

# SEWERS AND SEWAGE DISPOSAL

## 495 Attachment 1

### Menominee Indian Tribe

**Table 1**  
**Maximum Wastewater Infiltration Rates for Soil Absorption Systems**

If the answer to the condition is yes, the infiltrative, exposed natural soil surface for the system shall be sized using the identified soil loading factor in gallons per square foot per day<sup>1,2,3</sup>

Soil Conditions	Beds	Trenches
A. Is the soil texture of the entire profile 3 feet below the infiltrative surface extremely gravelly sand, gravelly coarse sand or coarser?	0.4 <sup>4</sup>	0.4 <sup>4</sup>
B. Is the soil structure of the horizon moderate or strong platy?	NP <sup>5,6</sup>	0.2 <sup>7</sup>
C. Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam, silt loam or finer, and the soil structure weak platy?	NP <sup>5,6</sup>	0.3 <sup>7</sup>
D. Is the moist soil consistence of the horizon stronger than firm or any cemented class?	NP <sup>5,6</sup>	NP <sup>5,6</sup>
E. Is the soil texture of the horizon sandy clay, clay or silty clay of high clay content, and the soil structure massive or weak?	NP <sup>5,6</sup>	NP <sup>5,6</sup>
F. Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam, silt or silt loam and the soil structure massive?	NP <sup>5,6</sup>	0.2 <sup>7</sup>
G. Is the soil texture of the horizon sandy clay, clay or silty clay of low clay content, and the soil structure moderate or strong?	0.2	0.3
H. Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam or silt loam and the soil structure weak?	0.2	0.3
I. Is the soil texture of the horizon sandy clay loam, clay loam or silty clay loam, and the soil structure moderate or strong?	0.4	0.5
J. Is the soil texture of the horizon loam or sandy loam and the soil structure massive?	0.3	0.4
K. Is the soil texture of the horizon loam or sandy loam and the soil structure weak?	0.4	0.5
L. Is the soil texture of the horizon sandy loam, loam or silt loam, and the soil structure moderate or strong?	0.5	0.6
M. Is the soil texture of the horizon very fine sand or loamy very fine sand? Or condition N below but with massive soil structure?	0.4	0.5
N. Is the soil texture of the horizon fine sand or loamy fine sand?	0.5	0.6
O. Is the soil texture of the horizon loamy sand, sand or coarse sand?	0.7	0.8

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### Footnotes to Table 1

- <sup>1</sup> The infiltration rates may be adjusted due to crossing horizons at the proposed infiltrative surfaces. Where such conditions occur, a weighted average may be used to determine the infiltration rate.
- <sup>2</sup> The infiltration rates and soil conditions may be verified by the Environmental Services Department, which may require modification of these rates, particularly where soil conditions exist that are not specifically referenced in this table.
- <sup>3</sup> A soil description report shall be completed for each soil profile. The reported texture, structure and consistence shall be used in calculating the loading rate of the infiltrative surface.
- <sup>4</sup> Pressure distribution shall be provided in accordance with § 495-13, except that doses shall be provided more than four times per day to increase retention time. Written approval of the Environmental Services Department is required for sites where voids between gravels and cobbles are not filled with soil material of two millimeters or less in size. If at least a six-foot separation below the proposed system to a limiting factor is evaluated and determined, or if a sand-textured blanket at least one foot thick is provided at the infiltrative surface, than a soil loading rate of 0.8 may be used, with or without pressure distribution. Split spoon or power auger equipment may be used for evaluations at depths of more than three feet below the proposed system, provided that such usage is noted on the soil description report.
- <sup>5</sup> NP = Not permitted. Systems may be permitted in these soils only with prior approval of the Environmental Services Department. Site-specific approval of the Environmental Services Department will not be required where standard approvals have been issued based on a design concept or regional soil condition.
- <sup>6</sup> Soil horizons meeting Condition D or E are not permitted within three feet below the infiltrative surface of either seepage beds or trenches. Soil horizons meeting Condition B, C or F are not permitted three feet below the infiltrative surface of seepage beds.
- <sup>7</sup> Pressure distribution is required.

