

POWTS



WCCA Zoning Leadership Training
January 9, 2017



History of Waste Disposal



SEWER means “seaward” in Old English



First waterborne waste disposal dates back at least 5000 years



Brick lined pits and sewers built of stone were used for wastewater disposal around 2500 to 1500 B.C.



Most wastewater was channeled directly into a nearby river or sea



Chamberpots, used beginning in the 1400’s, were emptied into the streets



The first septic tank was invented in 1860 in France. The purpose was to remove solids before discharge into the nearest stream or river. The word “septic” means putrid and was coined by Englishman, Donald Cameron in 1895.



Wastewater Related Diseases



The Black Plague, which started in the 1300's, killed an estimated one-third of Europe's population



Other diseases, including dysentery, typhus and typhoid fever, which are directly related to human waste, wiped out many hundreds of thousands of people in the Middle Ages



In 1817, more than 10,000 fatalities were caused by a major epidemic of cholera in Calcutta, India



In 1849, 55,000 people died of cholera in London

Recent Epidemics

- 1939** - 60 people died in an outbreak of typhoid fever at Manteno State Hospital in Illinois. The cause was traced to a sewer line passing too close to the hospital's water supply
- 1940** - A valve that was accidentally opened caused polluted water from the Genessee River to be pumped into the Rochester, NY public water supply system. About 35,000 cases of gastroenteritis and six cases of typhoid fever were reported
- 1955** - Water containing large amount of sewage was blamed for overwhelming a water treatment plant and causing an epidemic of hepatitis in Delhi, India. An estimated 1 million people were infected.
- 1961** - A worldwide epidemic of cholera began in Indonesia and spread to eastern Asia and India by 1964; Russia, Iran and Iraq by 1966; Africa by 1970 and Latin America by 1991. A Chinese freighter that dumped it's wastewater into the harbor at Lima, Peru is suspected of having brought the disease to Latin America. At least 10,000 deaths and 1 million cases have been reported to the Pan American Health Organization from Latin America alone
- 1968** - A four year epidemic of dysentery began in Central America resulting in more than 500,000 cases and at least 20,000 deaths. Epidemic dysentery is currently a problem in many African nations
- 1993** - An outbreak of cryptosporidiosis in Milwaukee, WI claimed 104 lives and infected more then 400,000 people, making it the largest recorded outbreak of waterborne disease in the US

Source: National Small Flows Clearinghouse, Pipeline, Volume 7, Number 3

Wisconsin

Regulating septic systems in some format since 1914

Counties were required to regulate septic systems started in 1968 – Department of Health, Department of Industry, Labor and Human Relations, Department of Commerce, Department of Safety and Professional Services

“The Executive Committee met on October 16, 1971 to discuss legislation on the controversial Septic Tank Fees. The committee went on record to repeal this \$10.00 fee to all counties that have adopted H. 62.20...It is the general opinion of the plumbers that they do not want to take time to do percolation tests and have to pick up the Septic Tank and Sanitary Permits....Has anyone had any problems with people wanting to use plastic pipe for sewers?...”

Sanitary Permits

- **145.195 Building on unsewered property.**
 - **(1)** No county, city, town or village may issue a building permit for construction of any structure requiring connection to a private on-site wastewater treatment system unless a private on-site wastewater treatment system satisfying all applicable regulations already exists to serve the proposed structure or all permits necessary to install a private on-site wastewater treatment system have been obtained.
 - **(2)** Before issuing a building permit for construction of any structure on property not served by a municipal sewage treatment plant, the county, city, town or village shall determine that the proposed construction does not interfere with a functioning private on-site wastewater treatment system. The county, city, town or village may require building permit applicants to submit a detailed plan of the owner's existing private on-site wastewater treatment system.

When can a septic system be installed without a permit?

- A. When the tank has collapsed and sewage is backing up into the home
- B. When the plumber doesn't have time to get the paperwork done because of bad weather
- C. Never

Emergency Installations

- County must verify the emergency
- Owner must sign “Affidavit for Emergency Installation” prior to the installation
- Plumber must submit Sanitary Permit Application and fee prior to the installation
- Plans must be submitted within 30 days

State Level Sanitary Permits

- When is a permit required?
 - SPS 383.21(1)(a) for installation of
 - New systems
 - Replacement systems
 - POWTS <12,000 gpd
 - SPS 383.21(1)(b) for modifications of
 - Holding components
 - Treatment components
 - Dispersal components

