Chapter 25
SEPTIC TANK AND/OR SOIL ABSORPTION SYSTEMS
AND OTHER SMALL WASTEWATER SYSTEMS

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CHAPTER 25

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AND OTHER SMALL WASTEWATER SYSTEMS

Section 1. General. This part contains the minimum standards for the design and construction of sewerage systems, treatment works and disposal systems for domestic wastes and industrial wastes generated by facilities other than specifically covered by other parts of this Chapter.

Section 2. Definitions

(a) "Absorption system" means a system constructed under the surface of the ground which receives and distributes effluent from a pretreatment device effectively filtering the effluent through soil or media.

(b) "Aerobic unit" means a covered, watertight receptacle which receives wastewater. The unit removes settleable solids, floatable material, and a part of soluble organic matter by the use of aerobic biological treatment.

(c) "Building drain" means the building drain is that part of the lowest piping of a drainage system which receives the discharge from soil, waste and other drainage pipes inside the walls of the building and conveys it to the building sewer beginning two feet (.6m) outside the building wall.

(d) "Building sewer" means the building sewer is that part of the horizontal piping of a drainage system which extends from the end of the building drain and conveys the building drain discharge to the septic tank or other onsite sewage disposal facility.

(e) "Domestic sewage" means the liquid- and waterborne wastes derived from the ordinary living processes, free from industrial wastes, and of such character as to permit satisfactory disposal without special treatment.

(f) "Dosing system" means the system of tanks, pumps or syphons, and piping located between the septic tank and soil absorption system which is intended to apply a large quantity of settled wastewater to the absorption system in a short period of time.

(g) "Hydrogeological study" means a study of the occurrence, distribution, quality and movement of the shallowmost groundwater of the site and the potential impact of wastewaters on the groundwater.

(h) "Impermeable soil" means any soil which has a percolation rate greater than 60 minutes per inch.

(i) "Pump Tank" means a tank in which the dosing pumps or syphons are installed.

Section 3. Design Flows. The sewerage system, treatment works and disposal system shall have a minimum absorption area based on the minimum peak design flows listed in Table 1 below.

Table 1

Quantities of Domestic Sewage Flows

Type of Establishment	Flow (gallons per day per_____)
Residential Units	
Single Family Dwellings	150/bedroom
Multiple Family Dwelling (with laundry capabilities)	150/bedroom
Multiple Family Dwelling (without laundry capabilities)	120/bedroom
Cottages	50/person
Mobile Home Parks	350/home*
Commercial Facilities	
Airports	4/passengers
Bar	3/patron
Bathhouses and swimming pools	10/person
Campgrounds (individual sewer outlets available)	100/site
Campgrounds (service building only)	75/site
Car or truck wash	200/vehicle
Church (no food preparation and/or dishwashing)	5/seat
Church (food preparation and/or dishwashing)	7/seat
Country Club	100/member
Factories	30/employee
Hospital	200/bed
Laundry (self-service)	600/machine or 50/cycle
Motels	80/double bed or 40/single bed
Office building	30/employee
Restaurant (toilet and kitchen wastes)	13/meal
Restaurant (kitchen wastes)	6/meal
Restaurant (additional for bars and lounges)	2/meal
Restaurant (kitchen wastes with disposable service)	2/meal
Rest Home	100/resident
Schools Boarding	100/resident student
Day, without gyms, cafeterias, or showers	15/student
Day, with cafeterias only	20/student
Day, with cafeteria, gym and showers	25/student
Service stations	10/vehicle served
Shopping Center	2/parking space
Store, Retail	30/employee
Theaters: Movie Drive-In	5/seat 15/vehicle space
Warehouses	30/employee

* Must consider flow into the soil absorption system from mobile homes where taps are allowed to run to prevent freezing.

Section 4. Isolation.

(a) Domestic wastewater. The isolation distances listed below apply when domestic wastewater is the only wastewater present.

(i) If the flow is less than 2000 gallons per day (gpd), the minimum isolation distance (in feet) shown in Table 2 shall be maintained.

Table 2

From	To Septic Tank Or Equivalent	To Absorption System
Wells (includes neighboring wells)	50	100
Property lines	10	10
Building Foundation (without foundation drains)	5	10
Building Foundation (with foundation drains)	5	25
Potable Water Pipes	25	25
Septic tank		10
Stream or Surface Body of Water (including seasonal and intermittent)	50	50

(ii) If the flow is greater than 2000 gpd but less than 10,000 gpd, the minimum isolation distances (in feet) shown in Table 3 shall be maintained.

Table 3

From	To Septic Tank Or Equivalent	To Absorption System
Wells (includes neighboring wells)	50	200
Property lines	10	10
Building Foundation (without foundation drains)	5	10
Building Foundation (with foundation drains)	5	50
Potable Water Pipes	25	50
Septic tank		10
Stream or Surface Body of Water (including seasonal and intermittent)	50	100

(iii) For systems larger than 10,000 gallons per day, the isolation distance shall be determined by a hydrogeological study in accordance with Section 15(b) of Chapter III, but shall not be less than those in subsection two above.

(b) Non-domestic wastewater. For disposal of wastewaters other than domestic wastewater, the isolation distances required shall be determined from a hydrogeological study in accordance with Section 15(b)of Chapter III.

(c) Location. Absorption systems shall not be located beneath buildings, parking lots, roadways or other similarly compacted areas.

Section 5. Site Suitability.

(a) Soil exploration. Soil exploration to a minimum depth of four feet below the bottom of the proposed absorption system shall be made to provide information on subsoil conditions.

(b) Soil evaluation.

(i) No less than three percolation tests shall be run in the proposed absorption system location. The percolation tests shall be performed in accordance with Appendix A of this part. The type of soil encountered at the percolation test location shall be specified.

(ii) An evaluation of the soil texture by a person experienced in soils classification, may be used to estimate the percolation rate, but at least one percolation test shall be performed.

(c) Groundwater protection and bedrock or impermeable soil separation.

(i) For single family homes, the depth to bedrock or impermeable soil must be at least four feet from the bottom of the absorption system stone and the natural ground surface. The depth to seasonally high groundwater must be at least four feet from the bottom of the absorption system stone and at least two feet from the natural ground surface.

(ii) For all systems other than single family homes up to 2000 gallons per day, the depth to bedrock or impermeable soil must be at least four feet from the natural ground surface. The depth to seasonally high groundwater must be at least four feet from the bottom of the absorption system stone and at least two feet from the natural ground surface. Also, a minimum of three feet of unsaturated soil shall be maintained between the bottom of the absorption system stone and the estimated groundwater mound imposed on the seasonally high groundwater table. The height of the groundwater mound may be estimated from Figures 1 through 6. The average daily flow should be used and may be estimated as 0.6 times the flow determined from Table 1.

(iii) For all systems larger than 2000 gallons per day, a minimum of three feet of unsaturated soil shall be maintained between the bottom of the absorption system stone and the estimated groundwater mound imposed on the seasonally high groundwater table. The maximum height of the groundwater mound shall be estimated by the design engineer.

(d) Excessively permeable soils. Soils having a percolation rate of one minute per inch or less are unsuitable for subsurface sewage disposal. These soils may be used if a six inch layer of soil having a percolation rate of five minutes per inch or greater is placed between the leach system stone and the existing soil. The soil absorption system shall be sized based on the percolation rate of the fill material.

(e) Sloping ground installations.

(i) Absorption systems shall not be located in an area where the natural slope is steeper than stated below. The following are the maximum permissible slopes on which an absorption system may be constructed.