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**Table 2**  
**Minimum Soil Absorption Areas for One- and Two-Family Dwellings**  
**Based Upon Percolation Tests Results**

<b>Percolation Rate (minutes per inch)</b>	<b>Minimum Absorption Area (square feet)</b>		
	<b>Trenches (bottom area)</b>	<b>Beds (bottom area)</b>	<b>Pits (sidewall area)</b>
0 to less than 10	195	240	195
10 to less than 30	275	350	275
30 to less than 45	315	390	315
45 to 60	330	415	330

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**Table 3**

<b>Column 1 Building Classification</b>	<b>Column 2 Units</b>	<b>Column 3 Factor</b>
Apartment building	1 per bedroom	1.5
Assembly hall - no kitchen	1 per person	0.02
Auto washer (service buildings, etc.)	1 per machine	6.0
Bar and cocktail lounge	1 per patron space	0.2
Beauty salon	1 per station	2.4
Bowling alley	1 per bowling lane	2.5
Bowling alley with bar	1 per bowling lane	4.5
Camp, day use only	1 per person	0.2
Camp, day and night	1 per person	0.45
Campground and camping resort	1 per camping space	0.9
Campground and sanitary dump station	1 per camping space	0.085
Car wash (automatic)	Subject to Department approval	
Car wash (per car hand wash)	1 per car	1.0
Catch basin – garages, service station, etc.	1 per basin	2.0
Catch basin – truck wash	1 per truck	5.0
Church – no kitchen	1 per person	0.04
Church – with kitchen	1 per person	0.09
Condominium	1 per bedroom	1.5
Country club	Subject to Department approval	
Dance hall	1 per person	0.06
Dining hall – kitchen and toilet	1 per meal served	0.2
Dining hall – kitchen only	1 per meal served	0.06
Dining hall – kitchen and toilet waste with dishwasher and/or food waste disposer	1 per meal served	0.25
Drive-in restaurant (all paper service)	1 per car space	0.3
Drive-in restaurant (inside seating)	1 per seat	0.3
Drive-in theater	1 per car space	0.1
Employees – in all buildings	1 per person	0.4
Floor drain	1 per drain	1.0
Hospital	1 per bed space	2.0
Hotel or motel and tourist rooming house	1 per room	0.9

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<b>Column 1 Building Classification</b>	<b>Column 2 Units</b>	<b>Column 3 Factor</b>
Medical office buildings, clinics and dental offices		
Doctors, nurses and medical staff	1 per person	0.8
Office personnel	1 per person	0.25
Patients	1 per person	0.15
Migrant labor camp – central bathhouse	1 per employee	0.25
Mobile home (single installation)	Use § 495-11C	
Mobile home park	1 per mobile home site	3.0
Nursing or rest home	1 per bed space	1.0
Outdoor sports facility – toilet waste only	1 per person	0.085
Park – toilet waste only	1 per acre	4.0
Park – showers and toilets	1 per acre	8.0
Restaurant – kitchen waste only	1 per seating space	0.18
Restaurant – toilet waste only	1 per seating space	0.42
Restaurant – kitchen and toilet	1 per seating space	0.6
Restaurant – (24 hr.) kitchen and toilet	1 per seating space	1.2
Restaurant – dishwasher and/or disposer	1 per seating space	0.15
Restaurant – (24 hr.) with dishwasher/disposer	1 per seating space	1.5
Retail store (number of customers = 70% of total area divided by 30 square feet per customer)	1 per customer	0.03
School – no meals, no showers	1 per classroom	5.0
School – meals served or showers	1 per classroom	6.7
School – meals and showers	1 per classroom	8.0
Self-service laundry – toilet waste only	1 per machine	1.0
Service station	1 per car served	0.15
Showers – public	1 per shower	0.3
Swimming pool bathhouse	1 per person	0.2

