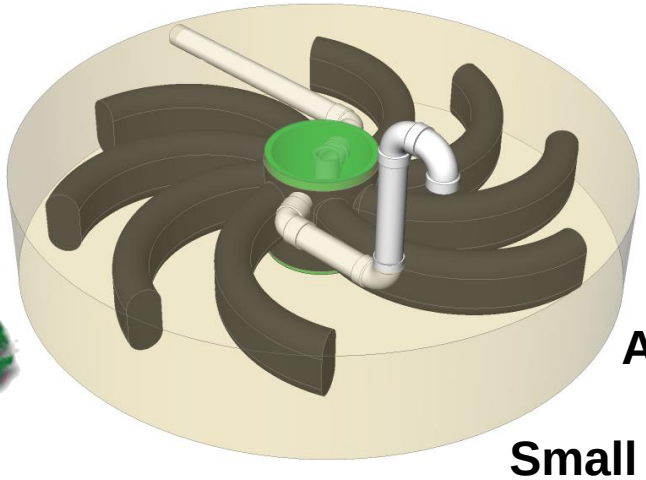
The Presby Wastewater Treatment System

Maine

Design and Installation Manual

For EnviroFin™



Simple ✓

Affordable ✓

Small Footprint ✓

Protects the Environment ✓

Flexible Design and Easy Installation ✓

Presby Environmental, Inc.

The Next Generation of Wastewater Treatment Technology

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EnviroFin™ is a trademark of Presby Environmental Inc.

IMPORTANT NOTICE: This Manual is intended ONLY for use in designing and installing Presby Environmental's EnviroFin™ Wastewater Treatment Systems. The use of this Manual with any other product is prohibited. The processes and design criteria contained herein are based solely on our experience with and testing of EnviroFin™.

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1.0 Background

Liquid that exits from a septic tank ("effluent") contains suspended solids that can cause traditional systems to fail prematurely. Solids can overload bacteria, cut off air required for aerobic bacterial activity, and/or seal the underlying soil, interfering with its ability to absorb liquid.

1.1 What Our System Does

By utilizing simple yet effective natural processes, the Presby Treatment System treats septic tank effluent in a manner that prevents suspended solids from sealing the underlying soil, increases system aeration, and provides a greater bacterial treatment area than traditional systems.

1.2 Why Our System Excels

The Presby Treatment System retains solids in its Fin Distribution Unit (FDU) and provides multiple bacterial surfaces to treat effluent prior to its contact with the soil. The continual cycling of effluent (the rising and falling of liquid inside the FDU and fins) enhances bacterial growth by wetting and drying the fibers, fabrics and specified System Sand media. Similar to lungs, this rising and falling of the effluent creates its own respiration, pushing the waste gases out and pulling in fresh, oxygen laden air provided by the passive, differential venting configuration. This all combines to create a unique eco-system that only Presby Environmental's passive wastewater treatment system is designed to offer. The result is a system that excels by being more efficient, lasting longer, while having a minimal environmental impact.

1.3 System Advantages

a) costs less than traditional systems
b) eliminates the need for washed stone
c) requires a smaller area
d) installs more easily and quickly than traditional systems
e) adapts easily to residential and commercial sites of virtually any size
f) adapts well to difficult sites
g) develops a protected receiving surface preventing sealing of the underlying soil
h) increases system performance and longevity
i) tests environmentally safer than traditional systems
j) recharges groundwater more safely than traditional systems
k) made in the USA

1.4 Patented Presby Technology

The EnviroFin™ (EF) system creates an eco-system designed to simultaneously and passively purify and disperse effluent after primary treatment by a septic tank. At the heart of the EF system is the centrally located Fin Distribution Unit (FDU), a plastic basin & sump, which is perforated around the circumference including patented, interior skimmer tabs. The FDU equalizes flow to other EF units in series and distributes effluent to 8 Treatment Fins radiating outward from the central unit. The Treatment Fins provide superior wastewater treatment utilizing high performance components. The perforated plastic air ducts supply oxygen to the bacterial surfaces and remove waste gases. The green, randomized, plastic fibers packed beneath the air duct and the geotextile fabric surrounding the Treatment Fin and FDU provide abundant and varied surface areas for bacterial attachment. The Treatment Fins distribute the treated effluent to a bed of specified System Sand for additional polishing and even dispersal to the native soil interface. At this point, the treated water has been stripped of the organics and third-party testing and certification show consistent treatment levels to better than secondary treatment standards. Treatment in this way protects the native soils from organic clogging and the formation of less permeable biomats in these critical areas essential for consistent, long term dispersal and infiltration of the treated wastewater flows. The EF system is also completely passive, requiring no electricity, motors, alarms, computers, etc. The Presby EnviroFin™ Wastewater Treatment System is the "revolutionary evolution" of our Enviro-Septic® technology.

1.5 EnviroFin™ (EF) Wastewater Treatment System

The EnviroFin™ unit is a revolutionary approach to wastewater treatment. The versatility of the EF system allows it to be used in many different configurations. The variability is only limited by imagination and site constraints. EF units can be designed to nest together in a single traditional, rectangular bed or separated and spread out in one or multiple EF unit satellite beds, sited at different elevations across the terrain. The Treatment Fins of the EF units can be spread out in the System Sand bed or condensed to the minimum 6-inch spacing in different shapes to accommodate the most demanding site criteria. The EF system has been successfully tested to the NSF 40 standard (a certification typically given to mechanical devices).

1.6 Presby Environmental Standards and Technical Support

All Presby Systems must be designed and installed in compliance with the procedures and specifications described in this Manual and in the product's Maine approval. This Manual is to be used in conjunction with the State of Maine DHHS regulations. In the event of contradictions between this Manual and Maine regulations, Presby Environmental,

Inc. should be contacted for technical assistance at (800) 473-5298. Exceptions to any Maine rules other than those specifically discussed in this Manual require a waiver/variance.

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1.7 Certification Requirements

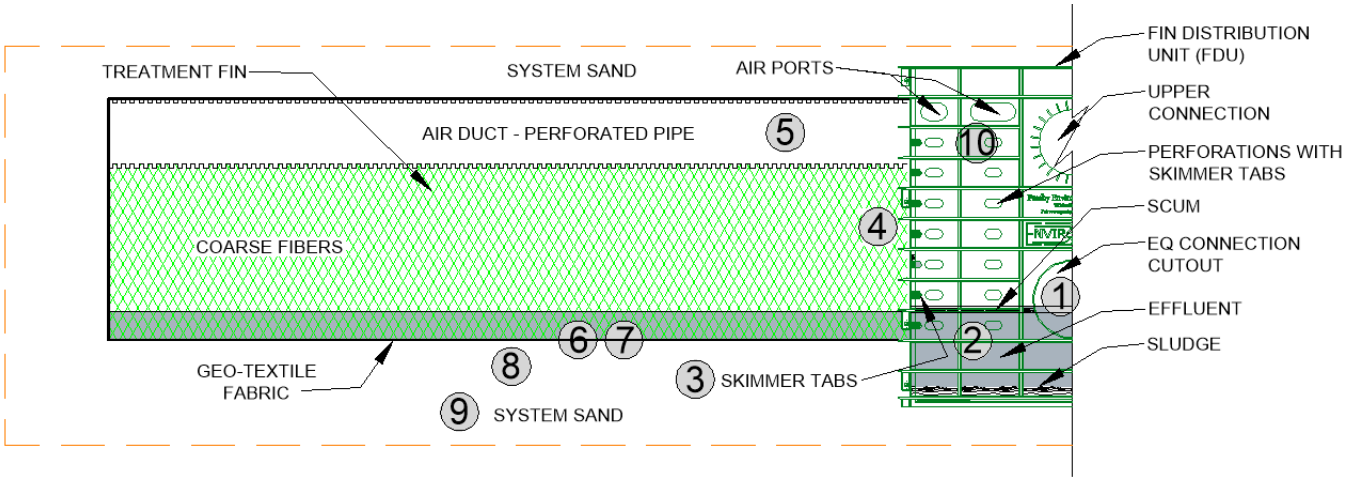
Any designers and installers wishing to use the EnviroFin™ treatment system are **required** to obtain Presby Certification. Certification is obtained by attending a Certification Course presented by Presby Environmental, Inc. or its sanctioned representative. Certification can also be obtained by viewing tutorial videos on our website (high speed connection required) and then successfully passing a short assessment test, which is also available over the internet. All professionals involved in the inspection, review or certification of EF systems should also become Presby Certified. This is a separate, additional certification from Presby Pipeline Systems (AES, ES & SS).

2.0 Ten Stages of Wastewater Treatment

The Presby Wastewater Treatment System's

10 STAGES OF TREATMENT

EnviroFin™



Stage 1: Warm effluent enters the FDU and is cooled to ground temperature.

Stage 2: Suspended solids separate from the cooled liquid effluent.

Stage 3: Skimmers further capture grease and suspended solids from the existing effluent.

Stage 4: Perforations in the FDU allow effluent to seep into the dense mass of coarse, randomly-oriented fibers and separate more suspended solids from the effluent.

Stage 5: The pipe (air duct) at the top of the fin allows air to flow along its length and into the fibers & System Sand promoting bacterial growth and treatment of the effluent. It is also a conduit for removal of waste gases at a different point in the cycle.

Stage 6: The fabrics and fibers provide a large amount of bacterial surfaces to break down solids.

Stage 7: Effluent passes into the geo-textile fabrics and grows a protected bacterial surface.

Stage 8: Sand wicks liquid from the geo-textile fabrics and enables air to transfer to the bacterial surfaces.

Stage 9: System Sand finishes treatment (polishing) of effluent to third-party-certified better than secondary treatment levels.

Stage 10: An ample air supply and fluctuating liquid levels increase bacterial efficiency and sustainability of the process.

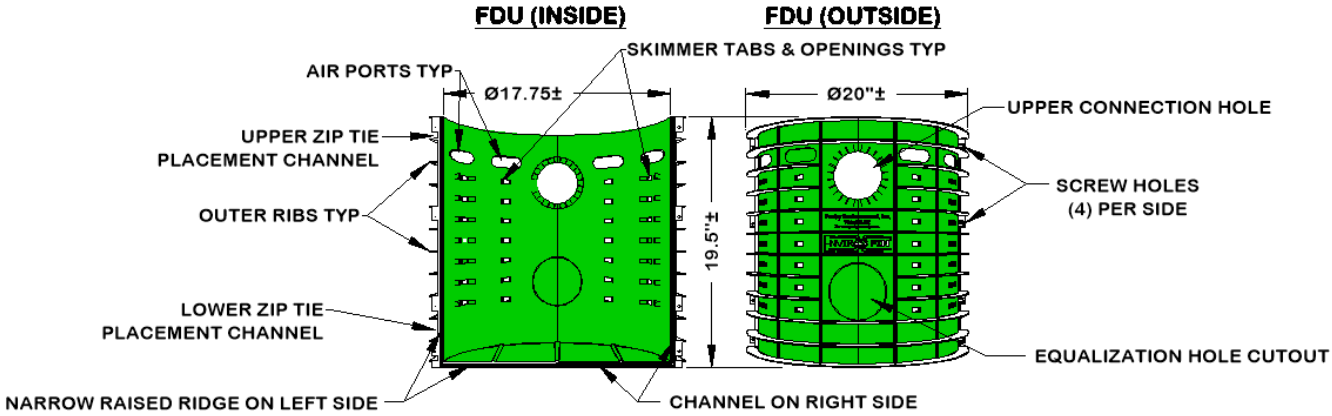
3.0 Presby EnviroFin™ System Components

3.1 Fin Distribution Unit (FDU)

A plastic injection molded sump, manufactured in two halves (see illustration of FDU half below).

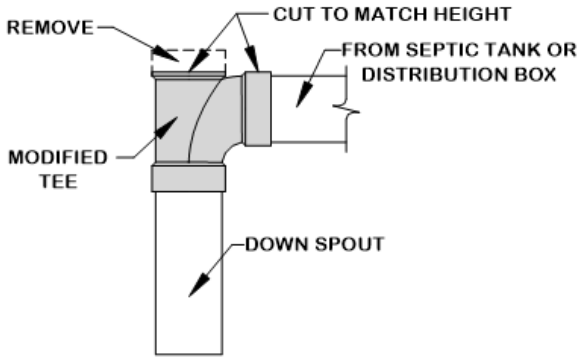
a) Perforated with skimmer tabs on interior
b) Upper inlet and outlet holes
c) Lower inlet and outlet cutouts are available for the connection of Equalization pipes.
d) Assembled using supplied stainless steel screws and silicone caulk for watertight bottom seal.

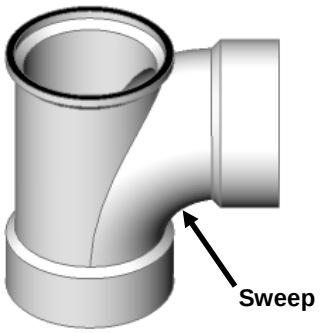
Illustration of inner and outer FDU component:



3.2 Modified Sanitary Tee (not supplied)

Attached to the 4-inch sewer line from the septic tank or distribution box is a modified 4-inch sanitary tee, which is used to create an inlet baffle inside the FDU. The modified sanitary tee is not supplied by Presby Environmental and can be easily manufactured by removing the top of the fitting with a hand saw as shown below (be sure to cut off end without sweep). Removing the top of the fitting will allow the necessary airspace above the fitting to ensure gases can escape the FDU. The downspout portion of this baffle must be sized to locate the bottom of the baffle 2.5 inches (+/- ½") from the bottom of the FDU. This baffle system is only required in the first EnviroFin™ unit. When connected in series, subsequent units utilize EQ Distribution through the bottom connection so a tee is not required.

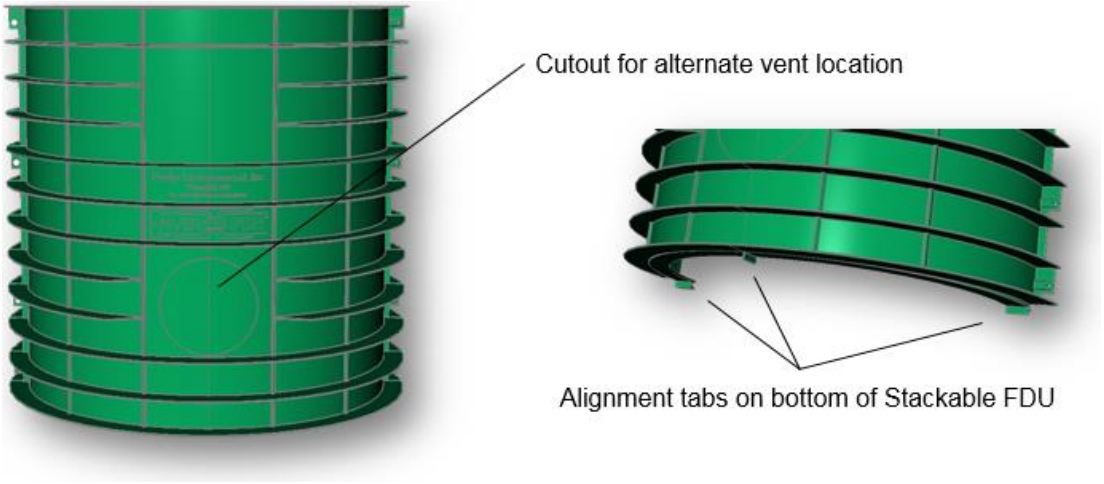




Modified Tee Enlarged

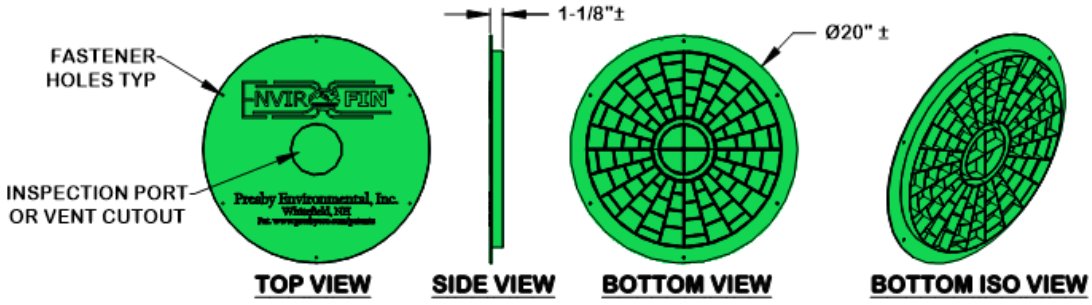
3.3 Stackable FDU (optional riser)

A stackable FDU is designed to be attached on top of a standard FDU in order to bring the cover closer to the final grade for access. It has no holes for pipe attachment but is provided with a cutout as an alternate vent location. The Stackable FDU is mated to the standard FDU with supplied stainless steel screws. Alignment tabs have been molded into the bottom of the FDU to facilitate easy assembly with the mating part.



3.4 Top Cover

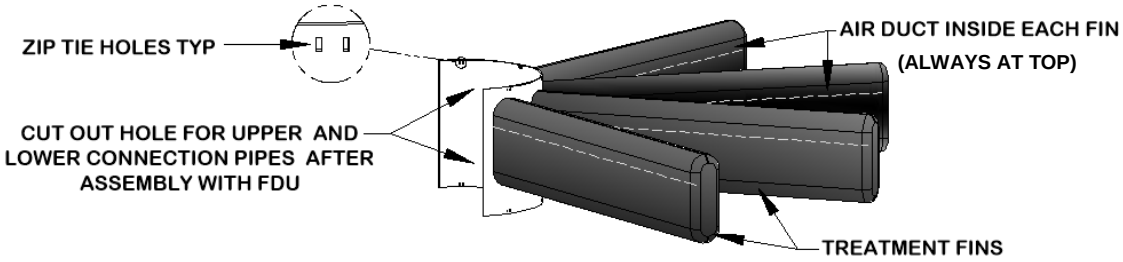
The FDU's top cover is an injection molded plastic component. In the center of the cover is a cutout for the attachment of an optional inspection port (see illustration below). The cover is attached to the top of the FDU with the supplied stainless steel screws.



3.5 Treatment Fin

There are eight (8) treatment fins per EnviroFin™ unit. Each set of fins is comprised of:

a) Two halves with four (4) treatment fins each (see illustration below).



b) A perforated plastic air duct which runs along the top.
c) Randomly-oriented, green fibers packed beneath the air duct.
d) Surrounded by Presby geo-textile fabric.

3.6 Zip Ties, Stainless Steel Fasteners and Plastic Pipe

Zip ties, stainless steel screws and silicone caulk are supplied to assemble the FDU halves with cover and to attach the Treatment Fins to the FDU body. Hand tools (razorblade knife, screwdriver) used to assemble the units are not provided. All 4-inch plastic piping and fittings must also be purchased by the installer from third parties.

4.0 Table A: Minimum Number of EnviroFin™ Units and System Sand Bed Area Required

Soil Profile	Number of Bedrooms*						Commercial Sizing 225 GPD per EF Unit @ 100 GPD**
	2	3	4	5	6	Additional Bedroom*	
	Minimum Number of EnviroFinTM Units (1.5 BDRMS per EF Unit)*						
	2	2	3	4	4		
1	222	333	444	556	667	111.1	74.07
2	89	134	178	223	267	44.5	29.67
3	133	200	267	333	400	66.7	44.44
4, 5 & 6	45	67	89	111	134	22.3	14.84
7	133	200	267	333	400	66.7	44.44
8	222	333	444	556	667	111.1	74.07
9	357	536	714	893	1071	178.6	119.05
	Minimum System Sand Bed Area (FT2)*						

*For additional bedrooms, divide number of bedrooms by 1.5 & round up to determine number of EF Units; and multiply number of bedrooms by the appropriate square footage in the additional bedroom column according to the Soil Profile to determine the minimum System Sand bed area.
**Consult PEI for high strength effluent requirements.