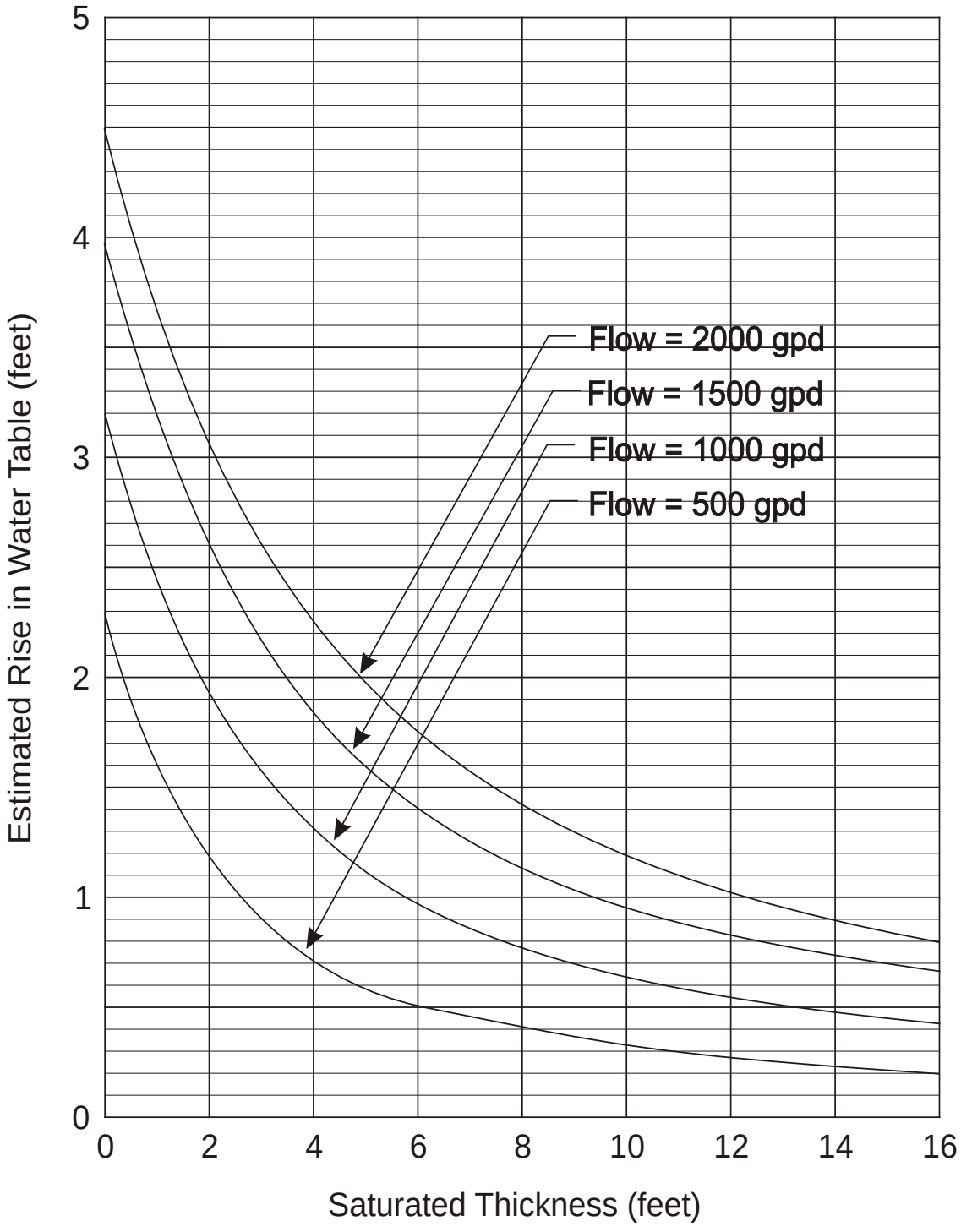
Percolation Rate(min/inch)	Maximum Slope*
Faster than 5	25%
6-45	20%
46-60	15%

*Flatter slopes may be required where the effluent may surface downslope.

(ii) All absorption systems must be located at least 15 feet from the top of any break in slope which exceeds the maximum allowed in subsection (i) above.

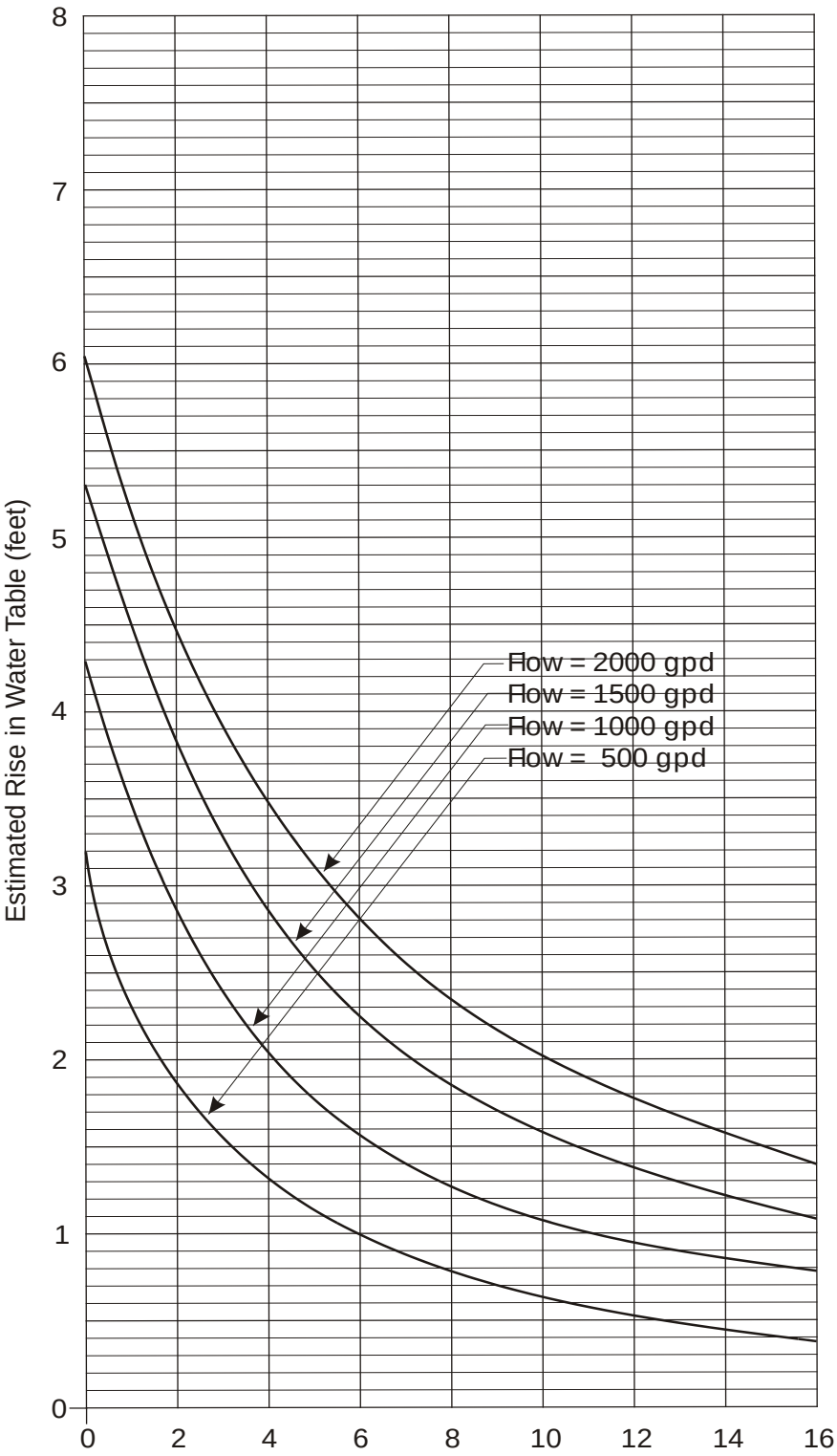
"Saturated Thickness": Distance between the seasonally high groundwater table and the under-lying impervious layer, such as: clay, bedrock, or soils with a significantly lower permeability.