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**Table 4**  
**Effective Absorption Area for Seepage Pits**

Inside Diameter of Chamber in Feet Plus 1 Foot of Wall Thickness Plus 1 Foot of Annular Space	Depth in Feet of Permeable Strata Below Inlet					
	3	4	5	6	7	8
7	75	101	126	151	176	201
8	85	113	142	170	198	226
9	94	126	157	188	220	251
10	104	138	173	208	242	277
12	123	163	204	245	286	327

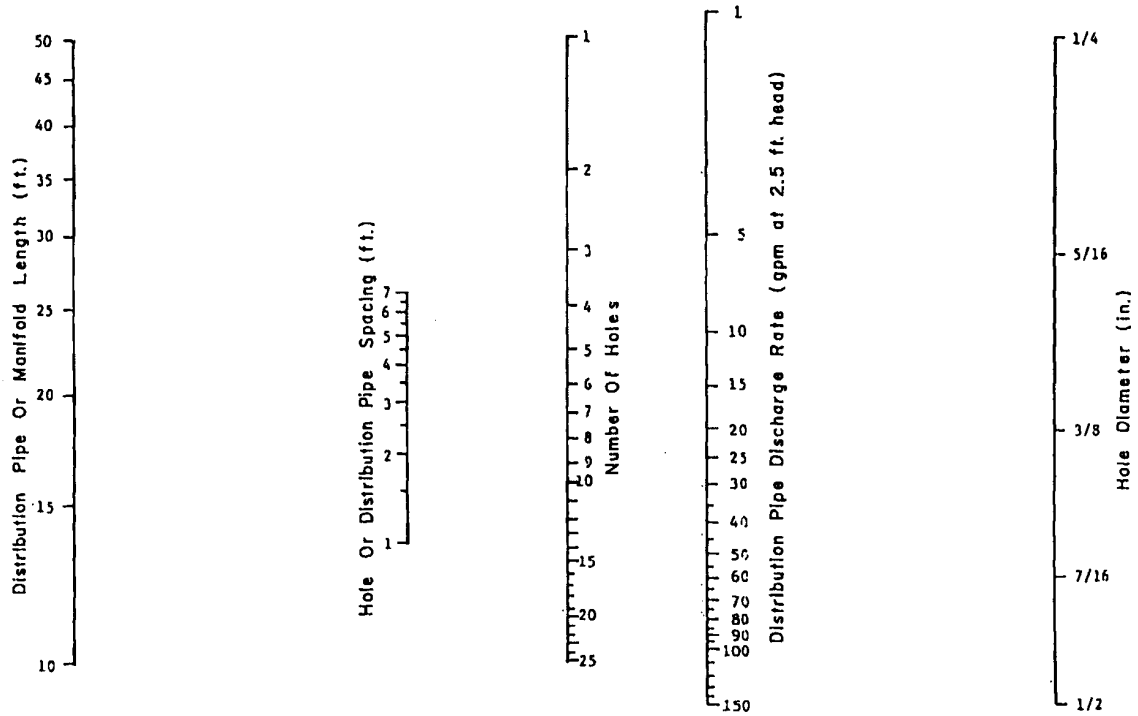
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**Table 5**  
**Required Distribution Pipe Diameters for Various Hole Diameters,**  
**Hole Spacings and Distribution Pipe Lengths**  
**(for plastic pipe only)**

Distribution Pipe Length (ft.)	Distribution Pipe Diameter (in.)																							
	Hole Diameter (in.) $\frac{1}{4}$						Hole Diameter (in.) $\frac{5}{16}$						Hole Diameter (in.) $\frac{3}{8}$						Hole Diameter (in.) $\frac{7}{16}$					
	Hole Spacing (ft.)						Hole Spacing (ft.)						Hole Spacing (ft.)						Hole Spacing (ft.)					
	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
10																								
15																								
20																								
25																								
30																								
35																								
40																								
45																								
50																								

