

EFFECTIVE LEACHING CREDITS & CENTER TO CENTER SPACING

LEACHING TRENCHES

Trench Depth (inches)	Trench Width (inches)	Effective Leaching Credit (SF/LF)	Center to Center Spacing (feet)
18	18	2.1	7
18	24	2.4	7
18	30	2.7	7
18	36	3.0	7
12	48	3.0	8

LEACHING GALLERIES

Gallery Height (inches)	Effective Leaching Credit (SF/LF)	Center to Center Spacing (feet)
48	9.2	12
36	8.0	12
30	7.4	12
27	7.1	12
24	6.8	12
18	6.2	12
12	5.9	12

PLASTIC LEACHING CHAMBERS

(backfilled with select fill or approved aggregate)

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
Infiltrator - Equalizer 24	15" x 11"	2.3	7
Infiltrator - Equalizer 36	22" x 13.5"	2.7	7
Infiltrator - Sidewinder (Stand.)	34" x 12"	3.7	7
Infiltrator - Sidewinder (High Cap.)	34" x 16"	3.9	7

PLASTIC LEACHING CHAMBERS

(backfilled with approved aggregate)

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
Cultec - Contactor EZ-24	16" x 12"	1.9	7
Cultec - Contactor EZ-24 (PDS)	16" x 12"	2.5	7
Cultec - Contactor 75	26.5" x 12.4"	2.6	7
Cultec - Contactor 100	36" x 12.5"	3.7	7
Cultec - Contactor 100 (PDS)	36" x 12.5"	4.3	7
Cultec - Contactor 125	26.5" x 18"	2.9	7
Cultec - Recharger 180	36" x 20.5"	4.4	7
Cultec - Recharger 180 (PDS)	36" x 20.5"	5.1	9
Cultec - Recharger 280	46" x 26.5 "	6.5	10
Cultec - Recharger 280 (PDS)	46" x 26.5 "	7.1	10
Cultec - Recharger 330XL HD	52" x 30"	5.6	11
Infiltrator Quick 4 Equalizer 24	16" x 11"	2.0	7
Infiltrator Quick 4 Equalizer 36	22" x 12"	2.6	7
Infiltrator Quick 4 Standard	34" x 12"	3.6	7
Infiltrator Quick 4 High Capacity	34" x 16"	4.1	7
ADS/Hancor- BioDiffuser ARC 36	34.5" x 13"	3.7	7
ADS/Hancor-BioDiffuser ARC36HC	34.5" x 16"	4.1	7

ELJEN IN-DRAINS

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
Eljen In-drain - Type "B" Unit	36" x 7"	4.7	7
Mantis 430-10, Internal Dist. Pipe	30" x 12"	6.5	9
Mantis 430-10, Top Dist. Pipe	30" x 12"	11.0	12
Mantis 536-8	36" x 18"	11.0	12

RUCK A FINS

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
Ruck A Fins - R1032C	32" x 7"	7.0	9

FROM CELL LIVING FILTERS

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
Living Filter- LF1210	29" x 18"	3.9	7
Living Filter- LF1810	29" x 24"	5.5	9
Living Filter- LF2410	29" x 30"	7.0	9
Living Filter- LF3010	29" x 36"	8.6	9
Living Filter- LF3610	29" x 42"	10.1	12
Living Filter- LF1224	60" x 18"	7.4	11
Living Filter- LF1826	64" x 24"	11.0	12
Living Filter- LF2426	64" x 30"	14.2	14
Living Filter- LF3026	64" x 36"	17.3	14
Living Filter- LF3626	64" x 42"	20.4	14

GREENLEACH FILTER

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
GLF 12.62	62" x 12"	7.9	12
GLF 15.62	62" x 15"	9.4	12
GLF 18.62	62" x 18"	11.0	14
GLF 21.62	62" x 21"	12.5	14
GLF 24.62	62" x 24"	14.0	14
GLF 27.62	62" x 27"	15.5	14
GLF 30.62	62" x 30"	17.0	14
GLF 33.62	62" x 33"	18.5	14
GLF 36.62	62" x 36"	20.0	14
GLF 12.37	37" x 12"	4.7	9
GLF 15.37	37" x 15"	5.6	9
GLF 18.37	37" x 18"	6.5	9
GLF 21.37	37" x 21"	7.3	9
GLF 24.37	37" x 24"	8.2	9
GLF 27.37	37" x 27"	9.1	9
GLF 30.37	37" x 30"	9.9	9
GLF 33.37	37" x 33"	10.8	12
GLF 36.37	37" x 36"	11.7	12

