State of Idaho
Department Of Environmental Quality
Technical Guidance Committee

Technical Guidance Committee Meeting

Agenda*

Thursday November 5, 2015

8:30 a.m. – 4:30 p.m.

Conference Room C
Department of Environmental Quality
1410 North Hilton
Boise, ID

8:30 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

8:35 AM Open to Public Comment – 30 minutes reserved for the public to provide comments to the TGC on subjects not on the agenda, if no public comment is presented at the start of comment period the agenda will move forward

9:05 AM July 22, 2015 Draft TGC Meeting Minutes: Review, Amend, or Approve (**Appendix A**)

9:15 AM August 20, 2015 Draft TGC Meeting Minutes: Review, Amend, or Approve (**Appendix B**)

9:25 AM 1.8 Easement (**Appendix C**) **
- Read public comment
- Review for final approval

9:55 AM Break – Ten Minutes

10:05 AM 1.4.2.2 Extended Treatment Package System Approvals (**Appendix D**)
- Review of two-tier approach implementation outlined in July 22, 2015 TGC minutes
- Review for final approval

10:35 AM 5.4 Extended Treatment Package Systems (**Appendix E**)
- DEQ's Recommendations on General Product Approvals
- Review for final approval

11:05 AM 5.13 Total Nitrogen Reduction Approvals (**Appendix F**)
- Sand Mound Total Nitrogen Reduction Review
- Review for final approval

11:35 AM 1.4.2.4 Proprietary Product Approval Policy (**Appendix G**)
- Review for final approval

12:05 PM 5.14 Proprietary Wastewater Treatment Products (**Appendix H**)
- Review for final recommendation

12:35 to 1:35 PM Lunch

1:35 PM Presby Environmental, Inc. Advanced Enviro-Septic Treatment System
- Product review for approval recommendation

2:35 PM Break – Ten Minutes

2:45 PM Proposal for Drip Distribution Guidance Amendment (**Appendix I**)
- Review proposal by Ryan Spiers for committee recommendation

2:55 PM Update on DEQ Service Provider Rule

3:00 PM 4.22.3.3 Intermittent Filter Dosing (**Appendix J**)
- Review for preliminary approval

3:10 PM 4.21 Recirculating Gravel Filter (**Appendix K**)
- Review for preliminary approval

3:50 PM 4.27 Subsurface Flow Constructed Wetland (**Appendix L**)
- Review for preliminary approval

4:30 PM Adjourn
- Meeting may adjourn early dependent upon discussion, interest, and participation for each agenda item

*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 # 1

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 **1**. 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 MyRoom Instructions

To Join HP MyRoom

This will allow users joining the meeting via online video conference 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. Login information is below.

1) Visit the Website Below

- https://www.myroom.hp.com/attend/MEPJ36CRG3L
- Enter your first and last name in the area provided
- Enter the room key: MEPJ36CRG3L

Appendix A

Technical Guidance Committee Meeting

Draft Minutes

Wednesday, July 22, 2015

Department of Environmental Quality
1410 North Hilton
Boise, Idaho

TGC ATTENDEES:

Tyler Fortunati, REHS, On-Site Wastewater Coordinator, DEQ
Joe Canning, PE, B&A Engineers
Bob Erickson, REHS, Senior Environmental Health Specialist, SCPHD
Dale Peck, PE, Environmental & Health Protection Division Administrator, PHD
Michael Reno, REHS, Environmental Health Supervisor, CDHD

GUESTS:

Tammarra Golightly, Administrative Assistant, DEQ
Ryan Spiers, Alternative Wastewater Systems, LLC
PaRee Godsill, Everlasting Extended Treatment, LLC
Sheryl Ervin, Bio-Microbics, Inc. (via telephone)
Jim Bell, Bio-Microbics, Inc. (via telephone)
Allen Worst, R.C. Worst & Company, Inc.
Shane Ruebush, Effluent Technologies, Inc. (via telephone)
Nathan Taylor, Environmental Health Supervisor, EIPH (via telephone)
Kellye Eager, Environmental Health Director, EIPH (via telephone)
Paul Cannon, Norweco, Inc.
Don Prince, Presby Environmental, Inc. (via telephone)
Dennis Fogg, Presby Environmental, Inc. (via telephone)
Christina Connor-Cerezo, Presby Environmental, Inc. (via telephone)

CALL TO ORDER/ROLL CALL:

Meeting called to order at 8:30 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.

Ryan Spiers, Alternative Wastewater Systems

Ryan Spiers stated that based on today's agenda it appears that DEQ has recommended abandoning the ETPS O&M entity model. Mr. Spiers is concerned that this will leave his customers in limbo until the proposed service provider model is in place. Mr. Spiers also expressed concern that this leaves the O&M entities, service providers, and manufacturers unprepared due to a lack of notice for termination of the O&M entity program. For the O&M entity none of the customer accounts are zeroed out. Mr. Spiers stated that he knows the testing year and reporting year dates changed to July 31 of each calendar year but this does not match the non-profit O&M entity tax cycles so the customer accounts are not zeroed at this time. Additionally, Mr. Spiers stated that Bio-Microbics typically subsidizes the O&M entity during the transition period between reporting years before member's pay their annual dues. Mr. Spiers asked the committee to consider these issues and make a responsible transition between the O&M entity and service provider program. Mr. Spiers stated his belief that if his entity's 1,000 customers are left in limbo for the next couple years that it will diminish them transitioning to the new program when that transition occurs. Mr. Spiers would like to see something in place until the new service provider system is implemented.

Dale Peck asked Mr. Spiers what he would suggest for the suspended O&M entities during this timeframe. Mr. Spiers did not have any suggestions for the suspended O&M entities.

Bob Erickson asked Mr. Spiers what he believed a smooth transition between the O&M entity system and service provider system would be. Mr. Spiers stated that probably at least one more year under the O&M entity model would be sufficient to ease people into the new service provider based system. This way O&M entity members can be setup to make informed decisions regarding the change when it does occur.

Tyler Fortunati updated the committee that based on the time of year and the necessary negotiated rulemaking schedule in Idaho that DEQ cannot bring the proposed service provider rules to the legislature until the 2017 legislative session. This makes the earliest date of implementation to the new system July 1, 2017. DEQ has already initiated the negotiated rulemaking process on the service provider rule changes at this time and it is expected that the notice for negotiated rulemaking will be published in an upcoming bulletin from the Office of the Administrative Rules Coordinator for the State of Idaho. The first, and potentially only, negotiated rulemaking meeting is tentatively scheduled for October 22, 2015.

Allen Worst, R.C. Worst & Company, Inc.

Tyler Fortunati read a public comment from Allen Worst submitted via email to the committee. Mr. Worst's email expressed concern that the Bio-Microbics BioBarrier was not technically a packed bed filter by definition. He recommended that an additional category be created for residential membrane packages if the committee determined they were sustainable under homeowner control. Mr. Worst also stated that in his opinion membrane systems are highly technical, maintenance intensive, and shouldn't be a technology that is left up to homeowner control. Mr. Worst also provide two excerpts from the BioBarrier service manual regarding the clean in place procedures and intense oxidative cleaning and citric acid cleaning procedures for the membrane cartridge. Mr. Worst stated that packed bed filters have no such ongoing cleaning

requirements in comparison to the membrane packages which makes the packed bed filter passive and sustainable under homeowner control.

Mike Reno asked Mr. Worst if the AdvanTex media bats needed regular cleaning. Mr. Worst stated that under normal operating conditions that the AdvanTex unit and media bats are self-sustaining. Mr. Reno asked if there was anything to tell a homeowner that the media bats were blocked up. Mr. Worst stated that they may get backup of wastewater into the home but most likely would be odors coming from the treatment unit and that there may also possibly be some discharge from the treatment unit as well.

Joe Canning asked how failure occurs in the AdvanTex unit. Mr. Worst stated that failure occurs in varying degrees. There are often oxygen issues that would be present making the unit go anaerobic. If the media within the unit was very plugged the wastewater may bypass the media and discharge back to the tank by passing along the side of the media filters.

MEETING MINUTES:

May 21, 2015 Draft TGC Meeting Minutes: Review, Amend, or Approve

No public comment was received on the draft minutes. The minutes were reviewed by the committee and no suggestions for amendments were made.

Motion: Dale Peck moved to approve the minutes.

Second: Bob Erickson.

Voice Vote: Motion carried unanimously.

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

OLD BUSINESS/ FINAL REVIEW:

1.4.2.3 Gravelless System Product Approvals

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

Tyler Fortunati provided a summary of NSF Standard 240 to the committee. The summary described the two methods of assessment for gravelless products. The summary also provided information on the purpose of the standard being geared toward performance evaluation for wastewater dispersal/disposal but that the standard did not evaluate treatment performance.

The committee made some minor changes to better reflect the maximum sizing reduction allowances of the approval policy.

Motion: Mike Reno moved that the TGC recommend final approval to DEQ for Section 1.4.2.3 Gravelless System Product Approvals as amended.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

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

2.2.5 Method of 72 to Determine Effective Soil Depth to Permeable Layers and Ground Water

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

Motion: Joe Canning moved that the TGC recommend final approval to DEQ for Section 2.2.5 Method of 72 to Determine Effective Soil Depth to Permeable Layers and Ground Water as presented.

Second: Mike Reno.

Voice Vote: Motion carried unanimously.

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

4.1 General Requirements

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

Motion: Bob Erickson moved that the TGC recommend final approval to DEQ for Section 4.1 General Requirements as presented.

Second: Dale Peck.

Voice Vote: Motion carried unanimously.

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

4.2 At-Grade Soil Absorption System

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

Motion: Joe Canning moved that the TGC recommend final approval to DEQ for Section 4.2 At-Grade Soil Absorption System as presented.

Second: Mike Reno.

Voice Vote: Motion carried unanimously.
Section will post to TGM as final. See DEQ website and **Appendix E.**

4.3 Capping Fill System

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

The committee included a statement to clarify that both drainfield aggregate and gravelless system products were acceptable for use in this system design.

Motion: Mike Reno moved that the TGC recommend final approval to DEQ for Section 4.3 Capping Fill System as amended.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

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

4.21 In-Trench Sand Filter

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

Motion: Bob Erickson moved that the TGC recommend final approval to DEQ for Section 4.21 In-Trench Sand Filter as presented.

Second: Dale Peck.

Voice Vote: Motion carried unanimously.

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

NEW BUSINESS/DRAFT REVIEW

1.8 Easement

Bob Erickson requested that a change be made to clarify the requirement for easements being required for any property that any portion of the subsurface sewage disposal is installed upon except for the property that the wastewater-generating structure is located on.

Motion: Dale Peck moved that the TGC recommend preliminary approval to DEQ for Section 1.8 Easement as amended.

Second: Bob Erickson.
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**.**

1.4.2.4 Packed Bed Filter Proprietary Product Approval Policy

Tyler Fortunati presented a literature review summary of research results regarding the performance of recirculating gravel filters (see **Appendix I**). Mr. Fortunati stated that the majority of the studies utilized media with a maximum size of 3 mm or less, where Idaho

allows dimensions up to 9 mm for recirculating media. The studies also contain varying system designs and recirculation rates. The committee came to the conclusion based on the literature results that recirculating media system performance is highly variable. The committee made no recommendations to change the current total nitrogen reduction approval levels for recirculating gravel filters in Idaho.

Joe Canning discussed the fact that the studies he was looking at all returned effluent from the filter back to the septic tank at a certain ratio to help with denitrification on the system. Mike Reno requested that DEQ look at design requirements for returning effluent from the filter back to the septic tank. Joe Canning agreed with the request

Action Item: Review current design guidance from other states and current research for returning effluent from the recirculating filter to the septic tank.

9:55 a.m. Break

10:10 a.m. Meeting Resumed

Tyler Fortunati presented Ryan Spiers' request to the committee to consider Bio-Microbics BioBarrier MBR unit classification to be similar to the intermittent sand filter or recirculating gravel filter due to the fact that they do not continue to discharge when they malfunction or fail (see **Appendix J**). Mr. Spiers' proposal included the request to remove the operation and maintenance requirements from this product.

The committee discussed their collective concern that all mechanical treatment systems should necessitate managed maintenance, not just the extended treatment package systems. The committee inquired as to whether they could go back to the Water Quality Division Administrator with this request. Tyler Fortunati stated that it has been previously stated that DEQ wouldn't support required managed maintenance for all systems with pumps and filters. Bob Erickson requested that Mr. Fortunati relay to the Water Quality Division Administrator that the committee feels strongly that all treatment systems with mechanical components should undergo required managed maintenance. Mr. Fortunati stated that he would pass this along.

Allen Worst stated that his initial proposal to classify the AdvanTex unit as a packed bed filter had three proposed solutions. One of those solutions was requiring that intermittent sand filters and recirculating gravel filters undergo the same operation and maintenance requirements as the extended treatment package systems. Mr. Worst stated that he does not believe going back to the Water Quality Division Administrator would bring a different result in acceptance of this maintenance proposal.

Dale Peck expressed concern to the committee that we already have an issue with extended treatment package systems. Mr. Peck feels that we may be considering an alternative with the packed bed filter classifications that will make the situation worse than it already is.

Joe Canning stated that he was interested in this afternoon's presentation from Presby Environmental, Inc. and didn't feel that he could make a decision on the proposals for the

AdvanTex or BioBarrier units until he had heard their product proposal. Mr. Canning was also hesitant to approve the proposed Section 1.4.2.4 until after the Presby Environmental, Inc. presentation. Dale Peck seconded these concerns and felt that a discussion needed to be held regarding the direction of the service provider operation, maintenance, monitoring, and reporting model for extended treatment package systems prior to moving forward on the proposed Section 1.4.2.4.

Bob Erickson expressed concern regarding the approved extended treatment package system manufacturers listed in Section 5.4 of the TGM. Mr. Erickson feels that those manufacturers' systems that have some form of recirculation component or non-passive treatment design will want to be classified as packed bed filters as well without O&M requirements and no existing testing data in Idaho to support the performance of their systems.

The committee requested to jump forward on the agenda and discuss the service provider operation, maintenance, monitoring, and reporting model for extended treatment package systems at this time until the Presby Environmental, Inc. presentation was made.

Service Provider Operation, Maintenance, Monitoring, and Reporting Model for Extended Treatment Package Systems

The committee held a discussion regarding how service providers would be qualified for service of particular technologies. Tyler Fortunati stated that at this time the proposal was for DEQ to provide the education and that the providers would be permitted through the health districts. There is currently no requirement that a manufacturer certify service providers in the draft service provider rules. Mr. Fortunati stated that under the current proposal any service provider could work on any system.

PaRee Godsill stated that there is currently a service provider that is not certified by Norweco, Inc. working on units in eastern Idaho. She was called out to one of the systems this provider has been servicing and found that the filter component was severely damaged. She is not sure who damaged the filter but feels this is an example as to why service providers should be certified by manufacturers to work on their technology.

Tyler Fortunati stated the current draft proposal is due to issued that DEQ has experienced in the past with manufacturers refusing to certify service providers. Mr. Fortunati stated that if manufacturer certification is going to be required that there would have to be requirements in place to require manufacturers to certify any interested party as long as they met the state requirements. Service providers and number of providers could not be limited by the manufacturer.

Mike Reno stated that the state could consider requiring a manufacturer provide a specific number of service providers in different regions of the state. Tyler Fortunati stated that currently manufacturers are having a hard time identifying providers to train so requiring them to find a certain number may not be the best route. Mr. Fortunati feels it should be open to whoever desires to provide those services. The committee discussed service providers and the number of providers they felt may be available or desire to work on the systems may be limited regardless.

The committee expressed concern that they felt their recommendations on the pursuit of a service provider operation, maintenance, monitoring, and reporting model for extended treatment package systems had been ignored by DEQ based on the current DEQ proposal. The committee stated that is does not feel abandoning the O&M entity model prior to implementation of the service provider model is advisable. The committee would like to see the O&M entity model remain in place until the transition occurs. The committee is concerned that abandoning the model early will cause issues transitioning existing property owners into the new service provider system.

Tyler Fortunati stated that it is unclear at this time if DEQ will have the legal authority to require the existing property owners that are subject to the O&M entity model to transfer to the service provider model. This is something that DEQ is still working on with the Attorney General's office. Mr. Fortunati stated that DEQ's proposal is based on the assumption that transferring existing permits to the new program is not possible.

Dale Peck stated that there needs to be a requirement to transition the existing extended treatment package system permits from the O&M entity program to the service provider program universally. Tyler Fortunati stated that he would continue to look into this possibility under the existing permits with the Attorney General's office.

Mike Reno stated that DEQ also needed to begin going through the product re-approval process as recommended by the committee. The committee is concerned that by switching systems this will allow manufacturer technologies that have not historically performed to the requirements of TSS and $CBOD_5$ testing to be installed again without straightening out their performance issues. Also, the committee is concerned that manufacturers' products that are currently approved and listed in Section 5.4 of the TGM but have never been installed in the state will begin to be allowed to be installed without verification of performance.

Dale Peck stated that DEQ needs to begin the product re-approval process with testing requirements and that a route needs to be determined to transition the current program into the new program.

Tyler Fortunati requested that the committee discuss the letter delivered to DEQ by Bio-Microbics, Inc. (see **Appendix** K) that highlights the Massachusetts program for extended treatment package systems. Mr. Fortunati stated this letter and the supplemental information provides some structure for manufacturer certification of service providers and a tiered product approval approach for extended treatment package systems.

Jim Bell provided the committee a description of how service providers are approved by the state of Massachusetts and are then required to obtain a manufacturer's certification to work on their technology. Mr. Bell described how this works with the providers and Bio-Microbics and summarized the memorandum of understanding that Bio-Microbics puts in place between them and the providers. Tyler Fortunati asked Mr. Bell if any service provider could work on any technology in Massachusetts if they are certified by the manufacturers. Mr. Bell stated that they could. Mr. Fortunati followed up with clarification as to whether the manufacturers could limit the technologies a provider

could work on through their memorandum of understanding. Mr. Bell stated they could not because the state would not allow it.

The committee requested that DEQ look at Massachusetts service provider certification rules and adding requirements to the proposed draft service provider rule in Idaho that requires manufacturer certification to work on a technology but prevents the manufacturer from limiting the number of providers that they will certify in the state.

The meeting was adjourned for Lunch.
Lunch 11:50 p.m. – 1:00 p.m.

Presentation of the Presby Environmental, Inc. Advanced Enviro-Septic Treatment System

Tyler Fortunati stated that the committee was going to jump forward on the agenda to hear the Presby Environmental, Inc. presentation since the representative were available, ready to present, and the committee had other agenda items to review that were on hold until this presentation was heard. Mr. Fortunati also updated the committee on his prior discussions with the Presby Environmental, Inc. representatives. This question that the committee needs to answer is how they would like to classify this type of system and what system type they would recommend that Presby apply for approval under.