"Estimated Rise in Water Table": The estimated distance the water table will rise at the center of the absorption system above the initial water table when the indicated flow is applied daily.



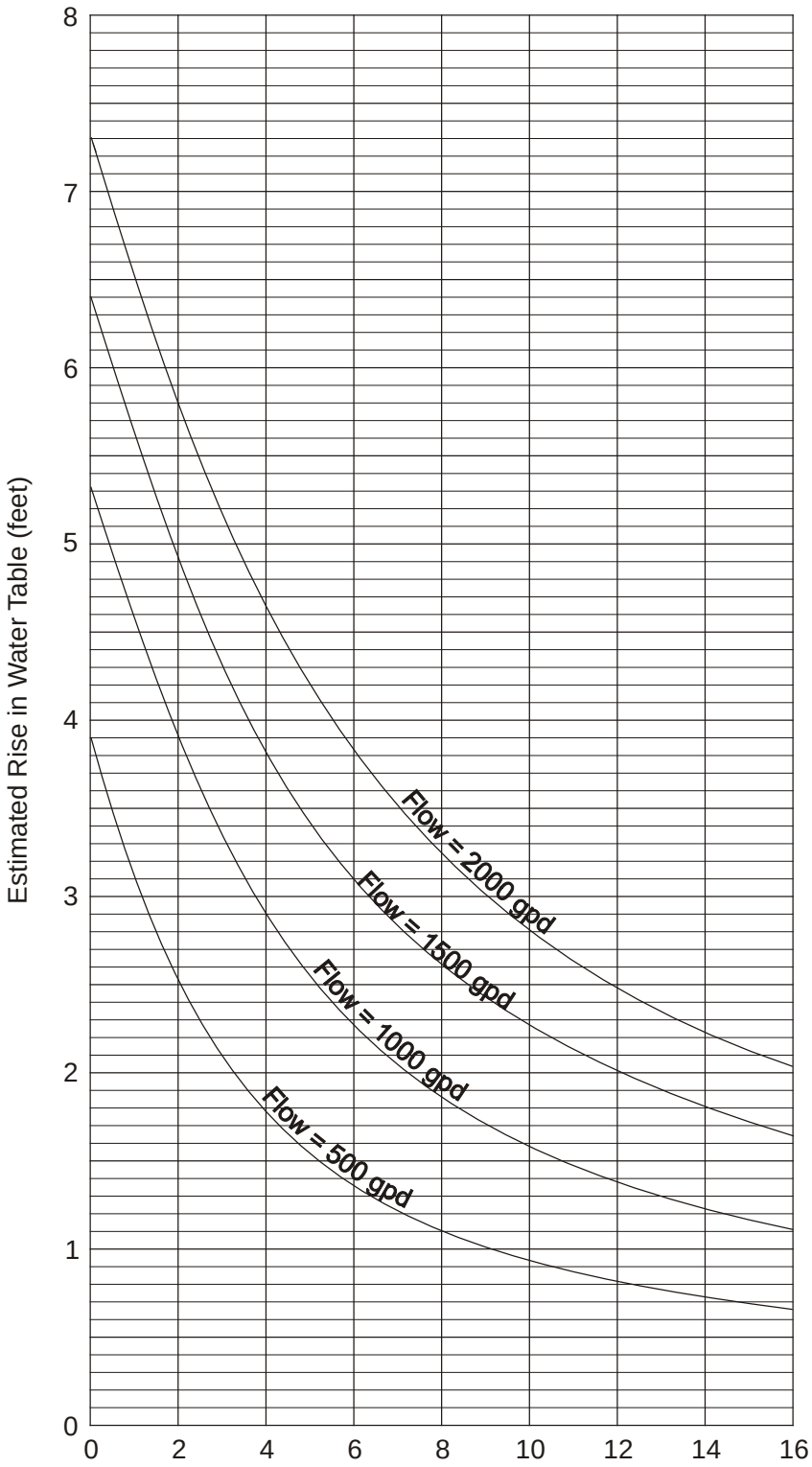
BASED ON A SOIL PERCOLATION RATE = 10 min/inch

FIGURE 1



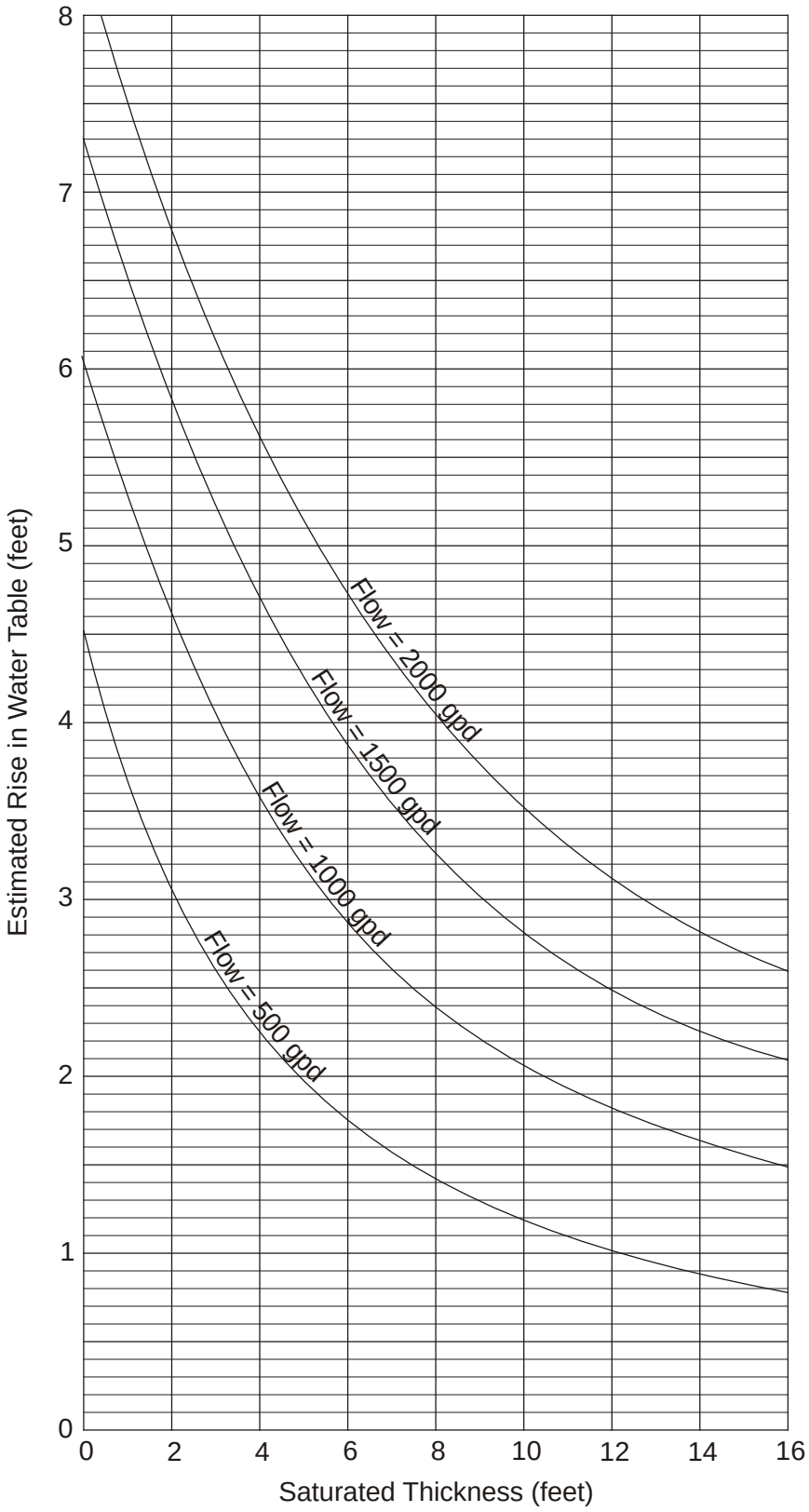
BASED ON A SOIL PERCOLATION RATE = 20 min/inch