5.0 Table B: Allowable Slope & Bed Configuration Requirements

Soil Profile	% System Slope Max.	% Site Slope Max.	Configurations Allowed
4, 5 & 6	25	33	All Single and Multi-Level™ Layouts
2			
3, 7			
1, 8	20	25	All Single-Level Layouts
9	10	15	

System slope refers only to the System Sand extension and not the treatment area, which must always remain level (see illustration in para. 7.3 on page 13):

6.0 EnviroFin™ Design Layout

The EnviroFin™ units can be arranged in many different configurations and shapes to accommodate an array of site challenges, provided the minimum Full Depth System Sand Bed Treatment Area and minimum System Sand dispersal area for the site soils (soil profiles) are utilized. For simplicity, this manual divides the EnviroFin™ design layout into two basic shapes:

6.1 Rectangular Design Layout

Utilizes minimum spacing to create efficient designs and minimize the amount of System Sand required. Allows for systems to be divided into multiple, single unit, EnviroFin™ beds using a d-box to split flows. Individual beds may be sized for different soils (soil profiles) within the same system and site. Refer to section 7.0, page 6 for rectangular design layouts.

6.2 Circular Design Layout

Utilizes round design which may accommodate constraints of certain sites better than rectangular bed. Allows for wide dispersal within the System Sand bed. Allows for system to be divided into multiple, single unit, EnviroFin™ beds using a d-box to split flows. Individual beds may be sized for different soils (soil profiles) within the same system and site. Refer to section 8.0, page 14 for circular design layouts.

7.0 Rectangular Design Procedure and Examples

Table C: Rectangular Beds Quick Pick System Sand Bed Area & System Sand Extension

Length / Width (FT)													
	4.5	5	***8.5***	10	***11***	***12.5***	15	***16.5***	20	***20.5***	***21.5***	25
4.5	20.25	22.5	38.25	45	49.5	56.25	67.5	74.25	90	92.25	96.75	112.5
5	22.5	25	42.5	50	55	62.5	75	82.5	100	102.5	107.5	125
8.5	38.25	42.5	72.25	85	93.5	106.25	127.5	140.25	170	174.25	182.75	212.5
10	45	50	85	100	110	125	150	165	200	205	215	250
11	49.5	55	93.5	110	121	137.5	165	181.5	220	225.5	236.5	275
12.5	56.25	62.5	106.25	125	137.5	156.25	187.5	206.25	250	256.25	268.75	312.5
15	67.5	75	127.5	150	165	187.5	225	247.5	300	307.5	322.5	375
16.5	74.25	82.5	140.25	165	181.5	206.25	247.5	272.25	330	338.25	354.75	412.5
20	90	100	170	200	220	250	300	330	400	410	430	500
20.5	92.25	102.5	174.25	205	225.5	256.25	307.5	338.25	410	420.25	440.75	512.5
21.5	96.75	107.5	182.75	215	236.5	268.75	322.5	354.75	430	440.75	462.25	537.5
25	112.5	125	212.5	250	275	312.5	375	412.5	500	512.5	537.5	625
30	135	150	255	300	330	375	450	495	600	615	645	750
32	144	160	272	320	352	400	480	528	640	656	688	800
35	157.5	175	297.5	350	385	437.5	525	577.5	700	717.5	752.5	875
40	180	200	340	400	440	500	600	660	800	820	860	1,000
42.5	191.25	212.5	361.25	425	467.5	531.25	637.5	701.25	850	871.25	913.75	1,062.5
45	202.5	225	382.5	450	495	562.5	675	742.5	900	922.5	967.5	1,125
50	225	250	425	500	550	625	750	825	1,000	1,025	1,075	1,250
53	238.5	265	450.5	530	583	662.5	795	874.5	1,060	1,086.5	1,139.5	1,325
55	247.5	275	467.5	550	605	687.5	825	907.5	1,100	1,127.5	1,182.5	1,375
60	270	300	510	600	660	750	900	990	1,200	1,230	1,290	1,500
65	292.5	325	552.5	650	715	812.5	975	1,072.5	1,300	1,332.5	1,397.5	1,625
70	315	350	595	700	770	875	1,050	1,155	1,400	1,435	1,505	1,750
75	337.5	375	637.5	750	825	937.5	1,125	1,237.5	1,500	1,537.5	1,612.5	1,875
80	360	400	680	800	880	1,000	1,200	1,320	1,600	1,640	1,720	2,000
85	382.5	425	722.5	850	935	1,062.5	1,275	1,402.5	1,700	1,742.5	1,827.5	2,125
90	405	450	765	900	990	1,125	1,350	1,485	1,800	1,845	1,935	2,250
95	427.5	475	807.5	950	1,045	1,187.5	1,425	1,567.5	1,900	1,947.5	2,042.5	2,375
100	450	500	850	1,000	1,100	1,250	1,500	1,650	2,000	2,050	2,150	2,500
105	472.5	525	892.5	1,050	1,155	1,312.5	1,575	1,732.5	2,100	2,152.5	2,257.5	2,625
110	495	550	935	1,100	1,210	1,375	1,650	1,815	2,200	2,255	2,365	2,750
115	517.5	575	977.5	1,150	1,265	1,437.5	1,725	1,897.5	2,300	2,357.5	2,472.5	2,875
120	540	600	1020	1,200	1,320	1,500	1,800	1,980	2,400	2,460	2,580	3,000

Length / Width (FT)

System Sand Bed Area (FT^2)

Column and Row numbers that are ***underlined italic*** represent the possible dimensions for an EnviroFin™ bed without System Sand extensions or System Sand extensions on only 2 sides. This ***underlined italic*** dimension will be the minimum length or width of the "full depth" or "tall" portion of the sand bed. For example: If the design consisted of two (2) EnviroFin™ modules oriented such that the sand bed dimensions are 4.5 ft wide by 21.5 ft long, Table C shows this will provide a Full Depth System Sand Bed Treatment Area of 96.75 sq ft. No System Sand extensions are included in this value. See illustration below:

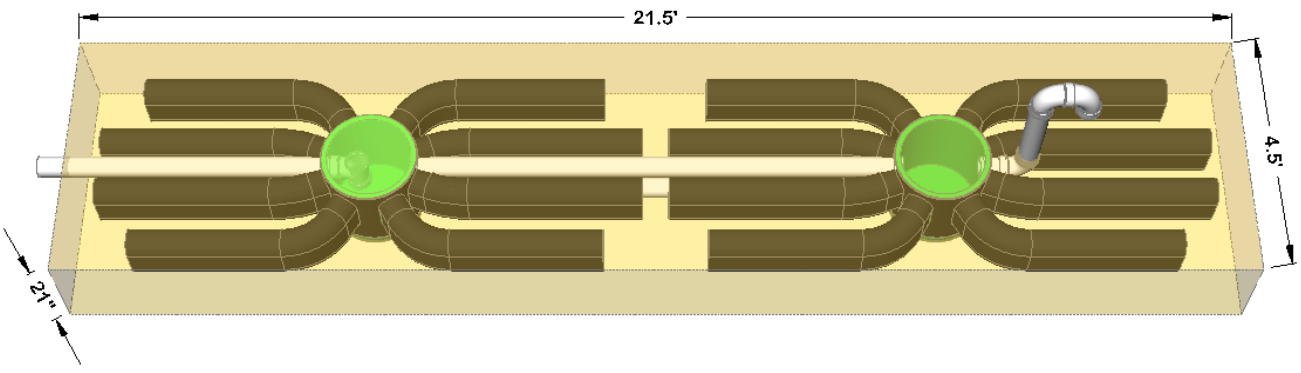


Table C (Continued)

Length / Width (FT)	30	***32***	35	40	***42.5***	45	50	***53***	55	60	65	70
4.5	135	144	157.5	180	191.25	202.5	225	238.5	247.5	270	292.5	315
5	150	160	175	200	212.5	225	250	265	275	300	325	350
8.5	255	272	297.5	340	361.25	382.5	425	450.5	467.5	510	552.5	595
10	300	320	350	400	425	450	500	530	550	600	650	700
11	330	352	385	440	467.5	495	550	583	605	660	715	770
12.5	375	400	437.5	500	531.25	562.5	625	662.5	687.5	750	812.5	875
15	450	480	525	600	637.5	675	750	795	825	900	975	1,050
16.5	495	528	577.5	660	701	742.5	825	875	907.5	990	1,072.5	1,155
20	600	640	700	800	850	900	1,000	1,060	1,100	1,200	1,300	1,400
20.5	615	656	717.5	820	871	922.5	1,025	1,087	1,127.5	1,230	1,332.5	1,435
21.5	645.0	688	752.5	860	914	967.5	1,075	1,140	1,182.5	1,290	1,397.5	1,505
25	750	800	875	1,000	1,063	1,125	1,250	1,325	1,375	1,500	1,625	1,750
30	900	960	1,050	1,200	1,275	1,350	1,500	1,590	1,650	1,800	1,950	2,100
32	960	1,024	1,120	1,280	1,360	1,440	1,600	1,696	1,760	1,920	2,080	2,240
35	1,050	1,120	1,225	1,400	1,488	1,575	1,750	1,855	1,925	2,100	2,275	2,450
40	1,200	1,280	1,400	1,600	1,700	1,800	2,000	2,120	2,200	2,400	2,600	2,800
42.5	1,275	1,360	1,487.5	1,700	1,806.3	1,912.5	2,125.0	2,252.5	2,337.5	2,550	2,762.5	2,975
45	1,350	1,440	1,575	1,800	1,913	2,025	2,250	2,385	2,475	2,700	2,925	3,150
53	1,590	1,696	1,855	2,120	2,253	2,385	2,650	2,809	2,915	3,180	3,445	3,710
50	1,500	1,600	1,750	2,000	2,125	2,250	2,500	2,650	2,750	3,000	3,250	3,500
55	1,650	1,760	1,925	2,200	2,338	2,475	2,750	2,915	3,025	3,300	3,575	3,850
60	1,800	1,920	2,100	2,400	2,550	2,700	3,000	3,180	3,300	3,600	3,900	4,200
65	1,950	2,080	2,275	2,600	2,763	2,925	3,250	3,445	3,575	3,900	4,225	4,550
70	2,100	2,240	2,450	2,800	2,975	3,150	3,500	3,710	3,850	4,200	4,550	4,900
75	2,250	2,400	2,625	3,000	3,188	3,375	3,750	3,975	4,125	4,500	4,875	5,250
80	2,400	2,560	2,800	3,200	3,400	3,600	4,000	4,240	4,400	4,800	5,200	5,600
85	2,550	2,720	2,975	3,400	3,613	3,825	4,250	4,505	4,675	5,100	5,525	5,950
90	2,700	2,880	3,150	3,600	3,825	4,050	4,500	4,770	4,950	5,400	5,850	6,300
95	2,850	3,040	3,325	3,800	4,038	4,275	4,750	5,035	5,225	5,700	6,175	6,650
100	3,000	3,200	3,500	4,000	4,250	4,500	5,000	5,300	5,500	6,000	6,500	7,000
105	3,150	3,360	3,675	4,200	4,463	4,725	5,250	5,565	5,775	6,300	6,825	7,350
110	3,300	3,520	3,850	4,400	4,675	4,950	5,500	5,830	6,050	6,600	7,150	7,700
115	3,450	3,680	4,025	4,600	4,888	5,175	5,750	6,095	6,325	6,900	7,475	8,050
120	3,600	3,840	4,200	4,800	5,100	5,400	6,000	6,360	6,600	7,200	7,800	8,400

Length / Width (FT) — **System Sand Bed Area (FT^2)**

Column and Row numbers that are ***underlined italic*** represent the possible dimensions for an EnviroFin™ bed without System Sand extensions or System Sand extensions on only 2 sides. This ***underlined italic*** dimension will be the minimum length or width of the "full depth" or "tall" portion of the sand bed. For example: If the design consisted of three (3) EnviroFin™ modules oriented such that the sand bed dimensions are 10 ft. wide by 32 ft. long, Table C shows this will provide a "Full Depth" System Sand Bed Treatment Area dimension of 32 ft. in length and a 10 ft. dimension for the width which includes a 4.5 ft. Full Depth System Sand Bed Treatment Area and a 5.5 ft. System Sand extension. See illustration below:

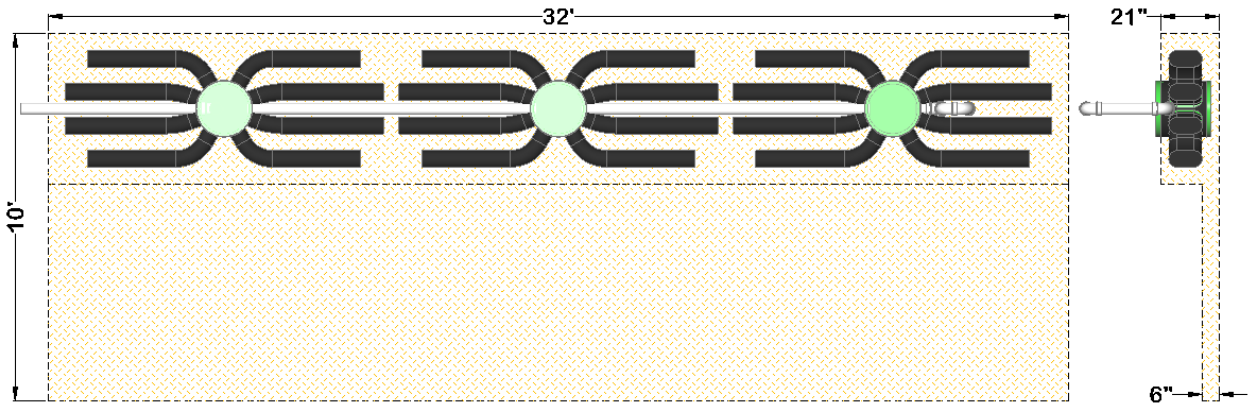


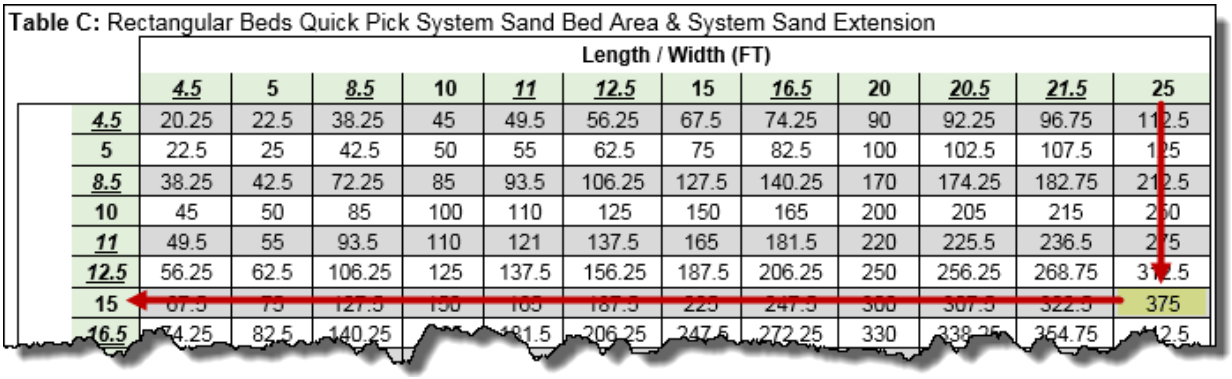
Table C (Continued)

Length / Width (FT)	75	80	85	90	95	100	105	110	115	120	125
4.5	337.5	360	382.5	405	427.5	450	472.5	495	517.5	540	562.5
5	375	400	425	450	475	500	525	550	575	600	625
8.5	637.5	680	722.5	765	807.5	850	892.5	935	977.5	1,020	1062.5
10	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250
11	825	880	935	990	1,045	1,100	1,155	1,210	1,265	1,320	1,375
12.5	937.5	1,000	1,062.5	1125	1,187.5	1,250	1,312.5	1,375	1,437.5	1,500	1,562.5
15	1,125	1,200	1,275	1,350	1,425	1,500	1575	1,650	1,725	1,800	1,875
16.5	1,237.5	1,320	1,402.5	1,485	1,567.5	1,650	1,732.5	1,815	1,897.5	1,980	2,062.5
20	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500
20.5	1,537.5	1,640	1,742.5	1,845	1,947.5	2,050	2,152.5	2,255	2,357.5	2,460	2,562.5
21.5	1,612.5	1,720	1,827.5	1,935	2,042.5	2,150	2,257.5	2,365	2,472.5	2,580	2,687.5
25	1,875	2,000	2,125	2,250	2,375	2,500	2,625	2,750	2,875	3,000	3,125
30	2,250	2,400	2,550	2,700	2,850	3,000	3,150	3,300	3,450	3,600	3,750
32	2,400	2,560	2,720	2,880	3,040	3,200	3,360	3,520	3,680	3,840	4,000
35	2,625	2,800	2,975	3,150	3,325	3,500	3,675	3,850	4,025	4,200	4,375
40	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800	5,000
42.5	3,187.5	3,400	3,612.5	3,825	4,037.5	4,250	4462.5	4,675	4,887.5	5100	5,312.5
45	3,375	3,600	3,825	4,050	4,275	4,500	4,725	4,950	5,175	5,400	5,625
50	3,750	4,000	4,250	4,500	4,750	5,000	5,250	5,500	5,750	6,000	6,250
53	3,975	4,240	4,505	4,770	5,035	5,300	5,565	5,830	6,095	6,360	6,625
55	4,125	4,400	4,675	4,950	5,225	5,500	5,775	6,050	6,325	6,600	6,875
60	4,500	4,800	5,100	5,400	5,700	6,000	6,300	6,600	6,900	7,200	7,500
65	4,875	5,200	5,525	5,850	6,175	6,500	6,825	7,150	7,475	7,800	8,125
70	5,250	5,600	5,950	6,300	6,650	7,000	7,350	7,700	8,050	8,400	8,750
75	5,625	6,000	6,375	6,750	7,125	7,500	7,875	8,250	8,625	9,000	9,375
80	6,000	6,400	6,800	7,200	7,600	8,000	8,400	8,800	9,200	9,600	10,000
85	6,375	6,800	7,225	7,650	8,075	8,500	8,925	9,350	9,775	10,200	10,625
90	6,750	7,200	7,650	8,100	8,550	9,000	9,450	9,900	10,350	10,800	11,250
95	7,125	7,600	8,075	8,550	9,025	9,500	9,975	10,450	10,925	11,400	11,875
100	7,500	8,000	8,500	9,000	9,500	10,000	10,500	11,000	11,500	12,000	12,500
105	7,875	8,400	8,925	9,450	9,975	10,500	11,025	11,550	12,075	12,600	13,125
110	8,250	8,800	9,350	9,900	10,450	11,000	11,550	12,100	12,650	13,200	13,750
115	8,625	9,200	9,775	10,350	10,925	11,500	12,075	12,650	13,225	13,800	14,375
120	9,000	9,600	10,200	10,800	11,400	12,000	12,600	13,200	13,800	14,400	15,000

Length / Width (FT)

System Sand Bed Area (FT^2)

Example: A three bedroom (270 GPD) daily flow placed on Soil Profile #1 soils requires a minimum 333 ft^2 System Sand bed area (SSBA) (see Table A). Assume a site constraint will limit the System Sand Bed Length (SSBL) to 25 ft. Using Table C, find 25 ft along the top of the chart and then move down that column until the minimum SSBA is found. Then move left to find the System Sand Bed Width (SSBW). In this example that would be 15 ft. See illustration below:



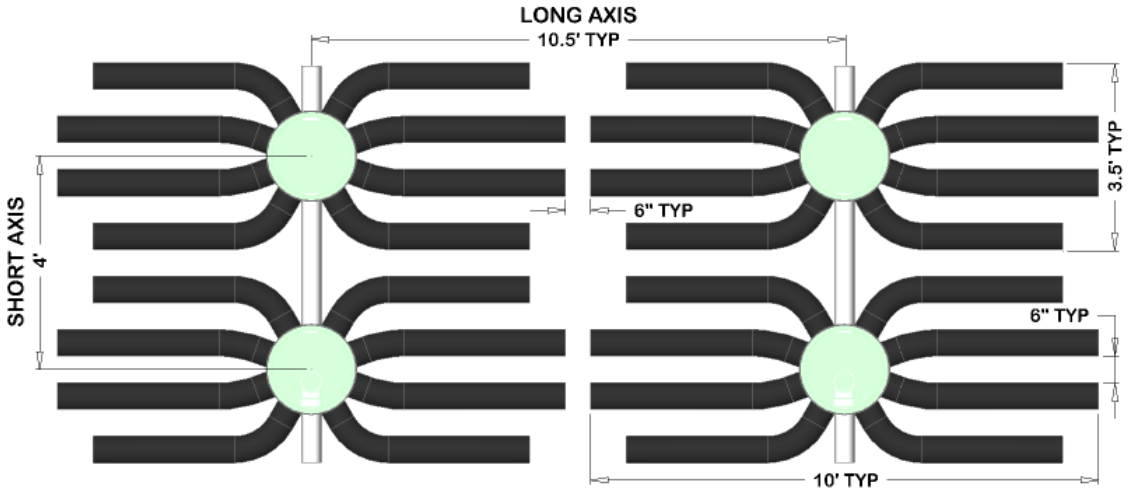
7.1 Design Procedure

Task 1: Using the number of bedrooms residential or GPD commercial, find the minimum number of EnviroFin™ units required from Table A or calculate the number of EnviroFin™ units by dividing the number of bedrooms by 1.5 for residential, or the daily design flow by 225 GPD/unit for commercial and round up to the nearest whole number.