Don Prince, Dennis Fogg, and Christina Connor-Cerezo presented basic information on the Presby Environmental, Inc. Advanced Enviro-Septic Treatment System (see **Appendix L**). The committee asked several questions regarding the system design and disposal area application rates.
Tyler Fortunati stated that Idaho only allows a maximum disposal area reduction for any product of 25% over the standard sizing requirements. Mr. Fortunati also let the Presby representatives know that Idaho has a small sizing footprint by rule compared to the rest of the United States at 150 gallons for the first bedroom per day and 50 gallons per day for every bedroom thereafter. Mr. Fortunati also questioned whether Presby was looking to obtain reduced separation distances to limiting layers like ground water and bedrock. The Presby representatives stated they would like a reduced disposal area and separation distances.

Mike Reno also stated that Idaho requires installation in trench configurations and that beds are only used as an option of last resort. The Presby representative stated they would prefer a bed but there is not an issue with this if every other product is subjected to the same requirements.

Tyler Fortunati also stated that Idaho requires pressurization of drainfields larger than 1,500 square feet by rule. Since this is a gravity product it would be limited to installations where the installed footprint is 1,500 square feet or less but that this should cover the majority of single family installations and small commercial systems. Tyler Fortunati also requested that the Presby representatives provide their product installation manuals for other states for DEQ's review.

Tyler Fortunati asked the committee where they would like to categorize this product or if they would recommend that Presby pursue approval under the draft proprietary product approval policy. The committee ultimately decided that they are willing to develop a proprietary product approval policy and that Presby Environmental, Inc. should pursue this approval route.

Presby Environmental, Inc. stated this would be an acceptable route for them to pursue approval in Idaho and will submit a formal approval request for review at the next committee meeting.

2:15 p.m. Break

2:25 p.m. Meeting Resumed

1.4.2.4 Packed Bed Filter Proprietary Approval Policy

The committee revisited the proposed draft of a packed bed filter proprietary approval policy.

The committee would like to see the name of this policy changed to be more generic to proprietary product approvals and removal of the packed bed references. The committee would also like to see the design requirements/descriptions in the policy be more generic to allow for a variety of designs. The committee would also like to see an allowance for product recommendations specific to individual product submittals such as:

- Designer requirements (PE or manufacturer certification)
- Operation and maintenance requirements and who provides the O&M
- Sizing and reduction allowances
- Separation distances
- Complex installer requirement for all approved proprietary systems

Dale would like to see a proprietary product approval table that lists each product and details the requirements outlined previously by the committee.

Motion: Dale Peck moved that the TGC table Section 1.4.2.4 Packed Bed Filter Proprietary Product Approval Policy and that the section be brought back for committee review after the recommended changes are made.

Second: Joe Canning.

Voice Vote: Motion carried unanimously.

Section is tabled pending further revision. See **Appendix M**.

8.6 Total Nitrogen Reduction Policy

Tyler Fortunati asked the committee if they are ok with moving Section 8.6 Total Nitrogen Reduction Policy to Section 1.9 without any content changes. The committee agreed that this is acceptable and approved the request.

Mike Reno began discussion on the draft Section 8.6 by stating that he feels sampling for TSS and $CBOD_5$ can be removed but feels that maintenance should be in place for all mechanical treatment systems and that effluent testing should remain in place for systems required to obtain total nitrogen levels less than 27 mg/L.

Tyler Fortunati asked the committee to discuss and provide a recommendation on the AdvanTex and BioBarrier packed bed proposals. The committee held general discussion on the proposals and maintenance.

Motion: Dale Peck moved that both the AdvanTex and BioBarrier products be classified as packed bed filters and that the requirement to test for TSS, $CBOD_5$, and TN $\geq$ 27 mg/L should be removed at this time and that continued maintenance remain in place under the ETPS program until such time that a new operation, maintenance, and monitoring program are in place.

Second: Mike Reno

Discussion: Bob Erickson began a discussion on system categories. The proposal for the Total Nitrogen Reduction Policy has classifications of Packed Bed Filters, Extended Treatment Package Systems, and Recirculating Extended Treatment Package Systems. Bob Erickson is concerned that it seems the system classifications are beginning to be setup based on historical system performance and not on system design criteria.

The committee agreed with Mr. Erickson. Tyler Fortunati stated that it seemed the committee was leaning toward a multi-tier approval policy for extended treatment package systems. It seems the committee is leaning towards a provisional approval level that requires units to continue testing until it is shown to function at specific treatment levels. After a unit is shown to achieve a specific treatment level successfully for a period of time the committee seems willing to place it in a general approval category based on the historical performance.

The committee agreed that this seems to be the direction they are leaning and provides a route to ensure that systems function properly before they are allowed to be installed in the state without proving performance capability.

Dale Peck withdrew his previous motion.

Motion: Dale Peck moved to table section 8.6 Total Nitrogen Reduction Policy and to bring the section back to the committee upon revision to classify systems based on a tiered approval approach that is supported by an amended Extended Treatment Package System Product Approval Policy.

Second: Mike Reno.

Voice Vote: Motion carried unanimously.

Section is tabled pending further revision. See **Appendix N**.

Action Item: The committee requested to hold a teleconference meeting in one month to review the proposed amendments and make preliminary recommendations on Section 1.4.2.2 Extended Treatment Package System Approvals, 1.4.2.4 Packed Bed Filter Proprietary Product Approval Policy, and Section 8.6 Total Nitrogen Reduction Policy.

Service Provider Operation, Maintenance, Monitoring, and Reporting Model for Extended Treatment Package Systems

The committee resumed discussion on the proposed direction of the pursuit of the service provider operation, maintenance, monitoring, and reporting model for extended treatment package systems.

Tyler Fortunati stated that looking at the previous recommendations from the committee, the counter direction provided by DEQ that is outlined in appendix K, and the discussions held thus far today he would like to develop a revised recommendation. Tyler Fortunati stated that in lieu of pursuing a product re-approval process they could utilize the proposed two tier approval approach to address the same issues with suspended and uninstalled technologies. The committee agreed and developed the following recommendations for DEQ to consider:

1. Create a 2 tier approval process for ETPSs in Idaho. The first tier would be "provisional approval" and would allow a manufacturer to install systems based on minimum initial criteria and follow a protocol of maintenance and testing to reach a "general approval level." This two tier approval approach and categorization in the "General" or "Provisional" levels would not take place until July 1, 2016 for existing and suspended systems and would not go into effect until either the service provider model goes into effect or a new O&M entity was created and in place for an approved manufacturer. This approach will impact existing systems and approved manufacturers in three ways:
    a. Existing systems under functioning and approved O&M entities – "General approval" would be given to all existing installations with sufficient data to support this level of approval. There would be required annual maintenance for all systems and effluent testing for TN on permits requiring <27 mg/L. There would be no required testing for TSS or CBOD.
    b. Suspended systems under functioning/non-functioning O&M entities – Would be placed in the "provisional approval" category and must show that the existing systems in the ground can meet the testing and maintenance requirements to achieve "General Approval" before any new systems would be allowed to be installed.
    c. Manufacturers that are already approved and listed in section 5.4 of the TGM – Would be placed in the "provisional approval" category and would be allowed to be installed with the maintenance and testing requirements in place until they can achieve the "General Approval" level.
2. DEQ will investigate who and how the existing ETPS installations in the state can be transitioned into the proposed service provider model if it is approved by the legislature. At this time it is not 100% clear as to whether the service provider system can be applied to the existing installation permits. DEQ will look into this

possibility as is under the current rules, Idaho Code, and installation permits and if that route fails may choose to pursue a rule requiring existing installation permits be subject to the new service provider program.

3. DEQ will abandon the O&M entity system effective July 1, 2017 if the service provider rule is passed by the legislature. If it does not pass the program will continue on as it has have up until this date.
4. DEQ and the TGC will work to revise the TGM guidance related to O&M entities and ETPS installations to match the proposed service provider program.
5. TGM guidance changes wouldn't go into effect until the service provider rules were in place.

Dale Peck requested that DEQ investigate implementing a rule requirement in the service provider revision that allows for a retroactive transition of existing extended treatment package system permits into the proposed service provider program. This rule would be included in the draft rule set if there is no method under the existing permits, rules and Idaho Code that would allow transferring existing systems to the new program.

The committee agreed that this approach was acceptable and would like it presented to DEQ's Water Quality Division Administrator.

Discussion on Recirculating Gravel Filter Splitter Methods and Filter Drying

Joe Canning presented a float ball style bypass valve that is designed specifically for recirculating gravel filters. The valve allowed some return of effluent to the recirculation tank even when the float ball is seated into the valve. This allows some form of constant recirculation that would either prevent or greatly prolong the recirculating filter from drying out. Mr. Canning is concerned that the existing design is overkill and has the downside of drying out the filter completely during periods of low use. Mr. Canning also brought up an issue that dosing the intermittent sand filter at 4% per day will continually trip the override float for the system. This needs to be adjusted to 5%

The committee would like to see an allowance for this type of valve in the recirculating gravel filter guidance and the intermittent sand filter dosing rate increased to 5%.

Action Item:

- Add the float ball valve allowance into the recirculating gravel filter guidance.
- Adjust the intermittent sand filter dosing rate to 5%

NEXT MEETING:

The next committee meeting is scheduled to be on August 20, 2015 by teleconference.

The following committee meeting is scheduled to be on November 5, 2015 at the Idaho Department of Environmental Quality's state office.

Motion: Mike Reno moved to adjourn the meeting.

Second: Bob Erickson.

Voice Vote: Motion carried unanimously.

The meeting adjourned at 3:53 p.m.

Appendix B

Technical Guidance Committee Meeting

Draft Minutes

Thursday, August 20, 2015

Teleconference
Department of Environmental Quality
1410 North Hilton
Boise, Idaho

TGC ATTENDEES:

Tyler Fortunati, REHS, On-Site Wastewater Coordinator, DEQ
Joe Canning, PE, B&A Engineers
Bob Erickson, REHS, Senior Environmental Health Specialist, SCPHD (via telephone)
Dale Peck, PE, Environmental & Health Protection Division Administrator, PHD (via telephone)
Michael Reno, REHS, Environmental Health Supervisor, CDHD (via telephone)

GUESTS:

Chas Ariss, PE, Wastewater Program Engineering Manager, DEQ
Tammarra Golightly, Administrative Assistant, DEQ
Ryan Spiers, Alternative Wastewater Systems, LLC (via telephone)
Sheryl Ervin, Bio-Microbics, Inc. (via telephone)
Allen Worst, R.C. Worst & Company, Inc. (via telephone)

CALL TO ORDER/ROLL CALL:

Meeting called to order at 9:33 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 comment were submitted during the allotted agenda timeframe.

NEW BUSINESS/DRAFT REVIEW

1.4.2.2 Extended Treatment Package System Approvals

There were no questions or comments from the committee regarding this policy revision.

Motion: Dale Peck moved that the TGC recommend preliminary approval to DEQ for Section 1.4.2.2 Extended Treatment Package System Approvals as presented.

Second: Mike Reno.

Voice Vote: Motion carried unanimously.

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

5.4 Extended Treatment Package Systems

The committee had general questions on how a manufacturer's product would be moved from provisional approval to general approval. Tyler Fortunati stated that a manufacturer would have to be in contact with DEQ regarding their systems and the data being collected. After the manufacturer obtained the necessary data DEQ would review it and make a decision on general approval.

Dale peck inquired as to whether those manufactures with or without systems installed in Idaho currently on the provisional approval list would be removed after two years if they didn't obtain the necessary data or weren't in the process of obtaining it. Tyler Fortunati stated that this would be the case. After finalization of the proposed Extended Treatment Package System policy DEQ would notify those manufacturers of the changes to the program and the requirements they would need to meet to remain on the provisional approval list.

Motion: Dale Peck moved that the TGC recommend preliminary approval to DEQ for Section 5.4 Extended Treatment Package Systems as presented.

Second: Bob Erickson.

Voice Vote: Motion carried unanimously.

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

5.13 Total Nitrogen Reduction Approvals

Tyler Fortunati explained that the total nitrogen reduction policy currently listed in section 8.6 of the TGM would be transitioned to a total nitrogen reduction approval list. The committee had questions as to how the operation and maintenance for the public domain systems would be relayed. Tyler Fortunati stated that it would be specified in the public domain system's design guidance as it currently is. The same would go for any other system included on the list and manufacturers' products would either contain the operation and maintenance requirements in their approved listing or in the guidance covering the system's classification.

Bob Erickson questioned why the sand mound was not included on the public domain systems list. Tyler Fortunati stated that it was never historically included on this list. Bob Erickson requested that DEQ provide the TGC a review of data obtained from literature on the sand mound's total nitrogen reduction abilities.

Action Item: Obtain total nitrogen reduction data for sand mounds and provide the information to the committee for consideration of inclusion on the Total Nitrogen Reduction Approvals list.

Motion: Dale Peck moved that the TGC recommend preliminary approval to DEQ for Section 5.13 Total Nitrogen Reduction Approvals as presented.

Second: Mike Reno.

Voice Vote: Motion carried unanimously.

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

1.4.2.4 Proprietary Product Approval Policy

Tyler Fortunati provided the committee an overview of a proposed addition to the policy that specifies functional design and treatment similarities to single-pass or recirculating media filters for any product that is submitted for review under this policy. The proposed addition also excludes products from consideration under the policy that have mechanical components that are in excess of a single-pass or recirculating media filter or those products that may allow wastewater to pass through the system untreated. The committee accepted this addition to the policy.

Dale Peck requested that the term operation and maintenance entity be replaced with approved service provider throughout the policy.

The committee held general discussion regarding how DEQ and the TGC would determine the treatment capabilities or a system and maintenance needs. Tyler Fortunati stated that the TGC is capable of requiring a manufactured product submitted for review under the proprietary product policy to undergo the two-level approval process that extended treatment package systems would have to go through. Tyler Fortunati also stated that operation and maintenance needs of a product would be determined on a case-by-case basis by the TGC and could be as simple as a property owner or more involved with managed maintenance through an approved service provider.

Motion: Dale Peck moved that the TGC recommend preliminary approval to DEQ for Section 1.4.2.4 Proprietary Product Approval Policy as amended.

Second: Joe Canning.

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

5.14 Proprietary Wastewater Treatment Products

Dale Peck requested that a comment column be added to the table listing the approvals. The committee felt that they wouldn't know exactly what should be included on the table

until they had a product to place on it. Tyler Fortunati stated that the table contents can be adjusted in the future as needed based on the products that are approved.

Motion: Joe Canning moved that the TGC recommend preliminary approval to DEQ for Section 5.14 Proprietary Wastewater Treatment Products as amended.

Second: Dale Peck.

Voice Vote: Motion carried unanimously.

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

Final TGC Recommendation Regarding Proposals for Orenco AdvanTex and Bio-Microbics BioBarrier Products

Tyler Fortunati began the discussion regarding the two product proposals by reminding the committee that they should first consider each product's design in comparison to other public domain system designs and second based on the historical performance of the system. Tyler Fortunati asked the committee to begin with making a recommendation on the Orenco AdvanTex product first followed by the Bio-Microbics BioBarrier.

Orenco AdvanTex Proposal

Dale Peck stated that he still believes all mechanical systems need continual maintenance including the public domain systems designed by a professional engineer.

Bob Erickson asked Allen Worst what Orenco thought of his three proposals to the committee for their product. Allen Worst stated that Orenco supported the proposals and that Tyler Fortunati had been in contact with them regarding this issue. Tyler Fortunati clarified for the committee that he had contacted both Orenco and Bio-Microbics regarding the proposals from Allen Worst and Ryan Spiers respectively. Tyler Fortunati stated that both manufacturers had stated they supported the proposals made for their products and the associated changes this may bring to their product approvals.

Mike Reno stated that under the proprietary product policy the committee just reviewed that the committee may require maintenance. Mike Reno stated that he agreed with Dale Peck that maintenance should be required for these systems.

Joe Canning stated that in his experience he had not witnessed the problems in public domain systems outlined in Allen Worst's proposal. Joe Canning stated that he does not feel that the intermittent sand filter should be brought into a managed maintenance program but that he was open to bringing the recirculating gravel filter into a managed maintenance program.

The committee held a general discussion regarding the monitoring available for the AdvanTex product.

Bob Erickson stated that he is also a proponent of requiring managed maintenance for intermittent sand filters and recirculating gravel filters but believes this is a moot point. Bob Erickson stated that he felt DEQ was firm in their stance that none of the public domain systems designed by an engineer would be brought into a managed maintenance program. With that consideration Bob Erickson stated that he was in support of Mr. Worst's first proposal option of classifying the AdvanTex unit as a recirculating gravel filter and requiring the same homeowner maintenance for this product.

Motion: Dale Peck moved that the TGC recommend to DEQ that the Orenco AdvanTex product be classified as a proprietary wastewater treatment product and to remove the requirement for managed operation, maintenance, and monitoring and allow the system to be maintained under the property owner effective upon the final approval of the proprietary wastewater treatment product approval policy.

Second: Bob Erickson.

Discussion: Joe Canning stated that he was in favor of option one and three presented by Mr. Worst. Joe Canning stated that he was concerned with how the committee would look at other products in the future and what would prevent all of the extended treatment package systems from seeking this classification. Dale Peck stated that the committee's evaluation would be on a case-by-case basis. Tyler Fortunati clarified that with the amended version of the proprietary wastewater treatment product approval policy that systems which would potentially allow wastewater to discharge from the product without treatment would not be considered under this policy.

Mike Reno stated that the Orenco website listed a variety of operation and maintenance procedures that must be provided to their product of the warranty would be voided. Allen Worst stated that these could be done by the property owner without voiding the warranty but expressed that it was not his intent to install the systems and not be available to provide service to them.

Voice Vote: From the committee members present two voted Aye, two voted Nay. The committee chairman voted Aye to break the tie. Motion passed 3 Aye, 2 Nay.

<u>Bio-Microbics BioBarrier Proposal</u>

Dale Peck stated that the BioBarrier product is not designed like a recirculating media filter.

Ryan Spiers stated that he was having a hard time understanding why a proprietary wastewater treatment system design must be a recirculating or single-pass filter. Mr. Spiers stated that previous discussions were focused on the system's historical performance and failure method to negate the need for managed maintenance. Mr. Spiers further stated that the nature with which a system failed by not discharging effluent was also discussed and that his product met all these criteria. Mr. Spiers also provided an overview of how the BioBarrier product functions and the components involved. Mr. Spiers also outlined membrane fouling in the BioBarrier product and how that would prevent untreated wastewater from discharging from the product.

Tyler Fortunati posed the question as to whether the membrane system in the BioBarrier product would be considered similar to a single-pass filter to the committee. The committee held discussion on the system design and Ryan Spier's proposal.

The committee questioned Ryan Spiers on why the system would be used if the property owner didn't need total nitrogen reduction from the system. Mr. Spiers described to the committee circumstances on which he felt the system could be installed.

Motion: Joe Canning moved that the TGC recommend to DEQ that the Bio-Microbics BioBarrier product be classified as a proprietary wastewater treatment product and to remove the requirement for managed operation, maintenance, and monitoring and allow the system to be maintained under the property owner effective upon the final approval of the proprietary wastewater treatment product approval policy.

Second: Dale Peck.

Discussion: Bob Erickson questioned Joe Canning's reference to wastewater not discharging from this system without treatment and if that was referenced in the proprietary wastewater treatment product approval policy. Joe Canning stated this is correct. Bob Erickson asked Ryan Spiers to clarify the functionality of the BioBarrier product. Ryan Spiers provided Bob Erickson an account of how the BioBarrier functions and wastewater moves through the system.