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**Table 6**



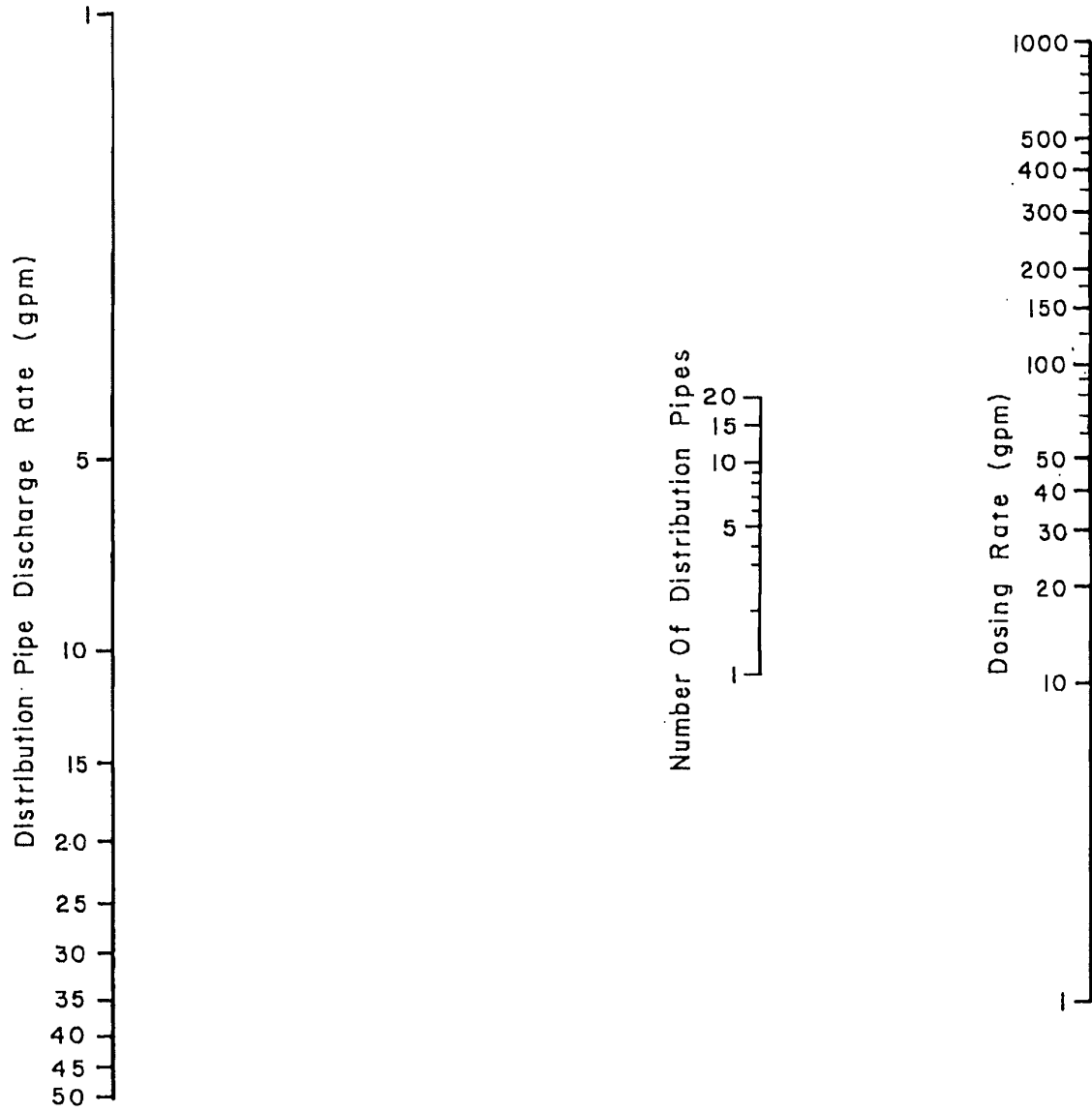
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**Table 7**  
**Recommended Manifold Diameters for Various Manifold Lengths,**  
**Number of Distribution Pipes and Distribution Pipe Discharge Rates**  
**(for plastic pipe only)**

