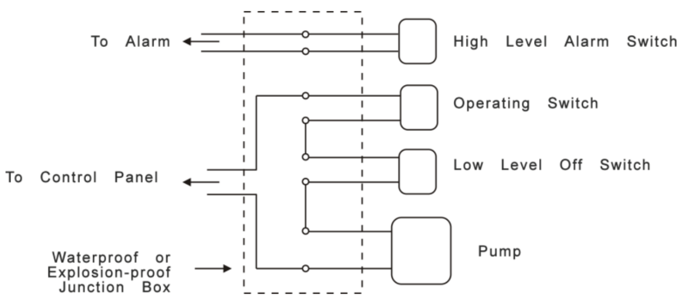
~~b. All electrical connections must be made outside of the chamber in either an approved weatherproof box or an explosion-proof junction box (Crouse-Hind Type EAB or equivalent).~~

~~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.~~

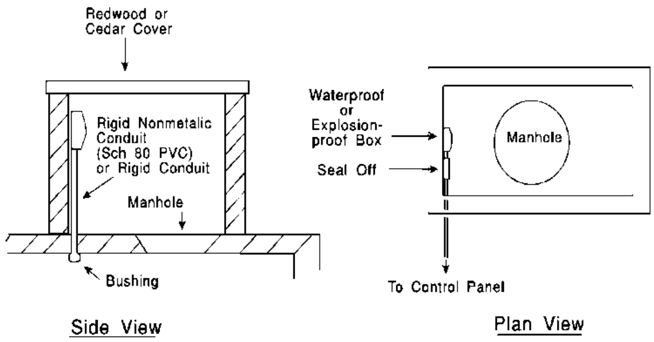
e~~d~~. ~~An acceptable circuit is shown in Figure 4-20.~~



~~**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 (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); 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).
9. The same electrical requirements that apply to both pumps and dosing chambers apply to in-tank pumps.

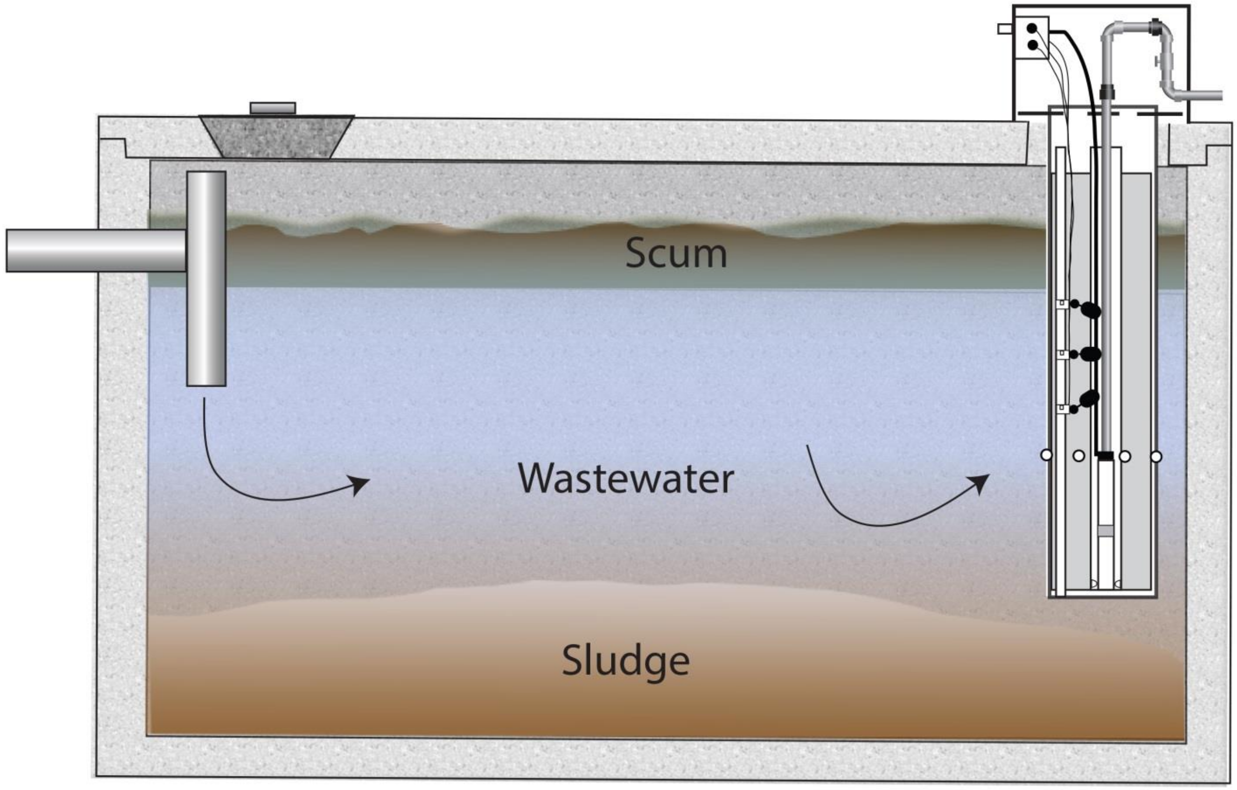


Figure 4-2221. Example of effluent pump installed into single-compartment septic tank using a pump vault unit.

4.20.3.6 Pump to Drop BoxGravity Distribution

A pump to drop boxgravity distribution 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). 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.

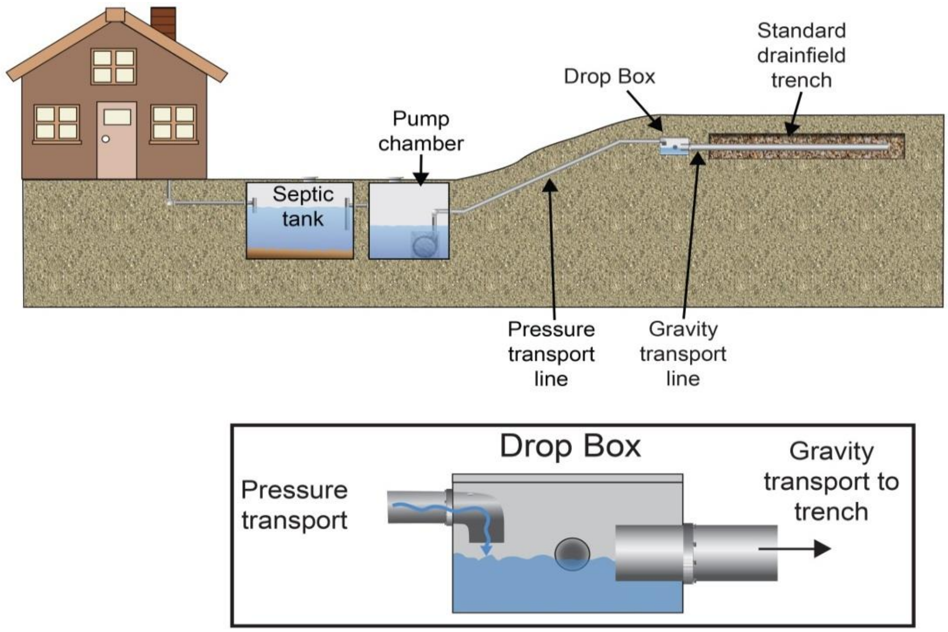


Figure 4-~~23~~22. Example of pump to ~~drop box~~gravity distribution system installation~~.~~

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. Pre-construction

      i. Recommended that pre-construction conference be conducted with the health district, responsible charge engineer, complex installer, and property owner (if available) present.

   b. During construction as needed

   c. Final construction inspection

      i. Including a pump drawdown/alarm check and pressure test of distribution network

~~3.~~2. The responsible charge engineer shall provide the health district 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 operation and maintenance 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 by cleaning of the screen 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. ~~1.~~Any other operation and maintenance as recommended by the system design engineer.

Appendix M

4.22 Recirculating Gravel Filter

Revision: ~~October 13, 2004~~June 5, 2014

4.22.1 Description

A recirculating gravel filter is a bed of ~~coarse sand~~filter media in a container that filters and biologically treats septic tank effluent. The filter effluent is returned to the recirculation tank for blending with untreated septic tank effluent and recirculated back to the filter. The treated effluent is distributed to a disposal trench of reduced dimension. System components include a septic tank, recirculating tank with float valve and low-pressure distribution system, free access filters, and a drainfield.

4.22.2 Approval Conditions

1. Nondomestic wastewater with BOD or TSS exceeding normal domestic wastewater strengths (section 3.2.1, Table 3-1) is required to be pretreated to these levels before discharge into the recirculating gravel filter system.
2. The bottom of the filter must not come within 12 inches of seasonal high ground water.
3. All pressurized distribution components and design elements of the recirculating gravel filter system that are not specified within section 4.22 must be designed and installed according to the guidance for pressure distribution systems in section 4.20.
4. The recirculating gravel filter container shall meet the same separation distance requirements as a septic tank.
5. ~~2.~~5.System must be designed by a PE licensed in Idaho.

4.22.3 Design

Minimum design requirements for the recirculating gravel filter components are provided in the sections below.

4.22.3.1 Septic and Recirculating Tank

1. The septic tank shall be sized according to IDAPA 58.01.03.007.07.
2. Minimum recirculating ~~chamber~~ tank volume ~~is 1.5 times the daily design flow of the structure.~~shall be capable of maintaining 2 times the daily design flow of the structure above the pump low level off switch and the tank inlet (see Figure 4-24).
3. The recirculating ~~chamber~~ tank may be a modified septic tank or dosing ~~tank~~ chamber selected from section 5.2 or section 5.~~7~~3.
   a. Alternatively, the recirculation ~~chamber~~ tank may be designed by the system's design engineer to meet the minimum necessary requirements of this section and IDAPA 58.01.03.007.
   b. Subsections .07, .08, .10, .11, and .13 of IDAPA 58.01.03.007 are exempt from the recirculating ~~chamber~~ tank design requirements.