Voice Vote: Motion passed 3 Aye, 1 Nay with Mike Reno clarifying that the Nay vote is based on his belief that all mechanical treatment systems should require managed maintenance.

NEXT MEETING:

The next committee meeting is scheduled to be on November 5, 2015 at the Idaho Department of Environmental Quality's state office.

Motion: Bob Erickson moved to adjourn the meeting.

Second: Dale Peck.

Voice Vote: Motion carried unanimously.

The meeting adjourned at 11:18 a.m.

Appendix C

1.8 Easement

Revision: ~~March 20~~November 5, 2015

The "Individual/Subsurface Sewage Disposal Rules" (IDAPA 58.01.03) provide that every owner of real property is responsible for storing, treating, and disposing of wastewater generated on that property. This responsibility includes obtaining necessary permits and approvals for installing an individual or subsurface sewage disposal system. Often the storage, treatment and disposal of wastewater remain solely on the real property from which it was generated. However, sometimes other real property is needed for the storage, treatment or disposal of that wastewater. When that is the case, an easement is required as part of the permit application. The real property from which the wastewater is generated is known as the dominant estate because it is entitled to the benefit of the easement. The other real property needed for storage, treatment or disposal is known as the servient estate. The servient estate is the real property subject to the easement. Therefore, a real property owner wishing to install an individual or subsurface sewage disposal system must obtain a permit under IDAPA 58.01.03 and any other necessary approval for installing the system, including any authorization needed to install the system on ~~an~~other real property that does not contain the wastewater-generating structure. The owner of the dominant estate may also own the servient estate, or the servient estate may be owned by another individual. ~~This property may be owned by the same individual who owns the parcel with the wastewater-generating structure or another individual.~~ Consistent with this requirement, IDAPA 58.01.03.005.04.l requires a permit applicant to include in the application copies of legal documents relating to access to the system.

This section provides guidance regarding the circumstances under which the health district should permit a system when there is both a dominant estate and a servient estate ~~to be located on another property that does not contain the wastewater-generating structure~~ and the legal documents that must be included in or with an application for such a system.

1. The health district will consider allowing an owner to install a subsurface sewage disposal system on other property~~the installation of a subsurface sewage disposal system on another property (e.g., lot or parcel)~~. However, this option should be considered ~~a last resort for use~~ only when other practical solutions for subsurface sewage disposal are not available on the ~~applicant's property~~property where the wastewater is generated. In addition, the entire site (i.e., the area for both the primary and replacement drainfield) on the ~~other~~ servient estate ~~property~~ must be reviewed by the health district, and the site must meet all requirements of IDAPA 58.01.03.
2. The placement of an individual subsurface sewage disposal system on ~~another~~ other property requires that an easement be in place before subsurface sewage disposal permit issuance. Easements are required anytime a subsurface sewage disposal system is proposed on another property regardless of property ownership. With one exception, e~~E~~asements must be obtained for ~~each~~ any real property~~, other than the wastewater-generating parcel that the application is submitted for,~~ ~~that~~ upon which any portion of the subsurface sewage disposal system is proposed to be installed ~~upon~~. Easements are not necessary for any portion of the system located on the ~~wastewater-generating parcel~~ dominant estate ~~that~~ for which the application is submitted ~~for~~. It is the applicant's responsibility to include an easement that is prepared by an attorney and:

a. Contains a sufficient description of the easement area and of the dominant estate ~~property to be benefited by the easement~~ (the real property of the applicant where wastewater is generated).

b. Contains language ensuring that the ~~other property~~servient estate can be used for the system, and that the applicant or a subsequent purchaser of the ~~applicant's property~~dominant estate has access to make repairs or perform routine maintenance until the system is abandoned. The language must ensure such use and access even when the ~~applicant's property or the other property~~dominant or servient estate is sold or otherwise transferred.

c. Contains language that restricts the use of the easement area in a manner that may have an adverse effect on the system functioning properly.

d. Is surveyed, including monumenting the corners of the entire easement area, to supply an accurate legal description of the easement area for both the primary and replacement drainfield areas and enable the health district to properly evaluate the site. The survey and monumenting of the easement area must be performed by an Idaho licensed professional land surveyor.

3. The applicant is responsible for ensuring that a legally sufficient document is prepared to establish the necessary easement ~~for the subsurface sewage disposal system located on another property~~. The applicant must submit the easement to the health district with the permit application~~This document must be submitted to the health district with the permit application~~. ~~The health district must ensure that an easement document is included in the application.~~ However, the health district does not have the expertise, nor is it the duty of the health district, to determine the legal adequacy of the easement document, and the issuance of a permit does not in any way represent or warrant that an easement has been properly created. To issue a permit that includes a ~~system on another property~~servient estate, the health district ~~must ensure that~~evaluates whether the easement document included with the application:

   a. Has been prepared by an attorney.

   b. Includes a survey that was prepared and monumented by an Idaho licensed professional land surveyor.

   ~~b~~c. Has been recorded in the county with jurisdiction. Evidence that the document has been recorded must be provided to the health district.

   If the easement document meets the ~~two~~ criteria described in 3.a-3.c ~~above~~, the health district may issue a permit. It is not the health district's responsibility to ensure the easement document meets the requirements in item 2 above. The applicant and the applicant's attorney are responsible for ensuring that the easement is legally sufficient and will meet the requirements in item 2 above.

Easement Restrictions

1. If easements for drainfields under separate ownership result in more than 2,500 GPD of effluent being disposed of on the same property, the drainfields must be designed as a large soil absorption system and undergo a nutrient-pathogen (NP) evaluation.
2. Easement boundaries that are not adjacent to the ~~permit applicant's/grantee's~~dominant estate's property line must meet the separation distance of 5 feet between the drainfield and/or septic tank and the easement boundary.

Appendix D

1.4.2.2 Extended Treatment Package System Approvals

Extended treatment package systems (ETPS) are required to undergo two levels of approval in Idaho (IDAPA 58.01.03.009.03). The first level of approval is provisional approval based upon a manufacturer's submitted literature and data that support the treatment claims for the product. The second level of approval is general approval based upon a manufacturer's proven performance after installation and operation in Idaho. Upon receiving provisional approval a manufacturer must proceed to obtain general approval within a specified timeframe otherwise the product will be disapproved.

1.4.2.2.1 Provisional ETPS Approval

Provisional ETPS approval allows a manufacturer's unit to be installed on a property but the system must undergo annual operation, maintenance, monitoring, and reporting performed by an approved service provider and third party tester. Operation, maintenance, monitoring, and reporting are the responsibility of the manufacturer under provisional approval.

Manufacturers seeking provisional approval of an ETPS technology shall submit product information to the DEQ on-site wastewater coordinator for review by DEQ. In addition to product information (i.e., engineering designs and product manuals), manufacturers must submit NSF/ANSI Standard 40 ~~and 360~~ approvals, reports, and associated data or equivalent third party standards. Manufacturers also seeking approval on the ETPS units for reduction of total nitrogen (TN) must submit NSF Standard 245 approvals, reports, and associated data or equivalent third party standards. Equivalency determinations of third party standards shall be made by DEQ on a case-by-case basis. All third-party standards evaluated for the ETPS model must be submitted including approvals, disapprovals, reports, and associated data. ETPS models that have not undergone third-party testing and wish to be approved for reduction in TSS, $CBOD_5$, and TN must be permitted and installed under the guidance in Section 4.7, "Experimental System."

Manufacturer's shall also submit as part of their request for provisional approval a quality assurance project plan to document how sampling and analysis will occur under provisional approval and identify who will perform both the sampling and analysis. All operation and maintenance performed during the provisional approval stage shall be done by a service provider approved by DEQ. All effluent testing performed during the provisional approval stage shall be done by a third party contracted by the manufacturer with experience in wastewater sampling. The service provider and effluent tester may not be the same individual or work for the same company. The manufacturer seeking approval and third party tester will be responsible for obtaining property access for testing of their system's effluent during the provisional approval stage. The manufacturer shall also be responsible for effluent testing costs.

All ETPS manufacturers that obtain provisional approval for one of their products must attempt to gain general approval and shall follow the minimum operation, maintenance, and effluent testing procedures outlined in section 4.8.3. Upon receiving provisional approval for an ETPS model a manufacturer must install that specific ETPS model within two years. If installation of the provisionally approved product does not occur within two years of the provisional approval the ETPS model shall be disapproved (IDAPA 58.01.03.009.04). Once a manufacturer's ETPS model is installed under provisional approval operation, maintenance, and monitoring of that unit as described in the manufacturer's quality assurance project plan and section 4.8.3 must begin

that same reporting year unless that system was installed less than three weeks prior to the reporting deadline. Additionally, if operation, maintenance, and monitoring of the provisionally approved unit is not submitted to DEQ for any year after initial installation under provisional approval the ETPS model shall be disapproved. Installed products under provisional approval that are disapproved shall be replaced by the manufacturer with a system that meets the installation requirements of the specific site that the ETPS model is installed at.

1.4.2.2.2 General ETPS Approval

General ETPS approval allows a manufacturer's unit to be installed on a property without the requirement to sample effluent on an annual basis for systems that are not required to obtain a TN level < 27 mg/L. The property owner must still have their ETPS unit undergo annual operation, maintenance, and reporting performed by an approved service provider.

To obtain general approval, or to lower reduction levels from those set in a general approval for any constituent, the ETPS model manufacturer must submit data from ETPS models installed in Idaho. The data submitted must be obtained through operation, maintenance, and monitoring protocols described in section 1.4.2.2.1 under a DEQ accepted quality assurance project plan. Data from other states will not be considered under this approval process. Any data submitted must be specific to a particular ETPS make and model. Data submission must include information on 30 installations with a minimum of 3 full years of operational data on each system, or the equivalent number of data points obtained on an annual basis for a lesser number of installations. All maintenance and effluent testing records, as described in section 4.8.3, obtained over this period must be submitted for review.

DEQ will issue general approval of an ETPS product in conjunction with associated reduction levels for TSS, $CBOD_5$, and TN. TSS and $CBOD_5$ reduction levels will be set at less than or equal to 45 mg/L and 40 mg/L respectively based on the data showing that 90% of the installed units have successfully maintained effluent reduction levels at or below 45 mg/L TSS and 40 mg/L $CBOD_5$. TN Reduction levels will be determined through statistical analysis of the data submitted. The submitted data will be statistically evaluated to determine a resulting value that corresponds to a 95% upper confidence limit. The resulting value that corresponds to the 95% upper confidence limit will be used as the system's TN performance limit. Third-party report average reduction values will not be accepted to establish system performance approvals for any constituent.

For adjustment in reduction levels of effluent constituents from a current general approval level to be approved a manufacturer must submit data as described in section 1.4.2.2.1 that was obtained through a DEQ accepted quality assurance project plan. Adjustments shall be made based on data analysis described in section 1.4.2.2.2 except that the data must be obtained over a period of at least two years regardless of the number of data points and must be obtained for all of the specific ETPS models installed in Idaho that the adjustment is being requested for.

Appendix E

5.4 Extended Treatment Package Systems

Revision: ~~May 21~~November 5, 2015

Table 5-3 lists extended treatment package systems ~~certified~~approved by DEQ for provisional use. Table 5-4 lists extended treatment package systems approved by DEQ for general use. Provisional use approval requires that manufacturers follow specific operation, maintenance, and monitoring protocols to obtain general use approval (see section 1.4.2.2.1). General use approval allows manufacturers ETPS units to be installed following specific operation and maintenance protocols (see section 1.4.2.2.2).

Table5-3. Extended treatment package systems ~~certified~~approved by DEQ for provisional use.

Manufacturer and Model ~~Aerobic Treatment Device (Std 40)~~	Treatment Limit (GPD) ~~Gallons per day~~	Third Party Standards (TPS) or Experimental ~~BOD_5 Removal~~	~~Total Suspended Solids Removal~~	Operation, Maintenance, and Monitoring Provider ~~Trench Size~~	~~Certification~~Approval Date
A-Aerobic-1, LLC A-Aerobic-1 Class I	500	TPS ~~Ave. 21 mg/L~~	~~Ave. 26 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	10/14/02
Advanced Septic Treatment System TRD-1000-500 Class I TRD-1000-600 Class I TRD-1000-700 Class I TRD-1000-800 Class I TRD-1000-900 Class I TRD-1000-1000 Class I	500 600 700 800 900 1,000	~~—~~ TPS	~~—~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	11/3/03
Aero-Tech Aerobic Treatment Units AT-500 Class I AT-600 Class I AT-750 Class I AT-1000 Class I AT-1500 Class I	500 600 750 1,000 1,500	~~—~~ TPS	~~—~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	11/26/08

Manufacturer and Model ~~Aerobic Treatment Device (Std 40)~~	Treatment Limit (GPD) ~~Gallons per day~~	Third Party Standards (TPS) or Experimental ~~BOD_5 Removal~~	~~Total Suspended Solids Removal~~	Operation, Maintenance, and Monitoring Provider ~~Trench Size~~	~~Certification~~Approval Date
Alternative Wastewater Systems Inc. SYBR-AER Class I SYBR-AER Class I SYBR-AER Class I SYBR-AER Class I SYBR-AER Class I	500 600 800 1,000 1,500	— TPS	—	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	11/3/03
American Wastewater Systems Inc. BEST 1 AWS-500 Class I BEST 1 AWS-800 Class I BEST 1 AWS-1000 Class I BEST 1 AWS-1200 Class I BEST 1 AWS-1500 Class I	500 800 1000 1,200 1,500	— TPS	—	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	11/03/03
Aquapoint Bioclere 16/12/500: Class I	500	~~Ave. 11 mg/L~~ TPS	~~Ave. 13 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	3/19/91
Aquarobic International Mini-Plant 54291 Concrete Filter Kit [1]: Class I Mini-Plant 54291 Fiberglass Class I	500 to 1,500 in 100 gal units	~~Ave. 7 mg/L~~ TPS	~~Ave. 11 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	11/03/03
~~Bio-Microbics®, Inc. RetroFAST® 0.375: Class I~~	~~375~~	—	—	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	—

Manufacturer and Model ~~Aerobic Treatment Device (Std 40)~~	Treatment Limit (GPD) ~~Gallons per day~~	Third Party Standards (TPS) or Experimental ~~BOD_5 Removal~~	~~Total Suspended Solids Removal~~	Operation, Maintenance, and Monitoring Provider ~~Trench Size~~	~~Certification~~Approval Date
Bio-Microbics®, Inc.					
BioBarrier® MBR 0.4 Class I	400				
BioBarrier® MBR 0.4-N Class I	400				
BioBarrier® MBR 0.5 Class I	500				
BioBarrier® MBR 0.5-N Class I	500	TPS~~—~~	~~—~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	~~—~~
BioBarrier® MBR 1.0 Class I	1,000				
BioBarrier® MBR 1.0-N Class I	1,000				
BioBarrier® MBR 1.5 Class I	1,500				
BioBarrier® MBR 1.5-N Class I	1,500				
~~Bio-Microbics®, Inc~~				Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	~~3/5/97~~ ~~6/5/00~~ ~~12/27/02~~
~~MicroFAST® 0.5 Class I~~	~~500~~				
~~MicroFAST® 0.75 Class I~~	~~750~~	~~92%–95%~~ ~~Ave. 11 mg/L~~	~~95%–97%~~ ~~Ave. 16 mg/L~~		
~~MicroFAST® 0.9 Class I~~	~~900~~				
~~MicroFAST® 1.5 Class I~~	~~1,500~~				
Busse Innovative Systeme GmbH MF-B-400	400	~~—~~ TPS	~~—~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	7/7/09

Manufacturer and Model ~~Aerobic Treatment Device (Std 40)~~	Treatment Limit (GPD) ~~Gallons per day~~	Third Party Standards (TPS) or Experimental ~~BOD_5 Removal~~	~~Total Suspended Solids Removal~~	Operation, Maintenance, and Monitoring Provider ~~Trench Size~~	~~Certification~~Approval Date
Clearstream Wastewater Systems				Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	3/28/96
Model 500 N/C Class I	500	~~95%–97%~~ ~~Ave. 14 mg/L~~ TPS	~~93%–98%~~ ~~Ave. 48 mg/L~~		
Model 600 N/C Class I	600				
Model 750 N/C Class I	750				
Model 1000 N/C Class I	1,000				
Model 1500 N/C Class I	1,500				
Consolidated Treatment System Inc.				Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	
Multi-Flo FTB: Class I		~~96%–97%~~ ~~Ave. 5 mg/L~~	~~97%–98%~~ ~~Ave. 6 mg/L~~		4/2/96
0.5, 0.6, 0.6-C, 0.75, 1.0, 1.5	500 to 1,500				
Nayadic M: Class I		~~96%–97%~~ ~~Ave. 6 mg/L~~ TPS	~~96%–98%~~ ~~Ave. 7 mg/L~~		4/2/96
6A, 8A, 1050A, 1200A, 2000A	500 to 1,500				
Delta Env. Products				Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	2/3/97
DF40-C, F, CC, CA, FF-Class I	400	~~95%–98%~~ ~~Ave. 6 mg/L~~ TPS	~~96%–97%~~ ~~Ave. 7 mg/L~~		
DF50-C, F, CC, CA, FF-Class I	500				
DF60-C, F, CC, CA, FF-Class I	600				
DF75-C, F, CC, CA, FF-Class I	750				
DF100-C, F, CC, CA, FF-Class I	1,000				
DF150-C, F, CC, CA, FF-Class I	1,500				
Desoto Concrete Products				Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	11/3/03
H-Two-O Series: Class I	500	— TPS	—		
	750				
	1,000				
Ecological Tanks, Inc.				Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	11/1/97 5/2/02
AA, AS 500 Class I	500	~~AA Ave. 2.0 mg/L~~ ~~AS Ave. 2.0 mg/L~~ TPS	~~AA Ave. 2.2 mg/L~~ ~~AS Ave. 1.6 mg/L~~		
AA, AS-650 Class I	650				
AA, AS-750 Class I	750				
AA, AS-100 Class I	1,000				
AA, AS-1500 Class I	1,500				
Enviro-Flo: Class I				Service Provider and Third Party Tester	12/18/02
E-500, E-550	500	~~Ave. 14 mg/L~~	~~Ave. 15 mg/L~~		