FIGURE 2



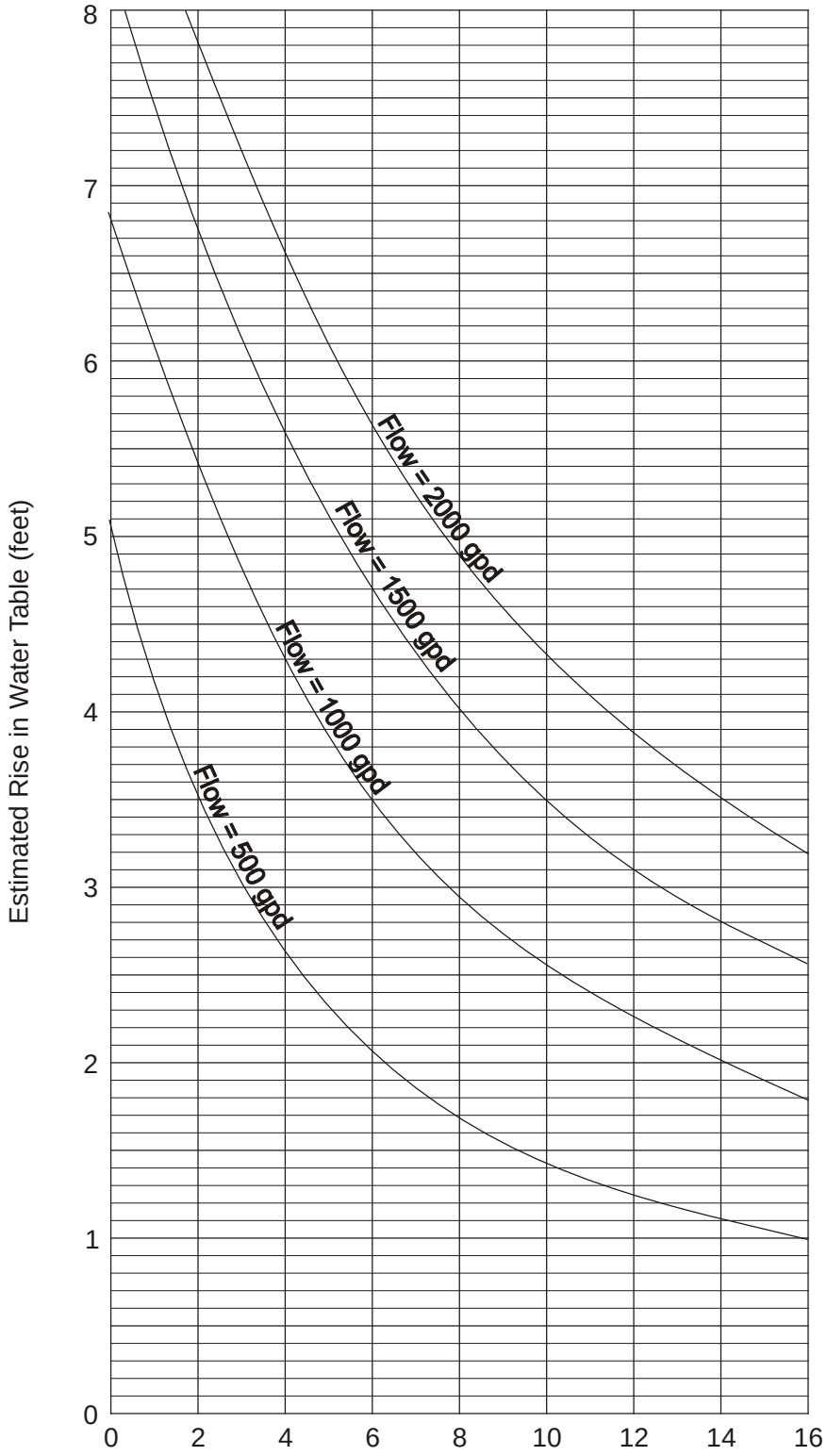
BASED ON A SOIL PERCOLATION RATE = 30 min/inch

FIGURE 3



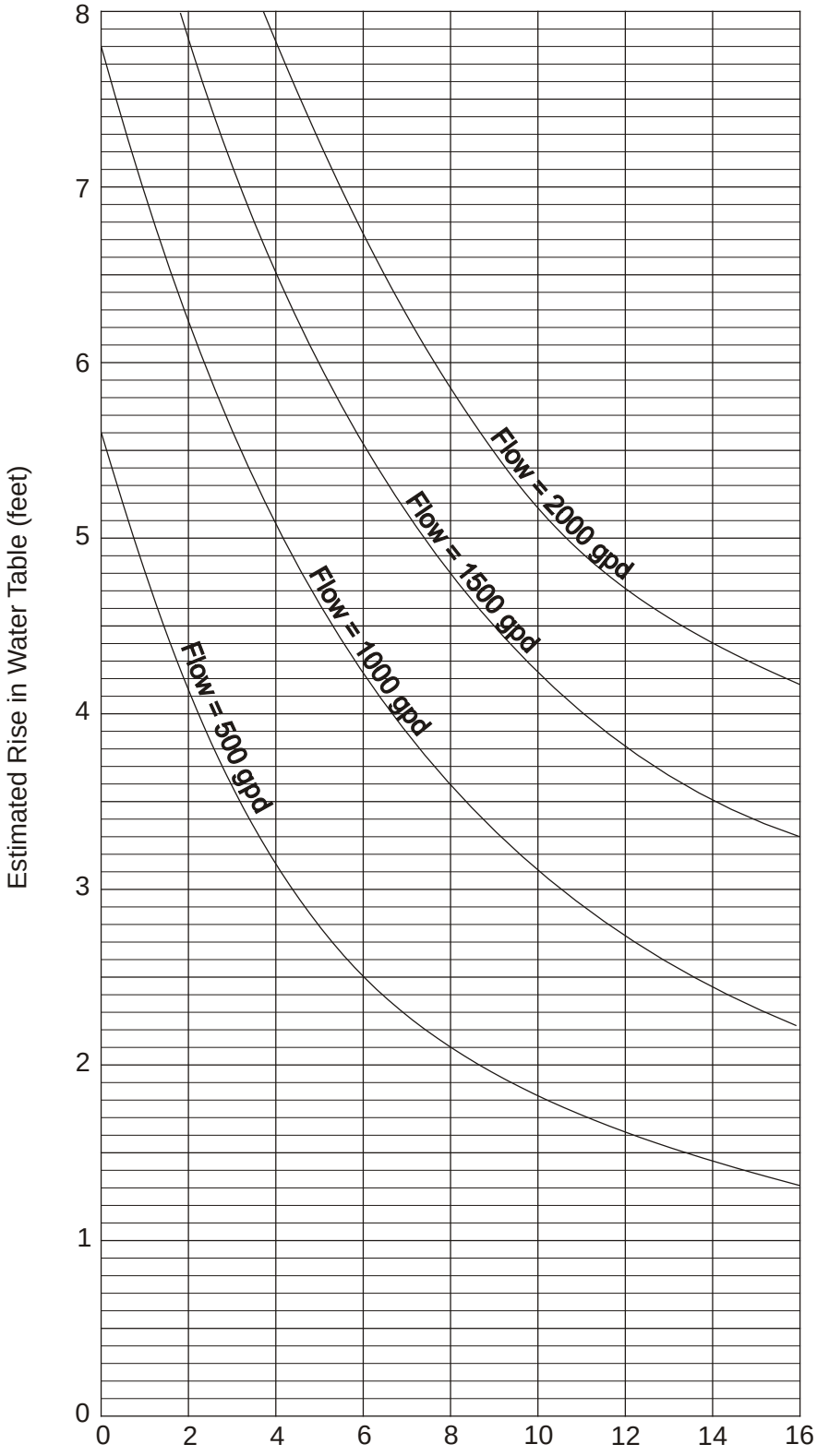
BASED ON A SOIL PERCOLATION RATE = 40 min/inch

FIGURE 4



BASED ON A SOIL PERCOLATION RATE = 50 min/inch

FIGURE 5



BASED ON A SOIL PERCOLATION RATE = 60 min/inch

FIGURE 6

Section 6. Building Sewer Pipes.