4. The recirculating ~~chamber~~ tank shall be accessible from grade and the ~~by-pass valve~~return line, flow slitter, pump, pump screen, and pump components shall be accessible from ~~this~~ these access points.

5. A flow splitter capable of simultaneously returning effluent to the recirculating tank and discharging effluent to the drainfield shall be located prior to, or within, the recirculating tank. The flow splitter shall meet the following minimum requirements:~~A~~ ~~Float valves or equivalent bypass alternatives are required in the recirculation tank.~~

   a. The flow splitter must be capable of returning effluent to the recirculating tank and discharging to the drainfield in a volume ratio equivalent to the designed recirculation ratio (e.g., if a recirculation ratio of 5:1 is used then 83% of the filtered effluent by volume shall be returned to the recirculating tank and 17% shall be discharged to the drainfield).

   b. Float valves that do not allow for continual splitting of filtered effluent prior to discharge to the drainfield shall not be used.

6. The recirculating filter effluent return point shall be located at the inlet of the recirculating chamber.

~~5.~~7. Discharge to the drainfield must occur after filtration and flow splitting.

8. The recirculating ~~chamber~~ tank shall meet all other minimum design and equipment requirements of section 4.20.3.4.

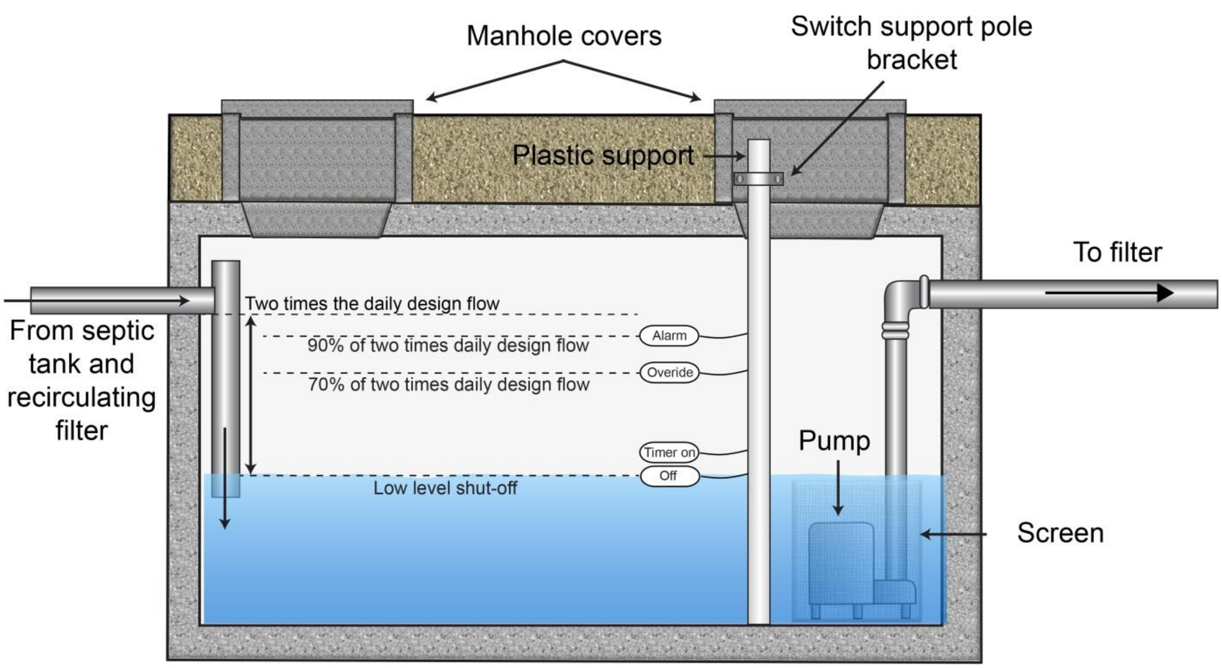


Figure 4-24. Recirculating tank.

4.22.3.2 Recirculating Filter

1. Filter container shall be constructed of reinforced concrete or other materials where equivalent function, workmanship, watertightness and at least a 20-year service life can be documented. The following requirements must be met for flexible membrane liners:

a. Have properties equivalent to or greater than 30-mil PVC.

b. Have field repair instructions and materials provided to the purchaser of the liner.

c. Have factory fabricated boots for waterproof field bonding of piping to the liner.

d. Liner must be placed against smooth, regular surfaces free of sharp edges, nails, wire, splinters, or other objects that may puncture the liner. A 4-inch layer of clean sand should provide liner protection.

2. The filter surface area is sized at ~~3~~ a maximum of 5 gallons/ft²/day forward flow (forward flow is equivalent to the daily design flow from the structure).

3. Filter construction media shall meet the specification in section 3.2.8.1.3.

4. Minimum filter construction media depth shall be 24 ~~36~~ inches ~~and result in the equivalent of a total daily recirculation flow of no more than 25 gallons/ft^3 of filter construction media~~ (see Figure 4-25).

~~4.~~5. The pressure distribution laterals shall be located in aggregate meeting the specifications in section 3.2.8.1.1 with a minimum depth of 6 inches below the laterals and 2 inches above the laterals. Gravelless domes or chambers may be substituted for aggregate as long as the lateral orifices are oriented up.

6. ~~12 inches of d~~Drainrock meeting the specification in section 3.2.8.1.1 shall be placed below the filter construction media ensuring a minimum depth that places 2 inches of drainrock cover over the underdrain.

~~5.~~7. The bottom of the filter should be sloped at least 1% to the underdrain pipe.

8. An underdrain must be located ~~within the drainrock~~at the bottom of the filter to return filtered effluent to the recirculation tank meeting the following requirements:

a. May be placed directly on the bottom of the filter.

b. Minimum diameter of 4 inches.

c. ~~and should be p~~Placed level throughout the bottom of the filter.

d. Constructed of slotted drain pipe with 1/4 inch slots 2.5 inches deep and spaced 4 inches apart located vertically on the pipe, or perforated sewer drain pipe with holes located at 5 and 7 o'clock.

e. One underdrain should be installed for each filter cell zone.

f. The distal end is vented to the atmosphere to allow entry of air flow into the bottom of the filter and access for cleaning.

g. Connected to solid pipe meeting the construction requirements of IDAPA 58.01.03.007.21 that extends through the filter and is sealed so the joint between the filter wall and pipe is watertight.

h. If gravity flow is not achievable from the underdrain to the recirculating tank or drainfield then the underdrain must connect to an approved dosing chamber (section 5.3) or modified septic tank (section 5.2) that is separate from the recirculating filter and sized and constructed as described in section 4.20.3.4. Upon discharge from the dosing chamber flow splitting requirements of every dose must still be met if splitting cannot be met prior to the dosing chamber.

9. Three 4 inch diameter observation tubes should be placed in the recirculating filter to monitor for ponding and clogging formation. The first should extend to the filter construction media/underdrain aggregate interface. The second should extend to the pressure distribution aggregate/filter construction media interface. The third should extend to the bottom of the underdrain aggregate and may be substituted by a properly designed vent from the underdrain.

    a. The monitoring tubes must be secured and perforated near the bottom.

    b. The monitoring tubes must extend through the recirculating filter cover and have a removable cap.

10. ~~No soil cover is required~~The surface of the recirculating filter must be left open to facilitate oxygenation of the filter. No soil cover is to be placed above the upper layer of drainrock in the recirculating gravel filter. However, the filter must be designed to prevent accidental contact with effluent from the surface. The following minimum cover requirements must be followed:~~.~~

    a. ~~Media and pipe shall be covered to prevent accidental contact and to provide access to the filter surface for filter maintenance~~Geotextile filter fabric shall be placed over the aggregate covering the pressurized distribution laterals.

    b. ~~Extreme climates may require insulation of the recirculating sand filter lid or cover to prevent freezing of the media~~A minimum of 12 inches of drainfield aggregate or decorative landscape stone shall be placed over the geotextile filter fabric.

    c. The filter and aggregate or stone cover shall be constructed to divert any surface waters away from the recirculating filter.

    d. The design engineer should account for potential freezing conditions in the design of the recirculating filter and pressure distribution system.

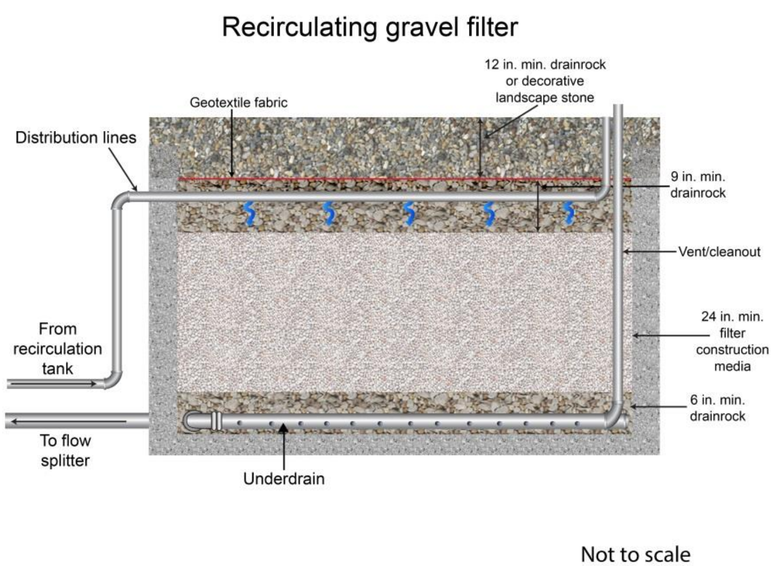


Figure 4-25. Recirculating filter.