Manufacturer and Model ~~Aerobic Treatment Device (Std 40)~~	Treatment Limit (GPD) ~~Gallons per day~~	Third Party Standards (TPS) or Experimental ~~BOD_5 Removal~~	~~Total Suspended Solids Removal~~	Operation, Maintenance, and Monitoring Provider ~~Trench Size~~	~~Certification~~Approval Date
E-550 E-600 E-750 E-1000	550 600 750 1,000	TPS		~~Intermittent sand filter drainfield~~	
H.E. McGrew, Inc. Class I Alliance 500, 750, 1000 Mighty Mac, 500, 600, 750 Cajun Aire Basic 500, 750, 1000 Cajun Aire Advanced, 500, 750, 1000	500 to 1,000	~~96.5%~~ ~~Ave. 7 mg/L~~ ~~Ave. 13 mg/L~~ TPS	~~97.2%~~ ~~Ave. 13 mg/L~~ ~~Ave. 19 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	6/5/00 12/5/97 12/30/02
Hoot Aerobic Systems, Inc. Class I H 500, 600, 750, 1000 LA 500, 1000	500 to 1,000	~~Ave. 3.2 mg/L~~ TPS	~~Ave. 3.6 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	2/6/01
Hydro-Action, Inc.: Class I AP-500, 600, 750, 900, 1500	500 to 1,500	~~Ave. 9 mg/L~~ TPS	~~Ave. 15 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	4/2/96 3/99 8/1/03
Jet Inc.: Class I J-500, J-600 J-750,1000, 1250, 1500	500 600 750–1,500	~~88%–96%~~ ~~Ave. 15 mg/L~~ TPS	~~91%–97%~~ ~~Ave. 12 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	10/96 5/93 7/29/97
MICROSEPTEC: Class I Enviroserver, ENFG 600, 1200, 1500	600 1,200 1,500	~~Ave. 6 mg/L~~ TPS	~~Ave 8 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	6/25/99
National Wastewater Systems Inc., Solar Air 500, 800, 1000, 1200	500 800 1,000 1,200	~~Ave. 13 mg/L~~ TPS	~~Ave. 19 mg/L~~	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	8/1/03
Norweco, Inc.				Service Provider and	

Manufacturer and Model ~~Aerobic Treatment Device (Std 40)~~	Treatment Limit (GPD) ~~Gallons per day~~	Third Party Standards (TPS) or Experimental ~~BOD_5 Removal~~	~~Total Suspended Solids Removal~~	Operation, Maintenance, and Monitoring Provider ~~Trench Size~~	~~Certification~~Approval Date
Singulair 950 series Class I	600–1,500	~~>85%~~	~~>85%~~	Third Party Tester	4/3/96
Singulair 960 series Class I	500–1,500	~~Ave. 6 mg/L~~	~~Ave. 10 mg/L~~	~~Intermittent sand filter drainfield~~	8/96
Singulair TNT	500-1,500	~~Ave. 4 mg/L~~	~~Ave. 9 mg/L~~		8/08
		TPS			
~~Orenco Systems Inc.~~				Service Provider and Third Party Tester	
~~AdvanTex AX20N~~	~~500~~			~~Intermittent sand filter drainfield~~	
~~AdvanTex AX20-RT~~	~~500~~				~~4/10/02~~
~~AdvanTex AX15-2N~~	~~800~~				
~~AdvanTex AX20-2N~~	~~1,000~~	~~Ave. 5 mg/L~~	~~Ave. 4 mg/L~~		~~3/1/10~~
~~AdvanTex AX15-3N~~	~~1,200~~				
~~AdvanTex AX20-3N~~	~~1,500~~				~~6/11/12~~
~~AdvanTex AX25-RT3N~~	~~625~~				
Pro Flo Aerobic Systems				Service Provider and Third Party Tester	
Pro Flo 500 TL	500	—	—	~~Intermittent sand filter drainfield~~	11/3/03
Pro Flo 750 SL	750	TPS			
Pro Flo 1000 TC	1,000				
Rogers Treatment Systems				Service Provider and Third Party Tester	
Mudbug 5	500	~~Ave. 15 mg/L~~	~~Ave. 22 mg/L~~	~~Intermittent sand filter drainfield~~	11/3/03
Mudbug 10	1,000	TPS			
Mudbug 15	1,500				
Southern Manufacturing				Service Provider and Third Party Tester	
SM-500 Class I	500			~~Intermittent sand filter drainfield~~	
SM-600 Class I	600	~~98.7%~~	~~98.1%~~		9/1/97
SM-750 Class I	750	~~Ave. 2.0 mg/L~~	~~Ave. 1.8 mg/L~~		8/28/00
SM-1000 Class I	1,000	TPS			
SM-1500 Class I	1,500				
SeptiTech				Service Provider and Third Party Tester	
M400/M400D	300	~~Ave. 12 mg/L~~	~~Ave. 5 mg/L~~	~~Intermittent sand filter drainfield~~	12/09
M550/M550D	400	TPS			
M750/M750D	500				
M1200/M1200D	1,200				

Manufacturer and Model ~~Aerobic Treatment Device (Std 40)~~	Treatment Limit (GPD) ~~Gallons per day~~	Third Party Standards (TPS) or Experimental ~~BOD_5 Removal~~	~~Total Suspended Solids Removal~~	Operation, Maintenance, and Monitoring Provider ~~Trench Size~~	~~Certification~~Approval Date
M1500/M1500D	1,500				
Zabel Environmental Technology ATS-AD-500: Class I	500	— TPS	—	Service Provider and Third Party Tester ~~Intermittent sand filter drainfield~~	12/02 Dropped

Notes: ~~5-day biological oxygen demand (BOD_5); milligram per liter (mg/L); average (ave.)~~; gallons per day (GPD)

Table5-4. Extended treatment package systems approved by DEQ for general use.

Manufacturer and Model	Treatment Limit (GPD)	$CBOD_5$ (≤40 mg/L) and TSS (≤45 mg/L) Removal	Operation and Maintenance Provider	Approval Date
Bio-Microbics®, Inc. RetroFAST® 0.375: Class I	375	Yes	Service Provider	—
~~Bio-Microbics®, Inc.~~ ~~BioBarrier® MBR 0.4 Class I~~ ~~BioBarrier® MBR 0.4-N Class I~~ ~~BioBarrier® MBR 0.5 Class I~~ ~~BioBarrier® MBR 0.5-N Class I~~ ~~BioBarrier® MBR 1.0 Class I~~ ~~BioBarrier® MBR 1.0-N Class I~~ ~~BioBarrier® MBR 1.5 Class I~~ ~~BioBarrier® MBR 1.5-N Class I~~	~~400~~ ~~400~~ ~~500~~ ~~500~~ ~~1,000~~ ~~1,000~~ ~~1,500~~ ~~1,500~~	~~Yes~~	~~Service Provider~~	—
Bio-Microbics®, Inc MicroFAST® 0.5 Class I MicroFAST® 0.75 Class I MicroFAST® 0.9 Class I MicroFAST® 1.5 Class I	500 750 900 1,500	Yes	Service Provider	3/5/97 6/5/00 12/27/02

Manufacturer and Model	Treatment Limit (GPD)	$CBOD_5$ (≤40 mg/L) and TSS (≤45 mg/L) Removal	Operation and Maintenance Provider	Approval Date
Orenco Systems Inc.				
AdvanTex AX20N	500	Yes	Service Provider	4/10/02
AdvanTex AX20-RT	500			
AdvanTex AX15-2N	800			
AdvanTex AX20-2N	1,000			3/1/10
AdvanTex AX15-3N	1,200			
AdvanTex AX20-3N	1,500			6/11/12
AdvanTex AX25-RT3N	625			

Notes: 5-day carbonaceous biological oxygen demand ($CBOD_5$); total suspended solids (TSS); milligram per liter (mg/L); ~~average (ave.)~~; gallons per day (GPD);

Appendix F

Sand Filter Total Nitrogen Reduction Brief Summary

- EPA Design Manual (2002) states that single-pass sand filters can be effective at nitrogen removal when coupled with anaerobic processes. Typically not used for nitrogen removal though without the anaerobic processes.
- EPA Design Manual (2002) stated that controlled studies generally find typical nitrogen removal of 18-33% in an intermittent sand filter.
- Virginia Department of Health document states that the efficiency of mound systems is dependent on nitrate being formed as it travels through the sand mound and that an anoxic environment is formed at the base of the mound due to ponding at the interface with the existing soil surface.
- The State of Montana removed sand mounds from level 2 treatment status and denied the system classification as 1a or 1b treatment systems due to:
    - The following summary is based on the results from four studies (House, et al., 1994; Shaw and Turyk, 1994; Converse et al., 1994; Harkin et al., 1979). The average percent reduction of total nitrogen in the elevated sand mounds (after treatment in the septic tank and before treatment below the absorption trenches) was 5.5%. When the estimated nitrogen reduction in the septic tank (10%) and beneath the absorption trenches (7%) is added in (USEPA, 2002; Siegrist et al., 2000; Gold and Sims, 2000; Pell and Nyberg, 1989; Laak, 1981), the reduction of total nitrogen is approximately 22.5%. In addition, the average effluent total nitrogen concentration prior to treatment in the absorption trenches measured in the studies was 51.5 mg/L.
    - Note: Level 2 treatment in Montana requires at least 60% of total nitrogen is removed as measured from the raw sewage load. Likewise Level1a removes 50-60%, and Level 1b removes 34-50%
- Montana also found the following for intermittent sand filters:
    - The following summary is based on the results from 17 studies (Dupuis et al., 2002; USEPA 2002; Penninger and Hoover, 1998; Pell and Nyberg, 1989; USEPA, 1985; Converse and Converse, 1998; Jones et al., 1998; Bushman, 1996; Weaver et al., 1998; Scherer and Mitchell, 1981; Cagle and Johnson, 1994; Sauer et. al., 1976; Effert et al., 1984; Ronayne et al., 1982; McCarthy et al., 1998; Loomis et al, 1998; Sievers, 1998). The average percent reduction of total nitrogen in the ISFs (after treatment in the septic tank and before treatment below the absorption trenches) was 30%. When the estimated nitrogen reduction in the septic tank (10%) and beneath the absorption trenches (7%) is added in (USEPA, 2002; Siegrist et al., 2000; Gold and Sims, 2000; Pell and Nyberg, 1989; Laak, 1981), the reduction of total nitrogen is approximately 47%. The average effluent total nitrogen concentration prior to treatment in the absorption trenches measured in the studies was 32.7 mg/L (after an additional estimated 7% treatment below the absorption trench the concentration discharged to ground water would be 30.4 mg/L).
    - Montana moved the intermittent sand filter form a Level 2 classification to a Level 1b classification.

- Wastewater Treatment Workgroup of the Chesapeake Bay Partnership recommended that intermittent sand filters (2' media depth) receive a 20% total nitrogen reduction allowance.

*This section will replace the current Total Nitrogen Reduction Policy

5.13 Total Nitrogen Reduction Approvals~~Policy~~

Revision: ~~August 30, 2012~~ November 5, 2015

On-site wastewater systems that qualify as best practical methods for the targeted nitrogen reduction amount appear in ~~Table 8-1~~Table 5-14. Areas of concern, such as nitrate priority areas, areas with shallow soils over bedrock, or a shallow depth to ground water, may be required to use one of these best practical methods to reduce the development's or home's environmental impact. Values listed in the TN column should not be exceeded to ensure that the required TN reduction percentage is attained. These TN values may be used in NP evaluations to evaluate the impact on ground water resources. Products installed for reduction of TN < 27 mg/L are subject to effluent testing (see section 4.8).

Table ~~8-1~~5-14. ~~Best practical methods for~~ On-site wastewater systems approved for total nitrogen reduction.

System or Manufacturer Product and Model ~~Best Practical Method~~	Total Nitrogen Reduction[a] (%)	Total Nitrogen[a] (mg/L)	Minimum Source Water Alkalinity[b] (mg/L)	~~Operations and Maintenance Provider~~
Public Domain Systems				
Intermittent Sand Filters (ISF)	15[c]	38	108	~~Property owner~~
Recirculating Gravel Filters (RGF)	40[c]	27	189	~~Property owner~~
Extended Treatment Package Systems				
Busse Innovative Systeme GmbH–MF-B-400	30	32	156	~~Nonprofit O&M corp.~~
Delta–Ecopod	30	32	156	~~Nonprofit O&M corp.~~
Delta–Whitewater	30	32	156	~~Nonprofit O&M corp.~~
Nayadic	30	32	156	~~Nonprofit O&M corp.~~
Norweco–Singulair	30	32	156	~~Nonprofit O&M corp.~~
Norweco–Singulair TNT	30	32	156	~~Nonprofit O&M corp.~~
Southern Manufacturing	30	32	156	~~Nonprofit O&M corp.~~
Jet Inc.	32[d]	31	163	~~Nonprofit O&M corp.~~
~~**Recirculating Extended Treatment Package System**~~				
SeptiTech	55[e,f]	20	180 mg/L	~~Nonprofit O&M corp.~~
Orenco–AdvanTex	65[e,f]	16	269 mg/L	~~Nonprofit O&M corp.~~
BioMicrobics	65[f]	16	269 mg/L	~~Nonprofit O&M corp.~~

a. Quantifiable values (milligram per liter [mg/L]) will indicate compliance with the qualitative TN reduction limit expressed as a percentage (%) reduction.
b. Minimum recommended source water alkalinity to support nitrification in the denitrification process. Use of water softeners is not recommended due to potentially detrimental effects on the biological processes.
c. Literature value
d. Idaho testing
e. Third party (Environmental Technology Verification Program)
f. National Science Foundation data

Appendix G

1.4.2.4 Proprietary Wastewater Treatment Product Approval Policy

Proprietary wastewater treatment products (PWTP) for subsurface sewage disposal are produced by a manufacturer to provide secondary wastewater treatment. The manufactured product must have functional design and treatment similarities to single-pass or recirculating media filters to be classified as a proprietary wastewater treatment product. Similarities will be evaluated on a case-by-case basis. Products requiring mechanical components in excess of a single-pass or recirculating media filter or that may allow wastewater to pass through the system untreated by design will not be considered for proprietary approval.

Manufactured PWTPs must obtain an approval from DEQ prior to permitting and installation. To obtain approval the manufacturer must submit the required information listed in section 1.4 of this manual to DEQ's On-Site Wastewater Coordinator. In addition, to justify the effectiveness of wastewater treatment by the product the manufacturer must also submit the final evaluation report from NSF International on the product's evaluation under the provisions of NSF/ANSI Standard 40 or another equivalent third party standard. Equivalency of third party standards will be made by DEQ on a case-by-case basis. The NSF/ANSI Standard 40 report is required to obtain the same drainfield sizing reduction and separation distance reduction to limiting layers for the product as the intermittent sand filter or recirculating gravel filter. If the manufacturer would also like to obtain approval for total nitrogen (TN) reduction then they must also submit the final evaluation report from NSF International on the product's evaluation under the provisions of NSF/ANSI Standard 245 or another equivalent third part standard. Equivalency of third party standards will be made by DEQ on a case-by-case basis. The NSF/ANSI Standard 245 report is required to obtain the same TN reduction as the recirculating gravel filter.

Approval of PWTPs must be recommended to DEQ by the Technical Guidance Committee (TGC). Approval of a PWTP may be required to go through the same two-level approval process as extended treatment package systems (see section 1.4.2.2) depending on the system design and effluent reduction approvals sought. Approval processes and minimum installation requirements for PWTPs shall be determined on a case-by-case basis by the Technical Guidance Committee. PWTPs submitted for approval that have not been evaluated by NSF/ANSI under Standard 40 and/or 245 or another equivalent third party standard shall not be considered for reduction in drainfield disposal area or separation reductions to limiting layers. All approved PWTPs shall be installed by a permitted complex installer. Approved PWTPs are listed in section 5.14.

PWTPs may also require periodic operation and maintenance. The operation and maintenance provider for all PWTPs shall be determined on a case-by-case basis by the TGC and may be a property owner or an approved service provider. If a PWTP is approved, permitted, and installed with a nitrogen reduction limit that exceeds the nitrogen reduction limit of a recirculating gravel filter, then the operation and maintenance provider for the PWTP shall be an approved service provider and the system shall follow the same operation, maintenance, monitoring, and reporting requirements as extended treatment package systems. If a nitrogen reduction limit is approved for a PWTP it shall be listed in section 5.13.

Appendix H

5.14 Proprietary Wastewater Treatment Products

Revision: November 5, 2015

Table 5-15 lists proprietary wastewater treatment products approved by DEQ. Proprietary wastewater treatment products shall be installed by a permitted complex installer.

Table 5-15. Proprietary wastewater treatment products approved by DEQ.

Proprietary Wastewater Treatment Product Manufacturer and Model	Treatment Limits (GPD)	Designer Requirements	Operation, Maintenance, and Monitoring Requirements	Drainfield Sizing and Size Limits	Vertical Separation Distances	Approval Date	Comments
Orenco Systems, Inc. AdvanTex AX20N AdvanTex AX20-RT AdvanTex AX15-2N AdvanTex AX20-2N AdvanTex AX15-3N AdvanTex AX20-3N AdvanTex AX25-RT3N	 500 500 800 1,000 1,200 1,500 625	None	Property owner maintenance. No monitoring required. No reporting required.	Hydraulic application rate equivalent to Table 4-21. Max size of drainfield: 1,500 ft^2 gravity, >1,500 ft^2 pressurized.	Equivalent to Table 4-20.	11/5/15	All AdvanTex systems must be setup to recirculate effluent in Orenco Mode 1 with primary tank and recirculation tank or Orenco Combo Mode with primary tank and recirculation tank. Effluent may not discharge from the AdvanTex unit by gravity. All pressure distribution system guidance in Section 4.19 must be followed for either a pressurized drainfield or pump to gravity distribution. All systems installed with total nitrogen reduction requirements < 27 mg/L must be permitted as an extended treatment package system and are subject to professionally managed operation, maintenance, monitoring, and reporting.

Notes: gallons per day (GPD); square feet (ft^2); milligrams per liter (mg/L)

Appendix I

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Proposal to the TGC

Drip Distribution Systems are an alternative method of discharging water or wastewater. They are designed for shallow discharge in the root zone at a low rate of flow to maximize evaporation and avoid saturation, they also offer greater flexibility for challenging sites and soils.

Drip systems have been in use throughout the country as long as we have had onsite advanced treatment, and often they are used without advanced treatment. The mechanical filtering and back flushing routine of these systems keeps out materials that would fail a conventional drainfield, eliminating the need for advanced treatment.

Drip systems are often cheaper and easier to install than a standard drain rock drainfield, however this is usually overshadowed by the additional costs of adding advanced treatment which is a requirement for Drip in Idaho. Drip systems are a means of delivery for water, their built in safety measures go far beyond any other drainfield product in our TGM yet we burden this technology with unnecessary red tape.

I propose to the committee that we remove the requirement for advanced treatment in front of drip distribution for cases where standard systems can be installed. If reduced vertical or horizontal setbacks are needed the appropriate advanced treatment should still be a part of the system.

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Appendix J

4.22.3.2 Intermittent Filter Dosing

1. Timed dosing is required, and the filter dosing cycle should meet the following minimum recommendations:
   a. Pumps are set to dose each cell once per hour.
   b. Dose volume delivered to the filter surface for each cycle should be ~~4~~5% of the daily design flow.
   c. A pump on override float should be set at a point that equates to 70% of the dosing chamber's volume.
   d. A high-level audio and visual alarm float should be set at 90% of the dosing chamber's volume.
   e. A low-level off float should be placed to ensure that the pump remains fully submerged at all times.
2. The pump controls should meet the following:
   a. Be capable of monitoring 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.

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Appendix K

4.21 Recirculating Gravel Filter

Revision: ~~May 21~~November 5, 2015

4.21.1 Description

A recirculating gravel filter is a bed of filter media in a container that filters and biologically treats septic tank effluent. The filter effluent is returned to both the equalization tank and 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, equalization tank, recirculating tank, low-pressure distribution system, free-access filters, ~~dosing chamber, mechanical~~ flow splitter, and drainfield.

