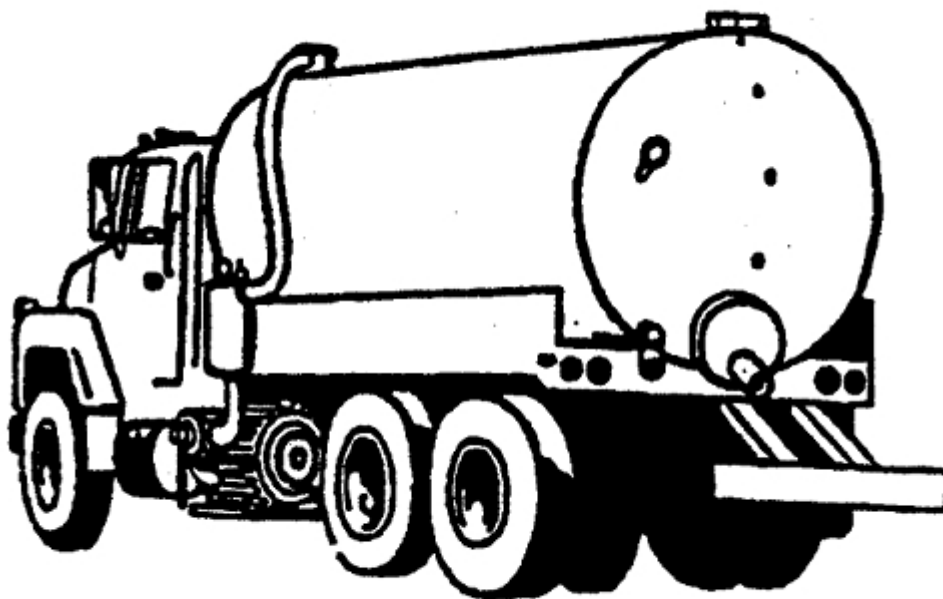




Wisconsin Department of Natural Resources Septage Service Operator Certification

Septage Service Study Guide Grade L 2016



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Septage Service Study Guide Grade L - 2016

Preface

The operator's study guide represents the results of an ambitious program. Operators of septage servicing facilities, regulators, educators, and local officials jointly prepared the objectives and exam questions for the Septage Servicing Operator (Grade T) and Septage Servicing (Grade L) Certification Exams.

Septage Service Study Guide Grade L - 2016

Table of Contents

Section 1 - Principle of Septage Servicing	pg. 1
Section 2 - Structure and Function	pg. 7
Section 3 - Operation	pg. 9
Section 4 - Maintenance	pg. 19
Section 5 - Monitoring	pg. 21
Section 6 - Troubleshooting	pg. 22
Section 7 - Safety	pg. 22
Section 8 - Calculations	pg. 24

Section 1 - Principle of Septage Servicing

1.1 Purpose.

The purposes of this chapter are to establish standards for the servicing of private sewage systems including septic and holding tanks, dosing chambers, grease interceptors, seepage beds, seepage pits, seepage trenches, privies and portable restrooms to provide for the use and disposal of wastewaters from these sources while protecting public health from unsanitary and unhealthful practices and conditions and to protect surface waters and groundwaters of the state from contamination by septage.

1.2 Definitions (A-F). In addition to the definitions and abbreviations in s. 281.48, Stats. the following definitions apply to terms in NR 13:

1. Agricultural land - means land on which a food crop, a feed crop, or fiber crop will be grown withing 12 months after septage is applied to the land; this includes range land and land used as pasture
2. Agronomic rate - means the total septage application rate (dry weight basis) designed to provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or other vegetation grown on the land and designed to minimize the amount of nitrogen in the septage that passes below the root zone of the crop or vegetation grown on the land to the ground water
3. Application rate - means the hydraulic loading limits placed on a landspreading site or field normally expressed as gallons/acre/week
4. Approved site - means property approved by the department or its agent for the disposal, recycling, or storage of septage
5. Available nitrogen - means the nitrogen present in the septage in the NH₃-N form and the nitrogen that is mineralized from the organic nitrogen in the septage both of which can then be absorbed and assimilated by growing plants in the cropping year
6. Available water capacity - means the amount of water which is readily held by the soil and available for plant uptake; available water holding capacity shall be calculated by a method acceptable to the department
7. Bedrock - means the rocks that underlie soil material; bedrock is present at the earth's surface when the weathered in place consolidated material, larger than 2 mm in size, is greater than 50% by volume
8. Business - means any individual, partnership, corporation, or body politic that does servicing
9. Certified operator - means any person servicing private sewage systems such as septic and holding tanks, dosing chambers, grease interceptors, seepage beds, seepage pits, seepage trenches, privies, or portable restrooms who holds a valid Wisconsin septage

operator's certificate under Ch. NR 114

10. Community well - means a public well which serves at least 15 service connections used by year round residents or regularly serves at least 25 year round residents; any public well serving 7 or more homes, 10 or more mobile homes, 10 or more apartment units, or 10 or more condominium units shall be considered a community well unless information is available to indicate that 25 year round residents will not be served

11. Complete application - means the uniform spreading of septage over the entire site at a rate not to exceed 12,800 gallons per acre per week of septic tank wastewater or holding tank wastewater or 4,400 gallons per acre per week of grease interceptor wastewater

12. Department - means the department of natural resources

13. Disposal - means the controlled discharge of septage to a POTW, treatment or storage lagoon, or to an agricultural field for the purpose of recycling nutrients back into the environment

14. Dormant field - means a field that is not currently used or will not be used within 12 months after septage has been applied to the field for the harvesting of a crop; a field may have a vegetative cover crop grown on it and a need for increased organic matter

15. Dosing chamber - means a water tight receptacle that employs a pump or automatic siphon to elevate or distribute effluent to the private sewage system

16. Dry run - means a drainage pathway, either natural or artificial with definable banks, which contains a confined flow during periods of runoff

17. Farmer - means a person who owns or leases a contiguous parcel of land of 40 acres or more than the person is using for agricultural purposes

18. Field - means a subset of a site

19. Floodplain - has the meaning specified in definition # 16

20. Food crops - means tobacco and crops grown for human consumption

1.3 Definitions (G-N). In addition to the definitions and abbreviations in s. 281.48, Stats. the following definitions apply to terms in NR 13:

1. Grease interceptor - means a water tight receptacle designed to intercept and retain grease or fatty substances contained in kitchen and other food wastes; grease interceptor and grease trap mean the same thing

2. Groundwater - means any of the waters of the state occurring in a saturated subsurface geological formation of permeable rock or soil