4.22.3.2.1 Recirculating Filter Cells

Depending on the volume of effluent and the type of structure utilizing a recirculating gravel filter, the recirculating filter may need to be split into cells that contain dosing zones. A filter cell is the total filter area that can be served by a single dosing pump or set of pumps. A filter zone is the area of a cell that can be dosed by a single dosing pump at any one time. Zone sizing is dependent upon pump size, lateral length, perforation size, and perforation spacing. The minimum filter design requirements for cells, zones, and pumps include:

1. Single family homes: one cell, one zone, and one pump.
2. Central systems or systems connected to anything other than a single family home (flows up to 2,500 GPD): one cell, two zones, and one pump per zone.
3. Large soil absorption systems (flows of 2,500 to 5,000 GPD): one cell, three zones, and one pump per zone.
4. Large soil absorption systems (flows over 5,000 GPD): two cells, two zones per cell, and one pump per zone.
5. ~~1.~~5. An alternative to installing one pump per zone is to install duplex pumps connected to sequencing valves that alternate zones for each pressurization cycle. For systems with multiple cells, each cell must have a dedicated set of duplex pumps. Pumps should alternate between each cycle.
6. Filter cells are hydraulically isolated from one another and shall be constructed according to the minimum requirements in section 4.22.3.2.
7. Each cell shall be equivalent in surface area and volume and have the same number of zones.
8. Each zone shall have the same number of laterals and perforations.

4.22.3.3 Recirculating Filter Dosing

1. The minimum recirculation ratio of the filter is ~~4~~5:1 and the maximum recirculation ratio is 7:1 (the daily flow moves through the filter a minimum of 5 times or a maximum of 7 times prior to discharge to the drainfield).
2. Timed dosing is required and the filter dosing cycle should meet the following minimum recommendations:
   a. Pumps are set ~~by timer~~ to dose each zone approximately ~~5–10 minutes per 30 minutes~~2 times per hour.
   b. Dose volume delivered to the filter surface for each cycle should be ~~9.6~~10.4% of the daily flow from the structure (forward flow).
   c. A pump on override float should be set at a point that equates to 70% of the recirculating tank's two times the daily design flow above the low level off float. This override float should only result in one additional pump cycle, or a shorter time off interval, each time it is activated. Once the effluent level returns to 60% of the recirculating tank's two times the daily design flow above the low level off float the control will resume operating at its normal setting.

d. A high level audio and visual alarm float should be set at 90% of the recirculating tank's two times the daily design flow above the low level off switch.

e. A low level off float should be placed to ensure that the pump remains fully submerged at all times.

3. The pump controls should:

a. Be capable of recording low and high level events so that timer settings can be adjusted accordingly.

b. Have event counters and run time meters to be able to monitor daily flows.

4. Orifices are recommended to be oriented up with an orifice shield used to minimize orifice blockage from the filter construction media.

Longer dosing cycles may be desirable for larger installations, e.g., 20 minutes every 2–3 hours. Hydraulic loading is 5 gallons/ft²/day (forward flow).

Filter media is very fine washed gravel (pea gravel), with 100% passing the three-eighths inch sieve, an effective size of 3–5 mm, a uniformity coefficient (C_u) < 2, and < 1% passing a #50 sieve.

3.5. Minimum recirculating chamber size is one-half the volume of the septic tank.

4.6. Gravel filter container, piping, gravel, and gravel cover should meet the minimum requirements as shown herein. No soil cover is required.

5. Filter container shall be constructed of reinforced concrete or other materials where equivalent function, workmanship, watertightness and at least a 20-year service life can be documented. The following requirements must be met for flexible membrane liners:

a. Have properties equivalent to or greater than 30-mil PVC.

b. Have field repair instructions and materials provided to the purchaser of the liner.

c. Have factory fabricated *boots* for waterproof field bonding of piping to the liner.

d. Liner must be placed against smooth, regular surfaces free of sharp edges, nails, wire, splinters, or other objects that may puncture the liner. A 4-inch layer of clean sand should provide liner protection.

6. Float valves or equivalent bypass alternatives are required in the recirculation tank. Discharge to the drainfield must occur after filtration.

7. Media and pipe shall be covered to prevent accidental contact and to provide access to the filter surface for filter maintenance.

8. Extreme climates may require insulation of the recirculating sand filter lid or cover to prevent freezing of the media.

4.22.4 Filter Construction

1. All materials must be structurally sound, durable, and capable of withstanding normal installation and operation stresses.

2. Components that may be subject to excessive wear must be readily accessible for repair or replacement.

5.3. All filter containers must be placed over a stable level base.

6.4. Pressure system must be designed and installed according to the guidance given for pressure distribution systems in section 4.20. Geotextile filter fabric shall not only be used in the recirculating gravel filterplaced over the top of the filter and must not be used in-between the filter construction media and drainrockunderdrain aggregate.

7.5. Access to the filter surface must be provided to facilitate maintenance.

4.22.5 Gravity DisposalDrainfield Trenches

1. Except as noted herein, the final disposal trenches must meet the requirements of a standard trench system.
2. Distances shown in Table 4-19 must be maintained between the trench bottom and limiting layer.
3. Capping fill may be used to obtain adequate separation from limiting layers but must be designed and constructed according to the guidance for capping fill trenches in section 4.5.
3.4. Pressure distribution may be used with the following design considerations:
    a. The pressure distribution system related to the drainfield is designed in accordance with section 4.20.
    a.b. The recirculation chamber and recirculating filter may not be used as the dosing chamber for the drainfield.
5. The minimum area, in square feet of bottom trench surface, shall be calculated from the maximum daily flow of effluent divided by the hydraulic application rate for the applicable soil design subgroup listed in Table 4-20.

Table 4-19. Recirculating gravel filter vertical setback to limiting layers (feet).

Limiting Layer	Flow <2,500 GPD	Flow ≥2,500 GPD
	All Soil Types	All Soil Types
Impermeable layer	2	4
Fractured rock or very porous layer	1	2
Normal high ground water	1	2
Seasonal high ground water	1	2

Note: gallons per day (GPD)

Table 4-20. Secondary biological treatment system hydraulic application rates.

Soil Design Subgroup	Application Rate (gallons/square foot/day)
A-1	1.7
A-2	1.2
B-1	0.8
B-2	0.6
C-1	0.4
C-2	0.3

4.22.6 Inspection

1. A preconstruction meeting between the health district, ~~design~~ responsible charge engineer, and installer should occur prior to commencing any construction activities.
2. The health district should inspect all system components prior to backfilling and perform inspections of the filter container construction prior to filling with drainrock and filter construction media.
3. The ~~design~~ responsible charge engineer should conduct as many inspections as necessary for verification of system and component compliance with the engineered plans.
4. The ~~design~~ responsible charge engineer shall provide the health district a written statement that the system was constructed and functions in compliance with the approved plans and specifications. Additionally, the ~~design~~ 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)

4.22.6 Operation and Maintenance

1. The recirculating gravel filter design engineer shall provide a copy of the system's operation, maintenance, and monitoring procedures to the health district as part of the permit application and prior to subsurface sewage disposal permit issuance (IDAPA 58.01.03.005.04.k).
2. Minimum operation, maintenance, and monitoring requirements should follow each system component manufacturer's recommendations.
3. Instructions on how to trouble shoot the pump control panel should be included to allow the adjustment of pump cycle timing if the low level off or high level alarm switch are frequently tripped in order to maintain the minimum 5:1 recirculation ratio.
4. Operation and maintenance directions should be included regarding the replacement of the filter construction media and the direction to the system owner that a permit must be obtained from the health district for this activity.
5. Maintenance of the septic tank should be included in the O&M manual.

6. All pressure distribution system components should be maintained as described in section 4.20.5.
7. Check for ponding at the filter construction media/underdrain aggregate interface through the observation tube in the recirculating filter.
8. Clean the surface of the filter regularly to remove leaves and other organic matter that may accumulate in the aggregate or rock cover.
9. Check the recirculating filter for surface odors regularly. Odors should not be present and are an indicator that something is wrong. Odors are likely evidence that the dissolved oxygen in the filter is being depleted and that BOD and ammonia removal are being impacted.

Figure 4-24 26 shows two examples of recirculating flow splitters. Figure 4-25 is a diagram of a recirculating/dose tank. Figure 4-26 27 shows an example of a distribution box flow splitter constructed out of piping. Figure 4-28 shows a cross section of a recirculating gravel filter system.

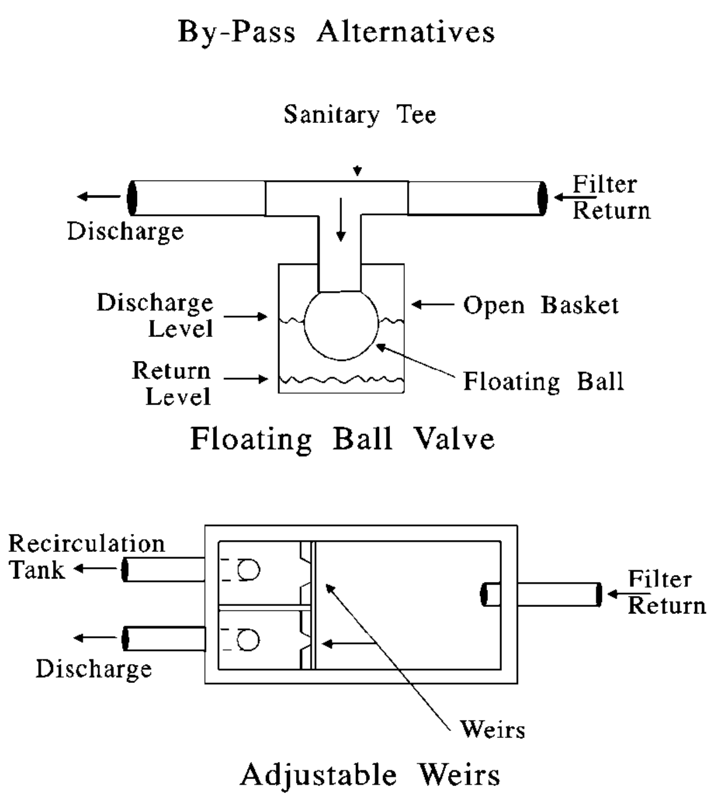


Figure 4-2426. Two examples of recirculating flow splitters.