4.21.2 Approval Conditions

1. Nondomestic wastewater with biological oxygen demand (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. A septic tank sized according to IDAPA 58.01.03.007.07 shall precede the equalization tank.
3. The bottom of the filter must not come within 12 inches of seasonal high ground water.
~~3~~4. All pressurized distribution components and design elements of the recirculating gravel filter system that are not specified within section 4.21 must be designed and installed according to the guidance for pressure distribution systems in section 4.19.
~~4~~5. The equalization tank, recirculating tank, and recirculating gravel filter container shall meet the same separation distance requirements as a septic tank.
~~5~~6. System must be designed by a PE licensed in Idaho.

4.21.3 Design Requirements

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

4.21.3.1 Equalization Tank

1. Minimum equalization tank volume shall be capable of maintaining two times the sum of the daily design flow of the system and recirculation volume returned to the equalization tank.
2. The equalization tank may be a modified septic tank or dosing chamber selected from section 5.2 or section 5.3.
   a. Alternatively, the equalization tank may be designed by the system's design engineer to meet the minimum requirements of this section and IDAPA 58.01.03.007.
   b. Equalization tank design is exempt from subsections .07 and .08 of IDAPA 58.01.03.007.
3. The recirculating filter effluent return point shall be located before the equalization tank and shall enter at the inlet of the equalization tank.

4.21.3.2 Recirculating Tank

1. Minimum recirculating tank volume shall be capable of maintaining two times the daily design flow of the system (Figure 4-27).
2. The recirculating tank may be a modified septic tank or dosing chamber selected from section 5.2 or section 5.3.
   a. Alternatively, the recirculation tank may be designed by the system's design engineer to meet the minimum requirements of this section and IDAPA 58.01.03.007.
   b. Recirculating tank design is exempt from subsections .07, .08, .10, and .11~~, and .13~~ of IDAPA 58.01.03.007.
3. The recirculating tank shall be accessible from grade and the return line, pump, pump screen, and pump components shall be accessible from these access points.
4. The recirculating filter effluent return point shall be located before the recirculation tank and shall enter at the inlet of the recirculating tank, unless a gravity float valve is used.
5. The recirculating tank shall meet all other minimum design and equipment requirements of section 4.19.3.4.

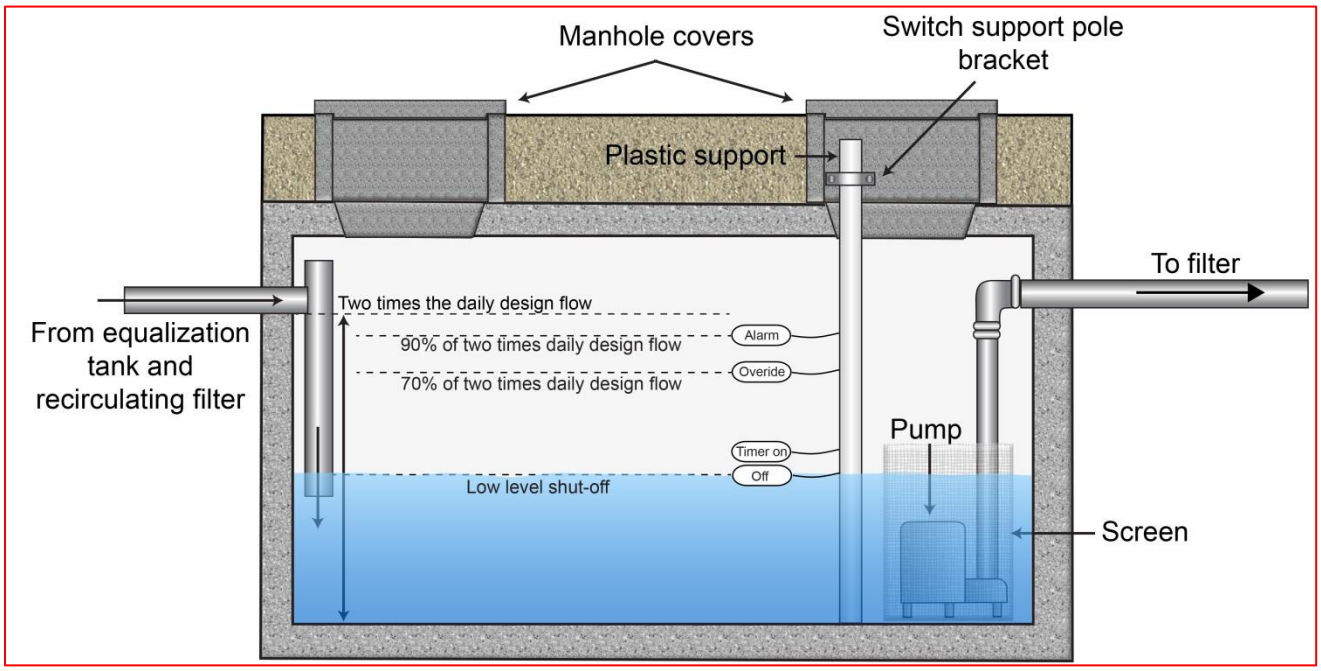

Figure 4-27. Recirculating tank.

4.21.3.3 Recirculating Filter

1. The 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.
2. The following requirements must be met for flexible membrane liners when used in place of concrete:
   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~~3. The filter surface area is sized at a maximum of 5 gallons/ft^2/day forward flow (forward flow is equivalent to the daily design flow from the structure).

~~3~~4. Filter construction media shall meet the specifications in section 3.2.8.1.3 for pea gravel and section 3.2.8.1.1 for drainrock.

~~4~~5. Minimum filter construction specifications (i.e., media depth, geotextile fabric placement, cover slopes, filter container height, and piping placement) shall meet the dimensions and locations depicted in Figure 4-28.

~~5~~6. The bottom of the filter may be sloped at least 1% to the underdrain pipe.

~~6~~7. An underdrain must be located at the bottom of the filter to return filtered effluent to the dosing chamber meeting the following requirements:

a. May be placed directly on the bottom of the filter.
b. Placed level throughout the bottom of the filter.
c. Constructed of slotted drain pipe with 0.25-inch slots, 2.5 inches deep and spaced 4 inches apart located vertically on the pipe, or perforated sewer pipe with holes located at 5 and 7 o'clock.
d. One underdrain should be installed for each filter cell zone.
e. The distal end is vented to the atmosphere, protected with a screen, and located within the filter to allow entry of air flow into the bottom of the filter and access for cleaning and ponding observation.
f. Connected to solid pipe that meets the construction requirements of IDAPA 58.01.03.007.21, extends through the filter, and is sealed so the joint between the filter wall and pipe is watertight.

~~7~~8. Two observation tubes should be placed in the recirculating filter to monitor for ponding and clogging formation.
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.

~~8~~9. The surface of the recirculating filter must be left open to facilitate oxygenation of the filter. No soil cover shall 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 requirements must be followed:
a. Chain-link fence or another acceptable protective barrier (Figure 4-28) shall be placed at the top of the filter container and cover the entire surface of the filter to prevent access, unless fencing is placed around the entire system to prevent access.
b. Geotextile fabric shall be placed over the access barrier.
c. Fencing around the recirculating gravel filter is recommended for all central systems.

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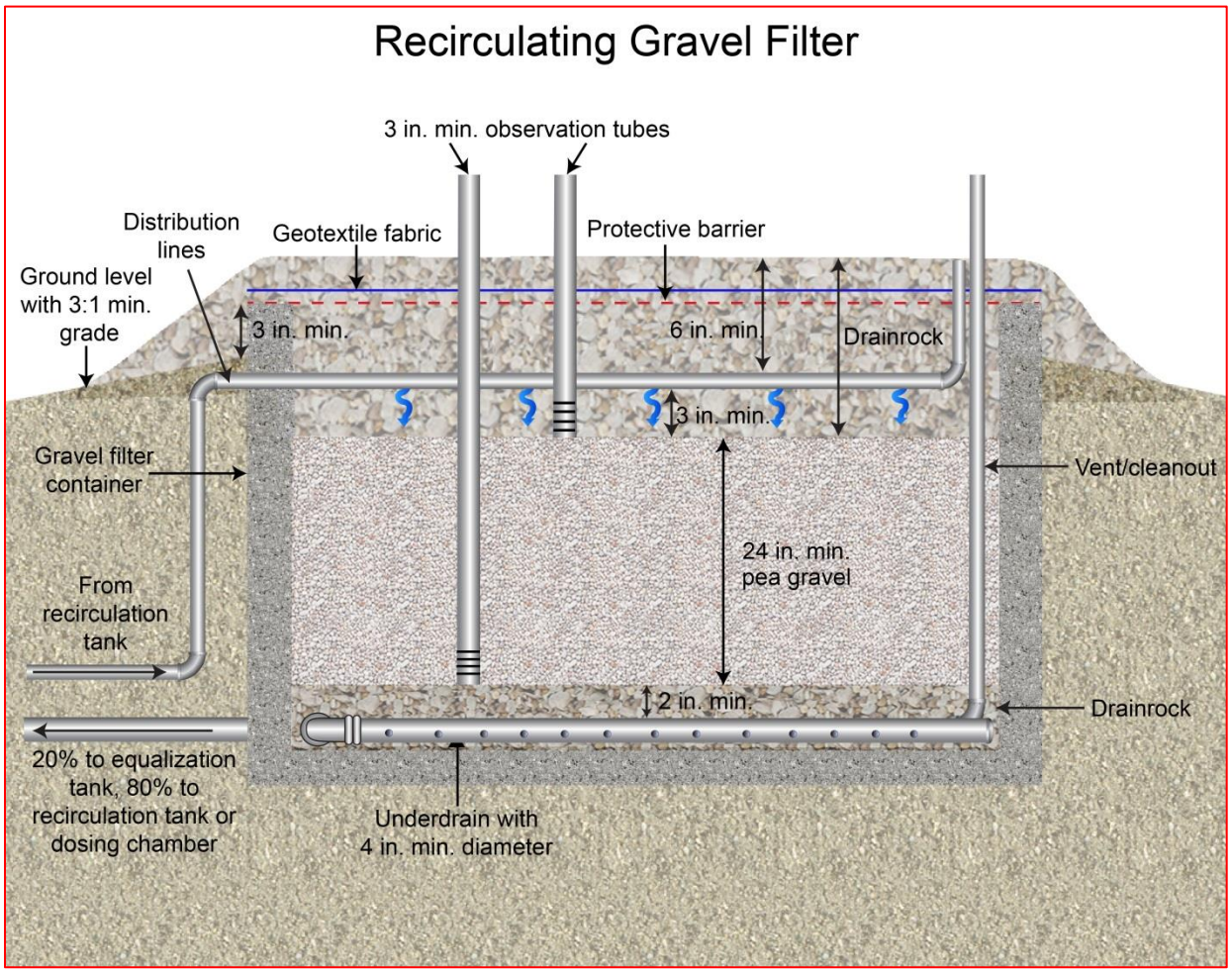

Figure 4-28. Recirculating gravel filter.

4.21.3.3.1 Recirculating Filter Cells

Depending on the volume of effluent and type of structure using a recirculating gravel filter, the recirculating filter may need to be split into cells that contain dosing zones (Figure 4-29). 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 depends upon pump size, lateral length, perforation size, and perforation spacing. The minimum filter design requirements for cells, zones, and pumps include the following:

1. Single-family homes: one cell, one zone, and one pump. If more than one cell or zone is used for a single-family home, duplex pumps are not required.
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. 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 recommended to be hydraulically isolated from one another and shall be constructed according to the minimum requirements in section 4.21.3.2.
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.

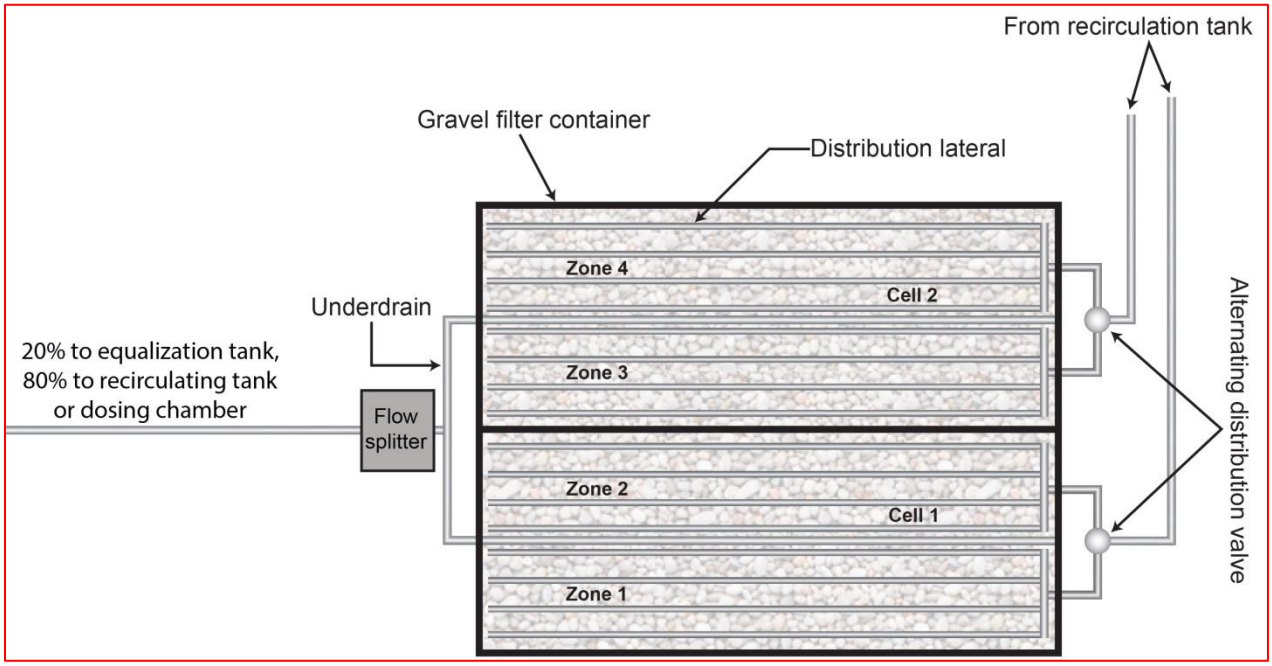

Figure 4-29. Overhead view of a recirculating gravel filter with multiple cells and dosing zones.

4.21.3.3.2 Recirculating Filter Dosing

1. The minimum recirculation ratio of the filter is 5:1, and the maximum recirculation ratio is 7:1 (the daily flow moves through the filter a minimum of five times or a maximum of seven times before discharge to the drainfield).
2. Timed dosing is required, and the filter dosing cycle should meet the following minimum recommendations:
   a. Pumps are set to dose each zone approximately two times per hour.
   b. Dose volume delivered to the filter surface for each cycle should be 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 volume.
   d. A low-level off float should be placed to ensure that the pump remains fully submerged at all times.
3. The pump controls should meet the following:

a. Be capable of monitoring low- and high-level events so that timer settings can be adjusted accordingly.
b. Have event counters and run-time meters to monitor daily flows.

4.21.3.4 ~~Dosing Chamber~~Effluent Return and Recirculation

4.21.3.4.1 Effluent Return

1. Effluent shall be returned from the recirculating gravel filter in a ratio of 20% to the equalization tank and 80% to the recirculation tank (Figure 4-30).
2. Effluent return from the filter to the equalization tank and recirculation tank may be done by gravity or under pressure.
3. The design engineer must specify how the return ratio will be met with the system design and document the return flow in the system design calculations.

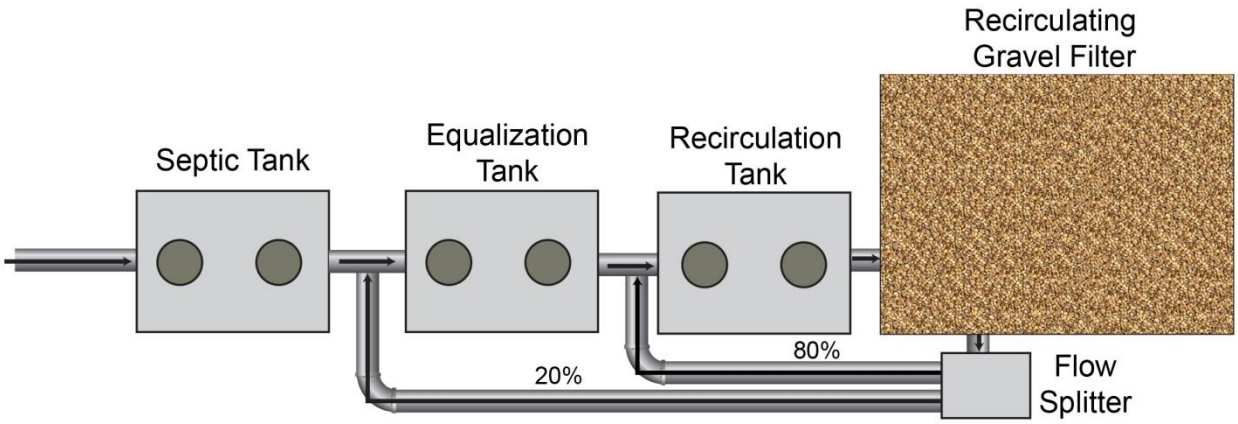

Figure 4-30. Effluent return locations and ratios from the recirculating gravel filter and flow splitter.

4.21.3.4.2 Effluent Recirculation

1. Effluent recirculation occurs within the recirculation tank and may occur by gravity or under pressure.
2. Gravity recirculation must occur utilizing a float valve (Figure 4-31) within the recirculating tank, float valve must:
   a. Be located on the inlet side of the recirculating tank.
   b. Allow for continual splitting of filtered effluent when the buoy is fully seated and discharging to the drainfield.
   c. Be capable of returning 80% of the filtered effluent to the recirculation tank when the buoy is fully seated.
3. Other types of gravity flow splitters shall not be used to split recirculation flows.
4. Pressurized recirculation must be done within a dosing chamber meeting the minimum requirements of section 4.19.3.4, the dosing chamber must:
   a. Be located after the recirculating filter.

b. Have all of the effluent returning to the recirculation tank returned to the dosing chamber, effluent returning to the equalization chamber may bypass the dosing chamber.

c. Utilize a mechanical flow splitter (Figure 4-32 and Figure 4-33) to split the flows capable of simultaneously returning effluent to the recirculating tank and discharging effluent to the drainfield.

5. Mechanical flow splitters shall:

a. Be located outside of the dosing chamber and prior to the recirculation tank.

~~2. A dosing chamber meeting the minimum requirements of section 4.19.3.4 shall be installed after the recirculating filter, and all effluent passing through the recirculating filter shall be returned to the dosing chamber.~~

~~2. A mechanical flow splitter (Figure 4-30~~31 ~~and Figure 4-31~~32~~) capable of simultaneously returning effluent to the recirculating tank and discharging effluent to the drainfield shall be located outside of the dosing chamber and before the recirculation tank. The flow splitter shall meet the following minimum requirements:~~

~~a~~b. ~~The flow splitter must b~~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, 80% of the filtered effluent by volume shall be returned to the recirculating tank, and 20% shall be discharged to the drainfield).