(a) Building drain pipe. All building drain pipe shall comply with the standards published in the Uniform Plumbing Code-1982 or other locally approved, nationally recognized plumbing code.

(b) Building sewer pipe. All building sewers shall be installed in accordance with the Uniform Plumbing Code - 1982 or other locally approved nationally recognized plumbing code. In the absence of an approved plumbing code, the building sewer shall comply with the following:

(i) Material. Polyvinyl Chloride (PVC), Acrylonitrile - Butadiene - Styrene (ABS), cast or ductile iron, portland cement, or vitrified clay pipe shall be used for sewer pipes. The septic tank inlet and outlet pipes shall be cast or ductile iron or schedule 40 PVC and shall extend past the septic tank excavation to solid ground.

(ii) Size. Building sewer pipes shall not be smaller than four inches in diameter. They shall be sized to handle the peak hourly flow from the building.

(iii) Slope. Building sewer pipes should be laid at a minimum slope of 1/4 inch per foot, but shall not be flatter than 1/8 inch per foot.

(iv) Alignment. Building sewer pipes should be laid in a straight line. Any single change or cumulative change of alignment of 22 ½ degrees or greater shall be served by a cleanout.

(v) Cleanouts. Cleanouts shall be provided every 100 feet maximum.

(vi) Backfilling. All sewer piping shall be laid on a firm bed throughout its entire length. It shall be protected from damage due to rocks, hard lumps of soil, debris and the like. Special care shall be utilized to prevent lateral movement or ovalation during backfill. The backfill material shall be compacted to a density at least equivalent to the trench walls. Backfill over the pipe shall be of sufficient depth to protect the pipe from expected traffic loads and the wastewater from freezing.

Section 7. Soil Absorption System Sizing.

(a) Trench, bed and seepage pit systems. The total infiltrative surface of a soil absorption system shall be calculated based on the flow rate as determined by the criteria stated in Section 3 and with the allowable loading rate as determined by using Figure 7. The total infiltrative surface is the sum of the sidewall and bottom areas of the absorption system below the invert of the distribution pipe.

(b) Soils with a percolation rate of 60 minutes per inch or greater are unacceptable for standard absorption systems.

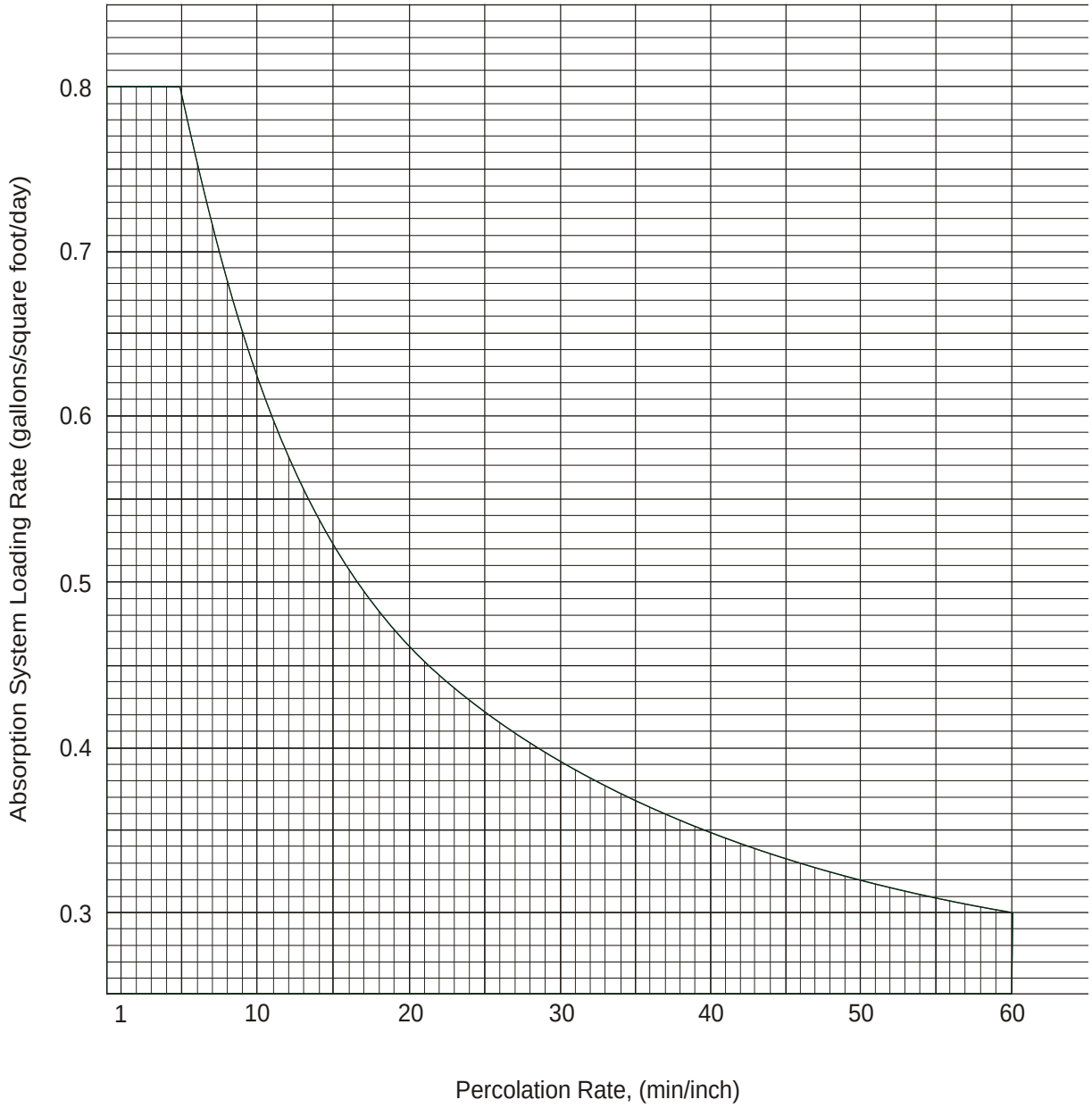

Absorption System Loading Rate (gallons/square foot/day)
0.8
0.7
0.6
0.5
0.4
0.3
1
10
20
30
40
50
60
Percolation Rate, (min/inch)

FIGURE 7

Section 8. Pretreatment.

(a) Septic tanks.

(i) Material. The septic tank shall be constructed of durable material not subject to excessive corrosion or decay and structurally capable of supporting the loads to which it will be subjected. The tank shall be water-tight.

(ii) Size.

(A) Residential units serving no more than 4 families. Minimum liquid volume of septic tanks shall be 1000 gallons for residences through four bedroom capacity. Additional capacity of 250 gallons per bedroom shall be provided for each bedroom over four.

(B) Commercial/industrial units. Septic tanks shall have a minimum effective liquid capacity sufficient to provide at least 36 hour retention at peak flow or 1,000 gallons, whichever is greater.