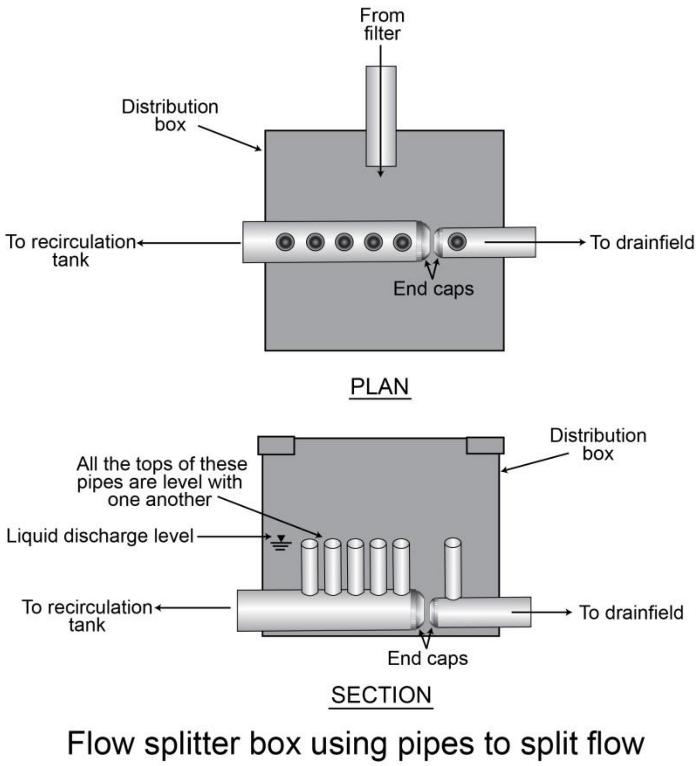
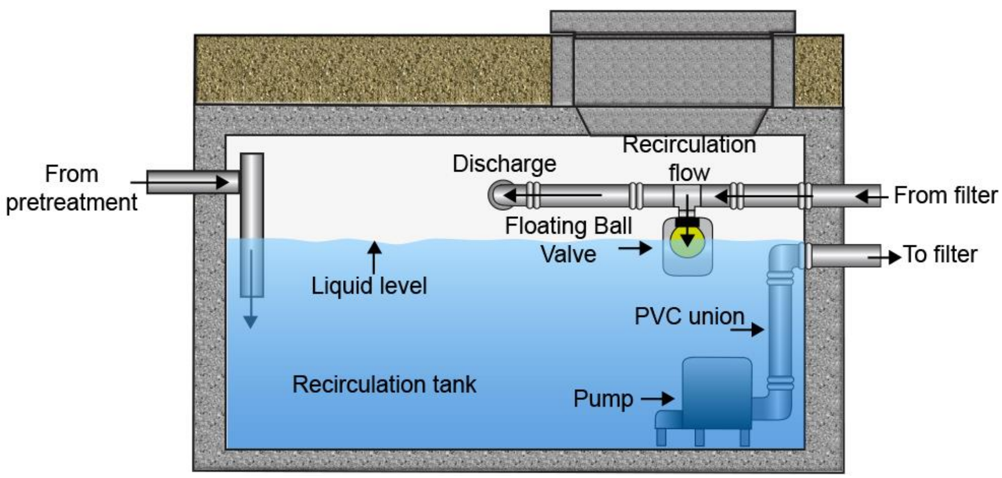


Figure 4-27. Distribution box flow splitter using piping.



~~**Figure 4-25. Recirculating/dose tank.**~~

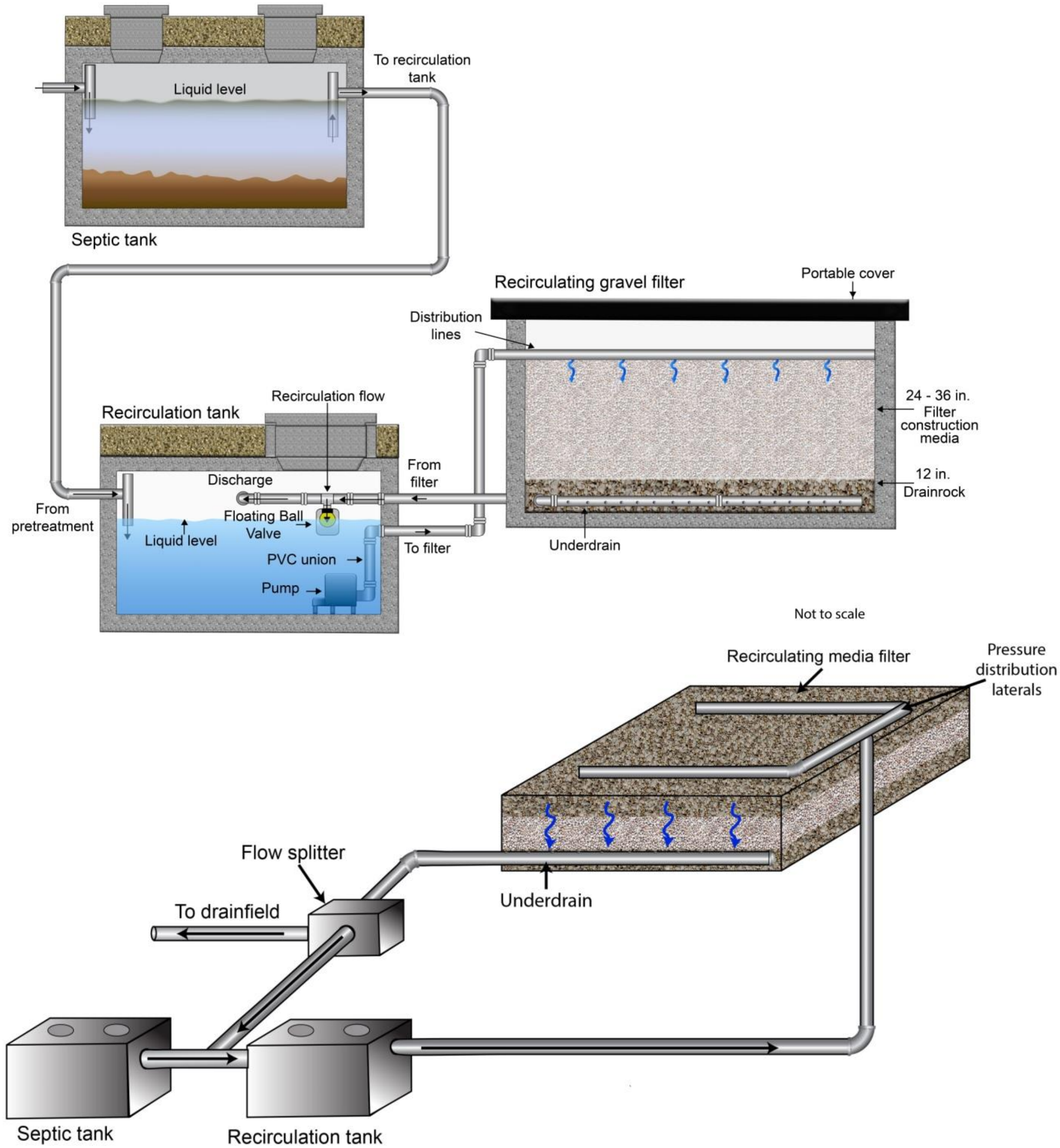


Figure 4-~~26~~28. Cross section of recirculating gravel filter system.

Appendix N

4.1 General Requirements

Revision: ~~July 18~~June 5, ~~2013~~2014

All rules pertaining to standard subsurface sewage disposal systems shall be applicable, except as modified in this section for each alternative.

All alternative systems shall be approved for specific site use by the health districts in a manner consistent with the guidance provided within this manual for each alternative system.

Requirements for each site-specific alternative shall be contained in the permit.

The designer of alternative *public* systems must be a PE licensed in Idaho and experienced in the alternative system's design. The designer of alternative *private* systems, other than those listed below, may be required to be either a PE or an environmental health specialist. The PE must be licensed in Idaho and the environmental health specialist must be registered with the National Environmental Health Association, and both should be experienced in the alternative system's design. The designer of the following complex alternative *private* systems must be a PE licensed in Idaho unless otherwise allowed within the specific system's guidance:

- Drip Distribution System
- Evapotranspiration and Evapotranspiration/Infiltrative System
- Experimental System
- Grey Water System (if pressurized)
- Individual Lagoon
- Pressure Distribution System
- Recirculating Gravel Filter
- Intermittent Sand Filter
- Sand Mound
- ~~Two-Cell Infiltrative System~~

4.1.1 Engineering Requirements

Engineered designs and design or responsible charge engineers shall meet the following minimum requirements of this section.