~~b. Float valves that do not allow for continual splitting of filtered effluent before discharge to the drainfield and nonmechanical weirs and flutes shall not be used to split flows.~~

~~3. Dosing of effluent from the dosing chamber may be either timed or on-demand.~~

~~4~~6. Discharge of effluent to the drainfield must occur after filtration and flow splitting.

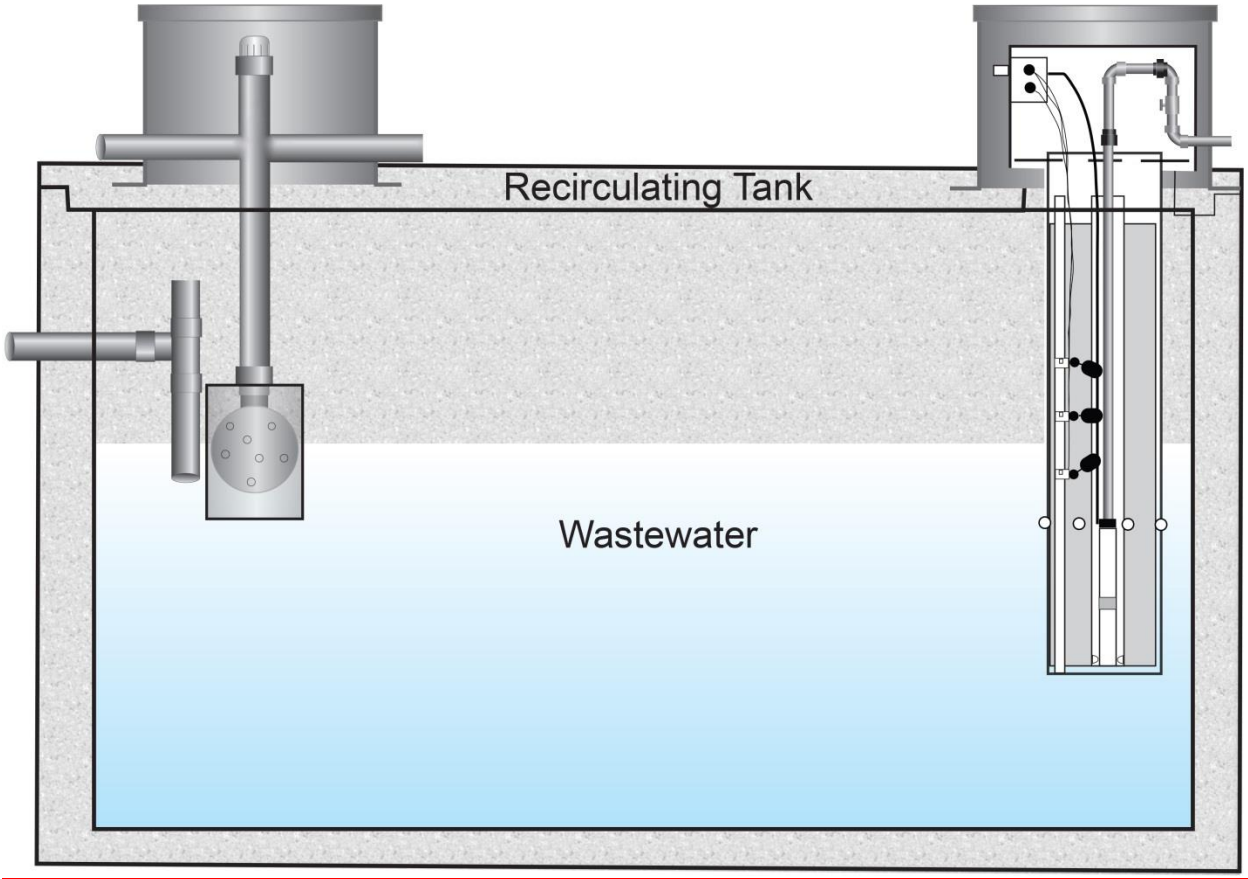

Figure 4-31. Gravity float valve return location within the recirculating tank.

4.21.4 Filter Construction

1. All materials must be structurally sound, durable, and capable of withstanding normal installation and operation stresses (Figure 4-~~32~~34).
2. Components that may be subject to excessive wear must be readily accessible for repair or replacement.
3. All filter containers must be placed over a stable level base.
4. Geotextile filter fabric shall be placed only over the top of the filter and must not be used in-between the filter construction media and underdrain aggregate.
5. Access to the filter surface must be provided to facilitate maintenance.

4.21.5 Drainfield Trenches

1. Distances shown in Table 4-20 must be maintained between the trench bottom and limiting layer.
2. Pressure distribution, when used, shall meet the following design considerations:
   a. If a pressure distribution system is designed within the drainfield, it must be designed according to section 4.19.
   b. If the pressurized line from the mechanical flow splitter breaks to gravity before the drainfield, it must be done according to section 4.19.3.6.
   c. The recirculation tank and recirculating filter may not be used as the dosing chamber for the drainfield or for flow-splitting purposes.
3. 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 4-21.

Table 4-20. Recirculating gravel filter vertical separation 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 4-21. Secondary biological treatment system hydraulic application rates.

Soil Design Subgroup	Application Rate (gallons/square foot/day)
A-1	1.7
A-2a	1.2
A-2b	1.0
B-1	0.8
B-2	0.6
C-1	0.4
C-2	0.3

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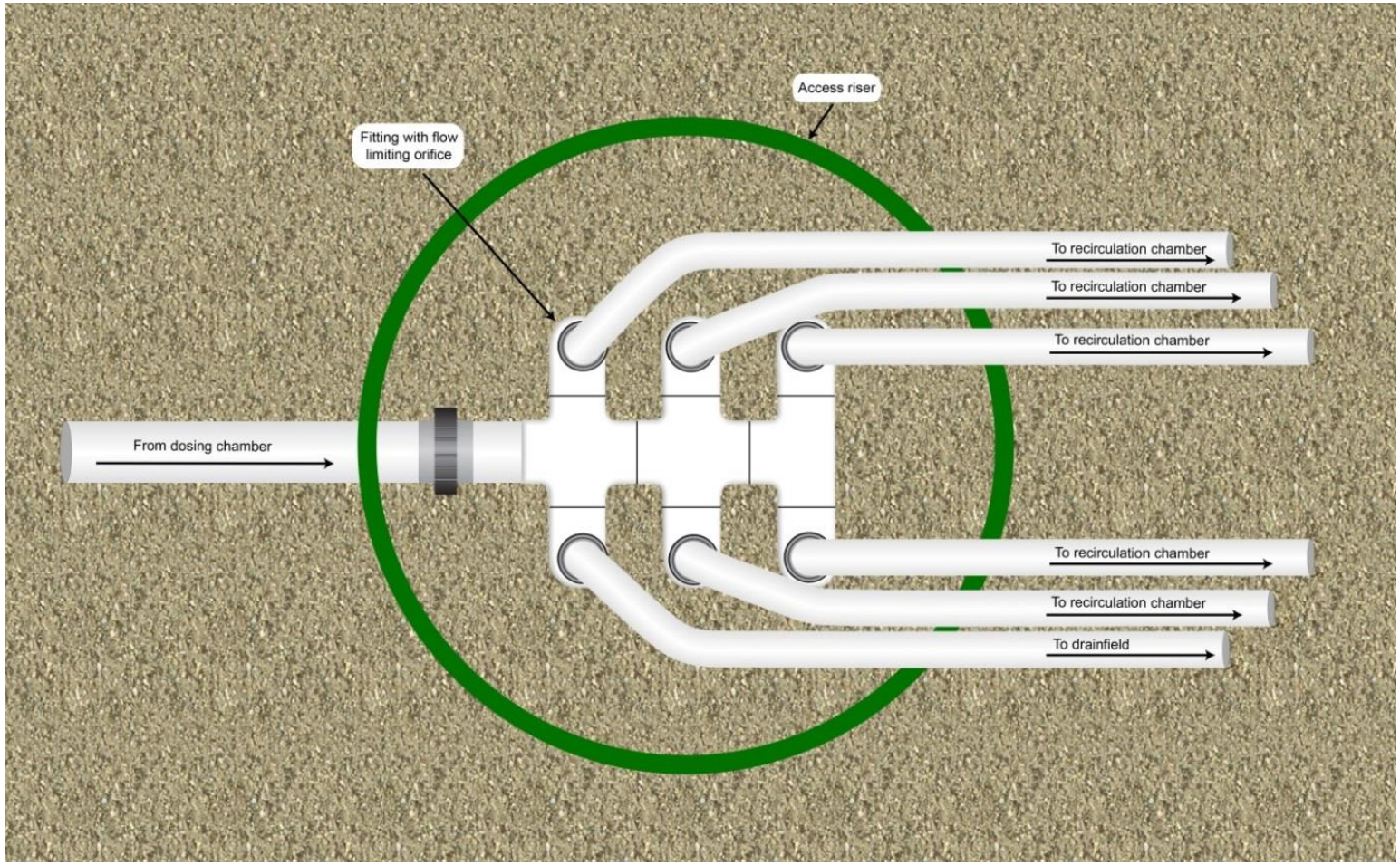

Figure 4-~~30~~32. Bottom view of a mechanical flow splitter for gravity distribution that delivers wastewater to all transport pipes with each dose.

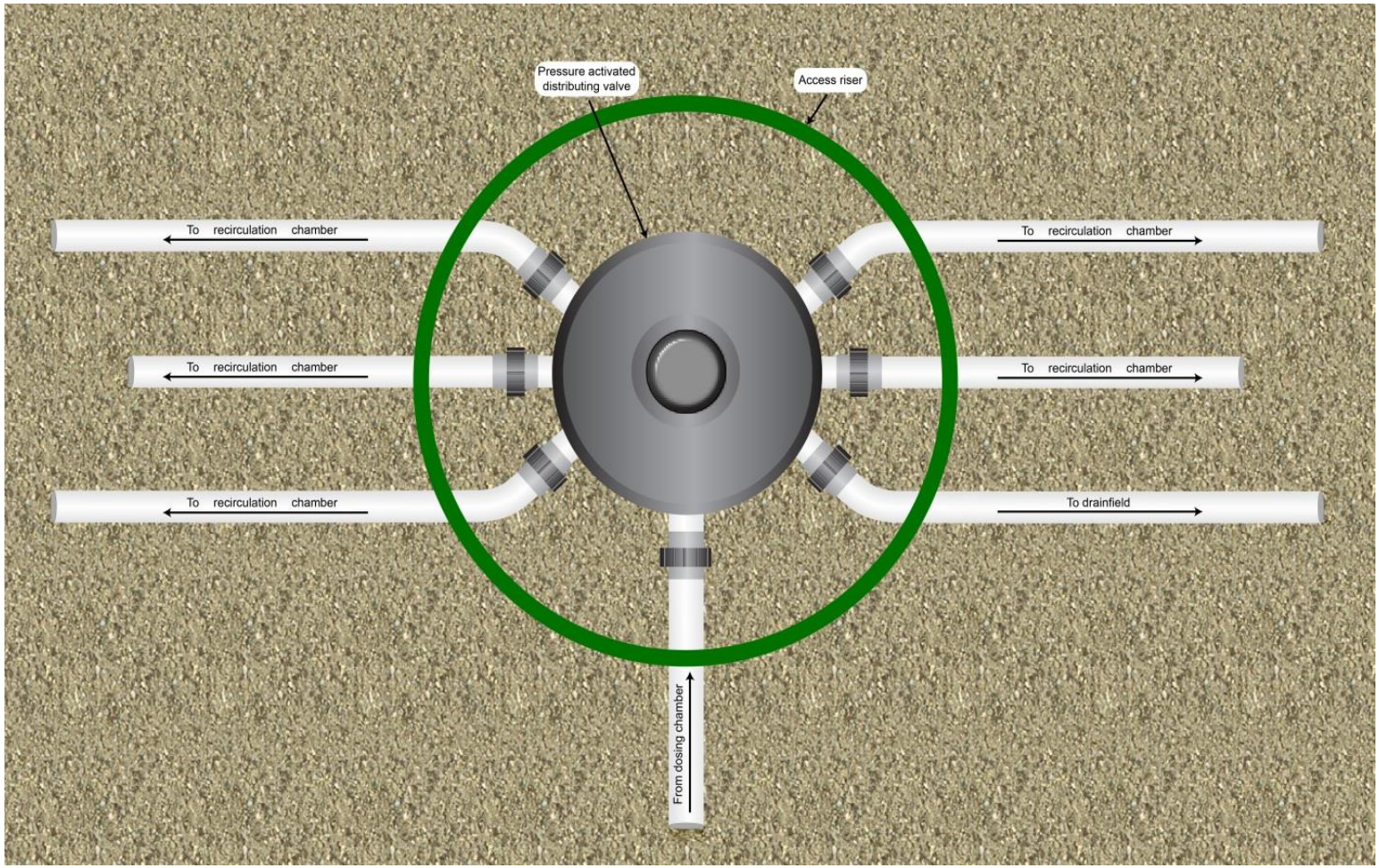

Figure 4-~~31~~33. Overhead view of a mechanical flow splitter for pressure distribution that only delivers wastewater to one transport pipe with each dose.

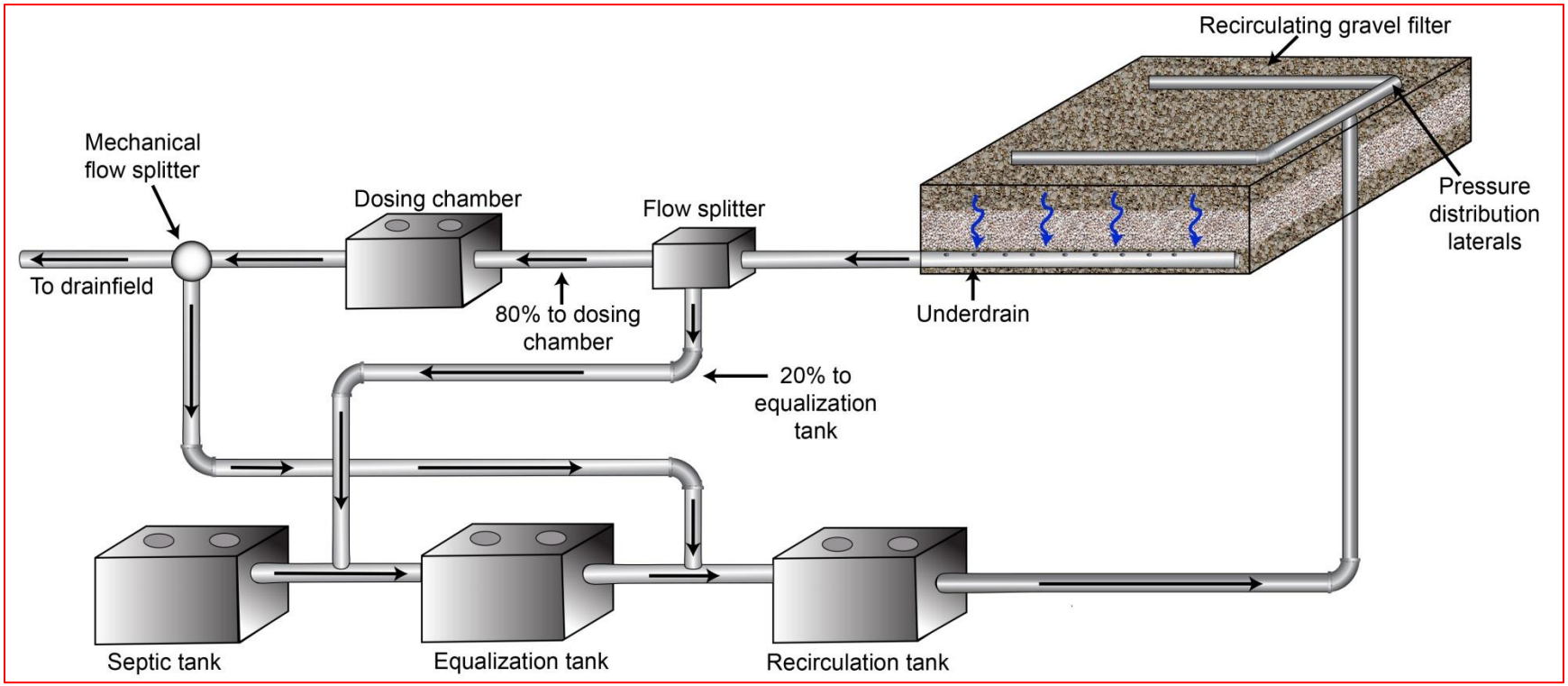

Figure 4-~~32~~34. Cross section of a recirculating gravel filter system with pressure transport to, and/or within, the drainfield.

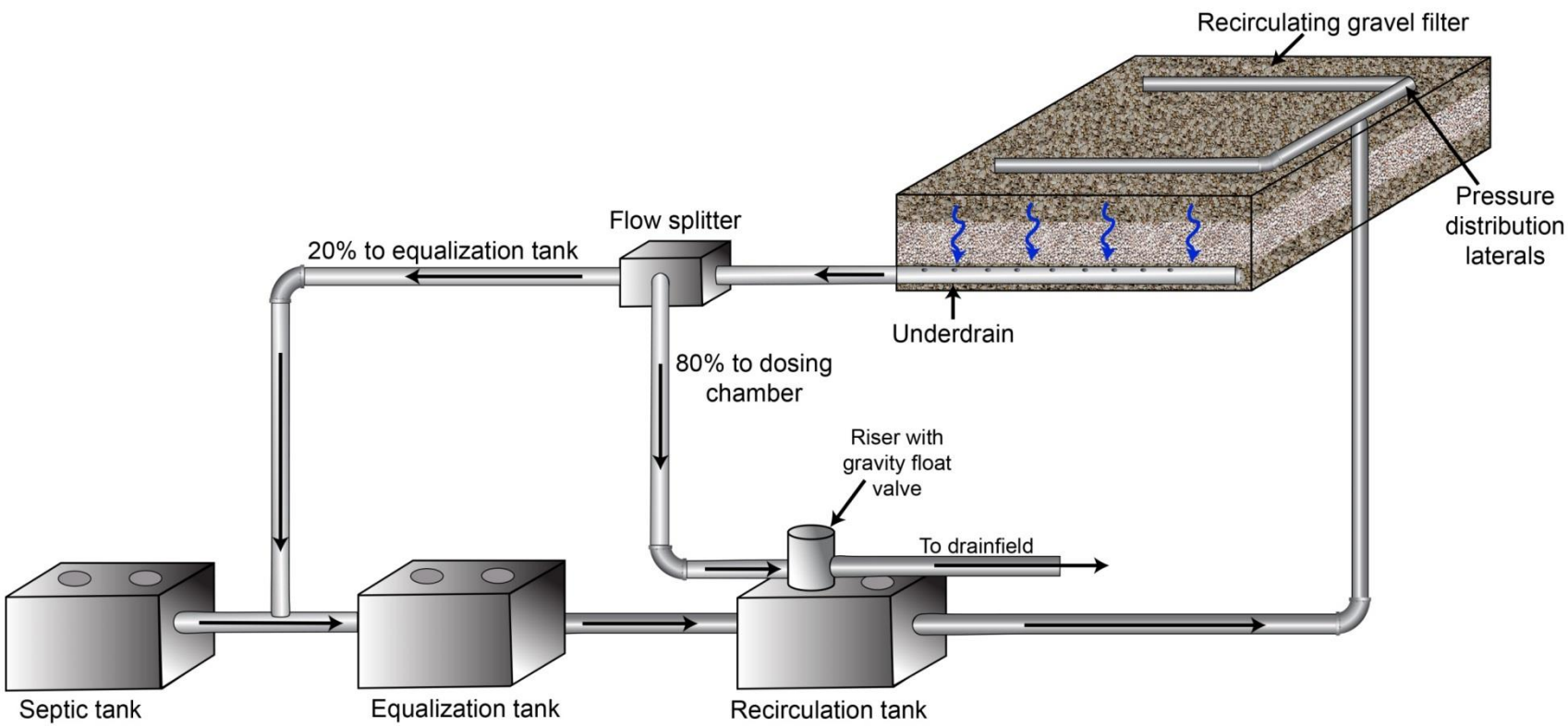

Figure 4-35. Cross section of a recirculating gravel filter system with gravity transport to the drainfield.