Task 2: Continuing with Table A, find where the system's Soil Profile and number of bedrooms intersect to determine the minimum System Sand Bed Area needed for the daily design flow for residential systems. For commercial systems, find where the system's Soil Profile and the commercial column intersect to determine the SSBA per 100 GPD. Multiply this number by the daily design flow, divided by 100 to determine the minimum SSBA.

Task 3: If using multiple beds, calculate the SSBA for each bed by dividing the SSBA by the total number of EF units required for all beds, then multiply by the number of EF units in each bed. Note: If individual beds are located in different soils (Soil Profiles), it is acceptable for the minimum System Sand bed area to be calculated separately to accommodate different loading rates, resulting in different-sized dispersal areas within the system.

To find the minimum Full Depth System Sand Bed Treatment Area dimensions needed to cover all the EF units, start by arranging the EF units in the bed(s) to best fit site constraints. The recommended Treatment Fin layout will result in rows being separated by 4 ft center-to-center along the narrow axis and by 10.5 ft center-to-center along the long axis (see illustration below).

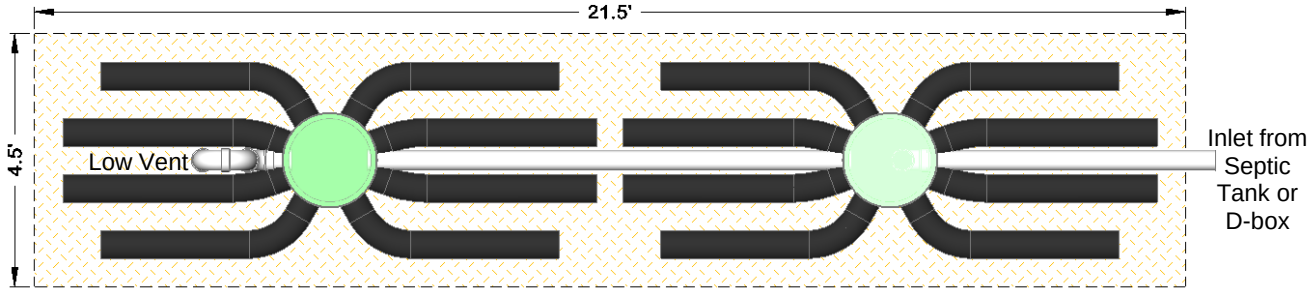


Note: Treatment Fins can interlace with the fins from adjacent EF unit(s) as long as there is a minimum of 6 inches of System Sand between them. This will result in odd dimensions for the unit's length and width. Although allowed, the standard layout is recommended for ease of design and installation.

Task 4: To find the length of the Full Depth System Sand Bed Treatment Area needed to extend beyond the EF units along their long axis multiply the number of EF units times 10.5 ft and then add 0.5 ft. Please note that the term "axis" only refers to the orientation of the EF units themselves. The EF units may be oriented with its long axis horizontally or vertically depending on site constraints.

(Full Depth System Sand Bed Treatment Area along Long Axis of EF = # of EF units x 10.5 + 0.5).

Example: The field is two EF units long, find the Full Depth System Sand Bed Treatment Area length needed to extend beyond the units along this axis–
(2 units x 10.5 ft + 0.5 ft) = 21.5 ft of System Sand needed to extend beyond the ends of the Treatment Fins with 6 inches of sand at the ends of field (see illustration below).

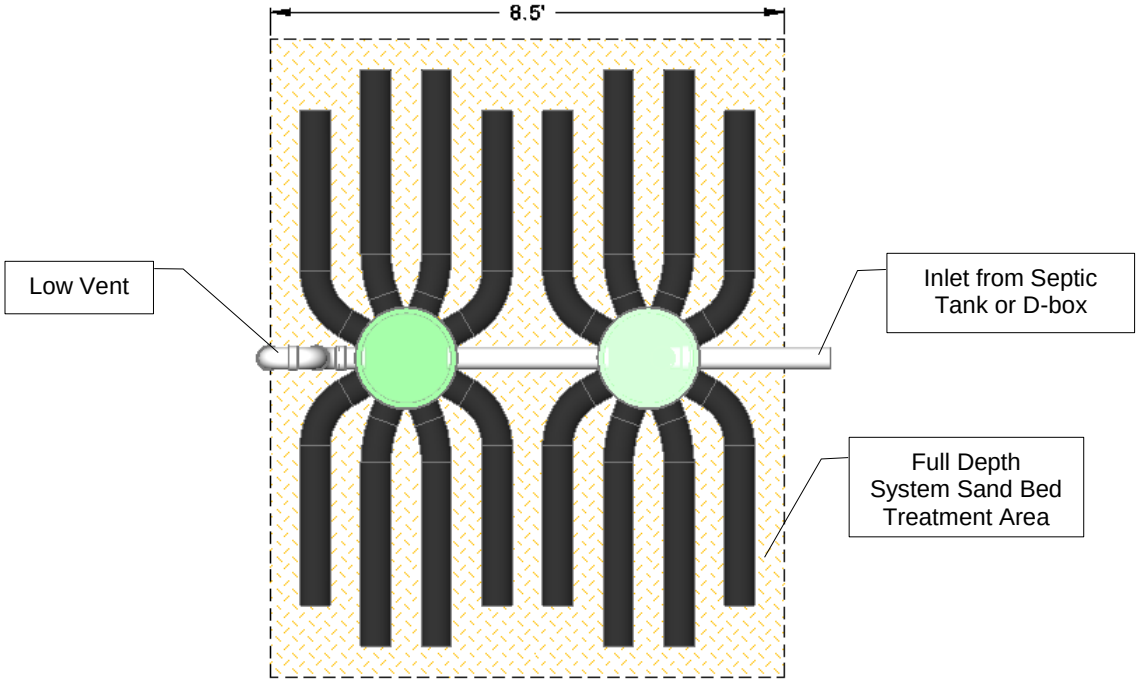


Full Depth System Sand Bed Treatment Area

Task 5: To find the length of the Full Depth System Sand Bed Treatment Area needed to extend beyond the EF units along the narrow axis: multiply the number of EF units x 4 ft and then add 0.5 ft.

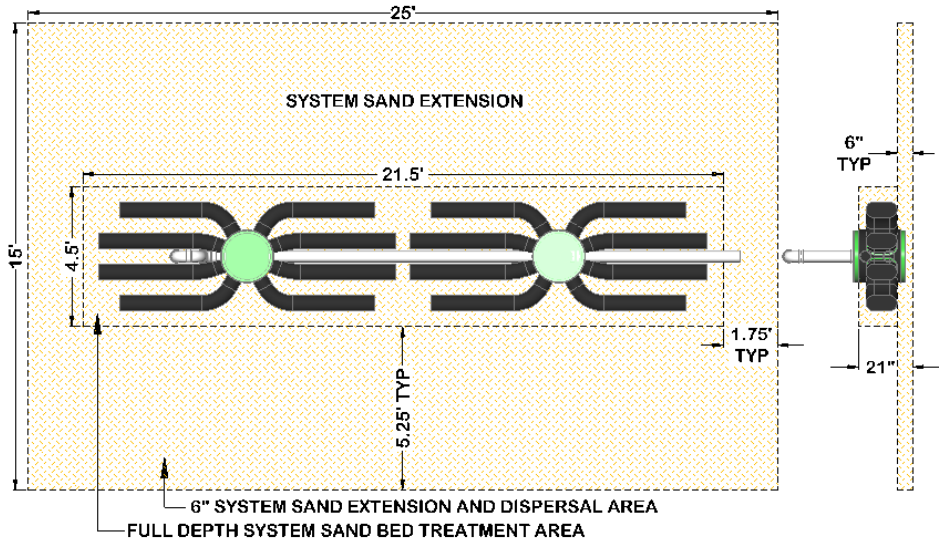
(**Full Depth System Sand Bed Treatment Area along Short Axis of EF units = # of EF Units x 4 + 0.5**)

Example: The field is two EF units long, find the Full Depth System Sand Bed Treatment Area length needed to extend beyond the units along this axis → (2 units x 4 ft + 0.5 ft) = 8.5 ft of Full Depth System Sand Bed Treatment Area needed to extend beyond the units with 6-inches of sand at the ends of field (see illustration below).



Task 6 (level beds): Choose sand bed dimensions to accommodate site constraints. Long and narrow beds are preferred. Sand bed dimensions must be at least those calculated in Tasks 4 & 5 and have the minimum sand bed area required from Task 2. Use Table C to find the sand bed area for your dimensions. The sand bed that extends beyond the dimensions calculated in Tasks 4 & 5 is called the System Sand Extension (SSE) and only needs to be 6 inches thick. The dimensions from Tasks 4 & 5 are referred to as the "treatment area." Any edge of the treatment area must be within 20 ft of the final sand bed dimensions.

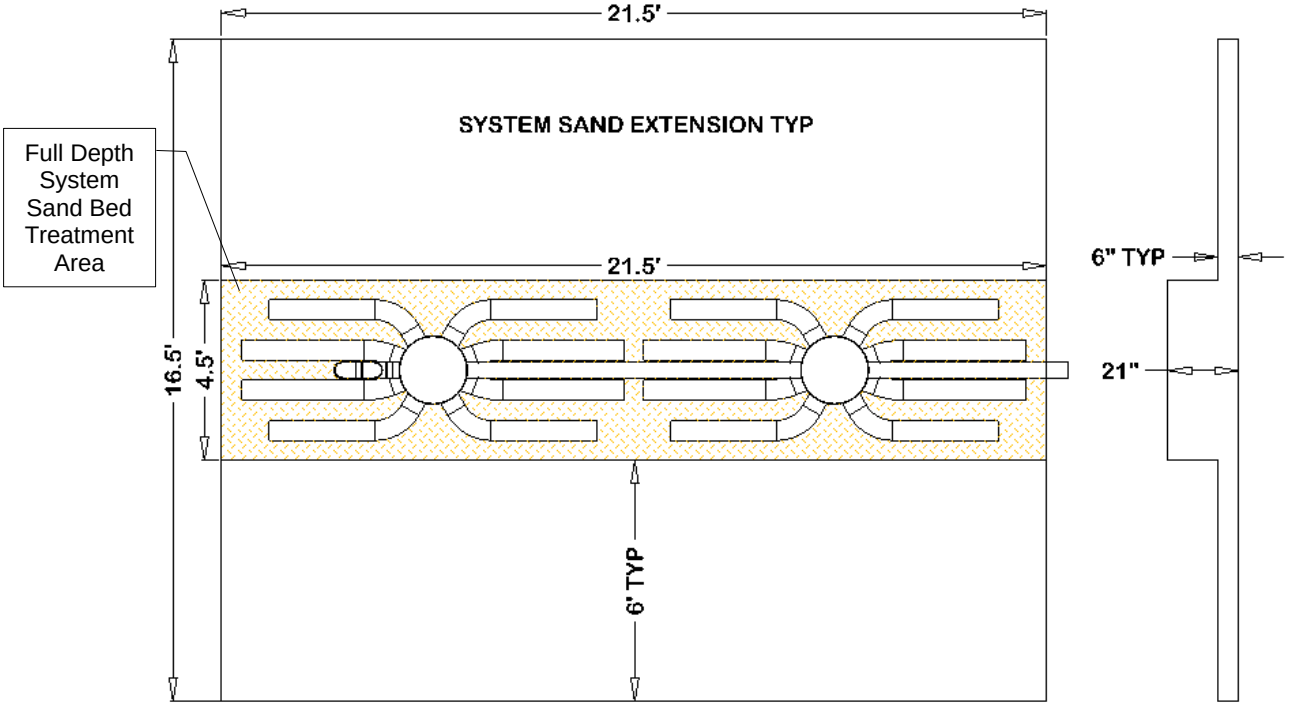
Example: Two EF units are used and placed along their long axis parallel to the terrain (as shown in Task 4). Assume the System Sand Bed Area required is 333 sq ft, and our site will accommodate a 25 ft long system. Using Table C, find 25 ft along the top of the chart and follow that column down until at least 333 sq ft of area is shown. Then move left to find a bed width of 15 ft. The resulting area is 375 sq ft. Because these dimensions are larger than the dimensions of the treatment area, there will be System Sand extensions. The treatment area edges must be placed within 20 ft of the final sand bed dimensions (see illustrations below).



Alternate acceptable configuration using Table C: Final sand bed dimensions of 20.5 ft long and 16.5 ft wide.

Table C: Rectangular Beds Quick Pick System Sand Bed Area & System Sand Extension

Length / Width (FT)	4.5	5	8.5	10	11	12.5	15	16.5	20	20.5	21.5	25
4.5	20.25	22.5	38.25	45	49.5	56.25	67.5	74.25	90	92.25	96.75	112.5
5	22.5	25	42.5	50	55	62.5	75	82.5	100	102.5	107.5	125
8.5	38.25	42.5	72.25	85	93.5	106.25	127.5	140.25	170	174.25	182.75	212.5
10	45	50	85	100	110	125	150	165	200	205	215	250
11	49.5	55	93.5	110	121	137.5	165	181.5	220	225.5	236.5	275
12.5	56.25	62.5	106.25	125	137.5	156.25	187.5	206.25	250	256.25	268.75	312.5
15	67.5	75	127.5	150	165	187.5	225	247.5	300	307.5	322.5	375
16.5	74.25	82.5	140.25	165	181.5	206.25	247.5	272.25	330	338.25	354.75	412.5
20	90	100	170	200	220	250	300	330	400	410	430	500
20.5	92.25	102.5	174.25	205	225.5	256.25	307.5	338.25	410	420.25	440.75	512.5
21.5	96.75	107.5	182.75	215	236.5	268.75	322.5	354.75	430	440.75	462.25	537.5
25	112.5	125	212.5	250	275	312.5	375	412.5	500	512.5	537.5	625



Calculation Method: 333 sq ft (Min. SSBA Table A) / 21.5 ft (length) = 15.49 ft round up to 15.50 ft (width of dispersal area). 15.50 ft – 4.5 ft = 11 ft / 2 = 5.5 ft System Sand Extension (SSE) on each side (drawing not shown).

Task 6 (sloping beds): For beds on sloping terrain, the System Sand extension is placed entirely on the down slope side of the field (see para 9.11b page 18 for illustration).

a) For site slopes less than 5%: If the Full Depth System Sand Bed Treatment Area length from task 6 is equal or larger than the minimum System Sand bed width from Task 5, then there will not be any System Sand Extensions. The Full Depth, System Sand Bed Treatment Area dimensions will meet the minimum SSBA. If the Full Depth, System Sand Bed Treatment Area width (Task 6) is smaller than the minimum SSBA width from Task 5 then a System Sand extension will be needed. To find the System Sand extension, subtract the Full Depth System Sand bed Treatment Area width (Task 6) from the minimum SSBA width (Task 5). This is the width of the System Sand extension(s) (SSE), which are a minimum of 6 inches thick.

b) For site slopes equal to or greater than 5%: To find the System Sand extension, subtract the Full Depth System Sand Bed Treatment Area width (Task 6) from the minimum SSBA width (Task 5). The minimum System Sand extension for beds on slopes of 5% or more is 2.5 ft. The System Sand extension may fan outward as much as 45 degrees on each side (see illustration in para 9.11c on page 18) if there is a down slope constraint, but can never provide less than a 2.5 ft System Sand extension.

7.2 Design Example #1: Single Family Residence, two bedrooms (180 GPD), Soil Profile #3 & single rectangular bed.

Task 1: Presby EnviroFin™ units required from Table A = 2 units

4.0 Table A: Minimum Number of EnviroFin™ Units and System Sand Bed Area Required

Soil Profile	Number of Bedrooms*						Commercial Sizing 225 GPD per EF Unit @ 100 GPD**
	2	3	4	5	6	Additional Bedroom*	
	Minimum Number of EnviroFinTM Units (1.5 BDRMS per EF Unit)*						
	2	2	3	4	4		

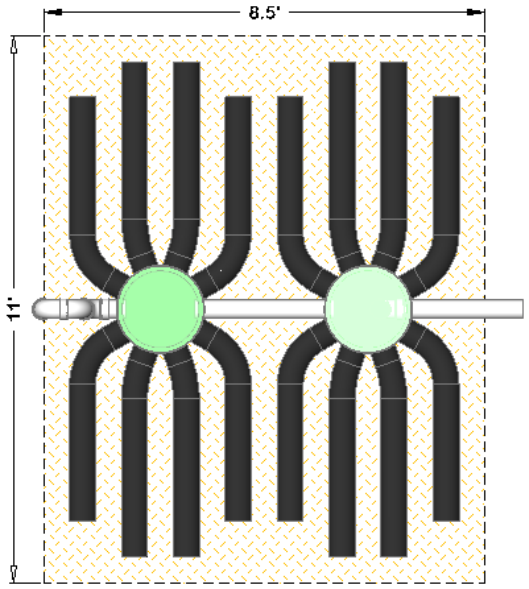
Task 2: Table A shows a minimum System Sand Bed Area of 133 sq ft required for two bedrooms and Soil Profile #3.

4.0 Table A: Minimum Number of EnviroFin™ Units and System Sand Bed Area Required

Soil Profile	Number of Bedrooms*						Commercial Sizing 225 GPD per EF Unit @ 100 GPD**
	2	3	4	5	6	Additional Bedroom*	
	Minimum Number of EnviroFinTM Units (1.5 BDRMS per EF Unit)*						
	2	2	3	4	4		
1	222	333	444	556	667	111.1	74.07
2	89	134	178	223	267	44.5	29.67
3	133	200	267	333	400	66.7	44.44
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	22.3	14.84

Task 3: N/A using a single bed configuration.