3. High groundwater level - means the higher of either the elevation to which the soil is saturated as observed as a free water surface in an unlined hole or the elevation to which the soil has been seasonally or periodically saturated as indicated by soil color patterns throughout the soil profile
4. High use field - means a field that receives more than 3 complete applications of septage per year and the number of applications are limited to the crop nutrient requirements
5. Historical site - means any property designated as a historical site
6. Holding tank - means an approved watertight receptacle for the collection and holding of sewage
7. Hydraulic loading rate - means the volume of waste discharged per unit area per unit time
8. Incorporation - means the mixing of septage with topsoil by methods such as discing, mold board plowing, chisel plowing, or rototilling to a minimum depth of 4 inches
9. Industrial wastes - means industrial wastes which are biodegradable and of animal or plant origin and includes suspended solids which are in a fluid or semifluid or solid state and are not regulated by Chs. NR 214, 500 to 536, or 600 to 685
10. Injection - means the subsurface placement of septage to a depth of 4 to 12 inches
11. Land application or landspreading - means the spraying or spreading of septage onto the land surface, the injection of septage below the land surface, or the incorporation of septage into the soil so that the septage can either condition the soil or fertilize crops or vegetation grown in the soil
12. Land with a high potential for public exposure - means land that the public uses frequently or may readily come in contact with and has received land application of septage or septage byproducts within the last 12 months; this includes but is not limited to public parks, ball fields, cemeteries, plant nurseries, turn farms, and golf courses
13. Litter free - means the absence of nonbiodegradable material such as plastics or glass of 2 inches or greater in length on the soil surface
14. Low use field - means a field that receives 3 or less complete applications of septage per year
15. Nuisance - means any source of filth or probable cause of sickness not in compliance with this rule

1.4 Definitions (P-R). In addition to the definitions and abbreviations in s. 281.48, Stats. the following definitions apply to terms in NR 13:

1. Parcel of land - means property that is contiguous and under the same ownership interest

Septage Service Study Guide Grade L - 2016

2. Pasture crop - means a crop such as legumes, grasses, grain stubble, or stover which is consumed by animals while grazing
3. Pathogens - means disease causing organisms; this includes but is not limited to certain bacteria, protozoa, viruses, and viable helminth ova
4. Permeability - means the rate of movement of liquid through the soil
5. Ponding - means the presence of free liquid over an area of 4 square feet or more visible 2 hours after application of the septage; an example of a 4 square foot area would be an area 4 feet by 1 foot
6. Portable restroom - means fixtures incorporating holding tank facilities designed to directly receive human excrement; portable restrooms are self-contained units may be designed for one or more person's use at a given time and are readily transportable
7. Posting - means the placement of signs on the perimeter of a site or field that contain a notice of septage application, name, address, and telephone number of the hauler spreading the septage and are spaced not more than 500 feet apart
8. Privy - means a cavity in the ground or a portable above ground device constructed for toilet uses which receives human excrement either to be partially absorbed directly by the surrounding soil or stored for decomposition and periodic removal
9. Public contact site - means land with a high potential for contact by the public; some examples include public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses
10. Publicly owned wastewater treatment work or POTW - has the meaning specified in definition # 11
11. Publicly owned treatment works holding tank service area - means the area outside the POTW's sewer service area where the area has a contract for service with the POTW to provide permanent service and the area has been added to the POTW's service area
12. Publicly owned treatment works planning area - means the area delineated in map form in which the service area delineation for a specific POTW is being or has been prepared to cover
13. Publicly owned treatment works sewer service area - means the area presently served and anticipated to be served by a sewage collection system as approved under Ch. NR 121 or as a facility planning effort done under Ch. NR 110, if no Ch. NR 121 designation has been made
14. Reclamation site - means drastically disturbed land that is reclaimed; this includes but is not limited to strip mines and construction sites

15. Recreational site - means a designated area clearly identified and maintained for the purpose of providing an opportunity for recreational activity

16. Restricted public access - means private property or the limiting of entry for a period of time by means such as signs, traditional agricultural fencing, or remote location

1.5 Definitions (S). In addition to the definitions and abbreviations in s. 281.48, Stats. the following definitions apply to terms in NR 13:

1. Seepage bed - means an excavated area larger than 5 feet in width which contains a bedding of aggregate and has more than one distribution line so constructed as to allow disposal of effluent by soil absorption

2. Seepage pit - means an underground receptacle so constructed as to allow disposal of effluent by soil absorption through its floor and walls

3. Seepage trench - means an area excavated one to 5 feet in width which contains a bedding of aggregate and a single distribution line so constructed as to allow disposal of effluent by soil absorption

4. Septage - means the wastewater or contents of septic or holding tanks, dosing chambers, grease interceptors, seepage beds, seepage pits, seepage trenches, privies, or portable restrooms

5. Septic tank - means a tank which receives and partially treats sewage through processes of sedimentation, oxidation, flotation, and bacterial action so as to separate solids from the liquid in the sewage and discharges the liquid to a soil absorption system

6. Servicing - means removing the scum, liquid, sludge, or other wastes from a private sewage system such as septic or holding tanks, dosing chambers, grease interceptors, seepage beds, seepage pits, seepage trenches, privies or portable restrooms, and properly disposing or recycling of the contents as provided in this chapter

7. Site - means property consisting of one or more fields used for the recycling, disposal, or storage of septage

8. Site management - means the physical manipulation of site characteristics to minimize the potential of septage runoff during the spring thaw or rainfall events

9. Soil - means the unconsolidated material which overlies bedrock

10. Soil conservation practice - means a measure used to retain surface water and soil on agricultural fields including but not limited to contour strip cropping, terracing, and grassed waterways

11. Soil conservation service or SCS - means United States department of agriculture, soil

conservation service, or natural resources conservation service (NSRC)

12. Soil profile - means the vertical arrangement of unconsolidated materials into distinct layers or horizons which overlie the bedrock

13. Soil saturation - means that the soil pore space is filled with water

14. Spill - means the uncontrolled discharge, dumping, or leaking of any septage so that 50 gallons or more of septage or any of its constituents may be admitted into the air be discharged into any waters of the state or otherwise enter the environment

15. Surface application - means spreading septage on the surface of the land without mixing the septage with the soil

16. Surface water - means those portions of Lake Michigan and Lake Superior within the boundaries of Wisconsin all lakes, bays, rivers, streams, springs, ponds, impounding reservoirs, marshes, water courses, drainage systems, and other surface water, natural or artificial, and public or private within the state or under its jurisdiction except those waters which are entirely confined and completely retained upon the property of a facility

1.6 Definitions (T-W). In addition to the definitions and abbreviations in s. 281.48, Stats. the following definitions apply to terms in NR 13:

1. Threatened or endangered species - are those species defined under Ch. NR 27

2. Vector attraction - means the characteristics of septage that attract rodents, flies, mosquitos, or other organisms capable of transporting infectious agents

3. Violation - means a failure to comply with any provision of this chapter

4. Wetlands - means those areas where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which have soils or vegetation indicative of wet conditions

5. Wisconsin pollutant discharge elimination system permit or WPDES permit or permit - means a permit issued by the department under Ch. 283, Stats. for the discharge of pollutants

6. Wisconsin soil testing program - means the soil analysis and fertilizer recommendation program established by the University of Wisconsin extension through the soil science department

7. Wisconsin sanitary license - means a license to service private sewage systems such as septic and holding tanks, dosing chambers, grease interceptors, seepage beds, seepage pits, seepage trenches, privies, or portable restrooms issued by the department pursuant

1.7 General requirements of septage business licensing.

- License requirements - no business unless exempted by statute may engage in servicing unless the vehicle and equipment used have been initially inspected by the department and issued a license indicating conformity with all requirements of NR 113
- Changes - every business required to be licensed by this chapter shall notify the department in writing within 15 days of any change in address, change of servicing vehicle, or change of owner
- Disposal - No vehicle operator or person may dispose of or recycle septage unless done in accordance with this chapter or under county authority approved by the department under s. 281.48 (5m), Stats
- Farmer exemption - a farmer or his or her designee who disposes of septage on land owned or leased by the farmer is exempt from the licensing requirements of this section if all of the following apply:
 - a. The septage is removed from a septage system that is located on the same parcel of land on which the septage is disposed
 - b. No more than 3,000 gallons of septage per week are disposed of on the same parcel of land
 - c. The farmer or his or her designee complies with all statutes and rules applicable to servicing
 - d. The farmer has sufficient land that is suitable for septage disposal

1.8 Enforcement.

- Citations - pursuant to s. 281.48 (5s), Stats. the department may follow the procedures for the issuance of a citation under ss. 23.50 to 23.99, Stats. to collect a forfeiture for a violation of this chapter
- Any licensed business which engages in improper servicing or violates any provision of this chapter may be subject to suspension or revocation as provided in s. 281.48 (5), Stats. and penalties or forfeitures provided in s. NR 113.14 or both
- Penalties - any person or business who engages in improper servicing or violates any section of this chapter shall be subject to penalties as provided in s. 281.98, Stats

Section 2 - Structure and Function

2.1 Septic Tank/Soil Absorption Systems

A septic tank is a large, watertight container sized to fit the expected loading of wastewater. It is designed to hold wastewater while treatment takes place.

Three types of treatment happen while wastewater is being held in the septic tank. The first type of treatment is that some of the solids in the wastewater settle to the bottom of the tank by gravity and form a sludge blanket (sedimentation). The second type of treatment is that some solids float to the top of the tank and form a scum layer (flotation). In addition to these two physical processes, a third type of treatment that of biological reactions, is also taking

place. The biological reactions are mainly caused by microorganisms that can live without oxygen. This process is called anaerobic decomposition and results in some of the organic materials in the wastewater being broken down into simpler substances.

Byproducts of anaerobic decomposition can be methane gas, hydrogen sulfide gas, and an absence of oxygen. Because methane and hydrogen sulfide gases are very toxic, it is important to follow strict safety precautions when working around septic tanks.

Septic tanks are designed to accumulate sludge and scum. They must be emptied periodically. As the sludge and scum accumulate, they lower the capacity of the tank to hold wastewater long enough for anaerobic decomposition to occur. If this happens, wastewater is not adequately treated. The frequency of pumping depends on the size of the tank and the loading to it. Typically, a single family residential septic tank should be pumped once every two to three years.

The wastewater that flows out of the septic tank is only partially treated and receives additional treatment as it is released and absorbed into the soil. It is illegal for a septic tank to discharge directly to the land surface or to surface waters.

There are four common types of soil absorption systems:

1. Trench System

Many absorption fields consist of a series of trenches. Each trench has a distribution pipe near the bottom surrounded by a bed of gravel. The wastewater flows by gravity through the distribution pipes and into the gravel bed. From the gravel it is absorbed into the soil.

2. Seepage Bed System

A seepage bed is similar to a trench system except instead of trenches the distribution pipes are laid in a bed of gravel in a large square or rectangular area. The bed of gravel is covered with a one to three foot layer of soil. The wastewater seeps through the gravel and is absorbed into the soil.

3. Pit System

A pit system is commonly called a drywell. It consists of a deep excavation with the sides of the excavation lined with blocks or some type of porous material. The wastewater seeps into the soil on the bottom or sides of the pit. Many of these systems are still in use in Wisconsin, but they are generally not as desirable as the other three types of systems. They are more likely to fail, and they do not provide as much protection to groundwater.

4. Mound System

A mound system is the newest method of soil absorption. It consists of built-up areas of sandy material with the distribution pipes near the base of the mound. They allow septic systems to function on soils that are not suitable for the other three types of absorption systems. Mound systems require a pump to lift the wastewater from the septic tank to the distribution pipes in the mound.

2.2 Pumping Systems

The two most common types of pumps used on pumper trucks are vacuum and centrifugal. The vacuum pump system works by having an air pump mounted on the truck's tank to pump air out of the tank. The septage is drawn out of the septic or holding tank by the vacuum in the tank truck. Advantages of the vacuum system are: the liquid does not have to flow through the pump, the system is less likely to freeze in winter, and the operator can use pressure when unloading. A disadvantage is that a vacuum system requires a heavy duty pressure resistant tank. The vacuum pump is the most commonly used system because of less mechanical problems.

The centrifugal pump system works by having a rotor spinning at high speed to move the liquid. It is more likely to clog and is subject to wear or damage by grit. The chance for damage increases because the liquid moves through the pump rather than just through the hose.

Both the vacuum and centrifugal pumps have a maximum suction lift of approximately 27 feet. For higher lifts, a submersible pump is placed directly in the septage to pump into the pumper truck.

Section 3 - Operation

3.1 Disposal of domestic septage.

Hauling septage to wastewater treatment plants is a preferred option whenever possible. The DNR is working to convince municipal treatment plants to provide excess capacity for septage treatment when possible and to accept septage at reasonable rates for treatment.

Disposal of septage at a wastewater treatment plant is a good environmental protection practice but can cause problems for the plant. Septage is a high strength waste and can overload a treatment plant if too much is discharged in too short a time. This is especially a problem at small treatment plants. To avoid this problem, some plants have holding tanks to allow the septage to be detained and fed into the treatment processes slowly or during periods of low flow. If there is no holding tank, it may be necessary to unload the truck very slowly or during off-peak times.

Septage is usually high in solids and may overload the sludge handling capacity of the plant. It may also be high in grit which will cause excess wear on pumps and other machinery.

If septage is high in ammonia it may overload the treatment plant and cause a permit violation. If septage contains toxic materials it could kill the microorganisms in the treatment plant and cause a major plant upset. This type of upset can take several days for the wastewater treatment plant to recover and get back to normal treatment efficiencies.

For these reasons, most plants have established fees for septage disposal and have strict rules relating to septage disposal. Some plants refuse to accept any septage, especially if they are already at or over their design loading capacity.

Large holding tanks proposed for development projects, which are designed to hold more than 3000 gallons per day, must have their waste hauled to a wastewater treatment plant.

Before the Department of Commerce can review plans for the installation of these systems, the DNR must receive confirmation from a wastewater treatment plant of their ability and willingness to accept the projected volume of waste from the development.

Every business engaged in servicing or authorizing servicing shall comply with the following requirements for disposal of septage:

- Disposal of septage shall be by discharge into a POTW or other facility for treatment or storage under a WPDES permit or to approved agricultural lands; septage from systems that have contracted for reserved capacity at a POTW shall be taken to that specific POTW

3.2 Frozen or snow covered ground restrictions. During months when the ground is frozen or snow covered the land application of waste from septic systems is strongly discouraged. During these months hauling waste from septic tanks to a POTW is the preferred method of disposal.

- Land application of waste removed from septic systems due to emergencies including but not limited to situations such as freeze-ups is allowed if no other reasonable disposal methods are available; reasonable disposal options include but are not limited to hauling the waste to a nearby treatment plant which will accept the septage; land appliers shall obtain special written approval in advance from the department for specific sites which may be used for emergency situations; in addition the following restrictions at a minimum will apply:

- a. Sites or fields used shall have slopes less than or equal to 2%
- b. Waste shall be applied at a rate of less than 10,000 gallons per acre
- c. Application is not allowed within 750 feet of any surface water or wetland
- d. Application is not allowed in a floodplain

- Waste removed from septic systems due to a routine pumping may not be land applied during months when the ground is frozen or snow covered; waste removed in these pumping situations shall be taken to a POTW

- Waste removed from septic tanks which are regularly pumped more frequently than once every 6 months may be land applied during the months when the ground is frozen or snow covered; the restrictions in par. (c) apply to the land applications of this waste

- Holding tank waste may be land applied during months when the ground is frozen or snow covered on approved sites; the following restrictions at a minimum apply:

- a. Sites or fields used shall have slopes less than or equal to 6%; if slopes are greater than 2% but less than or equal to 6% a site management plan is required
- b. Waste shall be applied at a rate of less than 10,000 gallons per acre
- c. Application is not allowed within 750 feet of any surface water or wetland
- d. Application is not allowed in a floodplain

- Any land application of holding tank waste or septic tank waste on frozen or snow covered

ground is also subject to restrictions in sub. (3); injection or incorporation may be utilized while the depth of frost is less than 4 inches

3.3 Disposal of septage at a POTW.

A. The following shall apply to disposal of septage for the period between April 16 and November 14:

- Licensed businesses may apply to a POTW for permission to discharge septage
- A POTW may deny or approve an application for disposal of septage at that facility; if approved the POTW may set conditions for disposal
- The only requirements that licensed disposers discharge to POTWs or that POTWs accept and treat septage during nonwinter months are those in sub. (1) (e) and (f)

B. The following shall apply to disposal of septage for the period between November 15 and April 15:

- Each year prior to September 1 licensed disposers may apply to POTWs for permission to dispose of septage during winter
- Applications submitted to POTWs by licensed disposers are subject to review by POTWs pursuant to s. 281.49, Stats

C. Licensed disposers shall cooperate with POTW's in the implementation of a septage acceptance priority system pursuant to s. NR 205.07 (2) (e)

3.4 Land disposal of septage.

A. No business may dispose of septage by a landspreading method unless the spreading is done in accordance with this chapter.

B. Disposal -

- Septage may not be landspread on soils which have a permeability rate greater than 6 inches per hour within the top 36 inches unless it is demonstrated that the soil has a water holding capacity of greater than 5 inches above the groundwater and bedrock; in no case may greater than the top 60 inches in a soil profile be used to determine the 5 inches of water holding capacity
- Septage may not be surface applied on soils that have a permeability of less than 0.2 inches per hour within the top 6 inches of soil
- Septage may not be landspread or discharged into or on any wetlands or in areas subject to ponding including any ditch, dry run, pond, lake, stream, flowage, floodplain, cave, sinkhole, mine, gravel pit, or quarry
- Septage may not be landspread on any land without the owner's permission
- Septage shall be landspread in a manner to prevent surface runoff; septage may not be landspread on saturated soils during rainfall events or in areas of ponded water; all landspreading fields shall be left in a litter free condition
- Landspreading vehicles shall be moving forward at all times while septage is being spread; ponding of septage is prohibited

Septage Service Study Guide Grade L - 2016

- Septage may not be landspread on fields that are receiving or have received POTW sludges in the last crop year
- Septage that is land applied based on the agronomic crop requirements may not be applied more than 10 months prior to the planting of the crop
- A minimum 2-foot wide grass strip shall be maintained at the property line down slope from all land application sites
- Fields that are discontinued for more than one year of crop production shall be revegetated with grass or other appropriate cover
- Each business proposing to use a high use field shall establish the nitrogen need of the crop to be grown as determined by the analysis of soil samples; the nitrogen recommendations shall be based on sampling done in accordance with the University of Wisconsin - extension bulletin A-2100 dated April 1991 ("soil information sheet") or soil sampling guidance approved by the department.
- Any person who land applies septage shall comply with the minimum separation distances and maximum slope requirements in Table 3

Figure 3.4.1

Table 3

	Spreading	Incorporation	Injection
Minimum depth from surface to bedrock and groundwater	3 ft	3 ft	3 ft
Maximum allowable slope (non-winter)	6%	12%	12%
Maximum allowable slope (winter)(3)	2%	N/A(4)	N/A
Minimum distance to a community well	1000 ft	1000 ft	1000 ft
Minimum distance to other well(5)	250 ft	250 ft	250 ft
Minimum number distance to a residence, business or recreational area without permission from the owner or occupant	500 ft	500 ft(1) 200 ft(2)	200 ft
Minimum distance to a residence or business with written permission from the owner or occupant	250 ft	200 ft(1) 100 ft(2)	100 ft
Minimum distance to rural schools and health care facilities	1000 ft	1000 ft	500 ft
Minimum distance to a stream, river, pond, lake, sinkhole, flowage, ditch or wetland (greater than 6% to 12% slope)	N/A	200 ft	150 ft
Minimum distance to a stream, river, pond, lake, sinkhole, flowage, ditch or wetland (greater than 6% to 12% slope; non-winter)	200 ft	150 ft	100 ft
Minimum distance to a stream, river, pond, lake, sinkhole, flowage, ditch or wetland (0% to 2% slope; winter)(3)	750 ft	N/A	N/A
Minimum distance to a dry run			
Slope 0 – 6%	100 ft	50 ft	25 ft
Slope 6 – 12%	N/A	100 ft	50 ft
Minimum distance to a property line (6)	50 ft	25 ft	25 ft

(1) If not lime stabilized but incorporated within 6 hours.

(2) If lime stabilized and incorporated within 6 hours.

(3) See NR113 sub. (1)(b) for further limitations on winter application.

(4) "N/A" means Not Allowed.

(5) Separation distances to ~~non-potable~~ wells used for irrigation or monitoring may be reduced to 50 ft. if the septage is incorporated or injected and the department does not determine that a greater distance to the wells is required to protect the groundwater.

(6) The distances to property lines may be reduced with the written permission of both property owners.

3.5 Land disposal of septage. {Continued}

- Septage may not be landspread where it is likely to adversely affect a threatened or endangered species or its designated critical habitat or a historical site

C. Septage -

- Septage may be landspread seasonally on or into soils with a seasonal high groundwater level at a depth greater than one foot but less than 3 feet from the surface if the landspreading is limited to times when the soil is not saturated within 3 feet of the surface
- Septage may be surface applied to hay fields after the hay has been harvested but not after the new growth of hay has reached a height of 6 inches

- All sites that are approved by the department or by a county and meet all the separation requirements at the time of approval may not have the site approval rescinded for separation distance encroachment by residences, businesses, or recreational areas for a period of 5 years; this 5-year period shall run from the date of the last department or county site approval
- Site management plans may not allow surface spreading of septage on disposal sites with a slope greater than 6%
- Surface application on snow covered fields requires plowed spreading lanes (snow removal) perpendicular to the slope when the snow depth is greater than 6 inches; plowed lanes may not be wider than 20 feet and no closer than 40 feet

3.6 Land disposal of septage. {Continued}

D. Pathogens -

- Pathogens shall be reduced by one of the following methods:
 - a. The site restrictions in subd. 2. shall be met when septage is applied to agricultural land, forest, or a reclamation site
 - b. The pH of septage applied to agricultural land, forest, or a reclamation site shall be raised to 12 or higher by alkali addition and without the addition of more alkali shall remain at 12 or higher for 30 minutes and the site restrictions in subd. 2. a. to d. shall be met; when this option is utilized each container of septage which is applied shall be monitored for compliance
- Pathogen reduction is achieved by the following site restrictions:
 - a. Food crops with harvested parts that touch the septage/soil mixture and are totally above the land surface may not be harvested for 14 months after application of septage
 - b. Food crops with harvested parts below the surface of the land may not be harvested for 20 months after application of septage when the septage remains on the land surface for 4 months or longer prior to incorporation into the soil
 - c. Food crops with harvested parts below the surface of the land may not be harvested for 38 months after application of septage when the septage remains on the land surface for less than 4 months prior to incorporation into the soil
 - d. Food crops, feed crops, and fiber crops may not be harvested for 30 days after application of septage
 - e. Animals may not be allowed to graze on the land for 30 days after application of septage
 - f. Turf grown on land where septage is applied may not be harvested for one year after application of the septage when the harvested turf is placed on either land with a high potential for public exposure or a lawn unless otherwise specified by the department
 - g. Public access to land with a high potential for public exposure shall be restricted for one year after application of septage
 - h. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of septage
- E. One of the following vector attraction reduction requirements shall be met when septage

is applied to agricultural land, forest, or a reclamation site

- Septage is injected below the surface of the land such that no significant amount of the septage shall be present on the land surface within one hour after the septage is injected
- Septage applied to the land surface shall be incorporated into the soil within 6 hours after application to or placement on the land
- The pH of septage shall be raised to 12 or higher by alkali addition and without the addition of more alkali shall remain at 12 or higher for 30 minutes; when this option is utilized, each container of septage which is applied shall be monitored for compliance

3.7 General site evaluation.

Site evaluation when required by s. NR 113.07 (3) (b) 11. shall be conducted by a soil scientist. Site evaluations are required for high use fields. Low use fields where detailed soil conservation or survey maps are not available shall have a site evaluation conducted. The evaluation shall include soil conditions, properties and permeability, depth of zones of soil saturation, depth to bedrock, slope, topography, all setback requirements, and the potential for flooding. Evaluation data shall be reported on forms acceptable to the department and signed by the soil scientist. Reports shall be filed with the department for all sites investigated within 30 days of completion of testing.

3.8 Site evaluation - soiling borings in high and low use fields.

Soil borings are required for all high use fields. Low use fields are not required to have soil borings as long as reliable detailed soil conservation or survey maps are available except as follows:

- Low use fields in which no soil information is available are required to have soil borings
- For all low use fields that have a high degree of variability or where a detailed soil conservation or survey maps are known to be unreliable the department or a delegated county may require soil borings

3.9 Application rates.

- General - septage shall be applied only to agricultural lands and may not be applied at rates which will supply available nitrogen at amounts greater than the agronomic need for the crop grown as calculated by sub. (4); yearly loading rates listed in Table 4 may be used if the crop grown on a low use field requires 100 lbs-N/ac or more; if the crop requires less than 100 lbs-N/ac the loadings shall be reduced in accordance with the equation in sub. (4)
- High use fields - the volume of septage applied annually on a high use field may not exceed the amount calculated in sub. (4) which is necessary to supply the nitrogen needs of the crop to be grown as determined by the analysis of soil samples; the nitrogen crop needs shall be based on the University of Wisconsin extension bulletin A-2100 dated April 1991 ("soil information sheet") or soil sampling guidance approved by the department except as allowed in sub. (3)
- Specific crops on high use fields - septage may be applied to most leguminous crops at a volume sufficient to supply 200 lbs/ac of available nitrogen; if septage is applied to

Septage Service Study Guide Grade L - 2016

soybeans the loading shall be limited to 140 lbs/ac of available nitrogen

- Annual agronomic rate - for the purpose of implementing this section septage may not be applied at a rate that exceeds the following calculation:

annual agronomic rate (gallons per acre per year) = pounds of nitrogen required for the expected crop yield per acre ÷ 0.0026

- Maximum loading - the hydraulic loading rate of application shall be limited by soil characteristics but under no conditions may it exceed 13,000 gallons per acre per week for holding tank or septic tank contents or a combination of the 2; ponding of septage shall be prohibited

- Grease interceptors - waste from grease interceptors shall be disposed of at a department licensed sanitary landfill, land applied, or through some other department approved method

1. Contents of grease interceptors that are land applied to agricultural lands shall be incorporated, injected, or mixed with septage at a level not to exceed 25% grease interceptor wastewater and applied in accordance with sub. (5);
2. The hydraulic loading rate for land application shall be limited by soil characteristics but under no conditions may exceed 4,300 gallons per acre per application for grease interceptor contents; ponding of the grease interceptor wastewater is prohibited

Figure 3.9.1

TABLE 4
Summary of Maximum Loading Rates

Maximum Weekly Hydraulic Loading			Low Use Field(2) Yearly Hydraulic Loading		High Use Field Yearly Hydraulic Loading
	Gal/Ac	Inches	Gal/Ac	Inches	
Septic Tank Wastewater	13,000	½	39,000	1 – ½	Loading is based on crop requirements (1)
Septic Tank Wastewater (3)	13,000	½	39,000	1 – ½	Loading is based on crop requirements (1)
Holding Tank Wastewater	13,000	½	39,000	1 – ½	Loading is based on crop requirements (1)
Holding Tank Wastewater (3)	13,000	½	39,000	1 – ½	Loading is based on crop requirements (1)
Grease trap Wastewater(4)	4,300	1/6	12,900	½	Not Allowed

1. The maximum annual hydraulic loading that will be permitted for any high use field will be based on the annual agronomic application rate computed by using the formula in sub. (4).
2. If the crop grown on a low use field requires less than 100 lbs N/ac, the maximum annual hydraulic loading that is permitted is based on the annual agronomic application rate in sub. (4).
3. 75% or more with Grease Trap Wastewater (25% or less)
4. All or greater than 25% of a mixed load of septage.

3.10 Site approvals.

Each business disposing of septage shall at least 7 days prior to using a disposal field submit the following information to the department or its designee:

- Plat map or aerial photograph or U.S. geologic survey topographic map with the field outlined and a scale attached for easy reference
- Detailed soil survey map with the field outlined if available or soil investigation data as required in s. NR 113.08; soil investigation data as required in s. NR 113.08 shall be collected, validated, and signed by a soil scientist
- Completed department landspreading site evaluation form
- Any other information required by the department to make a determination on the adequacy of the proposed site

Exception to the 7-day submittal requirement for farms:

- A licensed business may service and spread wastewater on the farm where the septage was generated without prior field approval
- A business may spread only on soils that meet the requirements of this chapter
- Each vehicle operator shall record in the log book all information required by the department under sub. (3) (b)

3.11 Record keeping and annual reporting.

Each business engaging in septage servicing shall submit or keep the following information on department approved forms as indicated in this subsection and submit it to the department or its designee:

- Annual submittals for land application; an annual land application report shall be submitted annually by January 31 following the year in which land application occurs; information to be submitted includes but is not limited to the following:

1. Completed records of the fields used gallons and type of septage applied on each field and number of acres used
2. Crop grown on each field used and its yearly nitrogen requirement
3. For high use fields actual annual nitrogen application rate in pounds per acre; application of nutrients from all sources shall be documented
4. In addition agricultural soil analysis for each high use field once every 4 years of use when required by s. NR 113.07 (3) (b) 11

- Annual submittals for other methods of septage disposal; an other method of disposal or distribution report shall be submitted annually to the department by January 31 following the year in which the disposal of septage occurs; information to be submitted includes but is not limited to the following:

1. The method of disposal utilized
2. The name and permit or license number of the receiving facility if applicable
3. The type and volume of waste disposed

- Vehicle log book or invoice records system; each licensed business and any person who services a septage system shall keep the following records and make these records available to department representatives upon request

1. Each vehicle operator shall have and maintain a daily log book or invoice records system for that vehicle
2. Daily log books and invoice records systems shall be kept in the vehicle for a minimum of 2 days after servicing a system
3. Daily books and invoice records systems shall at a minimum contain the following information:

- a. Name and address or location of system serviced
- b. Date and time of servicing
- c. Type of system and description of all wastes pumped
- d. Gallons collected
- e. Disposal location
- f. Date and time of disposal
- g. Written certification by the designated operator-in-charge regarding the pathogen and vector attraction reduction requirements; the certification statement shall read as follows: "I certify, under penalty of law, that the information that will be used to determine compliance with the pathogen requirements [insert either NR 113.07 (3) (d) 1. a. or NR 113.07 (3) (d) 1. b.] and the vector attraction reduction requirement in [insert NR. 113.07 (3) (e) 1., NR 113.07 (3) (e) 2., or NR 113.07 (3) (e) 3.] has been prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification."; this requirement may be satisfied by having the certification statement on annual year-to-date loading summaries for each site
- h. A description of how the pathogen reduction requirements are met
- i. A description of how the vector attraction reduction requirements are met

4. Lime purchase receipts if surface spreading with alkaline stabilization is the selected method for meeting the pathogen and vector attraction reduction requirements
5. Actual annual hydraulic and nitrogen application rates shall be retained
6. All servicing records (log book or invoice records) shall be kept on file and available for inspection for a period of 5 years

3.12 Septage storage facilities.

- Large existing facilities - existing in-ground or above-ground septage storage facilities constructed before September 1987 and with a capacity of greater than 25,000 gallons shall be allowed as long as they meet the provisions of ch. NR 110 the department has accepted in writing the plans and specifications and the storage facility has received a specific WPDES permit; storage facilities installed under ch. Comm 83 are allowed if the owner obtains a specific WPDES permit
- New large facilities - no person may construct any septage storage facility which singly or when added together provides capacity equal to or greater than 25,000 gallons without first

obtaining department plan and specification approval; all storage facilities shall be designed in accordance with the appropriate requirements of ch. NR 110; no storage facility with a capacity equal to or greater than 25,000 gallons may operate until a specific WPDES permit is issued and an inspection and adequacy of sealing report is submitted and accepted by the department

- Small facilities - new or existing septage storage facilities with a capacity of less than 25,000 gallons are allowed if they have been approved under ch. Comm 83 or meet the standards in ch. NR 110 and the department is notified of their use through form 3400-137 revised in July 1988
- Other storage facilities - septage may be stored at sites such as but not limited to manure storage facilities and sludge storage lagoons; the mixture resulting from any combination of septage and domestic wastewater sludge will all be classified as domestic sludge and its use or disposal will be governed by ch. NR 204; septage may not be stored in manure storage facilities if the storage facilities are located under a building where animals are housed; prior to use of a combined septage and other wastes facility the department shall review an operations report for the facility; the facility may be used to store septage upon approval by the department; this report shall include at a minimum:
 - a. The location of the storage facility
 - b. The type and volume of the storage facility including construction and sealing details
 - c. Sufficient site characteristics information to evaluate the environmental impact and suitability of such waste storage
 - d. The name and address of the owner of the storage facility
 - e. Any contractual arrangements involved
 - f. The type and composition of any wastes other than septage to be stored at the facility
 - g. Annual sampling and analysis of the combined wastes in accordance with requirements in the permit
 - h. The methods to be used for landspreading the septage or septage mixture
 - i. If septage makes up 10% or more of the mixture in the storage facility or if there are 25,000 gallons or more of septage in the mixture a certification statement that the entire contents of the storage facility shall be landspread in accordance with this chapter
- Extended storage - no person may store a batch of septage for longer than 2 years
- Department requirements - the department shall satisfy the time requirements for all permits and plan approvals in s. NR 108.03

Section 4 - Maintenance

4.1 Vehicle inspections and servicing.

- Inspection - any business engaged in servicing shall allow the equipment to be used for servicing to be inspected upon request and at any reasonable time and place as may be designated by the department
- Equipment requirements - vehicles and operations shall conform to this chapter and

vehicles shall display a license sticker; all vehicles and equipment used in servicing shall conform to the following:

- a. All vehicles and all equipment used in servicing shall be maintained in operational condition and in conformance with this chapter at all times during use in servicing
- b. The vehicles and implements used in servicing shall routinely be used for no other purpose except the hauling or servicing of septage, grease interceptors, municipal wastewater treatment sludges, or animal wastes
- c. Vehicles and equipment shall be stored in a manner which will not cause a nuisance
- d. The minimum allowable tank size is 1,000 gallons with the following exceptions:
 1. Tanks used for servicing only portable restrooms
 2. Tanks put into service prior to October 1, 1987
 3. A smaller tank may be used where found necessary and adequate by the department
- e. Department approval of any trailer-mounted servicing equipment shall be on an individual basis for specific uses only
- f. Portable tanks or containers used for servicing other than approved trailer-mounted servicing equipment are prohibited; all approvable tanks or containers shall be attached to the vehicle by welding or bolts and cannot be used for containing liquids that are intended for direct contact with humans or animals
- g. Each tank shall be strong enough for all conditions of operation, leakproof contain inertia baffles, and be designed to be kept tightly closed to prevent spillage or escape of odors while in transit or storage; tanks shall be constructed of suitable metal or materials approved by the department and mounted permanently on a truck chassis except where trailer-mounted equipment is approved
- h. Pump installation shall be designed to prevent backflow or leakage; connections shall be provided with caps or seals
- i. Discharge valves on tanks shall be watertight capped when not in use
- j. All servicing equipment used for surface spreading of septage shall have a splash plate or some other department approved method
- k. Hoses and piping when not in actual use shall be stored so as to prevent leakage or dripping of septage in transit or the ends of hoses and pipes shall be connected or sealed with tightly fitted caps or covers or the hoses and pipes shall be cleaned with water between uses
- l. Any business subject to the requirements of this chapter shall provide or have available facilities for washing the vehicles, tanks, implements, and tools; facilities shall be designed to prevent a nuisance to the general public

4.2 Identification requirements.

- No person unless exempt by statute or this chapter may operate a vehicle used for servicing unless a valid business license sticker is prominently displayed on the rear of the vehicle servicing tank
- Every licensee is required to paint on the side of each vehicle the words "Wisconsin

Sanitary Licensee” and immediately under these words “License No. ” with the number of its license in the space provided with letters and numbers at least 2 inches high with 1/2-inch minimum brush strokes and in a color distinct from its background

- The capacity of the tank in gallons in lettering and numbers at least 2 inches high with 1/2-inch minimum brush strokes shall be painted in a color distinct from the background and readily visible on the rear of any vehicle used in servicing
- Starting July 1, 1997 all servicing equipment used for surface spreading of septage including equipment in service prior to January 1, 1997 shall have a vehicle cab controlled discharge valve; new servicing equipment put into operation after January 1, 1997 shall be in conformance with department standards
- Servicing Requirements - every business engaged in servicing shall conform to the following:
 - a. The vehicles implements and containers shall be operated in a manner that does not cause a nuisance or health hazard
 - b. Any accidental spillage shall be cleaned up and the area restored to render it harmless to humans and animals; spills of 50 gallons or greater shall be reported within 24 hours to the department or the county if the county has been delegated septage regulation by the department
 - c. A written procedure for spill and accident cleanup shall be developed and a copy of the written procedure and a copy of the current Ch. NR 113 shall be placed in each vehicle cab
 - d. Any property serviced shall be left in a sanitary condition
 - e. All businesses servicing portable restrooms shall empty the septage from the portable restroom prior to transporting the portable restroom for any purpose
 - f. Water used for flushing servicing tanks or containers shall be disposed of in the same manner as the septage

Section 5 - Monitoring

5.1 Sampling

Frequently wastewater treatment plants require that samples be taken from the load during discharge. These samples are used to measure loadings to the plant and to check for toxic or harmful materials if there are problems at the treatment plant.

In order to be useful, the sample should be representative of what the entire load contains. This is not an easy thing to do because septage is high in solids that tend to settle quickly when the truck is stopped.

The best way to get a representative sample from most trucks is to take a sample from the discharge hose as the load is being unloaded. The sample will be most representative if it is taken about midway during the unloading so that it is not influenced by an accumulation of solids on the bottom of the tank or the lower solids portion of the load on the top of the tank. Fill the sample container gradually by taking several small samples as the septage is being discharged.

Section 6 - Troubleshooting

6.1 General Knowledge (See Admin. Codes)

Section 7 - Safety

7.1 Septic Tank Malfunctions

Septic tanks can have structural failures, such as cracked or broken walls, which could cause septage leaks into the soil without adequate treatment. Groundwater could seep in and hydraulically overload the system. Septic tank structural failure could also be broken baffles. When the baffles are broken, the wastewater can flow directly across the surface of the liquid in the tank without being held for treatment. This means inadequately treated wastewater reaches the distribution system and can cause failure of the absorption system. When an outlet baffle is broken, solids are more likely to flow out of the tank and into the absorption area, causing clogging of the soil and early failure of the system.

Although septic tanks malfunction at times, it is usually the distribution system that fails, and not the tank itself. A non-structural type of failure is when a septic tank is not emptied often enough and solids accumulate, filling the tank. When this happens, the wastewater is not held in the tank and inadequately treated wastewater reaches the absorption system. This can lead to early failure of the absorption system.

Onsite sewage installations may require minor repairs. Replacement or repair of manhole risers and covers; replacement or repair of distribution boxes ("D-Box"); and replacement of septic tank baffles are allowable for septic pumpers. All other replacement or repair work must be done by a properly licensed plumber.

The most common type of failure of an absorption system is when the system loses its ability to accept wastewater as fast as it is discharged from the septic tank. This results in ponding in the absorption system, and in severe cases, ponding on the surface or backup of sewers into the house. This kind of hydraulic failure can be caused by either saturated soil conditions or clogging of the soil surface where the treated wastewater is absorbed into the soil.

7.2 Confined Space Entry

Septic tanks and holding tanks are both considered confined spaces because they have limited openings for entry and exit. Plus they have little natural ventilation. It is possible for toxic gases to be present in lethal concentrations because of the anaerobic decomposition of wastewater and the lack of natural ventilation. Entry into a confined space should only be done in accordance with procedures that are approved by the DNR of Workforce Development. These include:

A. Continuous monitoring of the air with a tri-gas meter that will simultaneously test for oxygen, hydrogen sulfide and combustible gases and immediately signal when the atmosphere falls outside the air quality limits.

- B. Leaving the confined space immediately if the atmosphere falls outside any of the air quality limits.
- C. Not substituting forced ventilation in place of monitoring devices.
- D. The use of a harness, lifeline, and winch for emergency extraction of personnel.
- E. Having someone remain outside the confined space area to assist in case of an emergency.

7.3 Hazardous or Toxic Wastes

Certified and master septage servicing operators working for a licensed septage business under NR 113 and NR 114 are authorized to haul septage but not to transport hazardous wastes. Toxic or hazardous wastes that are land applied on a field may contaminate the site. Toxic or hazardous wastes that are disposed at a wastewater treatment plant may cause serious problems at the plant.

Operators should make sure their customers are reliable so they will not contract to haul a waste that is contaminated with any toxic or hazardous materials. Operators should also be particularly careful about hauling any waste from a site that is known to handle, store, manufacture, or sell any type of materials that are toxic or hazardous. This could include service stations, garages, metal finishing plants, plating plants, facilities that handle pesticides, factories using solvents, or any chemical manufacturing or processing facilities. If there is any doubt, it is better to refuse the business than to be part of a toxic or hazardous contamination.

7.4 Spills

Any spill of 50 gallons or greater MUST be reported to the Department within 24 hours. A written procedure, the Emergency Spill Plan, detailing spill cleanup must be developed by each licensee and a copy of the Emergency Spill Plan must be kept in the cab of each truck at all times.

Care should be taken to avoid septage spills. If a spill accidentally occurs, proper tools to contain it and clean it up should be available to the operator. This means having the proper tools stored on each septage truck. Common hand tools that should be available on each truck are: a shovel or spade, a squeegee with curved ends, flat suction wands for vacuum truck hose, garden hose, boots or waders, and gloves.

For large spills, it is important to have prior arrangements made to call in another truck to help clean up. This can be another truck from the same business or if only one company truck is available there should be a mutual agreement with other haulers in the area to respond in the case of an emergency. The Operator in Charge is responsible for creating the Spill plan, making sure copies are in each truck and training all employees on what to do in the case of a spill.

7.5 Personal Health

HAULING SEPTAGE IS NOT CONSIDERED A HIGH RISK OCCUPATION, BUT SEPTAGE DOES CONTAIN DISEASE CAUSING ORGANISMS. IT IS IMPORTANT FOR HAULERS TO FOLLOW CERTAIN PERSONAL SAFETY PRECAUTIONS. PHYSICIANS RECOMMEND BEING IMMUNIZED FOR TETANUS WITH A BOOSTER EVERY TEN YEARS. AFTER FIVE YEARS A BOOSTER IS RECOMMENDED IF A PERSON IS CUT OR WOUNDED. DOCTORS ALSO RECOMMEND BEING IMMUNIZED FOR POLIOMYELITIS.

Section 8 - Calculations

8.1 Gross and Axle Vehicle Weights

Certain roads and bridges have either permanent or seasonal load limits. These limits may be given as either gross vehicle weights or axle weights. The operator should be able to calculate both if the empty weight of a truck, the capacity, and the number of axles on the truck is known.

Example:

Given: Empty weight = 17,000 Pounds

Capacity = 2,100 Gallons

Number of Axles = 3

(Weight of one gallon = 8 Pounds)

Gross Weight = Empty weight + (Capacity X 8)

= 17,000 + (2,100 X 8)

= 17,000 + 16,800

= 33,800 Pounds

Axle Weights = $\frac{\text{Gross Weight}}{\text{Number of Axles}}$

= $\frac{33,800}{3}$

=11,267 Pounds per Axle

8.2 Application Rate Limits

In order to prevent environmental problems, it is necessary to limit septage application rates. Some limits are based on the hydraulic loading rate (gallons per acre). Others are based on the nitrogen loading rate (pounds per acre of nitrogen). The maximum allowable loadings are given in NR 113.09.

The plant crop limits the nitrogen loading rates. For a High Use Field a soil analysis must be done. Legume crops (alfalfa, clover) can receive up to 200 pounds per acre of nitrogen.

Soybeans can receive 140 pounds per acre. For a Low Use Field application is limited to 39,000 gallons per acre (13,000 gallons per acre per week), assuming the crop needs at least 100 pounds of nitrogen per acre. If the crop needs less than 100 pounds of nitrogen per acre, reduce the hydraulic loading according to the following calculation:

Example:

Given: Type of Crop = Oats
Nitrogen needed = 80 pounds per acre
EPA Factor = .0026

$$\begin{aligned}\text{Gallons per acre applied} &= \text{Pounds of Nitrogen Required} / .0026 \\ &= 80 / .0026 \\ &= 30,770 \text{ gallons}\end{aligned}$$

In order to stay within the maximum hydraulic loading rates, the operator must know at what rates the septage is applied. First, the operator should be able to calculate the application rate from one truckload of septage.

Example:

Given: Capacity = 1,000 Gallons
Spreading Width = 10 Feet
Feet Required To Spread Load = 500 Feet
(One Acre = 43,500 Ft.²)

$$\begin{aligned}\text{Area Covered} &= \text{Spreading Width} \times \text{Feet Required to Spread Load} \\ &= 10 \times 500 \\ &= 5,000 \text{ Ft}^2\end{aligned}$$

$$\begin{aligned}\% \text{ Of An Acre} &= (\text{Area Covered} / 43,500) \times 100 \\ &= (5,000 / 43,500) \times 100 \\ &= 11.5\%\end{aligned}$$

$$\begin{aligned}\text{Gallons Spread Per Acre} &= \text{Capacity} / \% \text{ of an acre} \\ &= 1000 / .115 \\ &= 8,696 \text{ gallons}\end{aligned}$$

References and Resources

1. ADMINISTRATIVE CODE NR 113.

Department of Natural Resources.

Wisconsin DNR, Septage Certification Coordinator. P.O. Box 7921, Madison, WI 53707.

Phone: (608) 266-8948.

<http://www.dnr.state.wi.us/org/es/science/opcert/septage.htm>

2. SEPTAGE SERVICING HANDBOOK.

Department of Natural Resources.

Wisconsin DNR, Septage Certification Coordinator. P.O. Box 7921, Madison, WI 53707.

Phone (608) 266-8948.

<http://www.dnr.state.wi.us/org/es/science/opcert/septage.htm>