CUR-TECH SYSTEMS

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
CTL-12	72" x 14"	8.3	12
CTL-18	72" x 20"	10.7	14
CTL-24	72" x 26"	13.0	14
CTL-48	72" x 50"	21.9	14

CORRUGATED LEACHING SYSTEMS
(lined with filter fabric)

Product Name	Dimensions (Diameter / W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
GEO-FLOW	12" Diam	2.3	7
Presby Env. - ENVIRO-SEPTIC	12" Diam	2.3	7
Presby Env. - SIMPLE-SEPTIC	12" Diam	1.5	7
ADS - SB2	10" Diam	0.9	7

GEOMATRIX

Product Name	Dimensions (W x H)	Effective Leaching Area (SF/LF)	Center to Center Spacing (feet)
GeoMat 1200	12" x 1"	1.0	7
GeoMat 3900	39" x 1"	3.0	8
GeoMat 7800	78" x 1"	5.9	13
LowPro WE 1200	72" x 1"	5.2	12
LowPro WE 3900	72" x 1"	5.6	12
GeoMat Edge ST 600	72" x 6"	14.0	14
GeoMat Edge ST 1200	72" x 14"	27.2	14
GeoMat Edge WE 1200	72" x 13"	27.2	14
GST 6206	62" x 6"	5.9	12
GST 6212	62" x 12"	10.0	12
GST 6218	62" x 18"	14.0	13
GST 6224	62" x 24"	18.1	13
GST 6230	62" x 30"	22.1	13
GST 6236	62" x 36"	26.2	13
GST 3706	37" x 6"	3.6	8
GST 3712	37" x 12"	5.9	10
GST 3718	37" x 18"	8.2	10
GST 3724	37" x 24"	10.5	12
GST 3730	37" x 30"	12.9	12
GST 3736	37" x 36"	15.2	12
GeoU636	36" x 6.5"	8.0	9
GeoU672	72" x 6.5"	15.5	14
GeoU1236	36" x 12.5"	14.8	12
GeoU1272	72" x 12.5"	28.8	14
GeoU1836	36" x 18.5"	21.7	12
GeoU1846	46" x 18.5"	27.4	12
GeoU1851	51" x 18.5"	29.9 (max. allowed)	13
GeoU3921	21" x 39"	27.4	12
GeoU3926	26" x 39"	29.9 (max. allowed)	12

Minimum Septic Tank Capacities for Residential Buildings

	Single-family	Multi-family
1-3 bedrooms	1,000 gallons	1,000 gallons
4 bedrooms	1,250 gallons	1,250 gallons
For each bedroom beyond 4	Add 125 gallons per bedroom	Add 250 gallons per bedroom

Garbage grinder: Add 250 gallons to required capacity of the septic tank. Garbage grinders are not recommended for use with subsurface sewage disposal systems.

Large tub: 100 to 200 gallon tub: Add 250 gallons to required capacity of the septic tank
Over 200 gallon tub: Add 500 gallons to required capacity of the septic tank.

LEACHING SYSTEM SIZING

TABLE 6 - RESIDENTIAL BUILDING

Percolation Rate (Minutes to Drop One Inch)	Square Feet of Required Effective Leaching Area				
	2-Bedroom Building	3-Bedroom Building	4-Bedroom Building	For Each Bedroom Above 4	
				Single Family	Multi-family
LESS THAN 10.1	375	495	660	82.5	165
10.1-20.0	500	675	900	112.5	225
20.1-30.0	565	750	1000	125	250
30.1-45.0	675	900	1200	150	300
45.1-60.0	745	990	1320	165	330

TABLE NO. 7 - RESTAURANTS, RESIDENTIAL INSTITUTIONS, AND NONRESIDENTIAL BUILDINGS WITH PROBLEMATIC SEWAGE

PERCOLATION RATE (Minutes to Drop One Inch)	APPLICATION RATE (Gallons per day to per square foot of Effective Leaching Area)
LESS THAN 10.1	0.8
10.1 to 20.0	0.7
20.1 to 30.0	0.6
30.1 to 45.0	0.5
45.1 to 60.0	0.4

TABLE NO. 8 - NONRESIDENTIAL BUILDINGS WITH NON-PROBLEMATIC SEWAGE

PERCOLATION RATE (Minutes to Drop One Inch)	APPLICATION RATE (Gallons per day per square foot of Effective Leaching Area)
LESS THAN 10.1	1.5
10.1 to 20.0	1.2
20.1 to 30.0	0.9
30.1 to 45.0	0.7
45.1 to 60.0	0.6

$$\text{REQUIRED EFFECTIVE LEACHING AREA} = \frac{\text{DESIGN FLOW}}{\text{APPLICATION RATE}}$$