Task 4: Two EF units may be arranged in a rectangular bed placed in a single row with the long axis oriented vertically (See illustration below). The Full Depth System Sand bed Treatment Area along the horizontal axis = 2 EF units x 4 ft + 0.5 ft = 8.5 ft



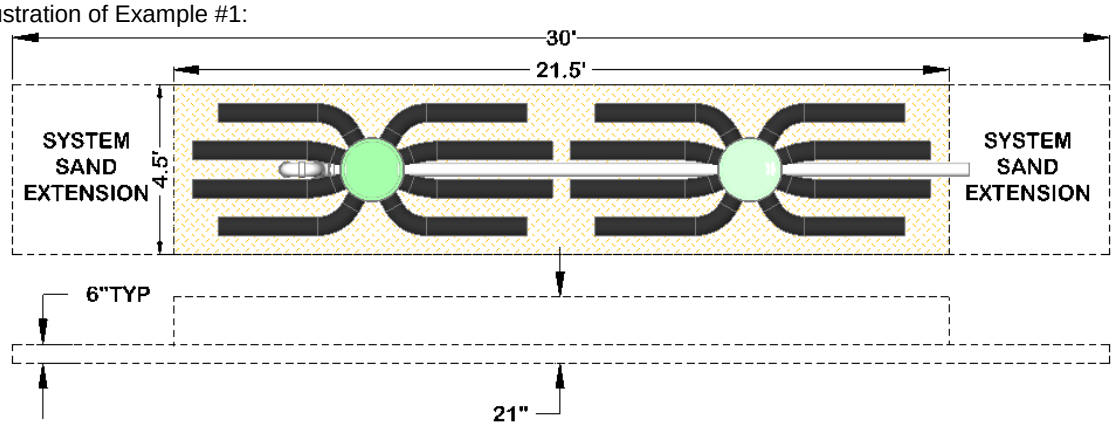
Task 5: The Full Depth System Sand Bed Treatment Area along the vertical axis = 1 EF unit x 10.5 ft + 0.5 ft = 11 ft (see illustration above)

Task 6 (level bed): The site will accommodate a sand bed length of 30 ft. Table C shows a width of 4.5 ft will provide 135 sq ft of sand bed area, which is larger than the 133 sq ft required by Task 2. These dimensions will accommodate 2 EF units with the long axis oriented horizontally (see illustration).

Table C (Continued)

	30	32	35
4.5	135	144	157.5
5	150	160	175
8.5	[illegible]	272	297

Illustration of Example #1:



Task 7 (sloping bed): N/A

7.3 Design Example #2: single family residence, 4 bedrooms, Soil Profile #8, 10% site slope
Task 1: Presby EnviroFin™ units required from Table A (4 bedrooms) = 3 units

Task 2: System Sand Bed Area from Table A is 444 sq ft.

Task 3: N/A, using single bed

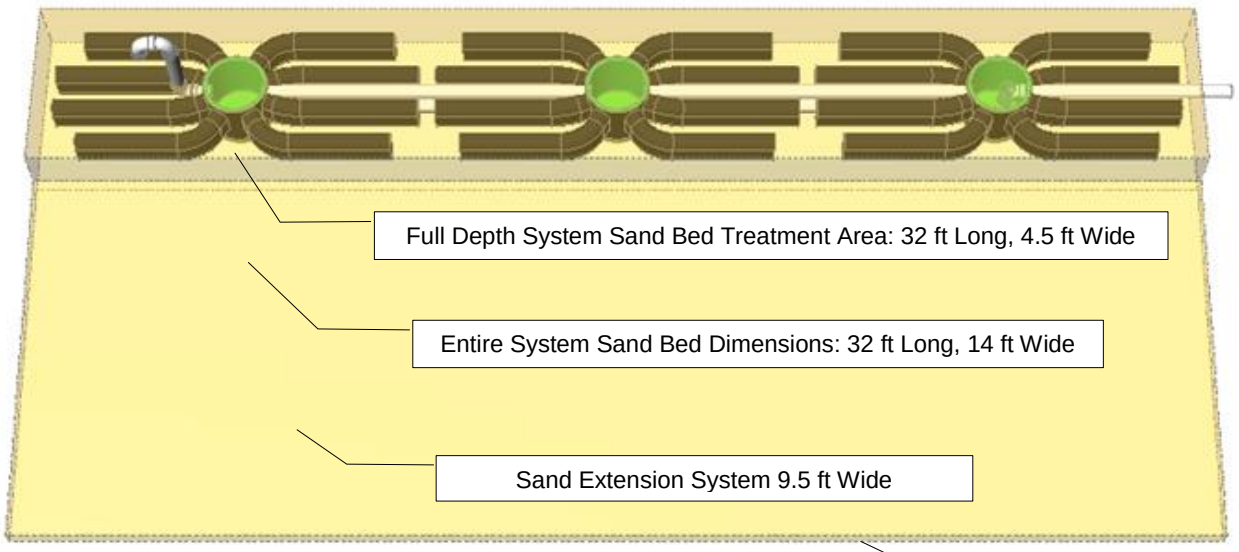
Task 4: Three EF units, arranged in a rectangular bed. Full depth System Sand Bed Treatment Area length = 32 ft

Task 5: Calculate System Sand bed width from minimum SSBA from Task 2: 444 ft^2 ÷ 32 ft = 13.88 ft,

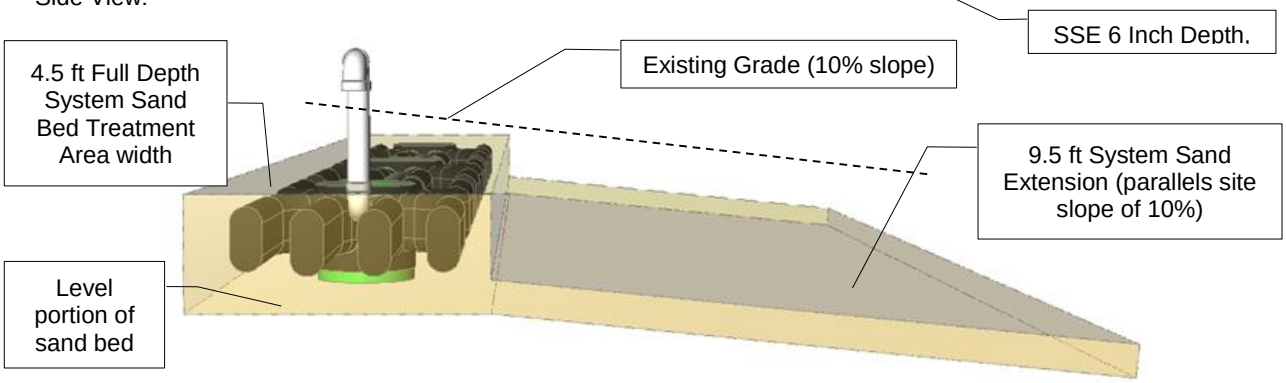
Task 6: Full depth System Sand Bed Treatment Area width = 4.5 ft

Task 7: 13.88 ft is larger than 4.5 ft. so there is a 9.38 ft minimum System Sand Extension on the downslope side of the bed (use 9.5 ft for ease of construction). System Sand bed dimensions are 32 ft long x 14 ft.

Illustrations of Example #2:



Side View:



8.0 Circular Bed Design Procedures and Example

Table D: Circular Beds, System Sand Bed Area & Diameter

System Sand Diameter (ft)	System Sand Bed Area (sq ft)	System Sand Diameter (ft)	System Sand Bed Area (sq ft)	System Sand Diameter (ft)	System Sand Bed Area (sq ft)	System Sand Diameter (ft)	System Sand Bed Area (sq ft)
9.00	64	12.50	123	16.00	202	19.50	299
9.25	68	12.75	128	16.25	208	19.75	307
9.50	71	13.00	133	16.50	214	20.00	315
9.75	75	13.25	138	16.75	221	20.25	323
10.00	79	13.50	144	17.00	227	20.50	331
10.25	83	13.75	149	17.25	234	20.75	339
10.50	87	14.00	154	17.50	241	21.00	347
10.75	91	14.25	160	17.75	248	21.25	355
11.00	96	14.50	166	18.00	255	21.50	364
11.25	100	14.75	171	18.25	262	21.75	372
11.50	104	15.00	177	18.50	269	22.00	381
11.75	109	15.25	183	18.75	277	22.25	389
12.00	114	15.50	189	19.00	284	22.50	398
12.25	118	15.75	195	19.25	292	22.75	407

8.1 Design Procedure

Task 1: Using the number of bedrooms residential or GPD commercial, find the minimum number of EnviroFin™ units required from Table A or calculate the number of EnviroFin™ units by dividing the number of bedrooms by 1.5 for residential, or the daily design flow by 225 GPD/unit for commercial and round up to the nearest whole number.

Task 2: Continuing with Table A, find where the system's Soil Profile and number of bedrooms intersect to determine the minimum System Sand Bed Area needed for the daily design flow for residential systems. For commercial systems, find where the system's Soil Profile and the commercial column intersect to determine the SSBA per 100 GPD. Multiply this number by the daily design flow, divided by 100 to determine the minimum SSBA.

Task 3: If using multiple beds, calculate the SSBA for each bed by dividing the SSBA by the total number of EF units required for all beds, then multiply by the number of EF units in each bed. Note: If individual beds are located in different soils (Soil Profiles), it is acceptable for the minimum System Sand bed area to be calculated separately to accommodate different loading rates, resulting in different-sized dispersal areas within the system.

Task 4: Arrange circular EF unit(s) to best fit site constraints. Find the diameter of the EF unit(s) without sand, from outer edge of fin on one side to outer edge of fin on the other. Add one foot for the 6 inches of System Sand around the outside of the fins. This is the Full Depth System Sand Bed Treatment Area diameter. Using curving fins provides the smallest diameter of 9 ft and using straight fins will result in a diameter of 11 ft.

Task 5: Using Table D and the System Sand bed area from Task 2 or 3 find the minimum System Sand bed diameter. This may also be calculated longhand by using the following formula: $2 * \sqrt{(\frac{SSBA}{\pi})}$

Task 6: If the diameter of the minimum SSBA is larger than the diameter of the Full Depth System Sand Bed Treatment Area, then there will be a 6-inch-deep, System Sand Extension (SSE) around the Full Depth System Sand Bed Treatment Area. Subtract the Full Depth System Sand Bed Treatment Area diameter from Task 4, from the minimum SSBA diameter from Task 5, then divide by 2. This is the distance of the SSE beyond the edge of the Full Depth System Sand Bed Treatment Area.

Task 7: If the diameter of the minimum SSBA is equal or smaller than the diameter of the Full Depth System Sand Bed Treatment Area, then there will not be a SSE. Calculate area of Full Depth System Sand Bed Treatment Area: π * (Diameter / 2)^2

Note: The System Sand bed can utilize many different shapes and configurations as long as there is a minimum of 6 inches of System Sand around the perimeter of the Treatment Fins and the appropriate minimum SSBA associated with the design flow & soils (perc rate) and the number of EF units within each bed of the system.

8.2 Design Example #3 (Circular Beds): Single Family Residence, two bedrooms (180 GPD), Soil Profile #1, level site, separated circular units due to site obstacle.

Task 1: EnviroFin™ units required from Table A – two (2)

4.0 Table A: Minimum Number of EnviroFin™ Units and System Sand Bed Area Required

Soil Profile	Number of Bedrooms*						Commercial Sizing 225 GPD per EF Unit @ 100 GPD**
	2	3	4	5	6	Additional Bedroom*	
	Minimum Number of EnviroFinTM Units (1.5 BDRMS per EF Unit)*						
	2	2	3	4	4		

Task 2: Table A shows a minimum System Sand Bed Area of 222 sq ft required for two bedrooms and Soil Profile #1.

4.0 Table A: Minimum Number of EnviroFin™ Units and System Sand Bed Area Required

Soil Profile	Number of Bedrooms*						Commercial Sizing 225 GPD per EF Unit @ 100 GPD**
	2	3	4	5	6	Additional Bedroom*	
	Minimum Number of EnviroFinTM Units (1.5 BDRMS per EF Unit)*						
	2	2	3	4	4		
1	222	333	444	556	667	111.1	74.07

Task 3: Total System Sand bed area (SSBA) from Table A requires 222 sq ft (see illustration above). SSBA per unit = 222 ft² ÷ 2 units = 111 ft² per unit (see illustration below).

Table D: Circular Beds, System Sand

System Sand Diameter (ft)	System Sand Bed Area (sq ft)	System Sand Diameter (ft)
9.00	64	12.50
9.25	68	12.75
9.50	71	13.00
9.75	75	13.25
10.00	79	13.50
10.25	83	13.75
10.50	87	14.00
10.75	91	14.25
11.00	96	14.50
11.25	100	14.75
11.50	104	15.00
11.75	109	15.25
12.00	114	15.50

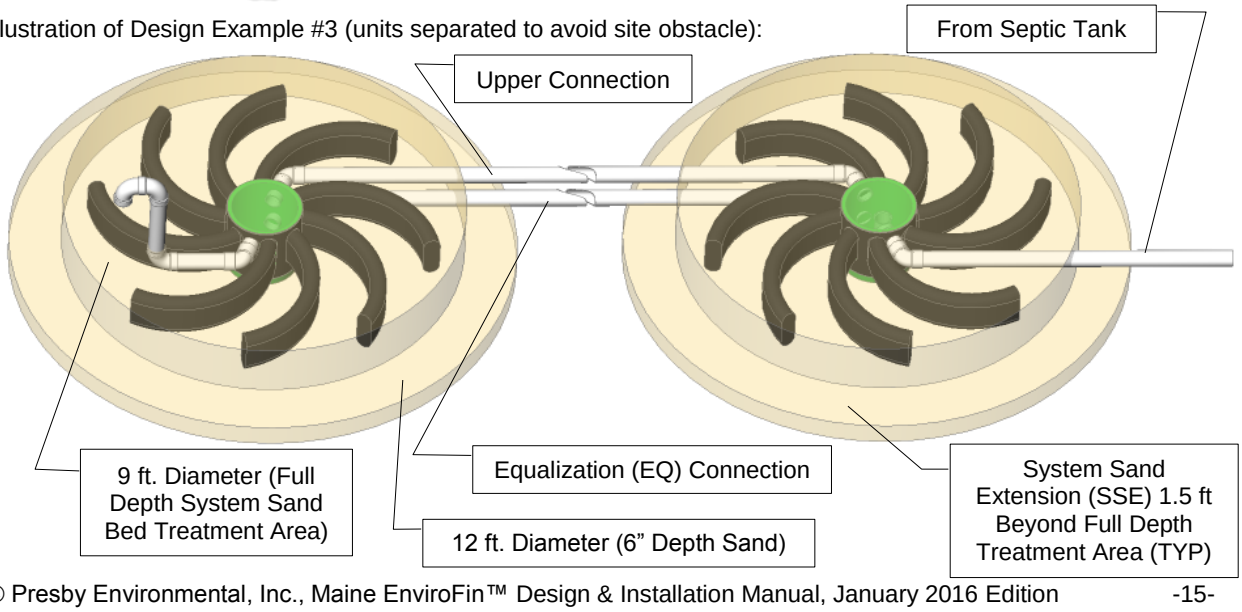
Task 4: System Sand Bed Treatment Area diameter at Full Depth – Fin outside diameter = 8 ft + 1 ft = 9 ft full depth diameter.

Task 5: Table D shows a System Sand bed diameter of 12 ft will provide the required 111 sq ft of sand bed area per unit (see illustration to right).

Task 6: System Sand Extension (SSE): (12 ft – 9 ft) ÷ 2 = 1.5 ft [18 inches] around perimeter of Full Depth System Sand Bed Treatment Area.

Task 7: N/A

Illustration of Design Example #3 (units separated to avoid site obstacle):



Side View:

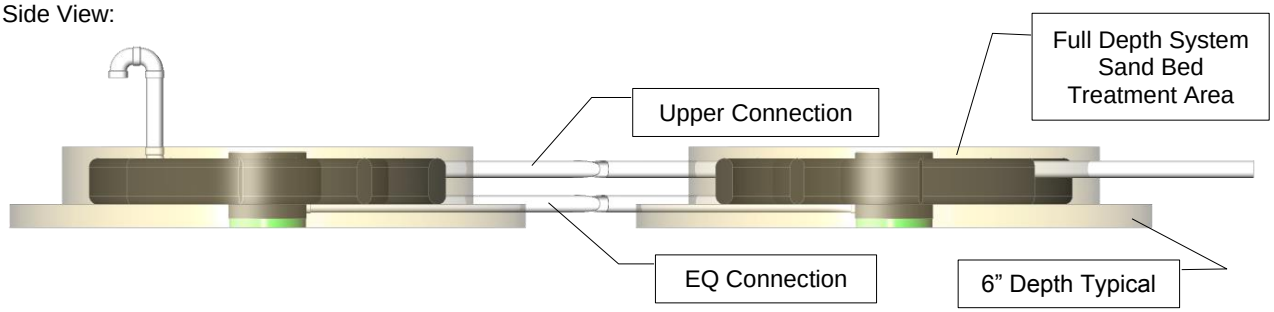
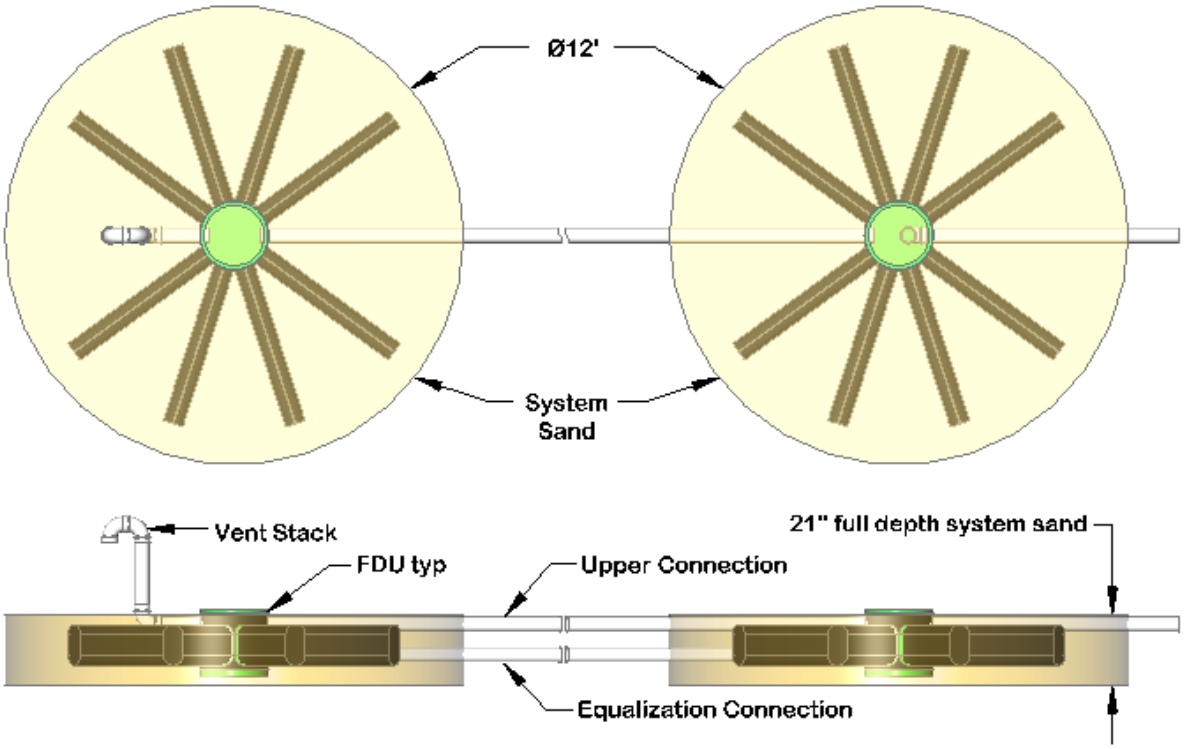


Illustration of Alternative Design for Example #3 (No System Sand Extensions):



9.0 Design Criteria

9.1 Barrier Materials over System Sand

No barrier materials (hay, straw, tarps, etc.) are to be placed between the System Sand and cover material; such materials may cut off necessary oxygen supply to the system. Fine materials from the soils above, will not migrate significantly into the System Sand, so no protection is needed.