4.21.6 Inspection

1. A preconstruction meeting between the health district, responsible charge engineer, and installer should occur before commencing any construction activities.
2. The health district should inspect all system components before backfilling and inspect the filter container construction before filling with drainrock and filter construction media.
3. The responsible charge engineer shall conduct as many inspections as needed to verify system and component compliance with the engineered plans.
4. The responsible charge engineer shall provide the health district with a written statement that the system was constructed and functions in compliance with the approved plans and specifications. Additionally, the responsible charge engineer shall provide as-built plans to the health district if any construction deviations occur from the permitted construction plans (IDAPA 58.01.03.005.15).

4.21.7 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 before 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 adjustment to pump cycle timing if the low-level off or high-level alarm switch is frequently tripped in order to maintain the minimum 5:1 recirculation ratio.
4. Operation and maintenance directions should be included describing replacement of the filter construction media and informing 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 4.19.5.
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. Regularly check the recirculating gravel filter for surface odors. Odors should not be present and indicate 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.

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* This system will be added to the engineered list in section 4.1.

4.27 Subsurface Flow Constructed Wetland

Revision: November 5, 2015

4.27.1 Description

Subsurface flow constructed wetlands are secondary wastewater treatment systems that receive and treat wastewater that has undergone primary treatment in a septic tank. Wastewater flows through a lined constructed wetland cell filled with porous media in which climate and anaerobic, water-tolerant vegetation is planted. The vegetation provides up-take of the wastewater in addition to a surface for microorganisms to grow that aid in wastewater treatment. Wastewater exits the horizontal constructed wetland cell and proceeds to a watertight overflow basin which then either discharges to another constructed wetland cell in series with the first or to a subsurface sewage disposal drainfield. Figure 4-46 provides a diagram of a subsurface flow constructed wetland.

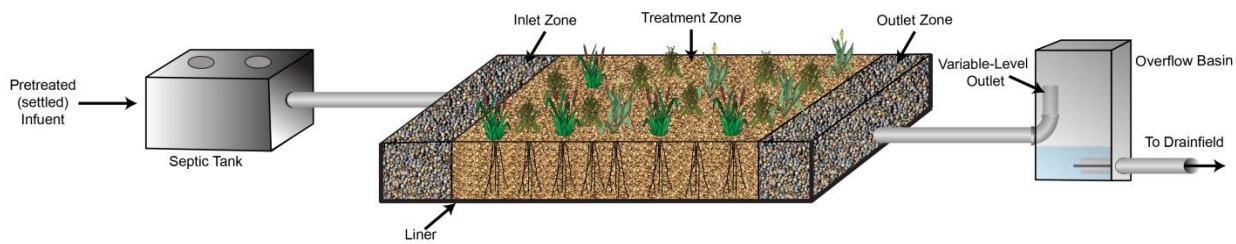

Figure 4-46. Cross-sectional view of a subsurface flow constructed wetland.

4.27.2 Approval Conditions

1. The system must be designed by a PE licensed in Idaho.
2. Wastewater must remain below the ground surface in the constructed wetland.
3. Nondomestic wastewater must be pretreated to residential strength before discharge to the constructed wetland.
4. Effluent shall not discharge to the drainfield without passing through the constructed wetland first.
5. The bottom of the constructed wetland must not come within 12 inches of seasonal high ground water.
6. The constructed wetland shall meet the same separation distance requirements as a septic tank.
7. The design engineer shall provide an O&M manual for the system to the health district before permit issuance.
8. All pressure distribution components shall be designed according to the pressure distribution system guidance (section 4.19).

4.27.3 Design Requirements

Minimum design requirements for the subsurface flow constructed wetland are provided below.

4.27.3.1 Septic Tank

1. The septic tank shall be sized according to the requirements of IDAPA 58.01.03.007.07.
2. The septic tank shall have an approved effluent filter (section 5.9) installed at the outlet.
3. The outlet manhole shall be brought to grade utilizing a riser and secured lid to provide maintenance access to the effluent filter.

4.27.3.2 Effluent Transport to the Subsurface Flow Constructed Wetland

1. Gravity flow is the preferred method to transport wastewater from the septic tank to the subsurface flow constructed wetland.
2. If gravity flow is not possible a dosing chamber may be installed meeting the requirements of section 4.19.3.4 and the effluent shall break to gravity following the requirements of section 4.19.3.6 prior to entering the subsurface flow constructed wetland.
3. If the installation of a pump to gravity distribution component is necessary the drop box shall be accessible from grade for maintenance purposes.
4. Pressurized doses should have a small volume so the subsurface flow constructed wetland does not receive large surge flows.

4.27.3.3 Subsurface Flow Constructed Wetland

1. The subsurface flow constructed wetland 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, or
2. The subsurface flow constructed wetland container shall be constructed of a flexible membrane liner meeting the following requirements:
   a. Have properties equivalent to or greater than 30-mil PVC and be compatible with wastewater.
   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.
3. The subsurface flow constructed wetland shall have a berm that is at least 1 foot above the surface of the planting media with sides that are as steep as possible, consistent with the soils, construction methods and materials.
4. Filter construction media shall meet the following specifications:
   a. Section 3.2.8.1.3 for planting media (pea gravel)
   b. Section 3.2.8.1.1 for inlet and outlet zone media (drainrock)
   c. Treatment zone media shall have an average diameter between 3/4 inch to 1 inch and be free of fines.
5. The surface of the subsurface flow constructed wetland shall be level.

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6. The bottom of the subsurface flow constructed wetland shall maintain a uniform slope from the inlet to the outlet of 1/2% to 1% to maintain flow conditions and allow for complete drainage.

7. Minimum filter construction specifications shall also meet the dimensions, ratios, and locations depicted in Figure 4-47.

8. The inlet and outlet zones should be designed to prevent accidental contact with effluent from the surface including:

   a. Chain-link fence or another acceptable protective barrier shall be placed below the planting media and at the top of the inlet/outlet media and cover the entire surface of the inlet and outlet areas to prevent access, unless fencing is placed around the entire system to prevent access.

   b. Geotextile fabric shall be placed over the access barrier.

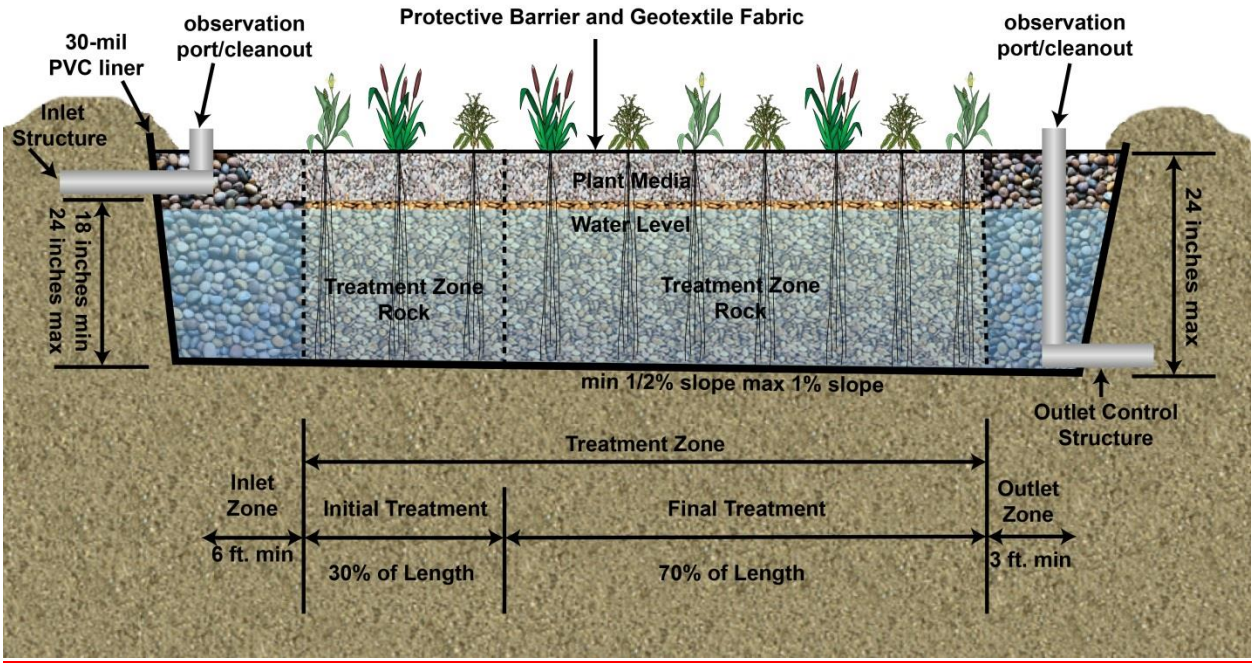

Figure 4-47. Cross sectional view of a constructed wetland cell.

4.27.3.4 Subsurface Flow Constructed Wetland Sizing

Sizing of a subsurface flow constructed wetland must take into account the loading of BOD and TSS from the wastewater. In addition the treatment zone of the subsurface flow constructed wetland should be capable of maintaining a hydraulic retention time of at least 2 days. Use Table 4-31 with the information provided in this subsection to size the wetland correctly.

1. Determine the minimum treatment zone surface area for both pollutants (BOD and TSS) and utilize the largest area.

   (a) BOD surface area: $A_{SB} = (Q)(B)/(53.5\ lb/acre/day)$

   (b) TSS surface area: $A_{ST} = (Q)(T)/(44.5\ lb/acre/day)$

Equation 4-17. BOD and TSS surface area in square feet.

Where:

A_{SB} and A_{ST} = total surface area of the treatment zone in square feet (ft^2) for BOD (A_{SB}) and TSS (A_{ST}).

Q = total daily design flow in gallons per day (gal/day).

B = 0.0018 lb/gal (constant value for the maximum BOD discharged to the system per gallon).

T = 0.00071 lb/gal (constant value for the maximum TSS discharged to the system per gallon).

Example:

A_{SB} = (250 GPD)(0.0018 lb/gal)/(53.5 lb/acre/day) = 0.0084 acres

(0.0084 acres)(43560 ft^2/acre) = 366 ft^2

A_{ST} = (250 GPD)(0.00071 lb/gal)/(44.5 lb/acre/day) = 0.004 acres

(0.004 acres)(43560 ft^2/acre) = 175 ft^2

Use A_{SB} = 366 ft^2

2. Apply a 25% safety factor to the required size of the treatment zone.

   Example:

   (366 ft^2)(1.25) = 458 ft^2

3. Determine the size of the initial treatment zone and final treatment zone within the total treatment zone using the following requirements:

   a. Initial treatment zone = 30% of the overall treatment zone area

      Example:

      A_{IT} = 0.3(458 ft^2) = 138 ft^2

   b. Final treatment zone = 70% of the overall treatment zone area

      Example:

      A_{FT} = 0.7(458 ft^2) = 321 ft^2

4. The hydraulic conductivity (K) of clean treatment zone media meeting the sizing requirements in section 4.XX.3.3(4) is 30,500 ft/day. Due to filtration and settling of materials the hydraulic conductivity of the treatment zone is:

   a. Initial treatment zone is 1% of the clean K, or 305 ft/day.

   b. Final treatment zone is 10% of clean K, or 3,050 ft/day.

5. Determine the minimum width based on the hydraulic loading rates that will maintain all flow below the surface of the submerged flow constructed wetland using Darcy's Law. The largest width should be used for the overall system design.

   $Q = KWD_W(d_h/L)$

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Equation 4-18 Darcy's Law

Where:

L = length of treatment zone = area/width; therefore:

$W^2 = (QA_{si})/(KD_w d_h)$

Where:

A_{si} = Surface area of the treatment zone (ft^2)

D_w = Depth of water (ft)

W = Width of cell (ft)

Q = Flow into cell (ft^3/day) (1 ft^3 = 7.48052 gal)

K = Hydraulic conductivity (ft/day)

d_h = Maximum permissible headloss (ft) (assume = 50% of difference between depth of media and depth of water)

Example:

Initial Treatment Zone = W^2 = [(33.42)(458 ft^2)]/[(305 ft/day)(1.33 ft)(0.167 ft)] = (15306.36 ft^2)/(67.74 ft) = 226 ft →(√226) = 15 ft

Final Treatment Zone = W^2 = [(33.42)(458 ft^2)]/[(3050 ft/day)(1.33 ft)(0.167 ft)] = (15306.36 ft^2)/(677.4 ft) = 22.6 ft →(√22.6) = 4.8 ft

Use 15 ft. for both treatment zone widths.

6. Determine the maximum length of each treatment zone by dividing the required treatment area by the width.

$L_{IT} = (0.3A_T)/W$

Equation 4-19. Initial Treatment Zone Length

Where:

L_{IT} = Total length of the initial treatment zone

A_T = Total required treatment area

W = Width (determined in step 5)

0.3 = Constant described in step 3

Example:

L_{IT} = [(0.3)(458 ft^2)/(15 ft) = 9.2 ft. → use 10 ft.

$L_{FT} = (0.7A_T)/W$

Equation 4-20. Final Treatment Zone Length

Where:

L_{FT} = Total length of the final treatment zone

A_T = Total required treatment area

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W = Width (determined in step 5)

0.7 = Constant described in step 3

Example:

L_{IT} = [(0.7)(458 ft^2)/(15 ft) = 21.4 ft. → use 22 ft.

7. Verify that the total treatment zone has a hydraulic retention time of at least 2 days assuming a porosity of the treatment media of 30% and that the length to width ratio of the submerged flow constructed wetland (inlet zone, total treatment zone, and outlet zone) is 3:1 or less. If the hydraulic retention time and/or the length to width ratio of the system do not meet the requirements above adjust the system dimensions to meet the requirements while maintaining the minimum treatment area and minimum width required.

$HRT = (L_{TZ}W_{TZ}(1.33)(0.3))/Q$

Equation 4-21. Hydraulic Retention Time

Where:

HRT = Hydraulic retention time

L_{TZ} = Length of the total treatment zone

W_{TZ} = Width of the treatment zone

1.33 = Depth of the water level within the submerged flow constructed wetland at normal operating level

0.3 = Porosity of the treatment zone media

7.48052 = Gallons per cubic foot

Q = Total daily design flow

Example:

HRT = [(41 ft)(15 ft)(1.33 ft)(0.3)(7.48052 gal/ft^3)]/(250 GPD) = (1835.6 gal)/(250 GPD) = 7.34 days

$L:W = (L_{TZ}+L_{IZ}+L_{OZ})/W_{TZ}$

Equation 4-22. Length to Width Ratio of the Subsurface Flow Constructed Wetland

Where:

L:W = Length to width ratio

L_{TZ} = Length of the treatment zone

L_{IZ} = Length of the inlet zone

L_{OZ} = Length of the outlet zone

W_{TZ} = Width of the treatment zone

Example:

L:W = (32 ft+6 ft+3 ft)/15 ft = 41 ft/15 ft = 2.73/1

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Table 4-31. Subsurface flow constructed wetland sizing checklist.

	Treatment Zone Surface Area	
1	Determine daily design flow (Q)	Q = _____ GPD
2	Determine the treatment zone surface area based on BOD and TSS A_{SB} = *[(Q)(0.0018 lb/gal)]/(53.5 lb/acre/day); and* A_{ST} = *[(Q)(0.00071 lb/gal)]/(44.5 lb/acre/day)* *Convert acreage to square feet and add safety factor using* *[(Acres)(43560 ft^2/acre)(1.25)] = ft^2*	A_{SB} = _____ ft^2 A_{ST} = _____ ft^2 *Use largest value (A)*
	Initial Treatment Zone and Final Treatment Zone	
3	Determine the size of the initial treatment zone A_{IT} = 0.3 (A)	Initial Treatment Zone = _____ ft^2 (B)
4	Determine the size of the final treatment zone A_{FT} = 0.7(A)	Final Treatment Zone = _____ ft^2 (C)
5	Determine the minimum width of the treatment zones $W^2 = (QA_{si})/(KD_w d_h)$ Round up to nearest foot	Initial Treatment Zone Width = _____ ft Final Treatment Zone Width = _____ ft *Use largest value (D)*
6	Determine the maximum length of the initial treatment zone L_{IT} = (B)/(D) Round up to nearest foot	Maximum Length of the Initial Treatment Zone Length = _____ ft (E)
7	Determine the maximum length of the final treatment zone L_{FT} = (C)/(D) Round up to nearest foot	Maximum Length of the Final Treatment Zone Length = _____ ft (F)
	Retention Time	
8	Verify the total treatment zone has a hydraulic retention time of at least 2 days HRT = $(L_{TZ}W_{TZ}(1.33)(0.3))/Q$	Hydraulic Retention Time = _____ days
	Length to Width Ratio	
9	Verify that the length to width ratio of the wetland is 3:1 or less L:W = $((E+F)+L_{IZ}+L_{OZ})/D$	Length to Width Ratio = _____

Notes: gallons per day (GPD); pounds per gallon (lb/gal); pounds per acre per day (lb/acre/day); square feet per acre (ft^2/acre); square feet (ft^2); feet (ft)

4.27.3.5 Subsurface Flow Constructed Wetland Cells

1. Subsurface flow constructed wetlands may be divided into multiple cells in series to maintain length to width ratios (Figure 4.48).
2. Subsurface flow wetlands shall be divided into multiple parallel trains that contain one or more cells as described in Table 4-31.

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3. For wetlands with daily design flows of 2,500 gallons per day or more piping shall be included in the design that allows each cell to be taken off line and bypassed for maintenance and repair needs.
4. Daily flows must be divided equally among each train.
5. Each subsurface flow constructed wetland cell shall contain its own watertight overflow basin described in section 4.27.3.6.