APPENDIX A: MINIMUM LEACHING SYSTEM SPREAD

All subsurface sewage disposal systems, when applicable, shall provide a leaching system spread that equals or surpasses the minimum leaching system spread (MLSS). The MLSS formula is based on hydraulic principles and is calculated utilizing factors reflective of the building’s design flow and the hydraulic characteristics of the site. MLSS is not applicable on sites that have a receiving soil depth exceeding 60 inches, reserve leaching areas, or on sites where a licensed professional engineer has satisfactorily demonstrated through a hydraulic analysis or loading test that the receiving soil can disperse the building’s permitted flow without overflow or breakout. In accordance with Public Health Code (PHC) regulations, **new systems and code-complying areas are required to have sufficient naturally occurring soil that can absorb or disperse the design flow.** Naturally occurring soil is formed from natural processes independent of human actions, and does not include fill placed by humans or deposited as a result of human actions.

Multiple leaching systems with shared receiving soil shall be evaluated collectively as a single system. On sloped lots, leaching systems in the same hydraulic window shall be at least 50 feet apart to avoid a MLSS assessment as a single system. On lots with flat groundwater tables, leaching systems located within 25 feet of one another shall be evaluated as a single system. Septic tank effluent shall be applied uniformly to the leaching system. If MLSS is applicable, single leaching system rows shall contain leaching units with the same or relatively equal ELA ratings (within 10 percent), or a hydraulic assessment shall be required to ensure no portion of the receiving soil is overloaded.

MLSS Formula

$$\text{MLSS (feet)} = \text{HF} \times \text{FF} \times \text{PF}$$

HYDRAULIC FACTOR (HF) = Factor based on the hydraulic gradient and receiving soil depth.

FLOW FACTOR (FF) = Factor based on the design flow of the building served.

PERCOLATION FACTOR (PF) = Factor based on the percolation rate of the receiving soil.

Definitions & Factor Information

Hydraulic gradient: The percent slope of the naturally occurring grade, or when demonstrated, the percent slope of the restrictive layer. The hydraulic gradient shall be the average gradient within and at least 25 feet downgradient of the leaching system. On lots with purported flat groundwater tables, the hydraulic gradient shall be confirmed to be level (essentially zero) by evaluating groundwater elevations within and at least 25 feet around the perimeter of the leaching system.

Leaching system spread: The leaching system length (feet) of sewage effluent application to the receiving soil as measured along a uniform elevation. On lots with flat groundwater tables, the leaching system spread shall be the entire length of the perimeter of the leaching system. On all other lots, the leaching system spread shall be measured perpendicular to the hydraulic gradient, and shall take into account converging and diverging contours at least 25 feet downgradient of the leaching system.

Restrictive layer: The first layer beneath the receiving soil that impedes downward movement of sewage effluent. Restrictive layers include ledge rock, groundwater, and impervious soil (percolation rate slower than 60 minutes per inch). The groundwater restrictive layer can be determined by field verification of redoximorphic features or groundwater monitoring. If groundwater monitoring is performed, the groundwater restrictive layer shall be the average of at least five (5) consecutive weekly readings taken in the most restrictive 30-day period of the wet season.

Receiving soil: The soil above the restrictive layer that is available to disperse sewage effluent from the leaching system. On lots with flat groundwater tables, the receiving soil shall include the soil around the perimeter of the leaching system. On all other lots, the receiving soil shall include the soil downgradient of the leaching system.

Receiving soil depth (RS Depth): The depth of receiving soil above the restrictive layer. On lots with flat groundwater tables, the RS Depth shall be the average depth within and 25 feet around the perimeter of the leaching system. On all other lots, the RS Depth shall be the average depth within and at least 25 feet downgradient of the leaching system. Large systems (2,000 GPD or greater) warrant evaluation of receiving soil depths within 50 feet downgradient of the leaching system.

USE OF MLSS FORMULA

New Systems and Code-Complying Areas: New subsurface sewage disposal systems approved pursuant to PHC Section 19-13-B103, and code-complying areas identified pursuant to PHC Section 19-13-B100a shall provide leaching system spreads that equal or surpass the MLSS. PHC regulations require that these systems have sufficient **naturally occurring soil** that can adequately absorb or disperse the expected volume of sewage effluent without overflow, breakout or detrimental effect on ground or surface water. For new systems, MLSS applies to the primary system only, although it is recommended that reserve areas provide additional spread and hydraulic capacity.