9.2 Converging Flows Restriction

Presby Systems must not be located where surface or ground waters will converge, causing surface water flow to become concentrated. Make sure to shed water away from system.

9.3 Daily Design Flow

Residential daily design flow for Presby Systems is calculated in accordance with Maine rules.

a) Systems servicing more than two residences shall use the Commercial portions of all sizing Tables.
b) The minimum daily design flow for any single-family residential system is two bedrooms (90 GPD per bedroom) and 300 GPD for any commercial system.
c) Certain fixtures, such as jetted tubs, may require an increase in the size of the septic tank.
d) Daily design flow for a single bedroom apartment with a kitchen connected to a residence (also sometimes referred to as a "studio" or "in-law apartment") shall be calculated by adding two additional bedrooms.
e) When daily design flow is determined by water meter use for commercial systems, refer to the ME Rules.
f) Note that "daily design flows" are calculated to assume occasional "peak" usage and a factor of safety;
g) Systems are not expected to receive continuous dosing at full daily design load.

9.4 Fill Extensions for Elevated (Mound) Systems

If any portion of the bed extends above the original grade, the fill covering the field cannot begin the 3:1 side slope taper for a distance of 3 ft. minimum from the outermost edge of the treatment fin.

9.5 Filters, Alarms & Baffles

a) Effluent Filters are not required in Maine and not recommended for use with Presby Systems
b) If a filter is used it **must** be maintained on at least an annual basis. Follow manufacturer's instructions regarding required inspections, cleaning and maintenance of the effluent filter
c) Effluent Filters must allow the free passage of air to ensure the proper functioning of the system. A blocked filter in any on-site septic system could interfere with venting, causing the system to convert to an anaerobic state and result in a shortened life.
d) All septic tanks must be equipped with baffles to prevent excess solids from entering the Presby System
e) Charcoal filters in vent stacks (for odor control) are not recommended by PEI. They can block air flow and potentially shorten system life. Significant odors at ground level may indicate potential problems with the system. Contact PEI for recommendations to correct odor problems.

9.6 Flow Equalizers Required

All distribution boxes used to divide effluent flow require flow equalizers in outlets to the field (not vents). Flow equalizers are limited to a maximum of 15 GPM per equalizer. Equalized Flow Distribution in a single series, utilizing one d-box outlet, will not require a flow equalizer.

9.7 Garbage Disposals (a.k.a. Garbage Grinders)

No additional units are required when using a garbage disposal (grinder). If a garbage disposal is utilized, follow the State's requirements regarding septic tank sizing. Multiple compartment septic tanks or multiple tanks are preferred and should be pumped as needed.

9.8 Pressure Distribution

The use of pressure distribution lines in Presby Systems is **prohibited**. Pumps may be utilized when necessary only to gain elevation and to feed a distribution box which then distributes effluent by gravity to the EnviroFin™ units.

9.9 System Side Slopes (Side Slope Tapers)

Side slope tapering begins 3 ft. from the edge of the treatment fin and is to be no steeper than 3:1 without a state waiver.

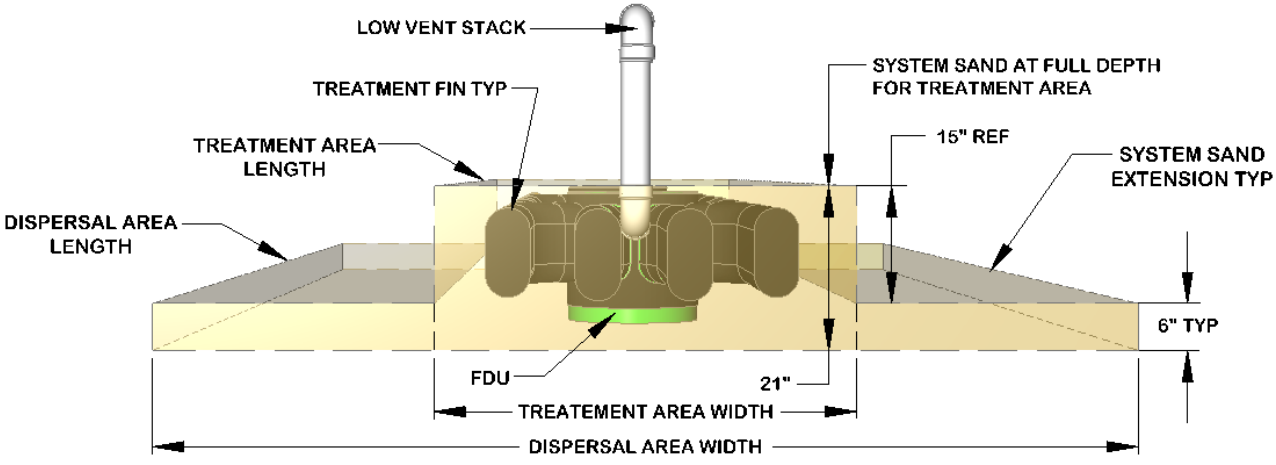
9.10 Separation Distances (Horizontal)

Separation distances to setbacks are measured from the outermost edge of the treatment fin. See also Vertical Separation Distances: Section 9.17, page19.

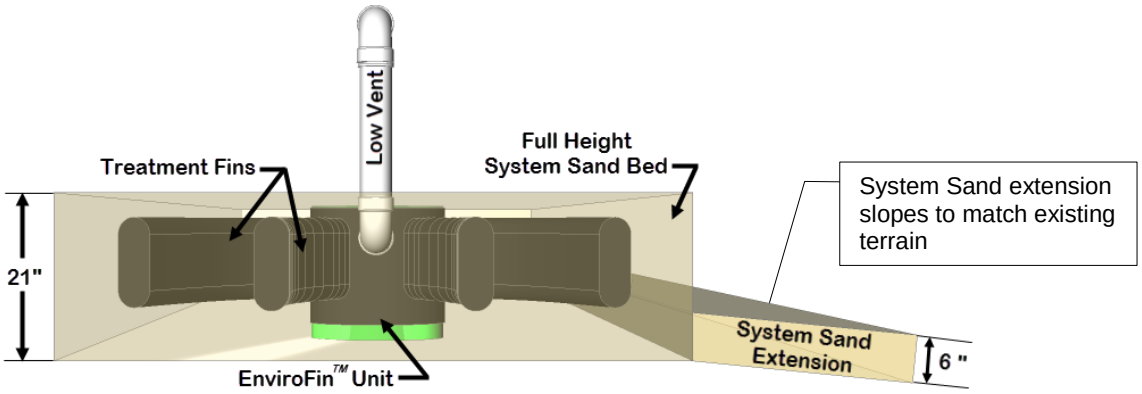
9.11 System Sand Extensions (SSE)

The EnviroFin™ units are designed to treat the wastewater in a Full Depth System Sand Bed Treatment Area and are sized based on the design flow to the system, without regard for the soils the system is placed in or upon. For the purpose of dispersal and depending on the parent material profile of the soils (soil profile), it may be necessary to increase the System Sand bed footprint of the EF system beyond what is needed to accommodate the EF units and Treatment Area within the bed. However, this extra System Sand Bed Area (SSBA), only needs to be 6 inches in depth and is called a System Sand Extension (SSE). Calculating and determining if a SSE is necessary, is shown in Section 7.1, page 9 and 8.1, page 14: Rectangular & Circular Bed Design Procedures and Examples.

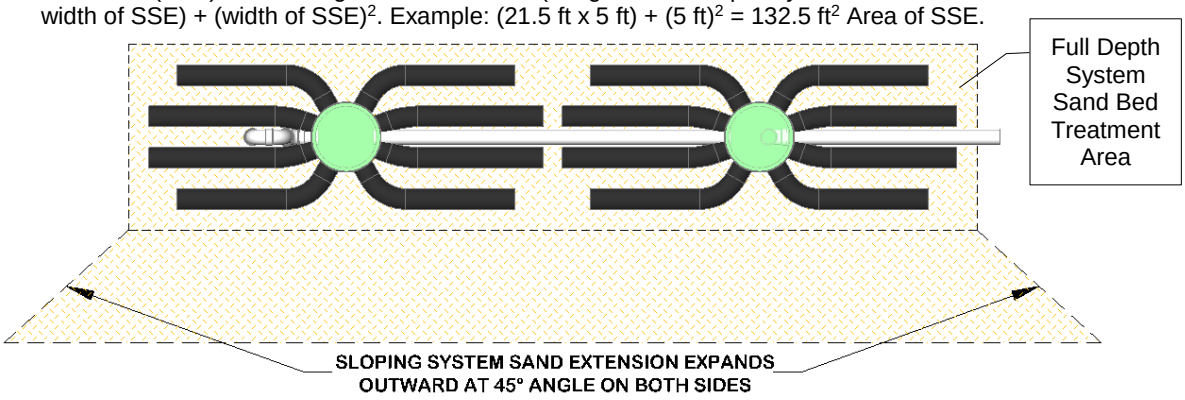
a) For level rectangular sand beds, System Sand extensions are divided to either side, end or both, as the design may require of the EnviroFin™ units as shown below.



b) For sloping sites using rectangular sand beds, the System Sand extension is placed entirely on the downslope side of the field as shown below. Please note that the "Full Depth System Sand Bed Treatment Area" portion of the field will always be constructed level; only the System Sand Extension is allowed to slope at the same angle as the existing terrain.



c) Sloping System Sand extensions may also expand outward at a 45 degree angle as it travels down the slope, which accommodates the flow path of the effluent. This also helps to minimize the total System Sand extension's width (see illustration below). The equation for calculating the area of the System Sand Extension (SSE) with 45 degree extensions is: (Length of Full Depth System Sand bed Treatment Area x width of SSE) + (width of SSE)^2. Example: (21.5 ft x 5 ft) + (5 ft)^2 = 132.5 ft^2 Area of SSE.



9.12 Sloping Sites and Sloping Mound Systems

a) The percentage of slope in all system drawings refers to the slope of the Presby System, not the existing terrain ("site slope") and refers to the slope of the System Sand bed itself ("system slope"). However, the EnviroFin™ unit itself will be designed and installed level.
b) The system slope and the site slope do not have to be the same.
c) Maximum site slope is 33% and maximum system slope is 25%.

9.13 System Sand Bed Height Dimension

The height of the EnviroFin™ System Sand Bed measures 21 in. minimum (does not include cover material):

a) 6 in. minimum of System Sand below the treatment fins (3" below FDU); and
b) 12 in. height of Treatment Fins; and
c) 3 in. minimum of System Sand above the top of the treatment Fin
d) System Sand Extensions (SSE) are a minimum 6 in. deep

9.14 Topographic Position Requirement

The system location must be located in an area that does not concentrate water, both surface and subsurface. If allowed by state and local authorities, altering the terrain upslope of a system may alleviate this requirement if the waters are sufficiently altered to redirect flows away from the field.

9.15 Wastewater Strength

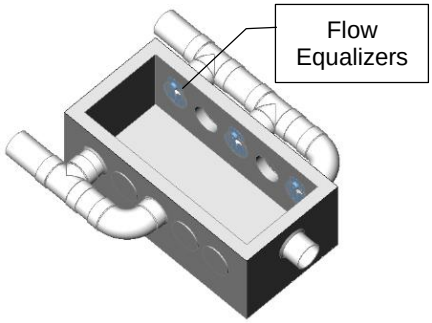
For commercial systems with high strength wastewater, see Maine Subsurface Wastewater Disposal Rules: 10-144 CMR 241, Section 4H, Table 4B. Use Adjustment Factors corresponding to the BOD_5 + TSS (wastewater strength) to determine the number of EF units needed for the system (Daily Design Flow * Adjustment Factor / 225 GPD rounded up to nearest whole number = number or EF units). Contact Presby Environmental at (800) 473-5298, for design recommendations or if you have any questions when dealing with high strength effluent.

9.16 Water Purification Systems

a) Water purification systems and water softeners should **not** discharge into any Presby System. This "backwash" does not require treatment and the additional flow may overload the system.
b) Salt and other water softener additives may be present in high concentrations in the backwash and are considered bacterial inhibitors. These additives can interfere with the normal function of the bacteria within the septic tank and may pose problems for all leachfield technologies.
c) If there is no alternative means of disposing of this backwash other than in the Presby System, then the system will need to be "oversized." Calculate the total amount of backwash in GPD, multiply by 3, and add this amount to the daily design flow when determining the field and septic tank sizing.
d) Water purification systems and water softeners require regular routine maintenance; consult and follow the manufacturer's maintenance recommendations.

9.17 Vertical Separation Distances to Restrictive Features (Single & Multi-Level™ Systems)

The vertical separation to the Seasonal High Water Table (SHWT) or impermeable layer is measured from the bottom of the Treatment Fins (not the bottom of the Fin Distribution Unit). For Multi-Level™ Systems, vertical separation is measured from the Treatment Fins of the lower units.



9.18 Distribution Box (D-Box) Manifold for Splitting Uneven Flows

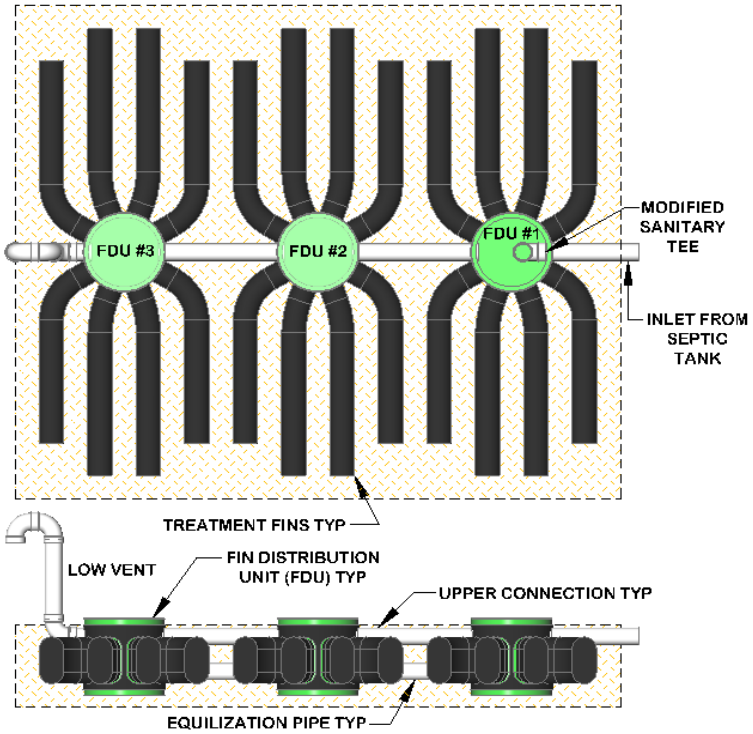
Divide flows to uneven sections or multiple beds by manifolding d-box outlets such that each outlet feeds a single EF unit. Example: Two sections, one with 2 EF Units and the other with 3 EF Units. Manifold 2 d-box outlets to one section and 3 outlets to the other section. This configuration will divide flows appropriately. Flow Equalizers are required in all d-box outlets which split effluent flows.

10.0 Equalized Flow Distribution (EQ Distribution)

The septic tank is connected to the first EnviroFin™ unit at the top connection fitted with a modified "Tee" baffle see section 3.2, page 3. Subsequent EF units are connected in a single series using upper and lower connections. Equalized Flow Distribution systems distribute evenly to each EF unit in the series simultaneously through the bottom connection. EQ Distribution system units must all be sited at the same elevation.
Other criteria:

a) Maximum number of EF units in single EQ Distribution is 5.
   i. Residential: Maximum 7 Bedrooms (1.5 bedrooms per unit)
   ii. Commercial: Maximum 1125 GPD (225 GPD per unit)
b) For gravity systems, d-boxes are not required.
c) The flow is not divided for EQ Distribution configurations, so flow equalizers are not required.
d) A low vent is connected to the upper connection of the last EF unit in the series.

Illustrations of Equalized Flow Distribution Configuration:

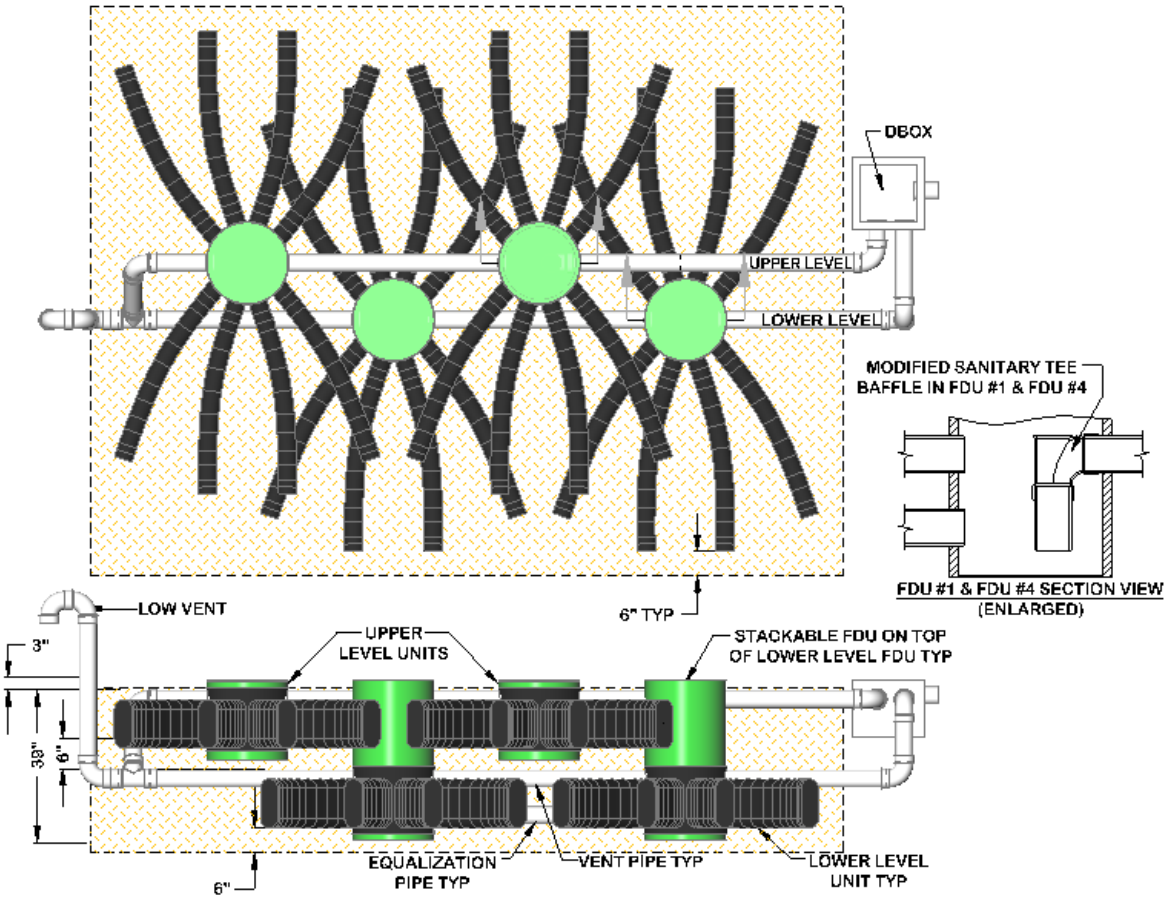


11.0 Equalized Flow Distribution Multi-Level™ (Multi-Level™ EQ Distribution)

Equalized Flow Distribution Multi-Level™ systems position EnviroFin™ units at multiple levels to allow a smaller footprint for accommodating tight sites in good soils. Multi-Level™ EQ Distribution systems must separate flows to each level using a d-box. Multi-Level™ EQ Distribution systems follow the requirements for EQ Distribution systems except:

a) Multi-Level™ EQ Distribution systems are limited to Soil Profiles: 2, 3, 4, 5, 6 & 7.
b) Full Depth System Sand Bed Treatment Area; no System Sand Extensions.
c) Mound fill extensions are measured from the upper level EnviroFin units
d) A minimum of 6 in. of System Sand separates the bottom of the fin in the upper Level EF Unit from the top of the fin in the lower Level EF Unit.
e) A vent manifold may connect both levels to a low vent.