Manifold Diameter (in.)												
Manifold Length (ft.)												
	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'		
Central Manifold	Number Of Distribution Pipes With Central Manifold											
	Flow Pipe (gpm)	4	6	8	10	12	14	16	18	20	22	24
	5	1"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"
	10	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"
	15	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"	7"
End Manifold	Flow Pipe (gpm)	4	6	8	10	12	14	16	18	20	22	24
	5	1"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"
	10	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"
	15	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"	7"
	20	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"	6"	6 1/2"	7"	7 1/2"

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Table 8



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**Table 9**  
**Friction Loss in Schedule 40 Plastic Pipe (C = 150)**

Pipe Diameter (inches)									
Flow	1	1 1/4	1 1/2	2	3	4	6	8	10
gpm	feet/100 feet								
1	0.07								
2	0.28	0.07							
3	0.60	0.16	0.07						
4	1.01	0.25	0.12						
5	1.52	0.39	0.18						
6	2.14	0.55	0.25	0.07					
7	2.89	0.76	0.36	0.10					
8	3.63	0.97	0.46	0.14					
9	4.57	1.21	0.58	0.17					
10	5.50	1.46	0.70	0.21					
11		1.77	0.84	0.25					
12		2.09	1.01	0.30					
13		2.42	1.17	0.35					
14		2.74	1.33	0.39					
15		3.06	1.45	0.44	0.07				
16		3.49	1.65	0.50	0.08				
17		3.93	1.86	0.56	0.09				
18		4.37	2.07	0.62	0.10				
19		4.81	2.28	0.68	0.11				
20		5.23	2.46	0.74	0.12				
25			3.75	1.10	0.16				
30			5.22	1.54	0.23				
35				2.05	0.30	0.07			
40				2.62	0.39	0.09			
45				3.27	0.48	0.12			
50				3.98	0.58	0.16			
60					0.81	0.21			
70					1.08	0.28			
80					1.38	0.37			
90					1.73	0.46			
100					2.09	0.55	0.07		
125						0.85	0.12		
150						1.17	0.16		
175						1.56	0.21		
200							0.28	0.07	
250							0.41	0.11	
300							0.58	0.16	
350							0.78	0.20	0.07
400							0.99	0.26	0.09
450							1.22	0.32	0.11
500								0.38	0.14
600								0.54	0.18
700								0.72	0.24
800									0.32
900									0.38
1,000									0.46

Velocities in this area  
become too great  
for the various flow rates  
and pipe diameter.