Properties that have less than 18 inches of naturally occurring soil (<18" of RS Depth in HF Chart) cannot be approved unless a licensed professional engineer conducts a hydraulic analysis or loading test to demonstrate compliance with PHC Section 19-13-B103e (a)(4). Sites without unsaturated naturally occurring soil are not candidates for hydraulic assessments since the naturally occurring soil is already in an "overflowed" condition.

Repairs and Potential Repair Areas: Repairs approved pursuant to PHC Section 19-13-B103, and potential repair areas identified pursuant to PHC Section 19-13-B100a shall provide leaching system spreads that equal or surpass the MLSS based on naturally occurring soil. On a site with less than 18 inches of naturally occurring soil, or when the leaching system cannot meet the MLSS, an exception from the local director of health shall be required. Exceptions may only be granted when determined they are unlikely to cause a nuisance, health hazard, or result in a breakout or surfacing of sewage effluent. In making this determination, the local director of health shall require an assessment referred to as a **non-compliant repair (NCR) MLSS**. The NCR MLSS takes into account the hydraulic capacity of existing receiving soil and fill included in the system design and installation. The following criterion shall be utilized in calculating the NCR MLSS:

1. Receiving soil fill shall have a percolation rate of 30 minutes per inch or faster, and shall be clean material free of debris and foreign objects.
2. The receiving soil in the leaching system area shall be measured from the bottom of the leaching system to the restrictive layer.
3. On lots with flat groundwater tables, the receiving soil 25 feet around the perimeter of the leaching system shall have a minimum depth of 6 inches. On all other lots, the receiving soil 25 feet downgradient of the leaching system shall have a minimum depth of 12 inches.
4. The RS Depth may include both naturally occurring soil and fill, and shall have a minimum depth of 18 inches and a maximum of depth 60 inches.
5. A percolation rate of 10.1-20 minutes per inch shall be used for a select fill layer included in the receiving soil. Percolation rates of different receiving soil layers shall be applied proportionality.

Leaching systems shall provide the maximum percent possible of the NCR MLSS based on a RS Depth of 18.0-22.0 inches. On sites where the NCR MLSS cannot be provided, additional fill shall be considered to reduce the NCR MLSS. Leaching systems that provide less than 50 percent of the NCR MLSS, or do not comply with Items 3 or 4 above, shall require a system designed by a professional engineer and a study of the receiving soil's ability to absorb or disperse the permitted flow in accordance with PHC Section 19-13-B103d (e)(4).

For the purposes of PHC Section 19-13-B100a (c)(2) and Section IV D, the required MLSS shall be equivalent to the NCR MLSS. The permitted flow noted on the Permit to Discharge shall be based on the most limited percentage of the required ELA or NCR MLSS provided. The Permit to Discharge shall clearly state that the system is non-compliant relative to MLSS, and that an exception has been granted.

HYDRAULIC FACTORS (HF)

Receiving
Soil Depth
(Inches)

		Hydraulic Gradient (% Slope)								
		<1.0	1.0-2.0	2.1-3.0	3.1-4.0	4.1-6.0	6.1-8.0	8.1-10.0	10.1-15.0	>15.0
0.1 - 17.9	See Comments in <u>Use of MLSS Formula</u>									
18.0 - 22.0	72	62	54	48	42	34	30	28	26	
22.1 - 26.0	66	56	48	42	34	30	28	26	24	
26.1 - 30.0	56	49	42	34	30	28	26	24	20	
30.1 - 36.0	48	42	34	30	28	26	24	20	18	
36.1 - 42.0	42	36	30	28	26	24	20	18	16	
42.1 - 48.0	36	32	28	26	24	20	18	16	14	
48.1 - 60.0	30	28	24	22	20	18	16	14	10	
>60.0	MLSS Need Not be Considered									

FLOW FACTORS (FF)

Flow Factor = Design Flow/300	
<p>Residential: Design Flow for each bedroom is 150 gallons per day (GPD), except for bedrooms beyond 4 in single-family residential buildings which have a 75 GPD per bedroom design flow.</p>	
<p>Single-family homes:</p> <p>2 Bedroom Home = 300/300</p> <p>3 Bedroom Home = 450/300</p> <p>4 Bedroom Home = 600/300</p> <p>5 Bedroom Home = 675/300</p>	<p>FF</p> <p>1.0</p> <p>1.5</p> <p>2.0</p> <p>2.25 Increase FF by 0.25 for each additional bedroom</p>
<p>Multi-family buildings: Same as above except 5 Bedrooms = 750/300 2.5 Increase FF by 0.5 for each additional bedroom</p>	
<p>Non-Residential:</p>	<p>Design Flow (GPD) / 300</p>