(iii) Configuration.

(A) The septic tank shall have a length to width ratio of no less than two to one, or be so partitioned as to provide protection against short circuiting of flow. The water depth shall be no less than four feet nor greater than six feet. The septic tank inlet shall be provided with a tee or baffle. The outlet shall be provided with a tee or baffle that extends into the middle third of the water depth to prevent floating or settled solids from carrying over into the disposal field or bed. The inlet pipe shall be at least three inches higher than the outlet pipe.

(B) If the septic tank is partitioned, the volume of the first compartment must be at least 50 percent of the total required volume. The partition shall allow venting of the tank.

(C) The outlet elevation shall be designed to provide a distance of 20 percent of the liquid depth between the top of the liquid and the bottom of the septic tank cover for scum storage.

(iv) Access. A manway access shall be provided to each compartment of the septic tank for inspection and cleaning. The manway access shall have a minimum opening of 20 inches in the least dimension. Both inlet and outlet devices shall be accessible. A cleanout having a minimum diameter of six inches shall be provided in each tank compartment and shall extend to the ground surface and be capped.

(v) Installation. The septic tank shall be placed on a level grade and a firm bedding to prevent settling.

(b) Aerobic units.

(i) Residential units serving no more than four dwelling units. Aerobic treatment units can be used as a pretreatment device for a single residential unit serving no more than four families provided the unit carries the seal of testing and approval from the National Sanitation Foundation (NSF) for the NSF Standard No. 40 - 1978. The unit shall be sized based on the flow quantities stated in Section 3. No reduction in the sizing of soil absorption systems or the final treatment systems shall be permitted if an aerobic unit is used instead of a septic tank.

(ii) Commercial and residential units serving more than four families. Aerobic units treating wastewater generated from other than a single residential unit serving four families or less shall meet the design requirements of Part B or Part C of Chapter XI.

(c) Interceptors - grease, oil, silt and sand.

(i) When required. Liquid wastes containing grease, oil, or silt and sand shall provide an interceptor before the septic tank. Waste streams from residential living units are exempt from this requirement.

(ii) Material. The interceptor shall meet the material requirements of Section 8 (a)(i).

(iii) Sizing. Interceptors shall be sized using one of the following formulas:

Commercial kitchens (grease, garbage)

Number of meals per peak hour	**X**	Waste Flow rate*	**X**	Retention time**	**X**	Storage factor***	=	Interceptor size(liquid capacity)

Car wash (sand, silt, oil)

Total washer equipment flow rate (GPM)	**X**	60	**X**	Retention time	**X**	Storage factor	=	Interceptor size (liquid capacity)

Laundries (grease, lint, silt)

Number of 2 cycles machines X per hour	**X**	Waste flow rate	**X**	Retention time	**X**	Storage factor	=	Interceptor size (liquid capacity

*Waste flow rate - see Table 1.

** Retention Times

Commercial kitchen waste:	
Dishwasher and/or disposal	2.5 hours
Single service kitchen:	
Single serving with disposal	1.5 hours
Car washers	2.0 hours
Laundries	2.0 hours

***Storage Factors

Fully equipped commercial kitchen	8 hr. operation: 1 16 hr. operation: 2 24 hr. operation: 3
Single service kitchen	1.5
Carwashers	self-serve: 1.5 employee operated: 2
Laundries	1.5 (allows for rock filter)

(iv) Configuration. Interceptors shall have a minimum of two compartments with the first compartment having at least 50 percent of the total required volume. Each compartment shall be vented.

(v) Access. The access shall meet the requirements of Section 8(a)(iv).

(vi) Location. Interceptors shall be located so that they are easily accessible for inspection, cleaning, and removal of the collected wastes. Interceptors shall be placed as close as practical to the fixture it serves. The wastewater from fixtures not producing grease, oil, or sand and silt shall bypass the interceptor.

Section 9. Dosing Systems Following Septic Tanks.

(a) Pumping systems for flow up to 2000 gallons per day.

(i) Pump tank. Where only one pump is provided, the pump tank shall have the minimum volume as required in Table 4 below. The tank shall comply with the material requirements for septic tanks. The pump tank shall be vented. The vent shall have a downward turn that terminates at least 12 inches above ground and be provided with a screen. The pump tank shall have an access manhole provided with an opening at least 20 inches in least dimension.

Table 4

Pump Tank
Volume (gallons) Required Between

AVERAGE FLOWS (gallons per day)	"OFF" & "ON" SWITCH	"ON" & "ALARM" SWITCH	"ALARM" SWITCH & TANK INLET	RECOMMENDED PUMP CAPACITY (gpm)
0-499	100	50	200	10
500-999	200	100	400	20
1000-1499	300	100	600	30
1500-2000	400	100	800	40

(ii) Pumps.

(A) Sizing. The pump shall have a flow rate of at least ten gallons per minute when installed. The pressure loss (feet of head) of the system can be calculated by adding: the elevation difference

between the discharge outlet at the soil absorption system and the low water level in the pump tank; and the friction losses incurred in the pressure transfer pipe and distribution piping. Table 5 may be used to estimate the head loss of the pipe when pumping ten gallons per minute and using plastic pipe.

Table 5

Diameter (inches)	Head Loss per 100 feet of pipe (in feet)
1	12
1¼	4
1½	2

(B) Installation/removal. The pump shall be installed in the tank so that it can be removed without entering the tank. This can be accomplished by (1) looping the pipe up near the access manhole with a pipe union provided at the top of the loop, (2) using a quick disconnect sliding coupler, or (3) using a pitless adapter. Chains, cable, or piping can be used to lift the pump out of the tank if designed for this loading. Setting the pump on an 8-inch block minimizes the transfer of any solids that may enter the pump tank.

(C) Electrical controls. The electrical control system for the wastewater pump shall consist of a "pump off" switch, a "pump on" switch, and a "high water alarm" switch which shall be located to provide the necessary volumes as stated in Table 4. All electrical controls (pump electrical cord, switches, etc.) shall comply with the National Electrical Code - 1981, Class 1, Group D, Division 1 locations. All openings around the cables or cords entering the tank shall be sealed.

(iii) Pressure transfer pipe. The pressure transfer piping between the tank and the leach system shall be designed to drain after each pump cycle to prevent freezing. This can be accomplished by either eliminating the check valve at the pump or by providing a weep hole in the pipe in the tank. If the pipe is long, the tank shall be enlarged by the volume of the pipe to accommodate the volume of liquid drained from the pipe.

(b) Syphons. Where automatic syphons are used, they shall be designed to empty the syphon tank in less than 20 minutes. The syphon tank shall be sized in accordance with Section 9(a)(i) above.

(c) For all systems exceeding 2000 gallons per day. The pumping system shall comply with the standards of Part B of Chapter XI.

Section 10. Subsurface Treatment and Disposal Systems.

(a) General requirements.

(i) Replacement area. An area shall be designated and shown on the plans for future installation of a replacement absorption system. If a trench system is used, the replacement area may include the area between the trenches if sufficient spacing has been provided. At least three feet of undisturbed soil shall remain between the existing and replacement trench side walls.

(ii) Protection. Effort shall be made to protect the natural absorptive properties of the soil.

Soil absorption systems shall not be installed during adverse weather or soil conditions. Rain, severely cold temperatures, or excessively moist soils are considered adverse weather or soil conditions. All smeared or compacted surfaces shall be restored to their original infiltrative conditions prior to placement of the stone.

(iii) Runoff. Surface runoff shall be diverted around or away from all soil absorption systems.

(iv) Stone. Soil absorption system stone shall be sized between 1/2-inch to 2 1/2inches. At least two inches of stone shall be placed over the distribution pipe, and at least six inches of stone shall be placed under and beside the distribution piping. A minimum of 12 inches of stone shall be placed between a seepage pit wall and structural liner. The stone shall be free from sand, silt, and clay.

(v) Gravity pipe. All plastic gravity absorption system pipes shall have a minimum diameter of four inches and shall conform to ASTM standard D2729. Piping in all horizontally constructed absorption systems shall be layed with the holes centered around the vertical axis at the bottom of the pipe. All field tile pipe shall be spaced 1/4 inch apart. Piping in horizontally constructed absorption systems shall have a maximum slope of three inches per 100 feet.

(vi) Pressure pipe. All pressure distribution piping shall be designed to withstand the anticipated pressures with a safety factor of two, provide uniform application of the wastewater, and have non-clogging orifices.

(vii) Distribution box. If a distribution box is used, it shall be installed to provide uniform distribution of the wastewater and shall be placed so that it will not be subject to frost heave.

(viii) Stone cover. A suitable cover such as untreated building paper, filter cloth, or straw shall be placed over the stone prior to backfilling the system.

(ix Earth cover. A minimum of 12 inches of earth shall be placed over the absorption system stone. The earth shall be permeable soil that will allow aeration of the system and will support the growth of grass. The earth cover shall be graded to insure that water will not pond on the surface.

(x) Levelness. The bottom of soil absorption systems and each segment of a sidehill system shall be level.

(b) Special requirements for seepage pits. If a structural lining is needed to support stone in a seepage pit, it shall be constructed of durable material not subject to excessive corrosion or decay and structurally capable of supporting the loads to which it will be subjected. The lining shall be perforated or otherwise designed to allow the passage of wastewater. Seepage pits shall be separated by a minimum distance equal to 3 times their diameter.

(c) Special requirements for mounded systems.

(i) Sizing.

(A) The infiltrative surface between the stone and the fill material shall be sized based on the flow rate as determined by Section 3 and the allowable loading rate as determined by Figure 7 of Section 7 for the percolation rate of the fill. The total infiltrative surface is the sum of the sidewall and bottom areas of the stone - soil interface below the distribution pipe.

(B) The interface area between the fill soil and the native soil shall be sized based on the infiltration rate of the native soil as determined by Figure 7 of Section 38 but shall not be smaller than a system designed to the requirements of subsection (ii) below.

(ii) Grade. The finished grade shall extend at least three feet horizontally beyond the stone and then be sloped to the parent soil at a grade no steeper than four horizontal to one vertical.

(iii) Fill soil. The fill soil that is placed between the native soil and the stone shall have a minimum percolation rate of five minutes per inch. Topsoil shall be placed over the mound to promote vegetative cover.

(iv) Preparation. All trees, roots, and other organic matter shall be removed from the area to be occupied by the mound.

(d) Special requirements for trench systems. A minimum separation of three feet or a horizontal distance equal to 1.25 times the vertical depth of the trenches, whichever is greater, of undisturbed soil shall be maintained between adjacent trench sidewalls.

(e) Special requirements for serial sidehill trench or bed systems.

(i) Separation. A minimum of three feet of undisturbed soil shall be maintained between adjacent trench or bed side walls.

(ii) Levelness. The bottom of each serial trench or bed system shall be level.

(iii) Overflow. The overflow pipe between serial leach systems shall be set no higher than the mid-point of the upstream distribution pipe. The overflow pipe shall not be perforated.

(f) Special requirement for bed systems. The distribution system piping shall be spaced no more than 10 feet apart.

Section 11. Evapotranspiration Beds.

(a) Sizing. The area of evapotranspiration beds shall be determined using the following formula:

$$\text{AREA} = 586 \left[\frac{Q}{\text{PET} - P} \right]$$

where:

Area = Area of the evapotranspiration bed at the ground surface in square feet

Q = Average daily sewage flow, gallons per day, (0.6 times the flow determined from Table 1)

PET = Potential evapotranspiration rate in inches per year

P = Annual precipitation rate in inches per year.

(b) Construction.

(i) If an impervious barrier is necessary for the protection of groundwater it shall be installed between the evapotranspiration bed and the native soil. It shall be a polyvinyl chloride sheet with a minimum thickness of 20 mils or equivalent. A 3 inch layer of sand shall be placed under and over the liner.

(ii) The bottom 12 inches of the bed shall be filled with clean stone 1/2 - 2 1/2 inches in diameter.

(iii) Perforated pipe complying with Section 10(a)(v) shall be placed in the stone.

(iv) Four inches of pea gravel (less than 1/4-inch in diameter) or durable filter cloth shall be placed over the stone.

(v) A 24-inch uniform sand layer in the size range of D50 (0.10mm) shall be placed on top of the pea gravel or filter cloth.

(vi) A six inch layer of sandy topsoil shall be placed on top of the evapotranspiration bed.

(vii) The bed should be vegetated with small shrubs and/or grasses such as fescue, brome, or alfalfa.

(viii) The evapotranspiration bed shall be placed at a depth sufficient to prevent surcharging of the septic tank.

Section 12. Holding Tanks.

(a) Uses. Holding tanks shall not be used for residential systems when other alternative systems are available, except on a temporary, seasonal or intermittent basis, or when used to correct a failed subsurface disposal system when other alternatives are unavailable. Use of holding tanks for new construction is prohibited. Where holding tanks are allowed, they shall be sized on the basis of seven days storage at the flow rate determined from Table 1.

(b) Acceptance. A letter of verification from the local receiving agency, denoting acceptance of the wastewater generated shall be submitted with the plans.

(c) Location. The location and construction of holding tanks shall meet the requirements for septic tanks in Sections 4(a)(i) and Section 8(a)(i) respectively.

(d) Vent. Each holding tank shall be provided with a two inch minimum diameter vent ending in a return elbow above final grade. The vent shall terminate at least 30 feet from any door, window, or fresh air inlet. The vent should be screened.

(e) Alarm. All holding tanks shall be equipped with a high water level alarm. The device shall be an audible alarm or an indoor illuminated alarm. The alarm level shall be placed at 3/4 the depth of the tank.

(f) Pumpout. A six inch pump out pipe which extends to the surface shall be provided. It shall be capped at all times.

Section 13. Privies.

(a) General requirements.

(i) All privies shall be designed and constructed to prevent access by flies and rodents.

(ii) If indoor plumbing is installed, the grey water disposal method shall meet the requirements of Section 3 through 12. The minimum design flow for grey water shall be obtained from Table 1 with a reduction of 33 percent allowed for the elimination of black wastes.

(iii) The privy shall consist of a vault and an outhouse building.

(b) Isolation. The isolation requirements for privies shall comply with Section 4(a)(i) for absorption systems.

(c) Soil exploration. Soil exploration to a minimum depth of 4 feet below the bottom of the proposed vault shall be made to provide information on subsoil condition.

(d) Groundwater and bedrock separation.

(i) The depth to seasonally high groundwater and bedrock or impermeable soil shall be at least four feet from the bottom of an unlined vault.

(ii) The depth to seasonally high groundwater from the bottom of a water tight vault shall be sufficient to prevent floatation of the empty vault.

(e) Sizing. Vaults shall have a minimum capacity of 500 gallons per riser and shall be a minimum of 4.5 feet deep.

(f) Construction.

(i) The vault shall be constructed and installed to resist breakage and damage imposed by frost heave, uplift pressures from a fluctuating water table, loads imposed by the outhouse building and soils, and damage that may be caused by vandalism or rough cleaning procedures. The vault shall be constructed to prevent access by flies.

(ii) Materials used for vault construction shall be resistant to alkali attack, hydrogen sulfide gas, and other corrosive elements associated with decomposing waste.