4.1.1.1 Responsible Charge of Engineered Systems and Plans

All new and repair or replacement systems that require engineered design shall have a new set of plans that have been stamped (sealed) by the design engineer unless the original design plan accounted for and included the design of the replacement system. If the original design plan included the design of the replacement system and that system design is in conformance with IDAPA 58.01.03 and the current applicable TGM alternative system design requirements then the existing plans may be used as long as those plans are stamped (sealed) by a responsible charge engineer (does not need to be the original design engineer) as required by Idaho Code 54-1223(5). A responsible charge engineer stamping (sealing) an existing set of plans for a replacement system should review the original work to ensure that:

- Correct field parameters were evaluated
- The existing design meets the requirements of IDAPA 58.01.03 and the current applicable TGM alternative system design requirements
- The system as designed is capable of being installed in the designated area without any design plan modification.

4.1.1.2 Operation and Maintenance of Engineered Systems

All subsurface sewage disposal systems require some level of system operation and maintenance. Engineered systems typically require system operation and maintenance that is far more extensive than operation and maintenance required for standard systems. Per IDAPA 58.01.03.005.04.k, the design engineer shall provide an operation and maintenance manual as part of the subsurface sewage disposal permit application upon submission of the engineered design plans prior to permit issuance. The operation and maintenance manual should include information on the following areas at a minimum:

- Manufacturer recommended operation and maintenance for any commercially manufactured component used in a system's design.
- Operation and maintenance of the system necessary based on the system design.
- Operation and maintenance of the system as specified within the alternative system's guidance in the TGM.
- A description of any monitoring procedures related to system function, failure detection, or system sampling.
- Corrective actions for system component malfunctions, alarms, or failure.
- Any other operation and maintenance as recommended by the system's design engineer.

4.1.1.3 As-Built Plans and Specifications of Engineered Systems

As a condition of issuing a subsurface sewage disposal permit the health district may require that complete and accurate drawings and specifications that depict the actual construction be submitted to the health district within 30 days after the completion of system construction (IDAPA 58.01.03.005.15). This requirement should be fulfilled by the system's responsible charge engineer for all systems that require engineered designs. As-built plans and specifications may be required when there are any deviations in construction from the permitted construction plans. If construction is completed in conformance with the permitted construction plans without deviation then the responsible charge engineer shall provide the health district a written statement that the system was constructed and functions in compliance with the approved plans and specifications. It is recommended that the responsible charge engineer perform as many inspections of the system construction as necessary in order to provide the above documentation.

4.1.2 Plumbing and Electrical Permits

Subsurface sewage disposal permits only cover the installation of a subsurface sewage disposal system (IDAPA 58.01.03.005.10) and provide documentation that the system is in compliance with IDAPA 58.01.03 and applicable alternative system requirements of the TGM (IDAPA 58.01.03.005.07). Subsurface sewage disposal systems begin at the septic tank and terminate at the end of the drainfield. Subsurface sewage disposal system permits do not include approval for installation of any plumbing preceding the septic tank or electrical components of a subsurface sewage disposal system. Requirements for these components are discussed in the following sections.

4.1.2.1 Plumbing Permits and Inspections

Any wastewater plumbing preceding a septic tank is under the jurisdiction of the Idaho Division of Building Safety Plumbing Program. All requirements related to this section of wastewater plumbing are governed by the Idaho State Plumbing Code. A permit for the installation of this plumbing and any necessary inspections of this plumbing must be obtained through the Idaho Division of Building Safety Plumbing Program. Health districts only have jurisdiction, including permitting and inspection authority, over the subsurface sewage disposal system. Health districts are not responsible for determining that any permit has been obtained for plumbing preceding the septic tank or that the plumbing preceding the septic tank is in compliance with the Idaho State Plumbing Code. A subsurface sewage disposal installer's registration permit issued under IDAPA 58.01.03.006 is not a substitute for a plumbing contractor license.

4.1.2.2 Electrical Permits and Inspections

Some alternative subsurface sewage disposal systems contain components that require an electrical connection. All electrical connections are under the jurisdiction of the Idaho Division of Building Safety Electrical Program. A permit for the electrical work necessary to connect these components to an electrical supply and any necessary inspections of the electrical work must be obtained through the Idaho Division of Building Safety Electrical Program. Health districts are not responsible for determining that any permit has been obtained for electrical work related to a subsurface sewage disposal system or that the electrical work is in compliance with the National Electrical Code. A subsurface sewage disposal installer's registration permit issued under IDAPA 58.01.03.006 is not a substitute for an electrical contractor license. Permitted subsurface sewage disposal system installers that do not hold a current electrical contractor license should not perform any electrical work related to a subsurface sewage disposal system. *It is highly recommended that health districts verify that a proper electrical inspection has been performed by the Idaho Division of Building Safety Electrical Program on any subsurface sewage disposal system component requiring electrical connection prior to coming into contact with the component, or any liquid that may be in contact with that component.*

Appendix O

1.5 Installer's Registration Permit

An installer is considered any person, corporation, or firm engaged in the business of excavation for, or the construction of subsurface sewage disposal systems (IDAPA 58.01.03.003.19). Per IDAPA 58.01.03.006.01 all installers must obtain either a standard/basic or complex installer's registration permit. These permits may be obtained from any health district in the state and may be used for the installation of subsurface sewage disposal systems throughout the entire state regardless of the health district that the registration permit was obtained through. Standard/basic installer's registration permit holders are limited in the type of subsurface sewage disposal systems that may be installed. Complex alternative installer's registration permit holders may install all systems that are allowed by the standard/basic registration permit and all of the following complex alternative systems:

- Drip distribution systems
- Evapotranspiration and Evapotranspiration/Infiltrative systems
- Experimental systems
- Extended treatment package systems
- Pressurized grey water systems
- Individual lagoons
- Pressure distribution or transport systems
- Recirculating gravel filters
- Intermittent sand filters
- Enveloped in-trench sand filters
- Pressurized in-trench sand filters
- Sand mound
- Two-cell infiltrative systems
- Drainfield remediation components
- Large soil absorption systems

1.5.1 Initial Installer's Registration Permit Issuance

To obtain an initial installer's registration permit the prospective installer shall:

1. Submit an installer registration permit application to one of the health districts (IDAPA 58.01.03.006.04).
2. Submit a bond to the health district in a form approved by DEQ and in the sum applicable to the permit type sought as specified in IDAPA 58.01.03.006.05.
3. Pay the applicable permit application fee as set by the individual health district's Board of Health (fees may vary from district to district based on program costs).

4. Pass the installer examination administered by the health district with a score of 70% or higher (IDAPA 58.01.03.006.02).

1.5.2 Installer's Registration Permit Renewal

All installer registration permits shall be renewed annually (IDAPA 58.01.03.006.03). In order to renew an installer registration permit the following items must be met:

1. The health district issuing the registration permit must receive items 1 through 3 as described in section 1.5.1.
    a. A bond continuation form may be substituted in lieu of a new bond upon registration permit renewal.
    b. If the installer registration permit is to be upgraded from a basic/standard registration permit to a complex alternative system registration permit at the time of renewal then the complex installer examination shall also be taken.
2. Every third year the applicant must attend a refresher course meeting the requirements as described in section 1.5.2.1.

1.5.2.1 Refresher Course Requirements

Installer refresher (continuing education) courses must be attended every three years in order to renew an installer registration permit per IDAPA 58.01.03.006.03. All refresher courses used to fulfill the refresher course requirements for an installer's registration permit must be approved by DEQ. Installer refresher courses delivered by the health districts or DEQ are approved courses. All other courses proposed to be held by non-DEQ or health district organizations to fulfill the refresher course requirements must submit an agenda and curriculum to DEQ's On-Site Wastewater Coordinator for review prior to holding the course. Courses held for the purpose of fulfilling the refresher course requirements of IDAPA 58.01.03.006.03 must:

- Be based on the most recent version of IDAPA 58.01.03 and the TGM.
- Contain information on recent updates to the TGM as approved by the TGC.
- Not contain manufacturer specific information.
- Have an agenda capable of filling a minimum of a four hour course.

Refresher courses may also contain:

- Health district information specific to the subsurface sewage disposal program.
- Discussion on issues related to the subsurface sewage disposal program identified by the health districts that need to be addressed with the installers.
- Presentations by non-health district or DEQ personnel as long as the presentations are not manufacturer specific.
- Other information as approved by DEQ.

Sign-in sheets should be maintained for all courses and should be filled out at the start and near the end of the course. Upon completion of the course the course provider should provide the installer a certificate of completion that includes the course date, time attended, and course holder. Health districts should maintain a copy of the most current certificate in each installer's file. For courses attended by an installer, that are not held by the district which they are licensed through, it is the installer's responsibility to provide the health district a copy of their course completion certificate. If an installer is not able to attend a refresher course they may meet this requirement of permit issuance by completing the process described in section 1.5.2.2.

1.5.2.2 Refresher Course Substitution

If an installer is not able to attend an approved refresher course in order to renew their registration permit they may:

1. Schedule a time with their permitting health district to watch a health district approved video that meets the requirements of section 1.5.2.1.
2. If the installer is not able to attend an in-person class for two straight renewal cycles then to renew their installer registration permit the installer must watch the video referred to above and retake the installer exam that is applicable to the permit type sought for renewal.

1.5.3 Installer's Registration Permit Exemption

An installer's registration permit is not required for (IDAPA 58.01.03.006.06):

1. Any person, corporation, or firm constructing a central or municipal subsurface sewage disposal system if that person, corporation, or firm is a licensed public works contractor, is experienced in the type of system to be installed, and is under the direction of a professional engineer licensed in the state of Idaho.
2. Any property owner installing their own standard or basic alternative system.
    a. Property owners installing a subsurface sewage disposal system on their property under the property owner exemption must perform all work related to the excavation and construction of the system and own or rent the equipment used in the installation.
    b. Commercial and industrial property owners and government entities are also allowed the exemption from an installer's registration permit for work performed on standard or basic alternative systems installed on land owned by the entity. The entity may utilize their staff and must own or rent the equipment to install the system.