PERCOLATION FACTORS (PF)

Percolation Rate	Percolation Factor (PF)
Up to 5.0 Minutes/Inch	1.0
5.1 to 10.0 Minutes/Inch	1.2
10.1 to 20.0 Minutes/Inch	1.5
20.1 to 30.0 Minutes/Inch	2.0
30.1 to 45.0 Minutes/Inch	3.0
45.1 to 60.0 Minutes/Inch	5.0

Table 1 – Minimum Separation Distance Table

Item	Separating Distance (Feet)	Special Provisions
A. Water supply well (potable, open loop geo-exchange, irrigation), spring or domestic water suction pipe. <u>Required withdrawal rate:</u> < 10 gal. per minute 10 to 50 gal. per minute > 50 gal. per minute	75 150 200	1. Separating distance to leaching system shall be doubled if the percolation rate is faster than one minute/inch and system is less than eight (8) feet above ledge rock. 2. Separating distance shall be increased as necessary to protect the sanitary quality of a public water supply well. 3. Separating distance between a domestic water suction pipe and a septic tank/pump chamber/grease interceptor tank shall be reduced to 25 feet if tank is verified to be watertight.
B. Human habitation on adjacent property	15	Building without drains. See item G for distance to building with drains.
C. Building served	15	Building without drains. See item G for distance to building with drains. Separating distance to a septic tank/pump chamber/grease interceptor tank shall be reduced to 10 feet for building served without drains.
D. Open watercourse	50	When not located on a public water supply watershed, distance shall be reduced as necessary to not less than 25 feet on lots in existence prior to the effective date of this regulation (8/16/82) and thereafter recorded as required by statute.
E. Public water supply reservoir	100	
F. Surface or groundwater drain constructed of solid pipe	25	Tight pipe with rubber gasketed joints or approved equal (See Table 2-C) are exempted from this requirement as long as the pipe excavation is not backfilled with free draining material, however no tight pipe shall be less than 5 feet from system. Leakage tests may be required to verify water tightness.
G. Groundwater drains (curtain, foundation, footing etc.), stormwater infiltration or retention/detention system Upgradient or on sides Downgradient	25 50 ⁽²⁾	1. No such drain shall be constructed downgradient of a leaching system for the purpose of collecting sewage effluent regardless of the distance. 2. Distance to septic tank/pump chamber/grease interceptor tank shall be reduced to 25 feet if tank is verified to be watertight.
H. Top of embankment (Downgradient and on sides of leaching system)	10	Cuts within 50 feet downgradient of leaching systems shall not be allowed if bleed-out conditions are possible.
I. Property line Upgradient or on sides Downgradient	15 ⁽²⁾ 25 ^(2,3)	1. Separating distance to septic tank/pump chamber/grease interceptor tank and reserve leaching system shall be reduced to 10 feet. 2. Separating distance shall be reduced to 10 feet if the top of the leaching system is below original grade, grading rights from the affected property owner are secured, or retaining walls are utilized (See Section VIII A for retaining wall provisions). 3. Separating distance between the primary leaching system and downgradient property line shall be reduced to 15 feet if MLSS is not applicable or on flat groundwater table lot.
J. Potable water and irrigation lines that flow under pressure	10	Excavations between 10 – 25 feet from system shall not be backfilled with free draining material.
K. Below ground swimming pool	25	See item G for downgradient pools with drains.
L. Above ground swimming pool	10	Includes hot tubs.
M. Accessory structure	10	Structure shall have no footing drains. See item G if drains provided. Structure without full wall, frost protected footings shall be reduced to 5 feet.
N. Utility service trench (Underground electric, gas, phone services, etc.)	5	Excavations between 5 – 25 feet from system shall not be backfilled with free draining material.
O. Water treatment wastewater system	10	See Section X.
P. Closed loop geo-exchange system Bore hole (BH), Trench Geo-exchange piping to BH, Trench	50 10	Separating distance to a septic tank/pump chamber/grease interceptor tank shall be reduced to 25 feet if tank is verified to be watertight. Excavations between 10 – 25 feet from system shall not be backfilled with free draining material.