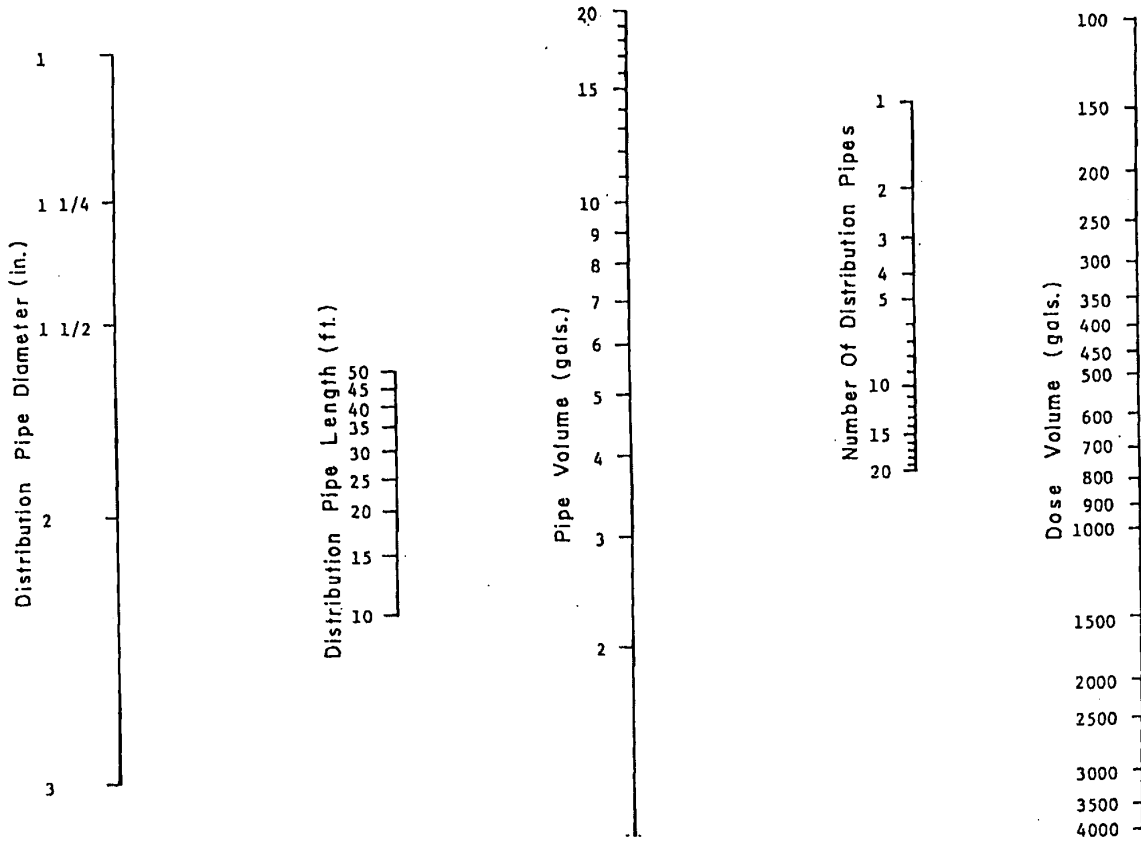
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**Table 10**  
**Void Volume for Various Diameter Pipes**

<b>Diameter (inches)</b>	<b>Volume (gal/ft length)</b>
1	0.041
1 1/4	0.064
1 1/2	0.092
2	0.164
3	0.368
4	0.655
6	1.47

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Table 11



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**Table 12**  
**Septic Tank Capacity**  
**One- and Two-Family Residences**

<b>Number of Bedrooms</b>	<b>Septic Tank Size (gallons)</b>
1	750
2	750
3	975
4	1,200
5	1,425
6	1,650
7	1,875
8	2,100

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**Table 13**  
**Septic Tank Capacity**  
**Public Buildings**

<b>Building Type</b>	<b>Septic Tank Size (gallons)</b>
Apartment buildings (per bedroom – includes auto washer)	150
Assembly hall (per person – no kitchen)	2
Auto washer (apartments, service buildings, etc., per machine)	300
Bars and cocktail lounges (per patron space)	9
Beauty salons (per station – includes customers)	140
Bowling alley (per alley)	125
Bowling alley with bar (per alley)	225
Campgrounds and camping resorts (per camp space)	100
Campground sanitary dump stations (per camp space) (omit camp spaces with sewer connections)	5
Camps, day use only – no meals served (per person)	15
Camps, day and night (per person)	40
Car wash (automatic) – subject to approval	
Car wash (per car handwash)	50
Catch basins – garages, service stations, etc. (per basin, etc.)	100
Catch basins – truck washing (per truck)	100
Churches – no kitchen (per person)	3
Churches – with kitchen (per person)	7.5
Condominiums (per bedroom – includes auto washer)	150
Country clubs – subject to approval	
Dance halls (10 square feet per person)	3
Dining hall – kitchen and toilet waste – with dishwasher and/or with disposer (per meal served)	11
Dining hall – kitchen waste only (per meal served)	3
Drive-in restaurants – all paper service (per car space)	15
Drive-in restaurants – all paper service inside seating (per seat)	15
Drive-in theaters (per car space)	5
Employee – in all buildings, per employee – total all shifts	20
Floor drain (per drain)	50
Hospitals (per bed space)	200
Hotels or motels and tourist rooming houses (per room – 2 persons per room)	100