The installer's registration permit exemption does not apply under the following scenarios:

1. The excavation and construction of the system are performed by an outside contractor or individual that is not the property owner.
2. The installer is installing a complex alternative system and is not a licensed public works contractor under the direction of a professional engineer.
3. Subsurface sewage disposal systems installed on property that is under a leasing agreement or easement for the installation of the system.

1.5.4 Installer's Registration Permit Revocation

All permitted subsurface sewage disposal installers must comply with IDAPA 58.01.03 (IDAPA 58.01.03.002.04). Failure to comply with these rules may result in the revocation of an installer's registration permit. Permit revocation may be initiated by any health district regardless of where an installer obtained their registration permit.

Appendix P

4.17 Individual Lagoon

Revision: ~~July 18, 2013~~June 5, 2014

4.17.1 Description

An individual lagoon is a pond sealed with a natural or synthetic liner into which sewage from a household or small business is discharged. Bacteria digest the solids in the presence of oxygen, and the liquid is evaporated into the atmosphere.

4.17.2 Approval Conditions

1. Lagoons are applicable only in areas of Idaho where the annual evaporation exceeds the annual precipitation.
2. The lagoon may not be placed within ~~100~~ 200 feet of the owner's property line ~~and may not be placed within 300 feet from a neighboring dwelling~~ as measured from the toe of the exterior slope.
3. Bottom of the finished lagoon must not be constructed within:
   a. 6 inches of the ~~maximum~~ seasonal high ground water.
   b. 2 feet of the normal high ground water level.
   c. 2 feet of bedrock.
4. Site must be located in an area of maximum exposure to the sun and wind.
5. Slope must not be greater than 12%.
6. Lagoons are restricted from use in areas where such systems may have an ice cover for more than 3 months.
7. A source of makeup water with a backflow prevention system between the source and the lagoon must be readily available.
8. Lot size should be at least 10 acres but in no case should be less than 5 acres. If the lot is less than 10 acres, a variance must be required.
9. This design is for individual residential dwellings or small commercial businesses that only discharge domestic wastewater. Facilities discharging non-domestic wastewater do not qualify for an individual lagoon under this guidance.
10. System designs that meet the definition of a central system (IDAPA 58.01.03.003.08) do not qualify for an individual lagoon under this guidance.
11. The system shall be designed by a PE licensed in Idaho.

4.17.3 Design

1. Area of the lagoon at the 2-foot minimum depth is first determined by the net evaporation of the area. Equation 4-13 gives the calculation for horizontal area.

$$A = \frac{1.2 \times \text{yearly flow (in cubic feet)}}{\text{Annual net moisture (in feet)}}$$

Equation 4-13. Lagoon horizontal area (square feet).

where:

Yearly flow in cubic feet = (GPD x 365 days) x (7.48 gallons/ft^3).

Annual net moisture as determined from a water mass balance beginning in October.

2. For commercial establishments with organic loadings higher than domestic sewage, check the area required based on biological oxygen demand (BOD) loading. This is an important check in areas with high evaporation rates and low precipitation. Equation 4-14 shows the calculation for horizontal area factoring in BODs.

$$A = \frac{(GPD)(BOD[mg/L])(8.35 \times 10^{-6})}{(20lb/acre/day)} \times (43{,}560\, ft^2/acre)$$

Equation 4-14. Horizontal area factoring in BOD.

where:

A = surface area in square feet.

3. Use the area calculation that gives the largest area.

42. Total liquid depth:

2 foot minimum depth + 2 foot freeboard + annual net moisture as determined by a water mass balance.

3. The lagoon shall be lined with material that is watertight and demonstrates at least a 20-year service life. The following requirements must be met for flexible membrane liners:
   a. Have properties equivalent to or greater than 30-mil PVC.
   b. Have field repair instructions and materials provided to the purchaser of the liner.
   c. Have factory fabricated boots for waterproof field bonding of piping to the liner.
   d. Liner must be placed against smooth, regular surfaces free of sharp edges, nails, wire, splinters, or other objects that may puncture the liner. A 4-inch layer of clean sand should provide liner protection.
4. The lagoon shall be designed for a maximum leakage rate of 500 gallons per acre per day.
5. Minimum dike and embankment details:
   a. Inner and outer slope–3 horizontal to1 vertical (3:1)
   b. Inner slopes should not be flatter than 4 horizontal to 1 vertical (4:1)
   c. Embankment width– 4 feet minimum
5. The effluent discharge inlet to the lagoon must be placed near its center with a concrete splash-pad constructed around the inlet.

6. A water depth gauge clearly visible from the edge of the lagoon should be ~~installed at~~located near the concrete splash pad.
7. A cleanout must be placed on the ~~gravity~~ influent lines at a point above the lagoon's maximum liquid elevation.
8. If the sewage is pumped to the lagoon, a valve must be installed in the line that will permit repairs without draining the lagoon and will prevent backflow of effluent to the pumping chamber.
9. The lagoon must be fenced to exclude children, pets, and livestock. A sign indicating Danger—Human Sewage is recommended.

4.17.4 Construction

1. ~~The effluent discharge inlet to the lagoon must be placed near its center.~~
2. ~~A concrete splash pad must be constructed around the inlet.~~
3. ~~A water depth gauge clearly visible from the edge of the lagoon should be installed at the concrete splash pad.~~
4. ~~A cleanout must be placed on the gravity influent lines at a point above the lagoon's maximum liquid elevation.~~
5. ~~If the sewage is pumped to the lagoon, a valve must be installed in the line that will permit repairs without draining the lagoon and will prevent backflow of effluent to the pumping chamber.~~
6. ~~Excavation must provide the following dike and embankment details:~~
   a. ~~Inner slope 3:1~~
   b. ~~Outer slope 2:1 or flatter~~
   c. ~~Embankment width 4 feet minimum~~

~~7~~1. All fill must be compacted to at least 95% Standard Proctor Density.
2. All soil used in constructing the pond bottom and dike cores shall be relatively impervious, incompressible and tight, and compacted to at least 95% Standard Proctor Density.
3. Lagoons shall be sealed such that the seepage loss through the seal is no more than 0.125 inches (1/8 inch) per day.
8. ~~The lagoon must be fenced to exclude children, pets, and livestock. A sign indicating Danger—Human Sewage is recommended.~~

4.17.5 Inspections

1. A preconstruction conference should be held between the health district, installer, and responsible charge engineer.
2. The site must be inspected when the cells are excavated and compaction test results for all fill material, dikes, and the lagoon bottom shall be provided at this time.

3. The site must be inspected at after the time the impervious liner is placed and prior to filling the lagoon.

2. Inspections may be required during embankment construction to ensure adequacy of fill compaction and after completion.

34. Individual lagoons will shall be seepage tested by a PE licensed in Idaho, an Idaho licensed professional geologist, or by individuals under their supervision using the appropriate pond/lagoon seepage test procedure.

   a. Seepage testing procedures, to demonstrate seepage rate compliance, must be submitted to DEQ for review and approval prior to conducting required seepage testing (see http://www.deq.idaho.gov/water-quality/wastewater/lagoon-seepage-testing.aspx for more information).

   b. This is a one-time seepage test that must be performed prior to the lagoon being placed into service.

   b. The leakage rate for the lagoon shall be no more than 0.125 inches per day.

5. The responsible charge engineer should conduct as many inspections as necessary for verification of system and component compliance with the engineered plans.

6. The responsible charge engineer shall provide the health district a written statement that the system was constructed and function 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)

4.17.6 Operation and Maintenance

1. The lagoon design engineer shall provide a copy of the system's operation, maintenance, and monitoring procedures to the health district as part of the permit application and prior to subsurface sewage disposal permit issuance (IDAPA 58.01.03.005.04.k).

2. The lagoon must be kept filled with at least 2 feet of liquid.

23. A supply of makeup water shall be availableAnnual maintenance and testing of the backflow prevention device installed on the makeup water supply line shall be performed and be done according to the manufacturer's recommendations.

3. If the water comes from a well or domestic water supply, an approved backflow prevention device must be installed between the water source and the discharge to the lagoon.

4. Embankments must be stable and maintained to avoid breech, overflow, aesthetic nuisance, or disturbance to the lagoon operation.

5. Permanent vegetation shall be maintained on the top and outer slopes of the embankment except where a foot or vehicle path is in use. Grasses should be mowed.

6. Woody vegetation should be removed from the embankments, grasses should be mowed, and other vegetation should be maintained regularly.

67. Weeds and other vegetation must not be allowed to grow in the lagoon.

78. Duckweed or other fFloating aquatic weeds must be physically removed when the vegetation obscures the surface of the liquidon a regular basis.

89. The fence and all gates must be maintained to exclude animals, children, and other unwanted intrusion.

10. Directions for repair of the impervious liner should be included.

11. Directions on how to address potential odor issues from the lagoon should be described.

Appendix Q

4.3 ~~Vested~~ Existing and Approved System Rights, Abandoned and Unapproved Systems, and Nonconforming Uses

Revision: ~~October 31, 2013~~June 5, 2014

4.3.1 Existing and Approved System Rights

Existing and approved system rights are commonly confused with the term *grandfathered/grandfathering*. Idaho Code and IDAPA 58.01.03 do not provide a definition or description of grandfathered or grandfathering in reference to property rights. For the purposes of subsurface sewage disposal a property owner may have existing or approved system rights. There is no "grandfathering" when it comes to subsurface sewage disposal. Existing and approved system rights in a subsurface sewage disposal system (septic system) allow a property owner to only use, repair, or replace an existing or approved system. To maintain existing or approved system rights to use, repair, or replace a septic system, the system must be:

- Installed prior to August 18, 1971 if it was not permitted (IDAPA 58.01.03.003.11) ("existing"), or
- Permitted if it was installed after August 18, 1971 (IDAPA 58.01.03.003.03) ("approved"), and
- In use and not abandoned (IDAPA 58.01.03.003.01).