- Modification means the addition or replacement of a listed component

_____ COUNTY
NO. _____

STATE SANITARY PERMIT

TRANSFER/RENEWAL PREVIOUS NO. _____

OWNER _____

PLUMBER _____ LIC.# _____

TOWN OF _____

SEC _____, T _____ N, R _____ E/W

AND/OR LOT _____ BLOCK _____

SUBDIVISION _____

_____ AUTHORIZED ISSUING OFFICER – DATE _____

THIS PERMIT EXPIRES _____ UNLESS RENEWED BEFORE THAT DATE

POST IN PLAIN VIEW

VISIBLE FROM THE ROAD FRONTING THE LOT DURING CONSTRUCTION

SSD-06-499 (R. 7/01)

CHAPTER 485.15(2) WISCONSIN STATUTES

(a) The purpose of the sanitary permit is to allow installation of the private sewage system described in the permit.

(b) The approval of the sanitary permit is based on regulations in force on the date of approval.

(c) The sanitary permit is valid and may be renewed for a specified period.

(d) Changed regulations will not impair the validity of a sanitary permit.

(e) Renewal of the sanitary permit will be based on regulations in force at the time renewal is sought, and that changed regulations may impede renewal.

(f) The sanitary permit is transferable.

History: 1977 c. 106; 1979 c. 24221; 1981 c. 314

Note: If you wish to renew the permit, or transfer ownership of the permit, please contact the county authority.

Component Modifications

Examples - State Permit Required

- Effluent filter is added to septic or dose tank
- Filter basin
- ATU is added to rejuvenate a dispersal system
- Dose tank is added
- Second holding tank is added
- Dispersal area is added or extended
- Mound distribution cell is cored out
- At-grade converted from gravity to pressure distribution
- Addition of a diverter valve or distribution box



Component Repairs - Examples

Local Permit Possible If Specified In County Ordinance

- Tank cover replacement
- Manhole riser replacement
- Pump replacement
- Filter replacement
- Adding turn-ups to a pressure system
 - Number of orifices must stay the same
- Repair of building sewer and effluent lines
 - A repair is not replacement of 50 ft of pressure lateral
- Mechanical/chemical restoration of dispersal components
- Reconnections

Other Installations - Examples

Local Permit Possible If Specified In County Ordinance

- Grease interceptors
- Non-domestic (industrial, commercial - e.g. laundromat, catchbasin wastes)
 - Holding tanks
 - Treatment and dispersal components
- SPS 391 devices
 - Privy
 - Composting toilet
 - Incinerating toilet

Why do forms and applications need to be neat and legible?

- A. The Zoning Staff are too picky
- B. State employees like to harp on the designers
- C. It is the customer's only record

Checklists

CHECKLIST FOR CERTIFIED SOIL TESTS

Rusk County Zoning Department
311 E. Miner Ave., Suite N110
Ladysmith, WI 54848
(715) 532-2156

Submit the Following Originals (Use Permanent Ink):

- Soil Evaluation Report (SBD-8330 R. 07/00)
- Plot Plan
- Review Form (Crew file sheet, system elevation sheet) optional
- Copies of Additional Information (Tax Statement, CSM, Deed) optional
- Fee (\$35.00)

Soil Evaluation Report: (Include the Following Information)

- Parcel Identification Number
- Property Owner's Information
- Property Location (Sec./Twp./Range, Lot #, Block #, CSM #)
- Fire Number and Nearest Road
- Floodplain Elevation, Flow Rate, Parent Material
- Proposed System elevation and system type
- Complete Soil Boring Information including loading rates
- Soils must be described accurately, including rock fragments, mottling, groundwater, bedrock or disturbed soil
- Soils must be described to at least three feet below the system elevation or more for sand with rock fragments of >35% (Table 83.44-3)
- Date Soil Evaluation was conducted
- CST Name, Signature, Number, Address and Phone Number

Plot Plan: (Include the Following Information Drawn to Dimension or to Scale)

- North arrow, scale size, legend
- CST, owner and property information
- Bench Mark (Description and Location)
- Contour Lines (Example = 98.0' / 96.0' / 94.0')
- Borings (Locations and Elevations)
- Percent and Direction of Land Slope
- Well Location (Including Neighboring Wells, If Applicable)
- Location of Wetland Areas, Floodplain and Navigable Waters
- Buildings, Driveways and Structures (Locations and Descriptions)
- Location of Property Lines
- Existing System Location
- Fire Number and Road Name
- Current Surface Elevation of Adjacent Navigable Waters
- CST, Owner and Property Information

Checklist for Sanitary Permit Applications

Rusk County Zoning Department
311 E Miner Ave, