

Design Criteria for Septic Tanks and Individual Disposal Systems

(Note: For large-capacity septic systems- equal to or greater than capacity of 5,000 gallons per day, please refer to WTS-23)

General

The following minimum design criteria for individual sewage disposal systems are to be complied with unless approval for revision is obtained from NDEP. Based on site-specific conditions, additional information may be required. This criteria is not meant to supersede or circumvent any existing state policy, statute or regulation. The Bureau of Water Pollution Control reserves the right to require further site characterization and additional design criteria.

1. Minimum Information Required on Maps:
 - a. Subdivision name, legal description and physical location.
 - b. Name, address and telephone number of engineer/land surveyors.
 - c. Engineer/Surveyor stamp, signature and date on the map.
 - d. Statement, labelling the map tentative or final.
 1. Number of lots and/or units.
 2. If a final map is submitted, the date of tentative approval by local government.
 - e. Statement that sewage treatment and disposal is by individual systems.
 - f. Contours at a minimum interval of 5 feet.
 - g. Location of the percolation and boring test holes.
 - h. Location of all domestic water supply wells on the property and within 200 feet of the property. The source of the drinking water for the project must be stated.

- i. The 50 year flood zone must be delineated, or a statement must be made that the property is not within this flood zone.
 - j. The distance to the nearest public sewer system. If none within 2 miles, so indicate.
 - k. The distance within 500 feet to any watercourse (pond, lagoon, stream, etc.). If none, so indicate.
 - l. A statement by local government that septage from septic tanks can be properly disposed.
 - m. A master plan delineating the future development and intended use of all land under the ownership or control of the developer in the vicinity of the proposed subdivision.
 - n. A subdivision vicinity map.
2. Site Evaluation Information Required:
- a. A minimum of two percolation test holes. Percolation tests must be completed in accordance with NAC 444.796. Infiltration/permeability tests may be used to supplement percolation test findings, but they may not be used as a substitute.
 - b. A minimum of two deep hole pits. These pits must be excavated to a minimum of five feet below the bottom of the proposed disposal system elevation. The following factors must be evaluated:
 - 1) Depth to bedrock, which is any rock which can not be excavated by power equipment, or is so slowly permeable that it will not transmit effluent, or has open fractures or solution channels.
 - 2) Depth to estimated high groundwater level, which is the highest elevation to which soil is saturated, as observed as a free water surface, or has been saturated as may be indicated by mottling.
 - 3) Depth to limiting soil layer, which is soil based on observed characteristics could have a low percolation rate, i.e. caliche.
 - 4) Thickness and texture of each soil layer encountered.

- 5) General color and color variation (i.e. mottling).
 - 6) Other prominent features such as structure, roots, fines etc.
- c. The land slope and amount of suitable area for subsurface disposal.

3. Septic Tank Requirements

- a. All liquid waste and wastewater shall discharge into the septic tank. Roof, footing, garage and surface water drainage and cooling and process water is prohibited and shall be excluded.
- b. The septic tank shall be located so that it is readily accessible. The following are minimum horizontal separation distances that must be provided between the tank and the features listed below:
 - 1. Buildings or structures 8 feet
 - 2. Property lines 10 feet
 - 3. Lakes, streams or water courses 100 feet
 - 4. Water supply wells 200 feet
 - 5. Water supply lines 10 feet
(mains & laterals)
- c. The septic tank shall be constructed of sound and 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 watertight.
- d. The tank shall be 1,000 gallons, minimum and will be sized as follows:
 - 1) Waste/sewage flow, up to 1500 gallons per day -
Flow x 1.5 = septic tank size
 - 2) Waste/sewage flow, over 1500 gallons per day -
Flow x 0.75 + 1125 = septic tank size
- e. The NAC chapter 444 should be reviewed for the requirements for individual residential septic system permits and construction specifications.

- f. The following sewage flow rates should be used when existing or closely related data is not available.

TYPE OF OCCUPANCY		UNIT GALLONS PER DAY
1.	Airports	15 per employee 5 per passenger
2.	Auto washers	Check with equipment manufacturer
3.	Bowling alleys (snack bar only)	75 per lane
4.	Camps:	
	Campground with central comfort station with flush toilets, no showers	35 per person 25 per person
	Day camps (no meals served)	15 per person
	Summer and seasonal	50 per person
5.	Churches (Sanctuary) with Kitchen waste	5 per seat 7 per seat
6.	Dance halls	5 per person
7.	Factories	
	No showers	25 per employee
	With showers	35 per employee
	Cafeteria, add	5 per employee
8.	Hospitals	250 per bed
	Kitchen waste only	25 per bed
	Laundry waste only	40 per bed
9.	Hotels (no kitchen waste)	60 per bed (2 person)
10.	Institutions (Resident)	75 per person
	Nursing home	125 per person
	Rest home	125 per person

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11.	Laundries, self-service (minimum 10 hours per day)50 per wash cycle Commercial	Per manufacturer's specifications
12.	Motel with kitchen	50 per bed space 60 per bed space
13.	Offices	20 per employee
14.	Parks, mobile homes picnic parks (toilets only) recreational vehicles - without water hook-up with water and sewer hook-up	250 per space 20 per parking space 75 per space 100 per space
15.	Restaurants - cafeterias toilet kitchen waste add for garbage disposal add for cocktail lounge kitchen waste - disposable service	20 per employee 7 per customer 6 per meal 1 per meal 2 per meal 2 per meal
16.	Schools - Staff and office Elementary students Intermediate and high with gym and showers, and with cafeteria, add Boarding, total waste	20 per person 15 per person 20 per student 5 per student 3 per student 100 per person
17.	Service station, toilets	1000 for 1st bay 500 for each addi- tional bay
18.	Stores public restrooms, add	20 per employee 1 per 10 sq.ft. floor space
19.	Swimming pools, public	10 per person
20.	Theaters, auditoriums drive-in	5 per seat 10 per space

- g. For subdivisions where a septic tank will service 2 or more residential dwellings, appropriate plans and specifications must be submitted to NDEP for approval.

4. Disposal Design

a. Trench

- 1. The absorption trench gives additional treatment to the sewage from the septic tank. Only domestic sewage shall be treated by disposal trenches.

- 2. The following are minimum horizontal separation distances that must be provided between the trench and the features listed below:

a)	Building or structures	8'
b)	Property lines	10'
c)	Lakes, streams or watercourse	100'
d)	Water supply wells	100'
e)	Water supply wells, not sealed for the first 50 feet	150'
f)	Water supply lines (mains & laterals)	25'

- 3. The disposal trench system shall be designed in accordance with:

$$Q = \frac{5}{\sqrt{t}}$$

where Q = rate of sewage application (gallons per sq. ft. per day) and t = percolation rate (minutes per inch).

- a) Septic tank capacity divided by Q (application rate) equals the area in square feet of absorption area required.
 - b) The maximum useable sidewall is three feet. Thus the maximum absorption area allowed per linear foot of trench is six square feet.
- 4. For domestic sewage from commercial or industrial sewage disposal systems, or systems servicing more than one residential dwelling, the minimum acceptable percolation rate is 10 minutes per inch.

5. Each absorption trench system shall have a minimum of two trenches.
6. The maximum length of any one trench shall be one hundred feet.
7. The bottom of the absorption trenches shall be at least eighteen inches and no more than sixty inches below the finished grade.
8. The NAC chapter 444 should be reviewed for the requirements for individual residential septic system permits and construction specifications.
9. For subdivisions where an absorption trench system will service 2 or more residential dwellings, appropriate plans and specifications must be submitted to NDEP for approval. Leach line inspection pipes will be required for all systems servicing 2 or more dwellings.

b. Absorption Bed

1. The information described under items 4a.1 and 2 apply.
2. The disposal bed shall be designed in accordance with:

$$Q = \frac{5}{\sqrt{t}}$$

where Q = rate of sewage application (gallons per sq. ft. per day) and t = percolation rate (minutes per inch).

- a. septic tank capacity divided by Q (application rate) equals the area in square feet of absorption area required.
 - b. the absorption area required must equal the area of the bottom of the disposal bed.
3. For commercial or industrial domestic sewage disposal systems, or systems servicing more than one residential dwelling, the minimum acceptable percolation rate is 10 minutes per inch.
 4. Each absorption bed shall have a minimum of two distribution lines.
 5. The maximum length of any distribution line shall be one hundred feet.

6. Distribution lines within an absorption bed shall be uniformly spaced no more than six feet nor less than four feet apart.
7. Distribution lines within an absorption bed shall be placed no more than three feet nor less than one and one-half feet from the sidewall of the bed.
8. The bottom of the absorption bed shall be at least eighteen inches and no more than sixty inches below the finished grade.
9. For subdivisions where an absorption bed system will service 2 or more residential dwellings, appropriate plans and specifications must be submitted to NDEP for approval.

c. Dosing Tanks.

1. Dosing tanks must be provided where there are over 500 lineal feet of distribution lines in the absorption system (trench or bed).
2. Dosing tanks must have sufficient capacity to distribute sewage equally to all parts of the absorption system at 3 to 4 hour intervals. Sufficient capacity is equivalent to 60 to 75 percent of the interior volume of the tile in the system.
3. Siphons must be automatic and must be of an alternating type when the length of the distribution lines is over 1,000 feet. Alternating siphons must discharge to separate disposal areas.
4. Construction and materials must conform to the provisions of NAC 444.800 to 444.812, inclusive.
5. Dosing tanks must be constructed in a manner that will permit venting the absorption system.
6. Each dosing tank or compartment must be provided with an access opening located so as to facilitate repair or adjustment of the siphon. The openings must be over the siphon or siphons and conform to the provisions of subsection 6 of NAC 444.800.