DEQ's subsurface sewage disposal rules (IDAPA 58.01.03) first went into effect in August 18, 1971. After the implementation of these rules, all subsurface sewage disposal systems were required to be permitted prior to installation. Thus, any system installed after this date that does not have a permit on record with the local health district is considered an unapproved system (IDAPA 58.01.03.003.03). If a system was installed prior to August 18, 1971, then that system is an existing system (IDAPA 58.01.03.003.11) and is considered a legal system. Regardless of whether a system was installed prior to or after August 18, 1971, the system must remain in use for the property owner to retain the existing or approved system rights.

Any repair or replacement of an existing or approved system must meet the current requirements of IDAPA 58.01.03 or if not possible, the intent of the rules (IDAPA 58.01.03.004.01). There is no right to repair or replace an existing or approved system with a system that does not meet the intent of the rules as described in IDAPA 58.01.03.004.01. Meeting the intent of IDAPA 58.01.03 may require that a property owner replace an existing or approved system, upon the system's failure, with an alternative system. Some alternative systems may require engineering or electrical components depending on the site conditions and alternative system requirements necessary to meet the intent of IDAPA 58.01.03.

4.3.2 Abandoned Systems

Any system that has ceased to receive blackwaste or wastewater due to the diversion of those wastes to another treatment system or due to the termination of waste flow is an abandoned system (IDAPA 58.01.03.003.01). The termination of blackwaste or wastewater discharge from the structures for more than one year is the typical timeframe used to determine system abandonment. Termination may result from the voluntary or involuntary removal of the wastewater generating structure or its abandonment through lack of either use or maintenance of the structure. Additionally, all structures connected to an existing subsurface sewage disposal system that were not constructed and connected to the system prior to August 18, 1971 must have a subsurface sewage disposal permit or other form of written health district approval on record with the local health district. If no such documentation exists, then those structures should not be considered in the determination of system abandonment because the connection to the system is not an authorized or approved connection (IDAPA 58.01.03.003.03). Structure construction dates are based on county records. The permitting health district makes determinations of abandonment on a case-by-case basis at its discretion.

Abandoned systems may be:

- Authorized or approved as documented through a previous subsurface sewage disposal permit (IDAPA 58.01.03.003.03), or
- Unapproved systems for which there is no documentation of approval by a health district (including the lack of an approved final inspection of a subsurface sewage disposal permit by the health district).

An abandoned system may be subsequently used if:

1. The system was originally permitted and approved, and
2. Current wastewater flows and blackwaste characteristics are similar to the system's original permit requirements for waste strength and flow rate received by the system, and
3. The system is not a failing system, and
4. The site is inspected and approved by the permitting health district and the district issues written approval to the applicant that the system may be placed back into use.

4.3.3 Unapproved Systems

An unapproved system is any system for which there is no documentation of approval regardless of the installation date. Approval documentation is either an approval letter or a completed and signed final inspection form for a previously issued subsurface sewage disposal permit. An unapproved and abandoned system may not be repaired, expanded, or placed into use unless it is first approved. An unapproved system may be replaced with a new system that meets the requirements of IDAPA 58.01.03 at any time, but the unapproved system must be abandoned once construction of the replacement system is completed unless the unapproved system is inspected and approved as described below. Unapproved systems with existing or approved system rights as described in section 4.3.1 may be replaced with a nonconforming system as an option of last resort as described in section 4.3.4. To turn an unapproved system into an approved system, the property owner must:

1. Submit an application to the health district of jurisdiction.
2. Have the system ~~U~~uncovered by a permitted installer or the property owner (IDAPA 58.01.03.011.02). "Uncovered"~~ed~~ means expos~~ure~~ing ~~of~~ the septic tank, effluent piping, and the front and back ends of each subsurface sewage disposal trench.

a. Septic tanks may be required to be leak tested over a 24-hour period to ensure structural integrity.

b. At least one test hole should be excavated at the time the system is uncovered within 10 feet of the existing drainfield to ensure sizing of the drainfield is adequate for the design flow and that all vertical separation distances to limiting layers are met as required by IDAPA 58.01.03.008.02.c.

3. Have the septic tank ~~P~~pumped by a permitted septic tank pumper prior to leak testing.

4. Have the uncovered system ~~I~~inspected by the health district ~~while uncovered~~ including evaluation of the test hole (IDAPA 58.01.03.011.02).

~~4.~~5. Ensure ~~T~~the system ~~must~~ meets all current requirements, including permit issuance (IDAPA 58.01.03.005.01).

a. If the system does not meet all current requirements, it must be brought into compliance with the current requirements prior to use according to the issued permit requirements.

b. If the system, or any portion thereof, cannot be brought into compliance with the current requirements, the system or portion of the system not in compliance must be abandoned and replaced in compliance with the current requirements and in accordance with the issued permit.

c. The permitting health district will provide the property owner written approval of the system after inspection in the form of a completed and signed final inspection form for the installation permit. Written approval will be provided regardless of whether any construction needs to occur on the system to bring it into an approved state.

4.3.4 Nonconforming Uses

The term *nonconforming uses* refers to a subsurface sewage disposal system that does not fully comply with all of the requirements of IDAPA 58.01.03. Nonconforming systems are typically existing systems (installed prior to August 18, 1971). There may be subsurface sewage disposal systems that were permitted and installed after August 18, 1971 that are also considered nonconforming systems due to changes in IDAPA 58.01.03 since the permitting of the system. For property owners to retain their existing or approved system rights in nonconforming systems, the systems cannot be considered abandoned as described in section 4.3.2.

All nonconforming systems must be brought into compliance with the intent of IDAPA 58.01.03 upon the repair, replacement, or enlargement of the system (IDAPA 58.01.03.004). The intent of the rules is best met by fully complying with the current requirements of IDAPA 58.01.03 at the time of permit issuance (IDAPA 58.01.03.004.02). Some systems installed prior to August 18, 1971 are located on properties where meeting the current requirements of IDAPA 58.01.03 is not feasible. Additionally, some systems that were permitted and installed prior to August 18, 1971 are located on properties that no longer meet all of the requirements of IDAPA 58.01.03 due to changes in the rule requirements over time. If the property owners have maintained existing or approved system rights for the use, repair, or replacement of the system, then they have the right to obtain a repair or replacement subsurface sewage disposal permit for their property.

If possible, the health district will only issue a subsurface sewage disposal permit for a system that meets all of the requirements of the then-current version of IDAPA 58.01.03. For some, this may require placing the system on the applicant's property or a neighboring property through the use of an easement as described in section 4.4. If it is not possible to permit a system on the applicant's property or on a neighboring property through the use of an easement, the health district may issue a nonconforming permit for the repair or replacement subsurface sewage disposal system only. New and expansion permits may not be issued for nonconforming systems as the property owner only holds existing or approved system rights in the repair or replacement of their system.

Even though property owners may repair or replace their existing system, the repaired or replaced systems must meet the current intent of the rules (IDAPA 58.01.03.004.01). This may require installing an alternative system. The type of alternative system required will be determined by the permitting health district on a case-by-case basis but will be selected to best meet the intent of the rules as described in IDAPA 58.01.03.004.01. Typically, alternative systems will be required upon replacement when a separation distance or effective soil depth cannot be met from the subsurface sewage disposal system to a feature of concern as provided in:

- IDAPA 58.01.03.007.17, or
- IDAPA 58.01.03.008.02.c-d, or
- As specified in section 2.2 of the TGM, or
- Per a specific alternative system's guidance in section 4 of the TGM.

Other scenarios may also require the installation of an alternative system but will be determined on a case-by-case basis by the permitting health district.

When issuing a nonconforming repair or replacement permit an emphasis shall be placed on meeting the intent of IDAPA 58.01.03.004.01.d, preserving the existing or potential beneficial uses of the waters of the State. This emphasis arises out of the direction of Idaho's legislative bodies as stated in Idaho's water quality policy (Idaho Code §39-3601) and policy on environmental protection (Idaho Code §39-102).

4.3.5 Permit Scenarios for Systems with Existing or Approved System Rights

Systems with existing or approved system rights will eventually require a determination on repair, replacement, or enlargement permitting requirements. If at all possible, the permitting health district will issue a repair or replacement subsurface sewage disposal permit in conformance with IDAPA 58.01.03. If this is not possible, a system with existing or approved rights meeting the requirements described in section 4.3 may be issued a nonconforming repair or replacement subsurface sewage disposal permit. All new and expansion subsurface sewage disposal permits must be issued in conformance with IDAPA 58.01.03. These scenarios are discussed in the following subsections. All final permitting determinations will be made by the permitting health district on a case-by-case basis pursuant to:

- IDAPA 58.01.03, and
- The information and processes contained within section 4.3 of the TGM, and
- The DEQ program directives described within the following subsections.