(iii) A clean-out manhole shall be installed and shall have a minimum opening of 20 inches in the least dimension. The manhole shall be located outside of the outhouse building and be equipped with a tightfitting secure cover.

(iv) The vault shall be ventilated to a point outside and above the outhouse building. The outhouse building shall have a set of vents installed near the floor on two opposite sides of the building and a roof vent that has a rain cap. All vents shall be screened.

(g) Vault additives. No chemical or biological additive shall be placed in the vault that may adversely effect the operation of a sewage treatment facility where the vault waste will ultimately be disposed or that may adversely impact the quality of the groundwater as specified in Chapter VIII, “Quality Standards for Groundwater of Wyoming”.

Section 14. Chemical Toilets.

(a) General requirements. Chemical toilets shall only be used in the containment of body wastes. These requirements apply only to the use of chemical toilets for permanent structures.

(b) Greywater. If indoor plumbing is installed, a separate greywater disposal is required and shall meet the requirements of Section 3 through 12. The minimum design flows for greywater shall be obtained from Table 1 with a reduction of 33 percent allowed for the elimination of blackwater wastes.

(c) Disposal. All chemical toilet wastes shall be disposed of at an approved wastewater facility. A letter of verification from the receiving agency, denoting acceptance of the wastewater generated shall be submitted with the plans. These wastes shall not be discharged into a soil absorption system.

(d) Construction. Chemical toilets shall be constructed and installed to resist breakage or damage from routine usage. Outdoor chemical toilets shall be adequately stabilized and secured to prevent overturning. Materials used shall be resistant to the sewage wastes and the chemicals encountered. The holding compartment of the toilet shall be constructed to prevent accessibility to the public and to disease transmitting vectors.

(e) Additives. No chemical or biological additive shall be placed in the toilet that may adversely affect the operation of a sewage treatment facility where the toilet waste will ultimately be disposed or that may adversely impact the quality of the groundwater as specified in Chapter VIII, "Quality Standards for Groundwater of Wyoming."

Section 15. Small Non-discharging Waste Stabilization Ponds.

(a) General requirements.

(i) The use of this section for small nondischarging waste stabilization ponds applies only to those systems defined as small wastewater systems. All other treatment systems shall meet the requirements of Part B or Part C of Chapter XI as applicable.

(ii) Non-discharging waste stabilization ponds shall only be constructed in soils where the percolation rate exceeds 60 minutes per inch and the soil is at least 1 foot thick on both the sides and bottom of the pond. If the 60 minute per inch percolation rate cannot be obtained, a sufficient clay shall be incorporated into the top foot of soil until the 60 minute per inch percolation rate is reached. An impermeable artificial liner of 20 mils in thickness may be substituted.

(b) Isolation. The isolation distances shall meet the requirements for absorption systems as specified in Section 4(a)(i).

(c) Groundwater protection and bedrock or impermeable soil separation.

(i) For single family homes, the depth to seasonally high groundwater shall be at least four feet from the bottom of pond.

(ii) For all "small wastewater systems" other than single family homes, a minimum of three feet of unsaturated soil shall be maintained between the bottom of the pond and the estimated groundwater mound imposed on the seasonally high groundwater table. The height of the groundwater mound can be estimated from Figures 1-6, Section 5 in conjunction with the average daily sewage flow.

(d) Sizing.

(i) The area of the lagoon shall be calculated based on the following formula:

$$A = \frac{584 \times Q}{(365 \times S) + (E - P)} \times 1.3$$

A = Area of the lagoon at the 5 foot water level in square feet

Q = Average daily sewage flow, gallons per day, (0.6 times the flow determined from Table 1)

S = Soil permeability in inches per day "S" cannot be greater than 0.25 inches per day "S" shall equal zero for an artificial liner or for bedrock

E = Annual evaporation rate in inches per year

P = Annual precipitation rate in inches per year

(ii) A minimum water level of at least two feet shall be maintained in the pond at all times, including start-up.

(iii) A minimum free board of two feet shall be provided between the lowest embankment berm and the maximum water level. The maximum water level shall not be less than five feet.

(e) Construction requirements.

(i) The slopes of the inside dikes shall not be steeper than three horizontal to one vertical nor flatter than four horizontal to one vertical. The slopes of the outside dikes shall not be steeper than three horizontal to one vertical and shall not allow surface runoff to enter the pond.

(ii) All organic material and debris shall be removed from the pond site prior to construction.

(iii) All fill material shall consist of impervious material that is well compacted and free of rocks, frozen soil, or other large material.

(iv) The minimum top width of the dike shall be eight feet.

Section 16. Commercial/Industrial Wastes.

(a) General requirements. Those requirements listed in Section 1 through 12 and 15 that are applicable to the specific commercial/industrial wastewater or combination of commercial/industrial and domestic wastewater shall apply to this section.

(b) Hydrogeologic investigation. If the wastewater is classified as, or determined to be hazardous and/or toxic and/or contain petroleum products, the applicant shall demonstrate to the administrator that any discharge or seepage from the wastewater facility will not cause a violation of the surface and/or groundwaters of the state in accordance with Chapter I, "Quality Standards for Wyoming Surface Waters"

and Chapter VIII, “Quality Standards for Wyoming Groundwaters.” Due to the wide variety of wastes, wastewater and site conditions, the latest available scientific information shall be used to demonstrate that violation will not occur.

(c) Impact. If the impact of the hazardous and/or toxic substance and/or petroleum products cannot be determined and mitigated, disposal of the wastewater using a soil absorption system shall be prohibited.

(d) Pre-treatment. Pre-treatment of the wastewater to remove the hazardous and/or toxic substance(s) and/or petroleum products shall be required prior to disposal if deemed necessary to protect the groundwater of the state.

APPENDIX A

Percolation Test Procedure

(a) Location. The percolation test holes shall be spaced uniformly over the proposed absorption field site. A minimum of three test holes are required.

(b) Preparation. A 4 inch to 12 inch hole shall be dug or bored to the proposed depth of the absorption field. The walls shall be vertical. To expose a natural soil surface, the sides and bottom shall be scraped with a sharp pointed instrument and the loose material shall be removed from the hole. Coarse sand or gravel shall be placed in the bottom of the hole to prevent it from scouring and sealing.

(c) Presoaking. The purpose of presoaking is to have the water conditions in the soil reach a stable condition similar to that which exists during continual wastewater application. The minimum time of presoaking varies with soil conditions but must be sufficiently long so that the water seeps away at a constant rate. The following presoaking instructions are usually sufficient to obtain a constant rate.

(i) In sandy soils, place 12 inches of water in the hole and allow it to seep away. Fill the hole again with 12 inches of water and if the water seeps away in ten minutes or less, it indicates that the soil is excessively permeable and requirements in Section 5(d) of these regulations shall be followed. If the water remains after ten minutes, additional saturation is necessary. Refer to Appendix A(c)(ii) below.

(ii) In other soils, maintain 12 inches of water in the hole for at least four hours. After the four hours of water contact, allow the soil to swell for 12 hours before starting the percolation rate measurement as stated in Appendix A (d) below.

(d) Percolation rate measurement. The water level should be adjusted to six inches above the gravel initially and after each time interval measurement when necessary.

(i) In other soils, establish a fixed reference point and measure the drop in water level at constant intervals. The water level drop should be measured to the nearest 1/8 of an inch. The test may be terminated when the water drop is consistent for three consecutive measurements.

(ii) The percolation rate for each hole is calculated as follows:

$$\frac{\text{Time Interval (Minutes)}}{\text{Final Water Level Drop (inches)}} = \text{Percolation Rate (minutes/inch)}$$

If only three to five percolation tests are performed, the design percolation rate for the absorption system is the slowest rate from all the holes tested. If six or more percolation tests are performed, the design percolation rate for the absorption system is the average of all the holes tested as determined by the above formula.