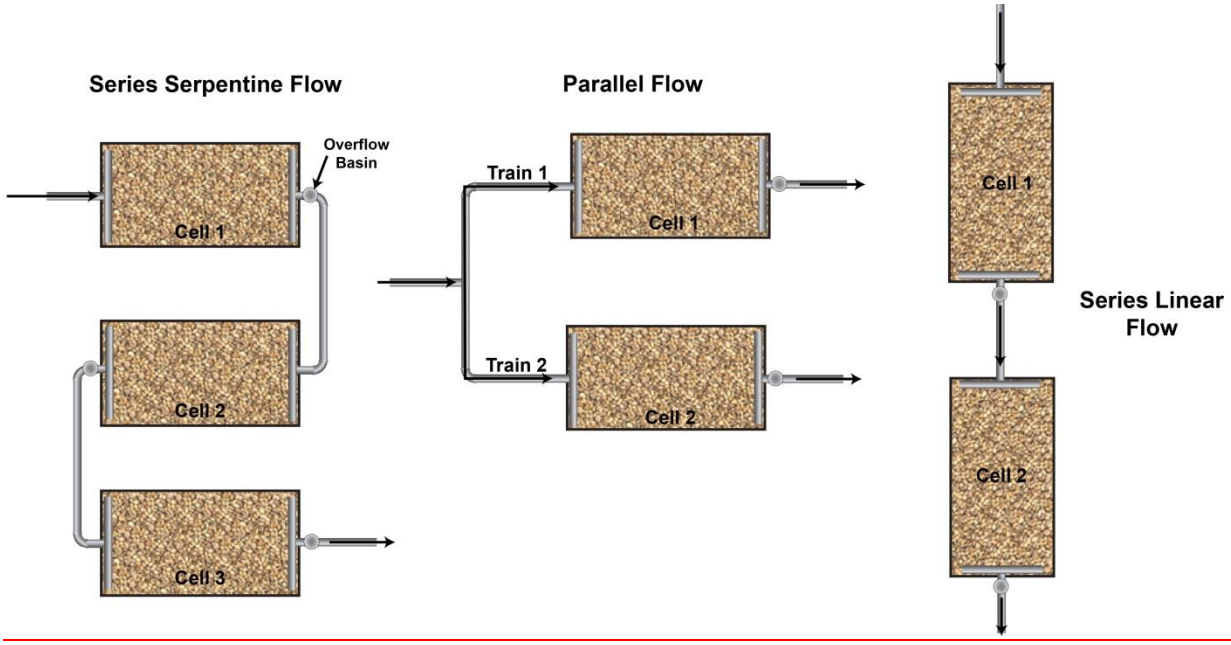

Figure 4-48. Configuration of wetland cells in series and parallel.

Table 4-31. Required subsurface flow constructed wetland trains and cells based on daily design flow.

Daily Design Flow (GPD)	Minimum Number of Trains	Minimum Number of Cells per Train	Minimum Number of Cells
< 2,500	1	1	1
2,500-4,999	2	2	4
≥5,000	4	2	8

Note: GPD – gallons per day

4.27.3.6 Inlet and Outlet Structures in the Subsurface Flow Constructed Wetland

1. The inlet control structure should uniformly distribute the inflow across the entire width of the constructed wetland (Figure 4.49).
2. The inlet and outlet piping and control structures shall have a minimum diameter of 4 inches.
3. The inlet and outlet control structures shall have cleanouts that are accessible from grade.
4. The inlet control structure shall be located at the top of the drainrock in the inlet zone, be located as close to the inlet wall of the wetland as possible, and be level across its entire length.

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5. Orifices on the inlet and outlet control structures should be evenly spaced with a maximum distance between orifices equal to 10% of the wetland width.
6. The outlet control structure should uniformly collect wastewater effluent across the entire width of the wetland.
7. The outlet control structure shall be located at the bottom of the drainrock in the outlet zone, be located as close to the outlet wall of the wetland as possible, and be level across its entire length.
8. The outlet control structure shall discharge to a watertight overflow basin located outside of the constructed wetland.
9. The watertight overflow basin (Figure 4.50) shall:
    a. Have a minimum diameter of 20 inches and be accessible from grade.
    b. Contain a water level control device that allow the operator to flood the constructed wetland to a point that is level with the surface of the planting media, completely drain the constructed wetland, and maintain the water level within the constructed wetland anywhere in between these two points and maintain a 2 day hydraulic retention time. *Note: Normal operating level is located 4 inches below the surface of the treatment media.*
    c. Gravity flow to the drainfield. If gravity flow is not achievable and/or pressurization of the drainfield or transport piping is necessary then the watertight basin must be an approved dosing chamber or septic tank that meets the requirements of section 4.19.3.4.

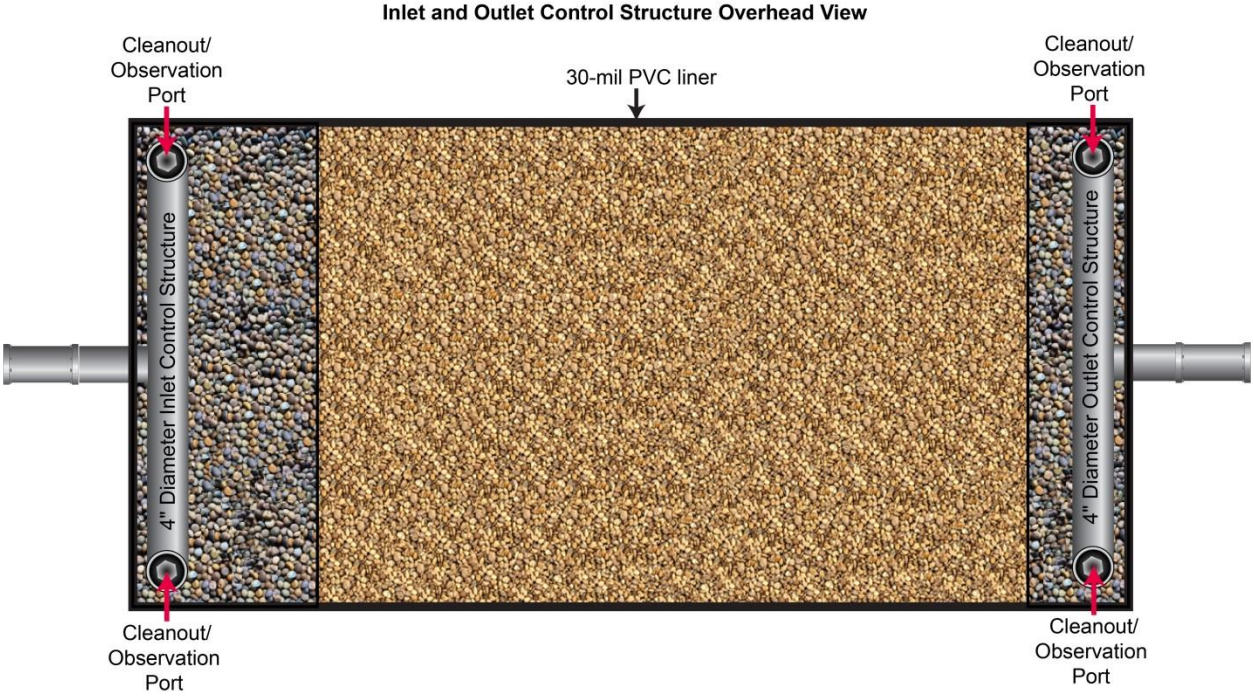

Figure 4.49. Overhead view of a wetland showing the inlet and outlet control structures in relation to the wetland width.

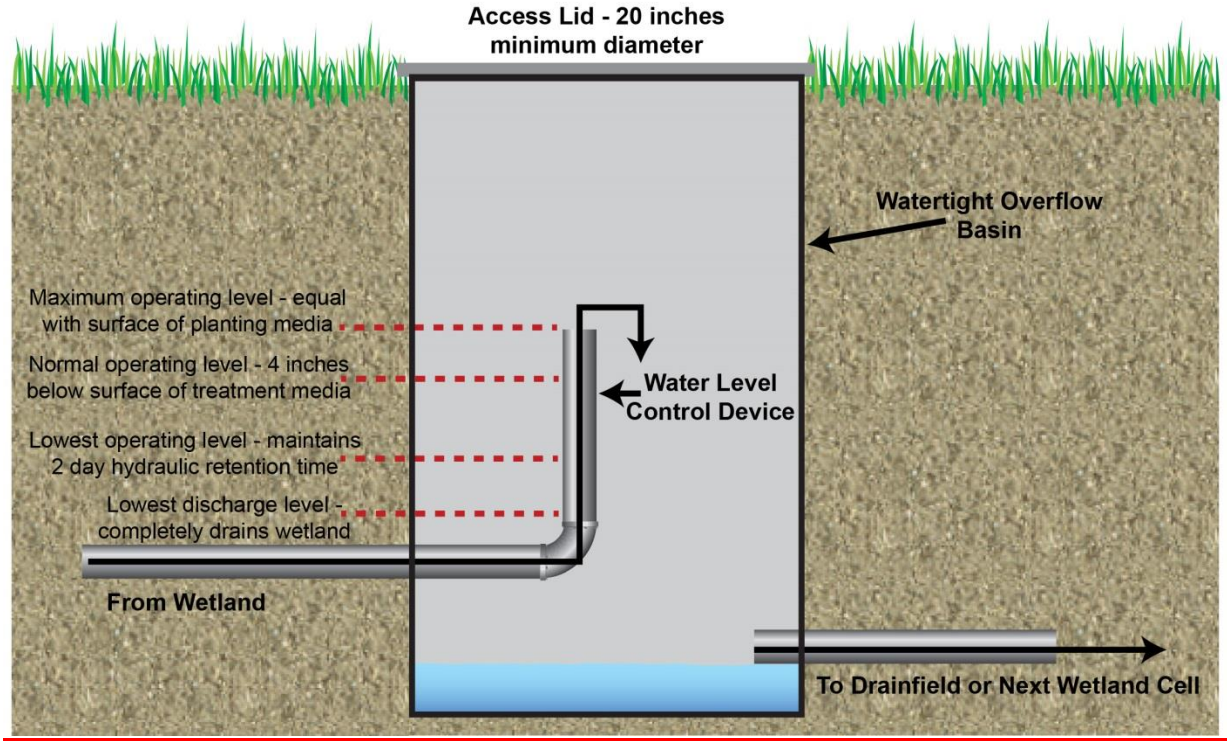

Figure 4.50. Cross-sectional view of an overflow basin.

4.27.3.7 Subsurface Flow Constructed Wetlands Vegetation

1. Planting densities shall be 1 ft. to 2 ft. on center in staggered rows throughout the treatment zone of the wetland (Figure 4.51).
2. Vegetation should not be established within the inlet and outlet zones of the wetland.
3. Vegetation shall not be established from seed.
4. Plant species should:
   a. Be capable of producing root depths that will extend to the bottom of the wetland (20 in.)
   b. Be tolerant of local climates and continuous submersion of their roots in anaerobic water
   c. Not be considered noxious or invasive plants
   d. Not be flowering or soft tissue plants that decompose rapidly
   e. Not be emergent woody plants or riparian trees and shrubs
   f. Not be submerged or floating aquatic plants
   g. Recommended species include, but are not limited to:
      i. Alkali bulrush (*Schoenoplectus maritimus*)
      ii. Baltic rush (*Juncus balticus*)
      iii. Broadleaf cattail (*Typha latifolia*)
      iv. Creeping spikerush (*Eleocharis palustris*)

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v. Hardstem bulrush (*Schoenoplectus acutus*)

vi. Nebraska sedge (*Carex nebrascensis*)

5. Plants should be allowed to be established prior to discharging wastewater to the wetland for a period up to 6 weeks. This is done by raising the water level in the wetland to the top of the planting media. After rooting establishment the water level in the wetland should be lowered to the normal operating depth of 4 inches below the treatment media surface.

6. To promote plant growth and enhance root development it is beneficial to lower the water level within the wetland on an annual basis from the normal operating level to a level that is equivalent to a 2 day hydraulic retention time within the treatment zone. The water level should be lowered and raised back to a normal operational level over a several week period.

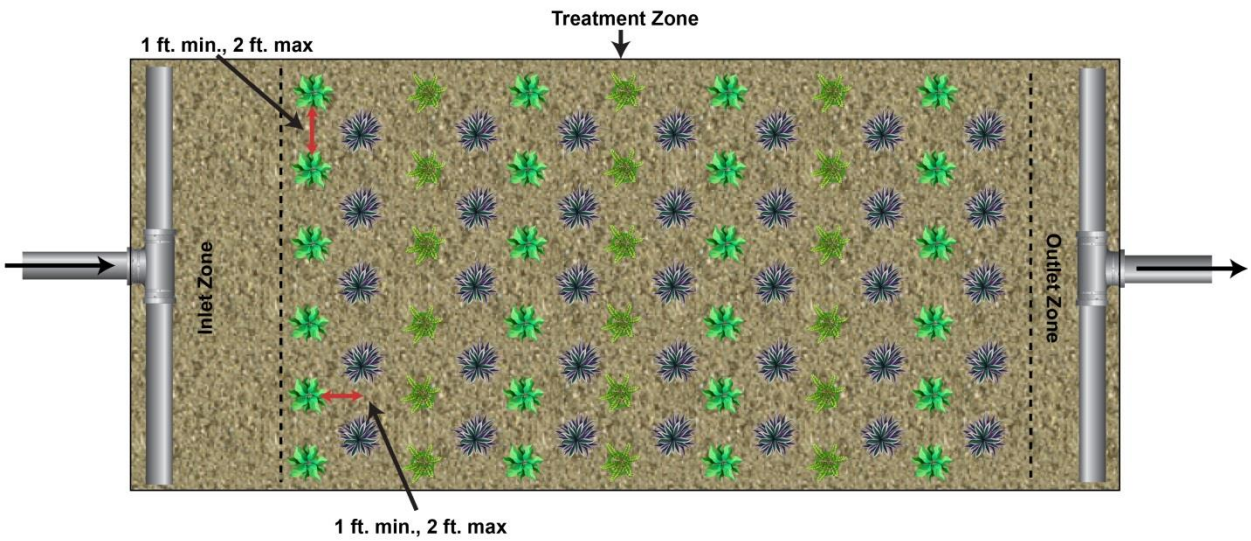

Figure 4.51. Vegetation and planting spacing throughout the wetland treatment zone.

4.27.3.8 Subsurface Flow Constructed Wetlands Temperature Protection

1. Temperature protection of the subsurface flow constructed wetlands and its components should be taken into consideration by the design engineer.

2. Several inches (≥ 6 inches) of insulating mulch or peat should be placed on a layer of geotextile fabric that covers the surface of the planting media.

3. Plants should not be cut back prior to the non-growing season.

4.27.4 Submerged Flow Constructed Wetlands Construction

1. All vegetation in the placement area of the wetlands should be cleared and grubbed to remove large roots and stumps. Large rocks should also be removed.

2. All soil used in constructing the wetland bottom and berm shall be compacted to at least 95% standard Proctor density.

3. When grading and constructing a wetland cell care must be exercised so as not to create low spots or preferred flows down a particular side of the wetland that will encourage short circuiting.

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4. After grading and compaction construction equipment should not enter the constructed wetland cell.
5. If used, the flexible liner containment system shall be constructed on top of a protective layer of sand. The protective layer of sand shall consist of a 4 inch layer of clean sand placed, graded, and compacted to match the wetland slope requirements on the compacted native grade.
   a. The liner should be installed according to the manufacturer's recommendations and extend to a height of 12 inches above the treatment media and be located within the containment berm at all locations above the planting media.
   b. It is recommended that a geotextile fabric with a weight of 4 ounces be placed over the liner prior to placing media in the constructed cell.
6. All media should be washed on site prior to placement in the constructed cell.

4.27.5 Drainfield Trenches

1. Distances shown in Table 4-32 must be maintained between the trench bottom and limiting layer.
2. Capping fill may be used to obtain adequate separation distance from limiting layers but must be designed and constructed according to the guidance for capping fill trenches in section 4.3.
3. Pressure distribution may be used with the following design considerations:
   a. The pressure distribution system related to the drainfield is designed according to section 4.19.
   b. The dosing chamber for the drainfield trenches may be substituted for the overflow basin from the constructed wetland cell.
4. The drainfield shall be sized by dividing the maximum daily flow by the hydraulic application rate for the applicable soil design subgroup listed in Table 4-33.

Table 4-32. Submerged flow constructed wetland vertical separation distance 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 4-33. Secondary biological treatment system hydraulic application rates.

Soil Design Subgroup	Application Rate (gallons/square foot/day)
A-1	1.7
A-2a	1.2
A-2b	1.0
B-1	0.8
B-2	0.6
C-1	0.4
C-2	0.3

4.27.6 Inspection

1. A preconstruction meeting between the health district, responsible charge engineer, and installer should occur before commencing any construction activities.
2. The site must be inspected when the wetland cell has been excavated and formed, and prior to installation of the containment structure. Compaction test results for all fill materials, containment berms, and the wetland bottom shall be provided at this time.
3. The health district should inspect all system components before backfilling and inspect the filter container construction before filling with drainrock and treatment construction media.
4. The responsible charge engineer shall conduct as many inspections as needed to verify system component compliance with the engineered plans.
5. The responsible charge engineer shall provide the health district with a written statement that the system was constructed and functions in compliance with the approved plans and specifications. Additionally, the responsible charge engineer shall provide as-built plans to the health district if any construction deviations occur from the permitted construction plans (IDAPA 58.01.03.005.15).

4.27.7 Operation and Maintenance

1. The subsurface flow constructed wetland 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. Fertilizing the system is not required.
3. System irrigation is not required.
4. Systems with multiple cells must have directions on how each cell may be isolated so repair work can be performed without additional wastewater entering the cell.
5. Periodic surface maintenance may be required for any of the following reasons:
   a. In the spring, the thick layer of leaves and any other organic material that has been built up on the system surface should be removed and disposed of with other yard refuse. Some wetland plants may require trimming, but should not be cut back or harvested.

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b. In the summer, if the surface contains weeds, they should be removed and disposed of with other yard refuse. Some wetland plants may require trimming, but should not be cut back or harvested.

c. Autumn maintenance may include gently spreading leaves over the surface and/or replacing the thick layer of mulch or peat over the system. Wetland plants should not be cut back or harvested. Wetland plants and a thick layer of leaves will provide a thermal blanket that will help prevent the system from freezing during the winter.

d. All woody or fibrous plant starts (e.g., tree saplings, bushes, etc.) should be removed any time they are noticed as they may result in damage to the wetland cells or liners.

6. Inspection/maintenance schedule and instructions for the constructed wetland cell(s), septic tank, inlet and outlet control devices, overflow basin, and any mechanical parts associated with system design.

7. Methods to address odors if they become noticeable.

8. Methods to address burrowing animals if they become a problem in or around the wetland cell.

9. A plan to address freezing issues that may arise during colder months. Suggestions include placing a thick layer of mulch or peat over the wetland cell, placing a thick layer of leaves over the wetland cell, temporarily raising and then lowering the water level within the wetland cell after the top water level has frozen.

10. Operation and maintenance directions should be included describing the replacement of the wetland cell media and informing the system owner that a repair permit must be obtained from the health district for this activity.

11. Vegetation management instructions should be included for vegetation start-up, harvesting (if necessary), and replacement. Vegetation sourcing information should also be included.

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