4.3.5.1 Failed Systems

All failed systems require the repair or replacement of the system if the existing structures cannot be connected to a municipal sewer system. A system is considered failed when it does not meet the intent of IDAPA 58.01.03.004.01, fails to accept blackwaste or wastewater, or discharges blackwaste or wastewater into the waters of the State or onto the ground surface (IDAPA 58.01.03.003.13). The following applies to the issuance of repair or replacement subsurface sewage disposal permits:

~~Failed system: Repair or replacement of an existing system.~~

1. ~~Dwelling or structure unit~~The structure(s) served by the system must not be altered, remodeled, or otherwise changed so as to result in increased wastewater flows that exceed the design flow of the system (IDAPA 58.01.03.004.04), otherwise a permit must be issued following the guidelines in section 4.3.5.2 of this manual.
2. ~~Reason~~ The reason for failure should be determined ~~if possible~~and addressed through the requirements of a repair or replacement subsurface sewage disposal permit if possible.
3. ~~If failure is due to age, t~~The system may be repaired or replaced with a similar system that shall be constructed ~~as close as possible~~according to the current dimensional and ~~setback~~ separation distance requirements ~~for standard systems~~of IDAPA 58.01.03.
4. ~~If failure has occurred in less than 10 years and is due to increased wastewater flows or poor site characteristics, an alternative or larger system must be constructed as close as possible to current dimensional and setback requirements for alternative systems~~If the system repair or replacement cannot meet the current dimensional and separation distance requirements of IDAPA 58.01.03, then a nonconforming permit may be issued based on the requirements of the subsurface program directive, "Failing Subsurface Sewage Disposal System," issued by DEQ on July 26, 1993 for the repair or replacement of the system that meets the intent of the rules through the use of an alternative system design (IDAPA 58.01.03.008.12).
    a. Nonconforming permits issued due to the inability to meet the separation distance requirements to ground water or surface water shall require one of the following alternative systems:
        i. Drip distribution system (section 4.7)
        ii. Extended treatment package system (section 4.10)
        iii. Recirculating gravel filter (section 4.22)
        iv. Intermittent sand filter (section 4.23)
        v. Sand mound (section 4.25)

a.b. All other nonconforming permits issued based on the requirements of this program directive shall best meet the intent of the rules through the use of alternative designs and their intended uses as described in the alternative system guidance in section 4 of this manual.

System replacement must follow the requirements of the subsurface program directive, "Failing Subsurface Sewage Disposal System," issued by DEQ on July 26, 1993.

4.3.5.2 Structure Additions or Alterations

A property owner may propose additions or alterations to an existing structure or the addition of a new structure to a system. No structure connected to a system shall be altered in any way, or alternatively no additional structures shall be connected to that system, that result in additional blackwaste or wastewater flows to the system without prior approval from the permitting health district documenting that the system will be in compliance with IDAPA 58.01.03 (IDAPA 58.01.03.004.02). Additionally, no permanent structures or expansion of existing structures shall be constructed on a property without prior approval from the permitting health district documenting that the replacement area is not impacted by these construction activities regardless of whether or not additional blackwaste or wastewater flows will be added to the system (IDAPA 58.01.03.004.06). Either activity described directly above may require abandonment, replacement, or expansion of the system, or any combination of these activities, and may require a subsurface sewage disposal permit for the repair, replacement, or expansion of the system.

Approval will be provided by the permitting health district in writing or through the issuance of a subsurface sewage disposal permit. Approval evaluation and if necessary, permit issuance, shall conform with the subsurface program directive, "Permit Requirements for Increased Flows at Single Family Dwellings," issued by DEQ on April 15, 2010. If property owners propose altering an existing structure or adding of a new structure on their property, the health district shall evaluate the request to determine the necessity of a subsurface sewage disposal permit based on the following minimum criteria:

Additions or alterations: Changes to an existing structure or dwelling.

1. ddition Adding a new structure or alterationing the existing structure will not cause exceed the design flow of the existing system to become unsafe or overloaded (IDAPA 58.01.03.004.04).

2. The system is an approved system and is not considered a nonconforming system.

3. If adding a new structure or altering the existing structure will exceed the design flow of the system, or encroach on the required separation distance between the structure foundation and the system, a subsurface sewage disposal permit may be issued if the following requirements are met:

   a. The expanded system will otherwise meet the current requirements of IDAPA 58.01.03. Nonconforming expansion permits will not be issued (IDAPA 58.01.03.004.02), or

   a.b. The replacement system will otherwise meet the current requirements of IDAPA 58.01.03. Nonconforming replacement permits will not be issued for additions or alterations of existing structures or the addition of an additional structure to a property (IDAPA 58.01.03.004.02), and

b.c. Enough Adequate reserve replacement area for both the original and additionalpermitted expansion or replacement system shall be preserved (IDAPA 58.01.03.004.06)., and

Wastewater flow will not be significantly increased (IDAPA 58.01.03.004.04). Significant increases shall be considered to be any increase in wastewater flow that exceeds the design flow of the system.

d. Area reserved for system replacement cannot be used for the addition of a new structure or the alteration of the existing structure (IDAPA 58.01.03.004.06)., and

e. If a permit is required due to the encroachment of the structure on the subsurface sewage disposal system, then the area of the system encroached upon must be abandoned and replaced so the entire system meets the separation distance requirements of IDAPA 58.01.03.007.17 and 58.01.03.008.02.d.

A subsurface sewage disposal permit may be required for system enlargement or adjustments based upon the addition or alteration plan.

A permit may be required due to possible impacts on separation distances from the addition or alteration to the existing subsurface sewage disposal system or due to additional wastewater flows from the addition or alteration that exceeds the original design flow of the system.

5.b. Permit issuance shall be required to conform with the subsurface program directive, "Permit Requirements for Increased Flows at Single Family Dwellings," issued by DEQ on April 15, 2010.

Abandoned system: An abandoned system is considered to be a system that has not received wastewater flows or blackwaste for 1 year or more due to the removal of a wastewater generating structure from the system.

An abandoned system may be used if the system was originally permitted and approved, and

Wastewater flows and blackwaste characteristics are similar to the system's original permit requirements for waste strength and flow rate received by the system, and

The site is inspected and approved.

If the system is not an approved system (i.e., no issuance of a previous subsurface sewage disposal permit regardless of the installation date), it must be

a. Uncovered by a permitted installer or the property owner (IDAPA 58.01.03.011.02). Uncovered means exposure of the septic tank, effluent piping, and the front and back ends of each subsurface sewage disposal trench.

b. Pumped by a permitted septic tank pumper, and

c. Inspected by the health district while uncovered (IDAPA 58.01.03.011.02).

d. ~~The system must meet all current requirements, including permit issuance (IDAPA 58.01.03.005.01).~~

1) ~~If the system does not meet all current requirements, it must be brought into compliance with the current requirements prior to use according to the issued permit requirements.~~

~~2) If the system, or any portion thereof, cannot be brought into compliance with the current requirements, the system or portion of the system not in compliance must be abandoned and replaced in compliance with the current requirements and in accordance with the issued permit.~~

Appendix R

3.2.3.1 Conversion of a Septic Tank to a Lift Station

In some circumstances an existing subsurface sewage disposal system may have been installed deeper than the current maximum installation depth for a subsurface sewage disposal system. Upon repair or replacement of the existing system it may be necessary to raise the discharge point elevation of the effluent to meet the current installation depth standards for the drainfield. This may be done in one of two ways:

1. Installation of a septic tank or dosing chamber after the existing septic tank.
   a. The septic tank or dosing chamber must have an approved bury depth meeting the depth of the existing septic tank.
   b. A pump must be installed, meeting the requirements in section 4.20, in the new septic tank or dosing chamber to lift the effluent to the maximum drainfield installation depth.
2. Conversion of the existing septic tank into a lift station to raise the effluent into a newly installed septic tank that is capable of gravity flow to the maximum drainfield installation depth.

Either of these methods is allowable, but the recommended method is the installation of a septic tank or dosing chamber after the existing septic tank. This is due to the following reasons:

- The wastewater undergoes primary treatment (clarification in the septic tank) prior to passing through a pump.
- Wastewater that has not undergone primary treatment prior to pumping does not settle out in the septic tank as well once it has passed through a pump.
- Less solids, fats, oils, and greases associated with wastewater are passed to the drainfield if the wastewater undergoes primary treatment prior to passing through a pump.

If an applicant or installer elects to convert an existing septic tank into a lift station, instead of installing a septic tank or dosing chamber after the existing septic tank, the following should be taken into consideration:

- The conversion of the septic tank into a lift station must be done under a permit from the Idaho Division of Building Safety Plumbing Program and Electrical Program.
  - The Plumbing Program inspects everything from the converted lift station up to the newly installed septic tank.
  - The Electrical Program inspects all electrical connections and installation associated with the lift station pump.
  - A subsurface sewage disposal installer's registration permit is not a substitute for a proper pluming or electrical license.

- The Idaho State Plumbing Code allows a lift station to discharge the entire volume of the lift station when the pump turns on.
  - This will cause the entire volume of the lift station to discharge to the new septic tank with each pump cycle if the pump control floats are not adjusted.
  - It is recommended that lift station pump control floats be adjusted to discharge 25% of the daily design flow of the subsurface sewage disposal system with each pump cycle.

It is also important that the applicant and installer protect the drainfield to the best of their ability if a lift station is installed prior to a septic tank. The following minimum recommendations may help achieve this goal:

- An effluent filter should be installed in the outlet baffle of the new septic tank and the outlet manhole brought to grade through the installation of a lid riser to aid in effluent filter maintenance.
- The septic tank should be oversized to increase retention and settling time of the wastewater in the septic tank prior to discharge to the drainfield.
- A two-compartment septic tank should be installed to aid in settling of the wastewater in the septic tank prior to discharge to the drainfield.
- The pump used in the lift station should be capable of passing larger solids (not larger than the transport piping from the lift station to the septic tank) and grinder-type pumps should be avoided.