Illustrations of Equalized Flow Distribution Multi-Level™ System Configuration:

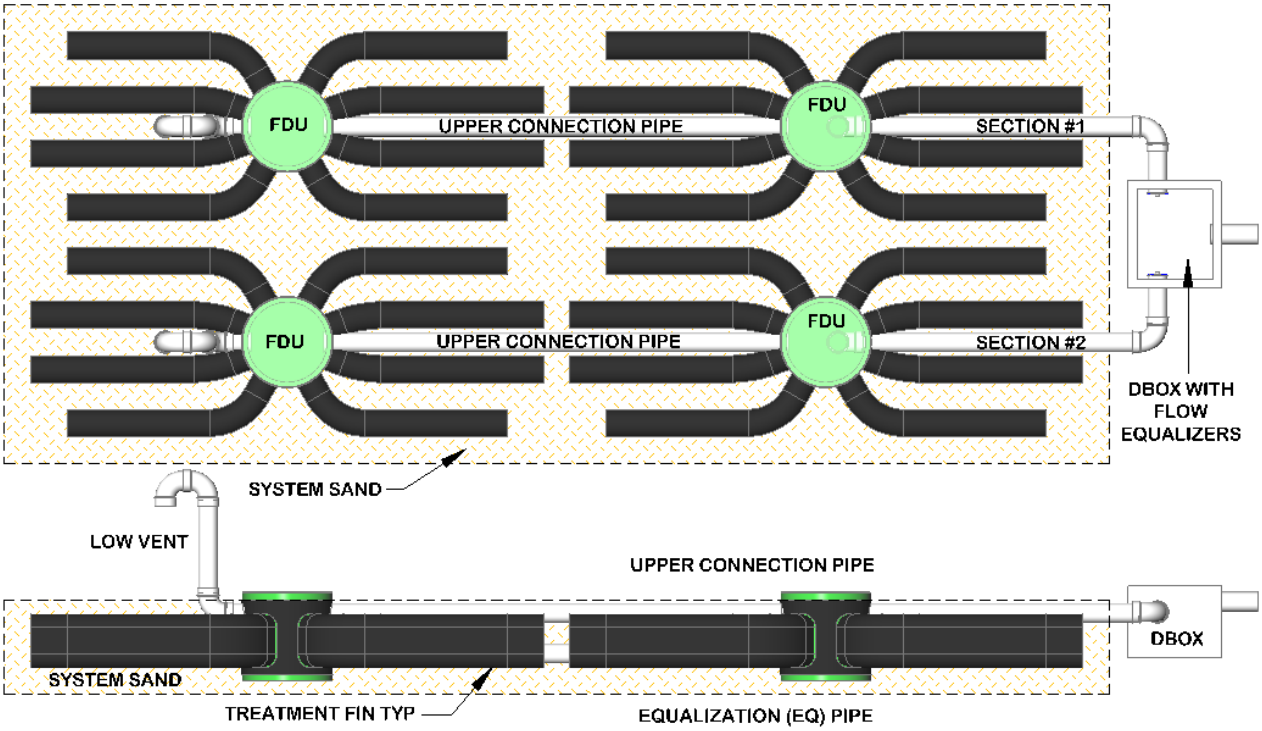


12.0 Equalized Flow, Combination Distribution (EQ Combination)

Equalized Flow, Combination distribution within one bed, or multiple beds, is required for systems with more than 5 EnviroFin units. Equalized Flow, Combination Distribution systems distribute effluent evenly to each EF unit in each section simultaneously through the bottom connection. EQ Combination systems may be designed and installed on a slope by dividing flows with a d-box to each elevation (and section). EQ Combination distribution consists of two or more sections installed within a single or multiple beds.

a) Each EQ Distribution section in an EQ Combination system consists of a series of EF units.
b) Maximum number of EF units in each EQ Distribution Section is 5.
   i. Residential: Maximum 7 Bedrooms (1.5 bedrooms per unit)
   ii. Commercial: Maximum 1125 GPD (225 GPD per unit)
c) EQ Combination sections may contain different amounts of EF units if flow are divided properly.
d) Divide flows to uneven sections by manifolding d-box outlets such that each outlet feeds the same number of EF units.
   Example: Two sections, one with 2 EF Units and the other with 3 EF Units. Manifold 2 d-box outlets to one section and 3 outlets to the other section.
e) There is no limit on the number of EQ Combination Distribution Sections within a bed.

Illustrations of Single Level EQ Combination Distribution Systems:

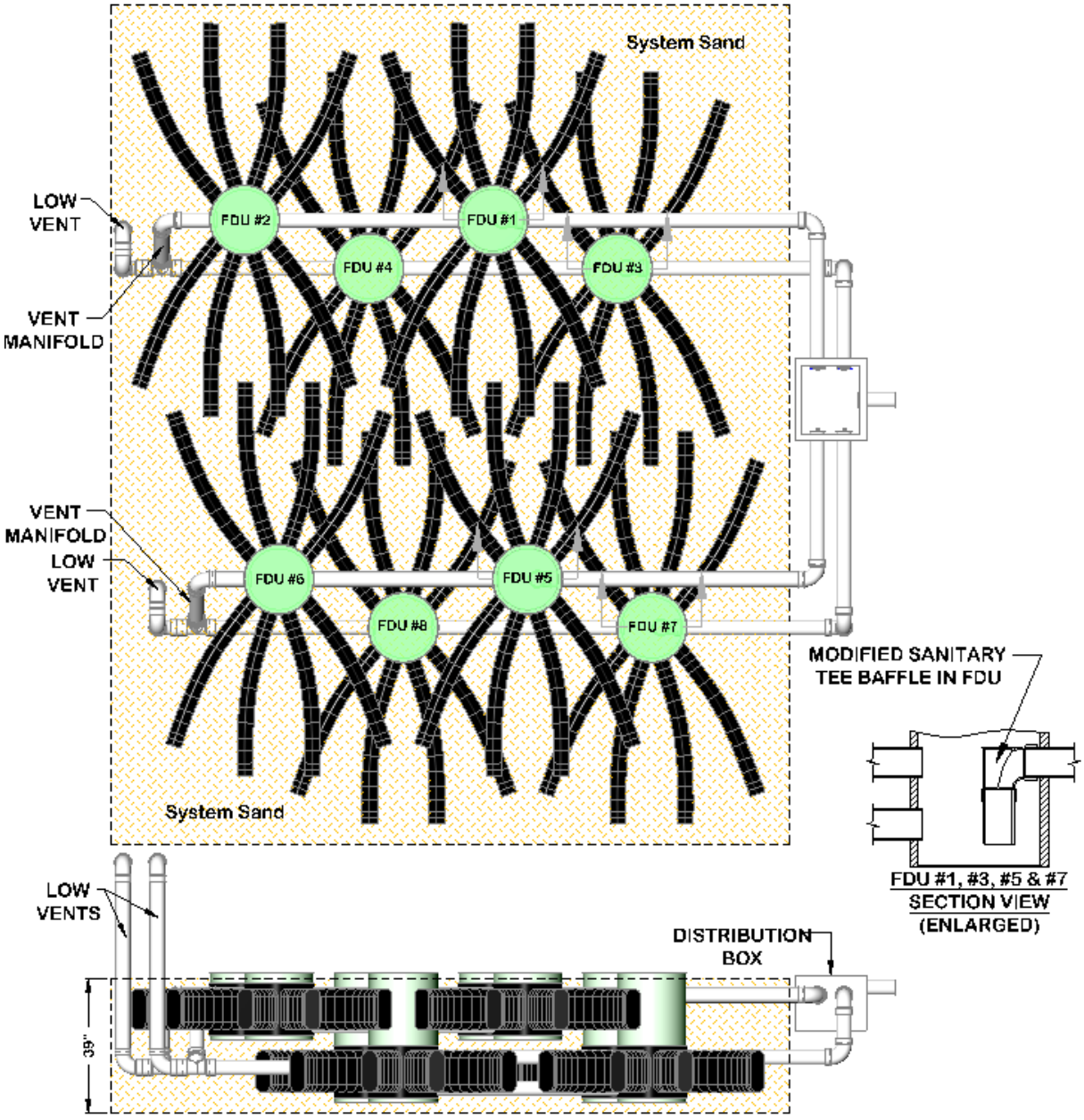


13.0 Equalized Flow, Combination Distribution Multi-Level™ (Multi-Level™ EQ Combination)

Equalized Flow, Combination Distribution Multi-Level™ systems position EnviroFin™ units at multiple levels to allow a smaller footprint for accommodating tight sites in good soils. Multi-Level™ EQ Combination systems follow the requirements for Single Level EQ Combination systems except:

a) Multi-Level™ EQ Combination systems are limited to Soil Profiles: 2, 3, 4, 5, 6 & 7.
b) Full Depth System Sand Bed Treatment area; no System Sand Extensions.
c) Mound fill extensions are measured from the upper level EnviroFin units
d) A minimum of 6 in. of System Sand separates the bottom of the Upper Level EF Unit fins from the top of the Lower Level EF Unit fins.
e) Effluent is delivered to each level separately using a d-box.
f) A vent manifold may connect both levels to a low vent.

Illustrations of Multi-Level™ EQ Combination Distribution Systems:



14.0 Individual D-Box Distribution

Individual D-Box Distribution is a configuration where every EnviroFin™ unit is fed individually from a D-Box outlet. Flow equalizers must be used in the D-Box outlets feeding the EF units.

a) Each EF unit requires a modified inlet "TEE" Baffle.
b) EF units may be contained in a single or multiple beds.
c) EF units may be arranged at a single elevation, different elevations, or on a slope.
d) The D-Box outlet invert will be at or above the elevation of the highest EF unit's inlet invert.

15.0 Multiple Bed Distribution

Multiple Bed distribution incorporates two or more beds (single level or Multi-Level™), each bed with EQ Flow, EQ Combination, or Individual D-Box Distribution. Multiple beds may consist of different size beds, as long as the D-Box outlet ratio matches the ratio of EnviroFin™ units within the beds. For instance: 3 beds with 3 EF units in the first bed, 2 EF units in the second bed and one unit in the third bed would be fed from a D-box by 3 manifolded outlets, 2 manifolded outlets and a single D-box outlet, respectively. Multiple beds may be oriented along the contour of the site, along the slope of the site or at different elevations.

a) In Multiple Bed Distribution, a single bed may consist of as little as a single EF unit.
b) Multi-Level™ systems may be used in Multiple Bed configurations.
c) The D-Box outlet invert will be at or above the elevation of the highest EF unit's inlet invert.
d) Test pit/perc tests should indicate the soils in each bed location, allowing the ability to size each location according to soil type.

Illustration of End-to-End Multiple Beds:

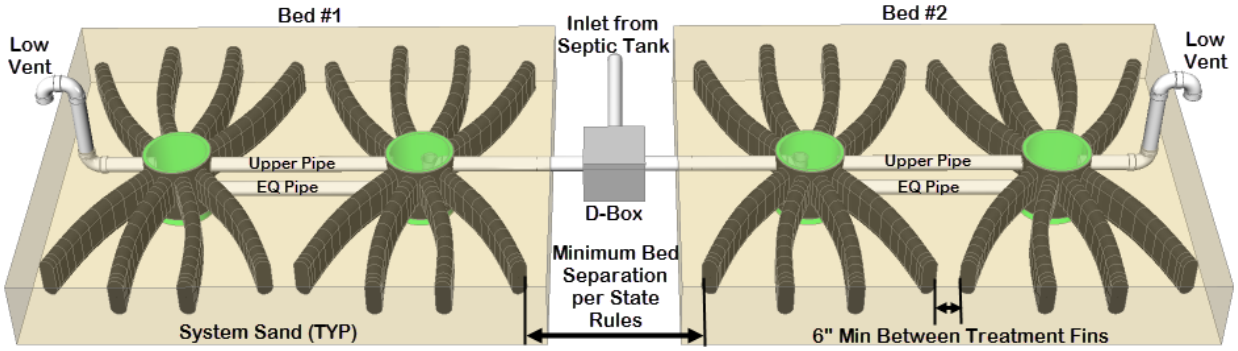
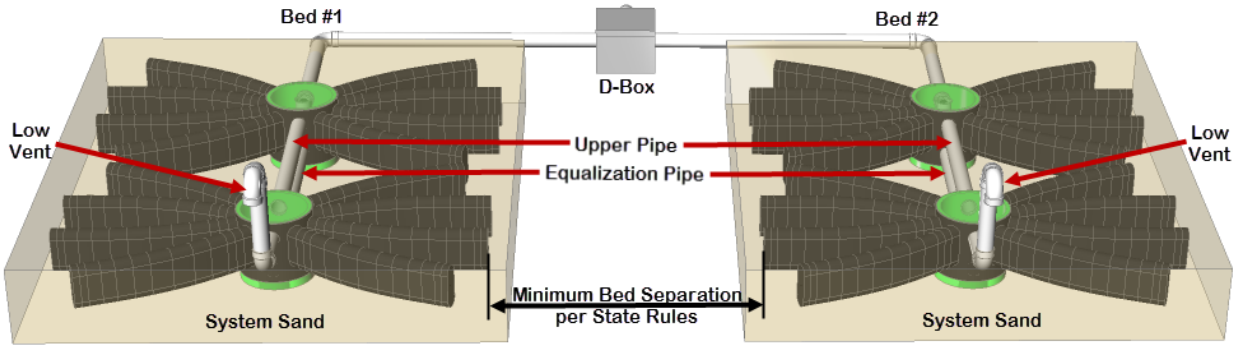


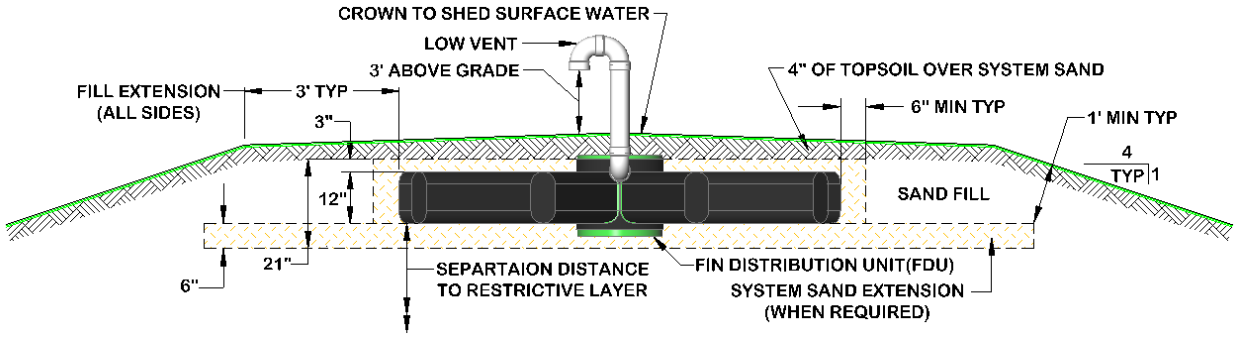
Illustration of Side-to-Side Multiple Beds



16.0 Elevated Bed Systems (Mounds)

Elevated Presby Beds are designed for sites with soil, depth to groundwater or restrictive feature constraints that do not allow for In-Ground Bed Systems. An elevated bed system is a soil absorption field with any part of the Presby System above original grade. Elevated bed systems require 3 ft. fill extensions on each side (measured from the outermost portion of the unit), after which side-slope tapering is to be a maximum of 3 horizontal feet for each 1 foot of vertical drop until it meets existing grade.

Illustration of an elevated level bed:



17.0 Pumped System Requirements

Pumped systems supply effluent to the Presby Field using a pump and distribution box when site conditions do not allow for a gravity system.

17.1 Alarm

Maine requires all pump systems to have a high water alarm float or sensor installed inside the pump chamber.

17.2 Differential Venting

All pump systems must use differential venting (see illustration, sect. 19.2 page 25).

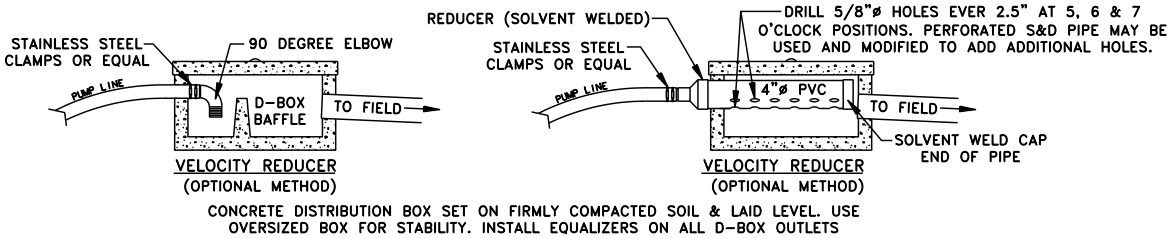
17.3 Distribution Box

All pump systems require a distribution box with some means of velocity reduction for the effluent entering the D-Box.

17.4 Velocity Reduction

The rate at which effluent enters the EnviroFin™ FDU must be controlled. Excessive effluent velocity can disrupt solids that settle in the FDU.

a) Effluent must never be pumped directly into the EnviroFin™ unit.
b) A distribution box or tank must be installed between the pumping chamber and the unit to reduce effluent velocity.
c) Force mains must discharge into a distribution box (or equivalent) with velocity reducer and a baffle, 90° bend, tee or equivalent (see illustrations below).



17.5 Dose Volume

a) Pump volume per dose must be no greater than 40 gallons times the total number of EF units.
b) Pump dosing should be designed for a minimum of 6 to 8 cycles per daily design flow.
c) If possible, the dosing cycle should provide one hour of drying time between doses.

17.6 Equalized Flow Distribution Limit

Pumped systems with Equalized Flow Distribution are limited to a maximum dose rate of 40 gallons per minute and do not require the use of flow equalizers in the D-Box outlet. Never pump directly into the EnviroFin™ FDU.

17.7 EQ Combination and Multiple-Bed Distribution Limit

All Presby Systems with Combination Distribution or Multiple Bed distribution must use Flow Equalizers in each distribution box outlet. Each Bed or EQ Distribution section or EQ Combination system is limited to a maximum of 15 gallons per minute, due to the flow constraints of the equalizer. Example: pumping to a combination system with 3 sections (using three D-Box outlets). The maximum delivery rate is (3 x 15) = 45 GPM. Always provide a means of velocity reduction.

18.0 System Sand and Sand Fill Requirements for All Beds

It is critical to the proper functioning of Presby Systems that the proper amount and type of System Sand be installed.