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<b>Building Type</b>	<b>Septic Tank Size (gallons)</b>
Medical office buildings, clinics and dental offices	
Doctors, nurses, medical staff (per person)	75
Office personnel (per person)	20
Patients (per person)	10
Migrant labor camp, central bathhouse (per employee)	30
Mobile home parks, homes with bathroom groups (per site)	300
Nursing and rest homes – without laundry (per bed space)	100
Outdoor sports facilities (toilet waste only – per person)	5
Parks, toilet waste (per person – 75 persons per acre)	5
Parks, with showers and toilet waste (per person – 75 persons per acre)	10
Restaurant – toilet waste only – without dishwasher and/or disposer (per seat)	9
Restaurant – toilet waste only (per seat)	21
Restaurant – kitchen and toilet waste (per seating space)	30
Restaurant (24 hr.) – kitchen and toilet waste (per seating space)	60
Restaurant – dishwasher and/or food waste disposer (per seat)	3
Restaurant (24 hr.) – dishwasher and/or food waste disposer (per seat)	6
Retail store – customers (number of customers = 70% total area divided by 30 square feet per customer)	1.5
Schools (per classroom – 25 pupils per classroom)	450
Schools with meals served (per classroom – 25 pupils per classroom)	600
Schools with meals served and showers provided (per classroom)	750
Self-service laundries (toilet waste only, per machine)	50
Service stations (per car)	10
Showers – public (per shower taken)	15
Swimming pool bathhouses (per person)	10

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**Table 14**  
**Minimum Setback Distances for Treatment Tanks, Pump and Siphon Tanks,  
Servicing Suction Lines and Pump Discharge Lines**

<b>Setback Element</b>	<b>Horizontal Distance (feet)</b>
All structures; swimming pools <sup>a</sup>	
Lot or property line	2
Underground water supply system and cistern	10
Well; high-water mark of lake, stream, pond, flowage or reservoir	25

**NOTES:**

<sup>a</sup> All structures include any building and portions of buildings with any type of foundation.  
Swimming pools include aboveground and below-ground pools.

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**Table 15**  
**Holding Tank Capacity For One- and Two-Family Residences**

<b>Number of Bedrooms</b>	<b>Holding Tank</b>
1	2,000
2	2,000
3	2,000
4	2,500
5	3,000
6	3,500
7	4,000
8	4,500

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**Table 16**  
**Minimum Sand Fill Depth (D) for Mounds on Sites Having**  
**At Least 24 Inches Above a Soil or Site Factor**

<b>Soil or Site Factor<sup>a</sup></b>	<b>Minimum Sand Fill Depth (D) (inches)</b>
Slowly permeable soils <sup>b</sup>	12
Estimated high groundwater	12
Bedrock	
Creviced	24 <sup>c</sup>
Poorly cemented sandstone	12
Strata having 50% or more rock fragments by volume	12

**NOTES:**

<sup>a</sup> Soil type as identified in § 495-21A.

<sup>b</sup> Refer to § 495-21A(2)(a) for soils having loading rates 0.3 or less.

<sup>c</sup> Minimum depth may be reduced to 18 inches on slopes 10% or greater.

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**Table 17**  
**Downslope and Upslope Width Corrections for Mounds On Sloping Sites**

<b>Slope</b>	<b>Downslope Correction Factor</b>	<b>Upslope Correction Factor</b>
0%	1.0	1.0
1%	1.03	0.97
2%	1.06	0.94
3%	1.10	0.915
4%	1.14	0.89
5%	1.18	0.875
6%	1.22	0.86
7%	1.27	0.83
8%	1.32	0.80
9%	1.38	0.785
10%	1.44	0.77
11%	1.51	0.75
12%	1.57	0.73