18.1 Presby System Sand

System Sand must be clean, granular sand, free of organic matter and must adhere to the following percentage and quality restrictions:

Presby System Sand Specification

Sieve Size	Percent Retained on Sieve (by weight)
3/4 in. (19 mm)	0
#10 (2 mm)	0 - 35
#35 (0.50 mm)	40 - 90
Note: not more than 3% allowed to pass the #200 sieve (verified by washing sample per requirements of ASTM C-117)	

18.2 System Sand Acceptable Alternative

ASTM C-33 (concrete sand), natural or manufactured sand, with not more than 3% passing the #200 sieve (verified by washing the sample per the requirements of ASTM C-117 as noted in the ASTM C-33 specification) may be used as an acceptable alternate material for use as System Sand.

18.3 Quantity of System Sand

System Sand is placed a minimum of 6 in. below, 6 in. beside & between and 3 in. above the EF treatment fins. A minimum of 6 in. of System Sand must extend horizontally around the perimeter of each EF unit, measured from the outermost edge of the treatment fin.

18.4 Sand Fill

Sand fill meeting the requirements of CMR 241 Table 11A is used to raise the elevation of the system in order to meet the required separation distance from the SHWT or other restrictive feature and in the fill extensions. No organic material or stones larger than 6 inches are allowed. System Sand may be used in place of sand fill; however, this may increase material costs.

19.0 Venting Requirements:

All EnviroFin™ systems must be vented.

19.1 General Rules

a) Vent openings must be located to ensure the unobstructed flow of air through the entire Presby System.
b) The low vent inlet must be a minimum of 3 ft. above final grade or anticipated snow level.
c) Multiple units requiring more than one low vent may be manifolded together as is practicable in order to reduce the number of low vents.
d) If a vent manifold is used it must be at least the same diameter as the vents.
e) One 4” vent is required for up to and including 20 EnviroFin™ units.
f) Multiple 4” vents or a 6” vent is required for more than 20 EnviroFin™ units.
g) A single 6” vent may be installed in place of up to three 4 in. vents.
h) Remote venting (sect.19.6, page26) or By-Pass venting (sect. 19.7, page 27) may be utilized to minimize the visibility of vent stacks.

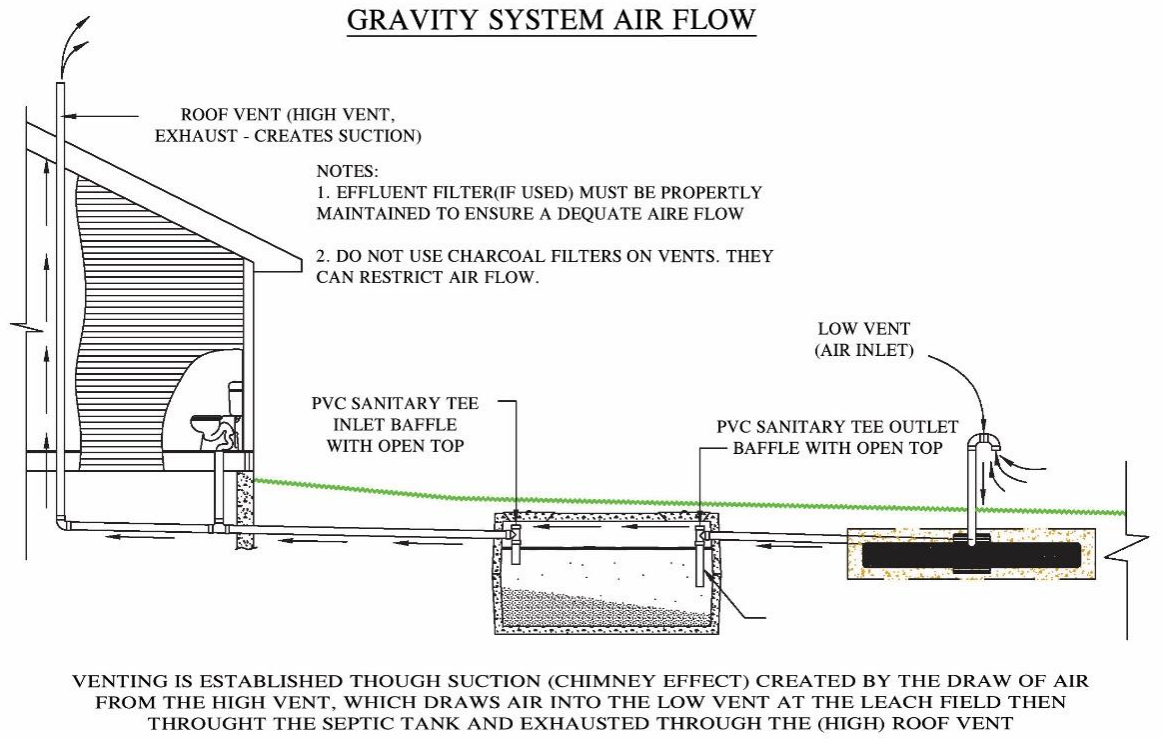
19.2 Differential Venting

a) Differential venting is the use of high and low vents in a system.
b) In a gravity system, the roof stack operates as the high vent.
c) High and low vent openings must be separated by a minimum of 10 vertical feet.
d) If possible, the high and low vents should be of the same capacity.
e) Sch. 40 PVC or equivalent should be used for all vent stacks.
f) Anchor the High vent to a post or other stable object.

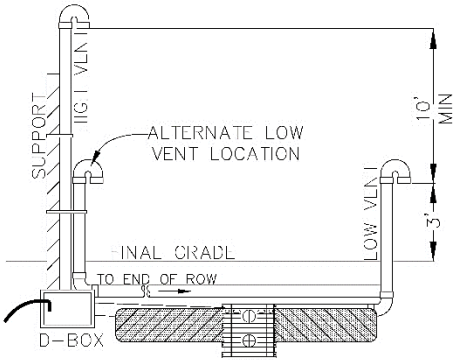
19.3 Vent Locations for Gravity Systems

a) A low vent is installed at the end of the last unit of each series (EQ section) utilizing the upper connection of the end unit.
b) The house (roof) vent functions as the high vent as long as there are no restrictions or other vents between the low vent and the house (roof) vent
c) When the house (roof) vent functions as the high vent, there must be a minimum of a 10 ft. vertical differential between the low and high (roof) vent openings

19.4 Pump System Vent Locations



a) A low vent is installed at the end of the last unit of each EQ section either through the top cover or end unit
b) A high vent is installed through an unused distribution box outlet.
c) A 10 ft. minimum vertical differential is required between high and low vent openings.
d) When venting multiple beds, it is preferred that each bed be vented separately (have their own high and low vents) rather than manifolding bed vents together.
e) The low vent may be attached to the D-box and the high vent attached to the end of the last EF unit (or manifold) only when the D-box is insulated against freezing.



19.5 Vent Piping Slope

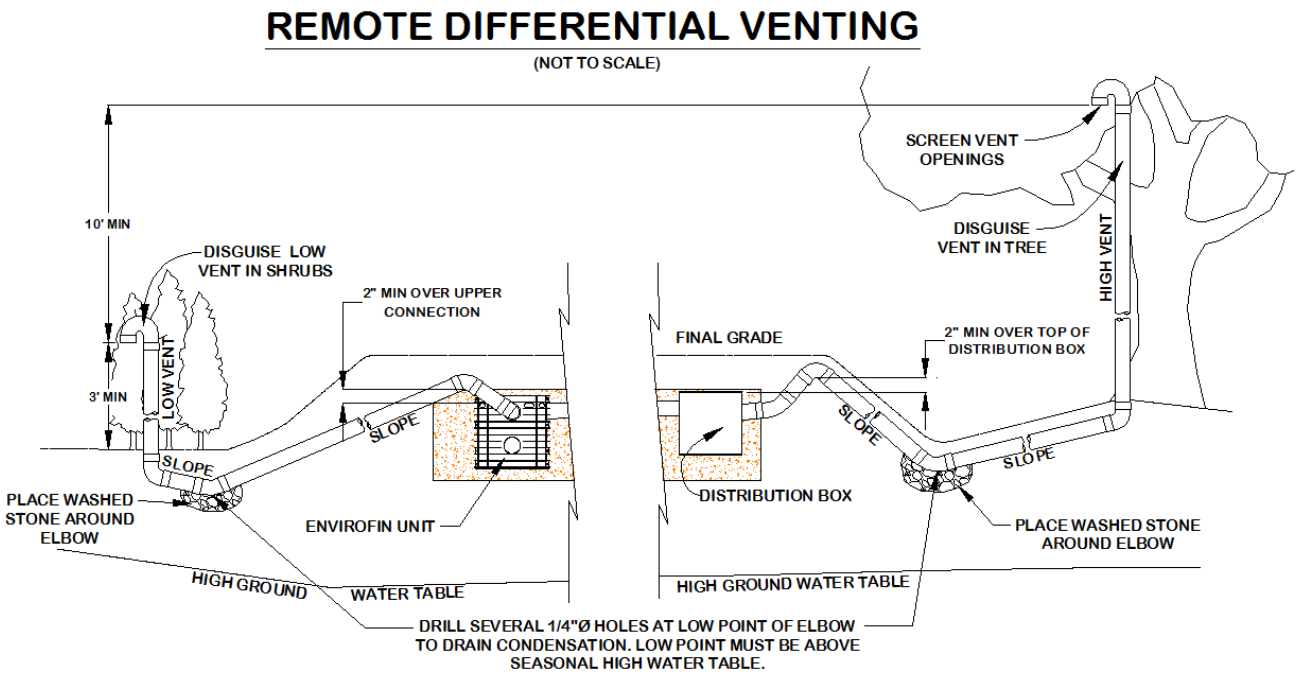
Vent piping should slope downward toward the system to prevent moisture from collecting in the pipe and blocking the passage of air.

19.6 Remote Venting

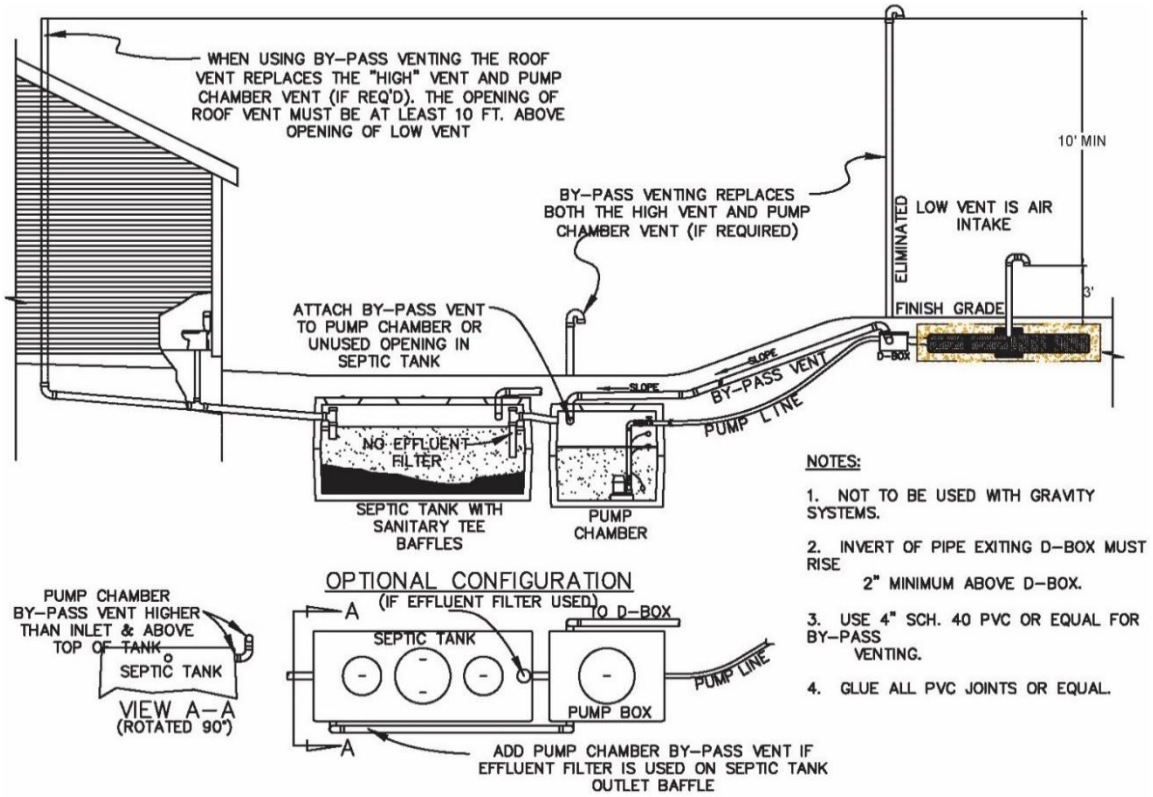
If site conditions do not allow the vent pipe to slope toward the system, or the owner chooses to utilize remote venting for aesthetic reasons (causing the vent pipe not to slope toward the system), the low point of the vent line must be drilled creating several ¼ in. holes to allow drainage of condensation. This procedure may only be used if the vent pipe connecting to the system has:

a) A **high point** that is above the highest point of all EnviroFin™ units or the Distribution Box; and,
b) A **low point** opened for drainage which is above the SHWT. (See diagram on next page.)

Illustration of Remote Venting:



19.7 By-Pass Venting



20.0 Site Selection

20.1 Determining Site Suitability

Refer to Maine Rules regarding site suitability requirements.

20.2 Topography

Locate systems on convex, hill, slope or level locations that do not concentrate surface flows. Avoid swales, low areas, or toe-of-slope areas that may not provide sufficient drainage away from the system.

20.3 Surface Water Diversions
Surface water runoff must be diverted away from the system. Diversions must be provided up-slope of the system and designed to avoid ponding. Systems must not be located in areas where surface or groundwater flows are concentrated.

20.4 Containment
Systems should not be located where structures such as curbs, walls or foundations might adversely restrict the soil's ability to transport water away from the system.

20.5 Hydraulic loading
Systems should not be located where lawn irrigation, roof drains, or natural flows increase water loading to the soils around the system.

20.6 Access
Systems should be located to allow access for septic tank maintenance and to the top of all the units. Planning for future access will facilitate Rejuvenation in the unlikely event the system malfunctions.

20.7 Replacement Area
In the event of system malfunction, contact PEI for technical assistance prior to attempting Rejuvenation procedures. In the unlikely event that a Presby System needs to be replaced; out-of-spec System Sand, sited at wrong elevation, etc.:

a) It can be reinstalled in the same location, eliminating the need for a replacement field reserve area.
b) All unsuitable material must be removed prior to replacement system construction.
c) Disposal of hazardous materials to be in accordance with state and local requirements.
d) Permits may be required for system replacement; contact the appropriate local and/or state authority.

21.0 Installation Requirements, Component Handling and Site Preparation

21.1 Component Handling
a) Keep mud, grease, oil, etc. away from all components.
b) Avoid dragging Treatment Fins through wet or muddy areas.
c) Store units on high and dry areas to prevent surface water and soil from entering the fins or contaminating the fabric prior to installation.
d) The outer fabric of the EF is ultra-violet stabilized; however, this protection breaks down after a period of time in direct sunlight. To prevent damage to the fabric, allow system to remain in cardboard packaging until ready to install or cover the EF units with an opaque tarp if stored outdoors.

21.2 Critical Reminder to Prevent Soil Compaction
It is critical to keep excavators, backhoes, and other equipment off the excavated or tilled surface of a bed. Before installing the System Sand, excavation equipment should be operated around the bed perimeter; not on the bed itself.

21.3 Site Preparation Prior to Excavation
a) Locate and stake out the System Sand bed, extension areas and soil material cover extensions on the site according to the approved plan.
b) Install sediment/erosion control barriers prior to beginning excavation to protect the system from surface water flows during construction.
c) Do not travel across or locate excavation equipment within the portion of the site receiving System Sand.
d) Do not stockpile materials or equipment within the portion of the site receiving System Sand.
e) It is especially important to avoid using construction equipment down slope of the system to prevent soil compaction.

21.4 When to Excavate
a) Do not work wet or frozen soils. If a fragment of soil from about 9 in. below the surface can easily be rolled into a wire, the soil moisture content is too high for construction.
b) Do not excavate the system area immediately after, during or before precipitation.
Note: If situation arises where wet or frozen soils are questionable, please contact Presby Environmental for technical assistance at (800) 473-5298.

21.5 Tree Stumps
Remove all tree stumps and the central root system below grade by using a backhoe or excavator with a mechanical "thumb" or similar extrication equipment, lifting or leveraging stump in a manner that minimizes soil disturbance.

a) Do not locate equipment within the limits of the System Sand bed.
b) Avoid soil disturbance, relocation, or compaction.
c) Avoid mechanical leveling or tamping of dislodged soil.
d) Fill all voids created by stump or root removal with System Sand or Sand fill.

21.6 Organic Material Removal

Before tilling/scarifying, remove all grass, leaves, sticks, brush and other organic matter or debris including all topsoil from any area to receive System Sand or sand fill. It is not necessary for the soil of the system site to be smooth when the site is prepared.

21.7 Raking and Tilling Procedures

All areas receiving System Sand, sand fill and fill extensions **must** be raked or tilled. If a backhoe/excavator is used to till the site, fit it with chisel teeth and till the site. The backhoe/excavator must remain outside of the proposed System Sand area and extensions.

a) For in-ground bed systems, excavate the system bed as necessary below original grade. Using an excavator or backhoe, tilt the bucket teeth perpendicular to the bed and use the teeth to rake furrows 2 in.- 6 in. deep into the bottom of the entire area receiving System Sand or sand fill ("receiving area").
b) For elevated bed systems remove the "A" horizon (see 21.6, Organic Material Removal), then use an excavator or backhoe to rake furrows 2 in. – 6 in. deep into the receiving area.

21.8 Install System Sand and/or Sand Fill Immediately After Excavation

a) To protect the tilled area (System Sand bed area and System Sand extension area) from damage by precipitation, System Sand should be installed immediately after tilling.
b) Work off either end or the uphill side of the system to avoid compacting soil.
c) Keep at least 6 in. of sand between the vehicle tracks and the tilled soil of the site if equipment must work on receiving soil.
d) Track construction equipment should not travel over the installed EF units and Treatment Fins. Mark location(s) of individual units and work around them.
e) Heavy equipment with tires must never enter the receiving area due to likely wheel compaction of underlying soil structures.
f) Using the properly specified System Sand, place at least six inches of material on the scarified surface(s).
g) Level the top of the System Sand to the required elevation within ±1/2 inch.
h) Locate the center of the FDUs with a grade stake or other means and remove three inches of System Sand large enough to accommodate the FDU. This will leave three inches of System Sand below the FDU.

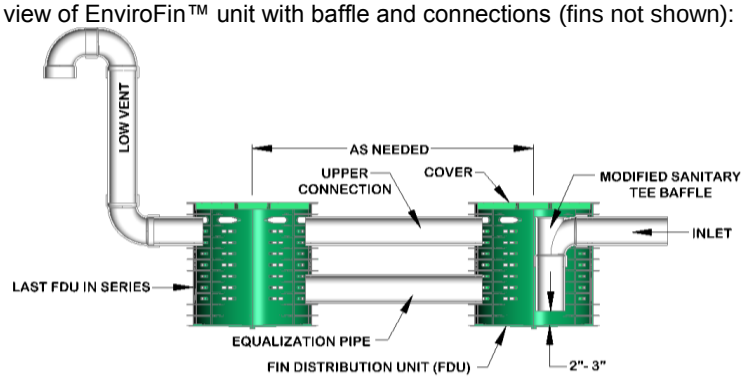
21.9 EnviroFin™ Unit Installation

Once the dispersal field has been properly prepared, place the required number of EnviroFin™ units required by the approved plan and daily design flow. To install the EnviroFin™ units:

a) Place the assembled EnviroFin™ units on the System Sand bed by centering the FDU in the prepared holes excavated earlier. Notice the orientation of the inlet and outlet holes of the FDU and orient them to allow easy connection with the inlet sewer line. This should be clearly shown on the approved design.
b) Using grade stakes and/or System Sand, position the EnviroFin™ Treatment Fins to allow at least six inches of System Sand between all the fins.

21.10 Connecting EnviroFin™ Units

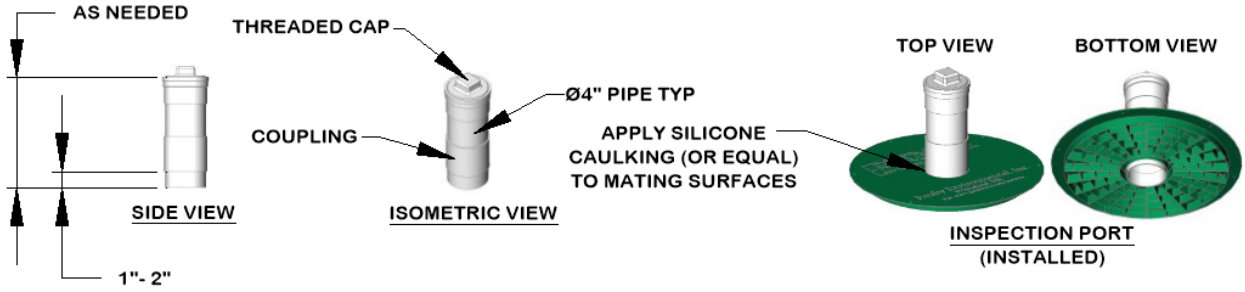
a) Verify the distance between centers of the FDU's is a minimum of four (4) feet center to center or as noted on the approved design.
b) Mark and cut all 4-inch plastic pipe to required lengths. Schedule 40 pipe should be used. Remember to add four inches to allow the pipe to extend into the inside of FDU(s). Remove all burred edges of pipes.
c) The first EnviroFin™ unit of a series or group is required to have a modified sanitary tee baffle on the inlet side of the FDU. This modified tee is created by cutting the top off (see section 3.2, page 3 for instructions).
d) The bottom of the inlet baffle must extend downward to within 2 to 3 inches of the FDU's bottom.
e) Now connect the upper feed and equalization pipes to the next FDU if connected in series to multiple units. If the EnviroFin™ unit is the last module in a series or one of multiple satellite units, the upper exit pipe is used as the vent and there will be no outlet equalization pipe needed (inlet only). The upper feed pipe may be installed after backfilling with System Sand to that level.
f) All plastic pipe joints must be glued or joined with stainless steel fasteners.
g) Repeat as necessary for additional EnviroFin™ units.
h) Section view of EnviroFin™ unit with baffle and connections (fins not shown):



21.11 Distribution Box Installation
To prevent movement, be sure D-boxes are placed level on compacted soil, sand, pea gravel base, or concrete pad.

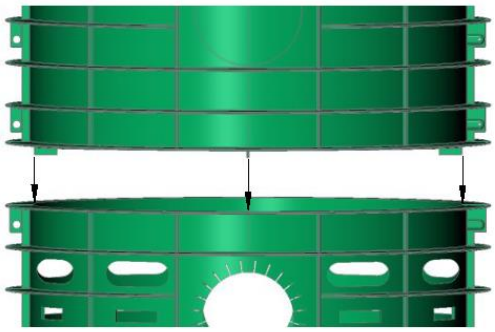
21.12 Level Tolerances
Use a laser level or transit to install the EF unit level. Variations beyond 1/2 in. (±1/4") for the FDU and variations beyond 1 in. (±1/2") for the Treatment Fins may affect system performance and are not acceptable.

21.13 Inspection Port (optional)
When an inspection port is desired or mandated by regulators, the cutout in the center of the cover is used. The cutout will accommodate 4-inch Schedule 20 to 40 pipe. The inspection port is constructed from third party plastic pipes and fittings. The inspection port is to be constructed with watertight fittings and joints. The top of the port should be within a few inches of the final grade. The inspection port may also extend above the final grade. Apply silicon caulking (or equal) to the inspection port and cover's mating surfaces.
Illustration of typical inspection port:

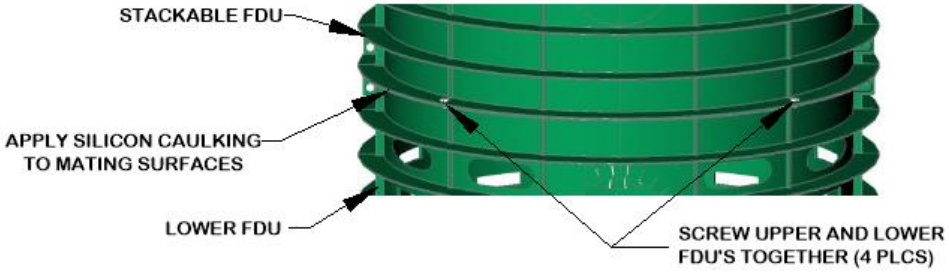


21.14 Installing Stackable FDU (Riser) as needed
Some installations will have more material cover than traditional systems. This will place access to the top of the FDU cover more than 12 inches below grade. In these cases, Presby Environmental offers an optional extension kit called a stackable FDU. It is placed on top of the lower FDU and is attached with supplied stainless steel screws. The cover is then attached to the top of the stackable FDU. Use the following procedure when an FDU extension is required once the bottom FDU, Treatment Fins, and System Sand are installed:

a) Join two Stackable FDU halves with the supplied stainless steel screws.
b) Remove cover from bottom FDU.
c) Place and secure Stackable FDU on top of the lower FDU (in place of the cover) making sure the alignment tabs on the Stackable FDU are inside the lower FDU.

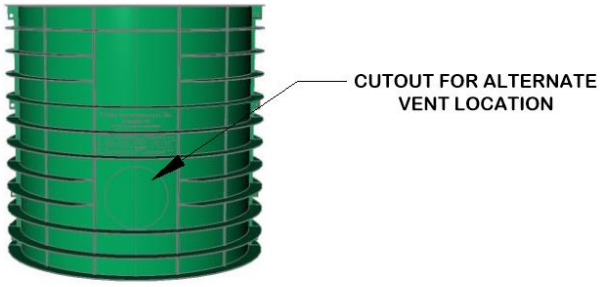


d) Screw the upper FDU to the Lower FDU with the supplied stainless steel screws.



e) Place and secure cover on Stackable FDU.

f) The 4-inch diameter cutout in the Stackable FDU can be used as an alternate location for the vent.



STACKABLE FDU

g) Install design-required fill sand and top soil around the Stackable FDU.

21.15 Backfilling EnviroFin™ Unit(s)

a) Place and secure cover on FDU with stainless steel screws provided.
b) Attach Inspection Port if required. Apply silicon caulking to mating surfaces.
c) Carefully place System Sand around treatment fins, FDU's, Upper Connection and EQ Connection pipe. Lightly tamp to fill voids.
d) Ready for State and/or local inspection if required.
e) Optional - Place magnetic tape or ferrous metal (rebar, etc.) over top of FDU(s) so they can be located easily using a metal detector.
f) Continue placing System Sand to a minimum of 3 in. over the Treatment Fins and a minimum of 6 in. beyond the perimeter of the outermost Treatment Fins.
g) Once required amount of System Sand is achieved, place topsoil (material free of organics, stones over 4 in. and building debris, having a texture similar to the soil at the site), without causing compaction.
h) Grade field to shed water.

21.16 Fill Extensions Requirements

All Presby Systems with any portion of the System Sand bed above original grade require 3 ft. fill extensions on each side beyond the outside edge of all EF Treatment Fins and then tapering to meet existing grade at a maximum slope of 3:1

21.17 H-10, H-20 Loading

At the present time and until further testing is conducted, the EnviroFin™ Wastewater Treatment system cannot be specified for H-10, H-20 loading or beneath pavement applications.

21.18 System Soil Cover Material

A minimum of 4 in. of suitable earth cover (topsoil or loam), with a texture similar to the soil at the site and capable of sustaining plant growth, must be placed above the installed system.

21.19 Erosion Control

To prevent erosion, soil cover above the system shall be planted with native, shallow-rooted vegetation such as grass, wildflowers and certain perennials or ground covers.

21.20 Trees and Shrubs

No trees or shrubs should be located within 10 ft. of the system perimeter to prevent roots from growing into and damaging the system.

22.0 System Bacteria Rejuvenation and Expansion

This section covers procedures for bacteria rejuvenation and explains how to expand existing systems.
Note: Presby Environmental, Inc. must be contacted for technical assistance prior to attempting rejuvenation procedures.

22.1 Why would System Bacteria Rejuvenation be needed?

Bacteria rejuvenation is the return of bacteria to an aerobic state. Flooding, improper venting, alteration or improper depth of soil material cover, use of incorrect sand, sudden use changes, introduction of chemicals or medicines, and a variety of other conditions can contribute to converting bacteria in any system from an aerobic to an anaerobic state. This conversion severely limits the bacteria's ability to effectively treat effluent, as well as limiting liquids from passing through. A unique feature of the EnviroFin™ System is its ability to be rejuvenated in place.

22.2 How to Rejuvenate EnviroFin™ Bacteria

System bacteria are "rejuvenated" when they return to an aerobic state. By using the following procedure, this can be accomplished without costly removal and replacement.

1) Contact Presby Environmental before attempting Rejuvenation for technical assistance. Please note that state and/or local permits may be required.
2) Determine and correct the problem(s) causing the bacterial conversion.
3) Drain the septic tank and EnviroFin™ units at each FDU of wastewater using a state approved septage hauler. No effluent is allowed to reach ground or surface waters. Note: All EF units connected with an Equalized connection can be drained from a single EF unit in the series.
4) Expose and open the distribution box (if present).
5) Safeguard all system openings and excavations.
6) Guarantee a passage of air through the system.
7) Allow all units to dry for 72 hours minimum. The System Sand should return to its natural color.
8) Re-assemble the system to its original design configuration. As long as there is no physical damage to the Presby components, the original components may be reused.

23.0 System Expansion

Presby Systems are easily expanded by adding units to the original design or by adding additional sections. All system expansions must comply with State and local regulations. Permits may be required prior to system expansion.

23.1 Reusable Components

Presby EnviroFin™ components are not biodegradable and may be reused. In cases of improper installation, it may be possible to excavate, clean, and reinstall all system components.

24.0 Operation & Maintenance

24.1 Proper Use

Presby Systems require minimal maintenance, provided the system is not subjected to abuse. An awareness of proper use and routine maintenance will guarantee system longevity. We encourage all system owners and service providers to obtain and review a copy of our Owner's Manual, available from our website www.PresbyEnvironmental.com or via mail upon request to (800) 473-5298 or info@presbyeco.com.

24.2 System Abuse Conditions

The following conditions constitute system abuse:

a) Liquid in high volume (excessive number of occupants and use of water in a short period of time, leaking fixtures, whirlpool tubs, hot tubs, water softening equipment or additional water discharging fixtures if not specified in system design).
b) Solids in high volume (excessive number of occupants, paper products, personal hygiene products, garbage disposals or water softening equipment if not specified in system design)
c) Antibiotic medicines in high concentrations
d) Cleaning products in high concentrations
e) Fertilizers or other caustic chemicals in any amount
f) Petroleum products in any amount
g) Latex and oil paints
h) System suffocation (compacted soils, barrier materials, etc.) without proper venting

24.3 System Maintenance/Pumping of the Septic Tank

a) Inspect the septic tank at least once every two years under normal usage.
b) Pump the tank when surface scum and bottom sludge occupy one-fourth or more of the liquid depth of the tank.
c) If a garbage disposal is used, the septic tank will likely require more frequent pumping.
d) After pumping, inspect the septic tank for integrity to ensure that no groundwater is entering it. Also check the integrity of the tank inlet and outlet baffles and repair if needed.
e) Inspect the system to ensure that vents are in place and free of obstructions.
f) Presby Environmental does not recommend the use of effluent filters due to their tendency to clog and cut off oxygen to the System as well as restrict the passive movement of air for venting. If an effluent filter must be used, choose a filter that maximizes air flow through the top of the tee, follow filter manufacturer's maintenance instructions and inspect filters frequently.
g) PEI and most regulatory agencies do not recommend the use of septic system additives.

24.4 Site Maintenance

It is important that the system site remain free of shrubs, trees, and other woody vegetation to within a minimum of 10 ft. of the system, including the entire System Sand bed area, and areas impacted by side slope tapering and perimeter drains (if used). Roots can infiltrate and cause damage or clogging of system components. If a perimeter drain is used, it is important to make sure that the outfall pipes are screened to prevent animal activity. Also check outfall pipes regularly to ensure that they are not obstructed in any way.

25.0 Glossary

This Manual contains terminology which is common to the industry and terms that are unique to Presby Systems. While alternative definitions may exist, this section defines how these terms are used in this Manual.

25.1 Remote System Drain

A remote system drain is a 4" PVC line connected to the EQ Connection hole in the base of the FDU at the end of each EQ distribution section or each EF unit in an Individual D-Box Distribution Configuration. This line is connected to a remotely located sump or chamber and is utilized to lower the water level in a saturated system or to facilitate system rejuvenation by pumping at the sump/chamber by a licensed septage hauler.

25.2 Coarse Randomized Fiber

A mat of coarse, randomly-oriented fibers which separates more suspended solids from the effluent protecting the bacterial surface in the geo-textile fabric (see illustration in sect. 2.0 page 2).

25.3 Daily Design Flow

The peak daily flow of wastewater to a system, expressed in gallons per day (GPD); systems are typically sized based on the daily design flow. Design flow calculations are set forth in the Maine Rules. In general, actual daily use is expected to be one-half to two-thirds less than "daily design flow."

25.4 Differential Venting

A method of venting a Presby System utilizing high and low vents (see sect. 17.2 page 24).

25.5 Distribution Box or "D-Box"

A device designed to divide and distribute effluent from the septic tank equally to each of the outlet pipes that carry effluent into the Presby System. D-Boxes are also used for velocity reduction, see Velocity Reduction, sect. 17.4 page 24.

25.6 D-Box Distribution Configuration

A design in which each Section receives effluent from a distribution box outlet. Such a system is also called an "Individual Flow" or an "EQ Combination".

25.7 EQ Combination

The use of a D-Box when connecting 2 or more EQ Distribution sections inside a single bed.

25.8 EQ Connection

The lower inlet and outlet of a FDU.

25.9 EQ Flow

Connecting 2 or more EnviroFin™ units using both the Upper Connection and EQ Connection to provide even flow of effluent throughout the entire series of EF units.

25.10 EQ Distribution

Non D-box system, maximum 5 EnviroFin™ units, using both the Upper Connection and EQ Connection.

25.11 Fill Extension

Utilized in constructing Elevated (mound) Systems connecting the raised portion of the system with side slope tapering to meet existing grade. Fill extensions of 3 ft. are required on all sides of elevated systems and are measured from the edge of the outermost part of the Treatment Fins (see sect. 9.4 page 17).

25.12 Fin Distribution Unit (FDU)

The center portion of the EnviroFin™ unit.

25.13 Flow Equalizer

An adjustable plastic insert installed in the outlet pipes of a D-Box to equalize effluent distribution to each outlet.

25.14 GPD and GPM

An acronym for Gallons per Day and Gallons per Minute respectively.

25.15 High and Low Vents

Pipes used in differential venting. Detailed information about venting requirements can be found in Venting Requirements, sect. 19.0 page 25.

25.16 High Strength Effluent

High strength wastewater is septic tank effluent quality with combined 30-day average carbonaceous biochemical oxygen demand (CBOD) and total suspended solids (TSS) in excess of two-hundred and forty (240) mg/L. High

strength effluent may require more EnviroFin™ units. See Wastewater Strength, section 9.15, page 18 for more information

25.17 Multi-Level™
A Multi-Level™ System is a patented process using EnviroFin™ units. It consists of two layers (Levels) of EnviroFin™ units installed in the same bed with one Level offset and on top of another with a minimum of 6 in. vertically of System Sand between the Treatment Fins from one level to the next. Effluent flow is split to each level separately by a d-box. Multi-Level™ Systems are approved for use with Soil Profiles: 2, 3, 4, 5, 6 & 7. (See illustrations in section 11.0 page 20).

25.18 Multiple Bed Distribution
Incorporates two or more beds, each bed with EQ Distribution, EQ Combination, or Individual D-Box distribution and receiving effluent from a distribution box (see section 15.0, page 23).

25.19 Pressure Distribution
A pressurized, small-diameter pipe system used to deliver effluent to an absorption field. Pressure Distribution is not permitted to be used with the Presby System. Presby Systems are designed to provide even distribution through Equalized Flow connections without the need for pressure distribution.

25.20 Pump Systems
Utilize a pump to gain elevation in order to deliver effluent to a D-Box (see sect. 17.0 page 24).

25.21 Raking and Tilling
Refers to methods of preparing the native soil that will be covered with System Sand or Sand Fill, creating a transitional layer between the sand and the soil (see Installation Requirements sect. 21.7 page 29.

25.22 Section
Consists of up to four EnviroFin™ units connected together as described in sect.12.0, page21: Equalized Flow Combination Distribution, and fed by a single D-Box outlet or outlet manifold.

25.23 Sand Fill
Clean sand, free of organic materials and meeting the specifications set forth in System Sand and Fill Material Specifications, sect. 18.4 page 25. Sand fill is used to raise the elevation of the system to meet required separation distance or in side slope tapers. System Sand may be used in place of Sand Fill.

25.24 SHWT
An acronym for Seasonal High Water Table.

25.25 Skimmer Tabs
Projections into the EnviroFin™ FDU that help to capture grease and suspended solids from the existing effluent (see illustration in sect. 2.0 page 2).

25.26 Slope (4:1)
In this Manual's illustrations, slope is expressed as a ratio of run to rise. Example: A slope with a grade of three-to-one (4:1) is the difference in horizontal distance of three (4) horizontal feet (run) over an elevation difference of one (1) ft. (rise).

25.27 Slope (%)
Expressed as a **percent**, is the difference in elevation divided by the difference in horizontal distance between two points on the surface of a landform. Example: A site slope of one (1) percent is the difference in elevation of one (1) foot (rise) over a horizontal distance of one hundred (100) feet (run).

25.28 Smearing
The mechanical sealing of soil air spaces along an excavated, tilled or compressed surface. This is also referred to as “compacting.” In all installations, it is critical to avoid smearing or compacting the soils under and around the field.

25.29 Surface Diversion
A natural or manmade barrier that changes the course of water flow around an onsite system’s soil absorption field.

25.30 System Sand Bed
System Sand bed area required to be used in Presby Systems. The System Sand bed extends a minimum of 6 in. below, 3 in. above and 6 in. horizontally from the outside edges of the EnviroFin™ treatment fins.

25.31 System Sand
System Sand must be clean, granular sand free of organic matter and must adhere to the Presby System Specification or alternative ASTM C-33 concrete sand with no more than 3% passing the #200 sieve (see complete details in sect. 18.0 page 24).

25.32 Topsoil (a.k.a. Loam or Soil Cover Material)
Topsoil, also known as Loam, is soil material cover capable of sustaining plant growth which forms the topmost layer of cover material above the system.

25.33 Velocity Reducer
Velocity reducer refers to any of the various components whose purpose is to reduce the velocity of effluent flow into the EnviroFin™. A distribution box with a baffle or inlet tee is sufficient for velocity reduction in most systems (see illustration in sect. 17.4 page 24).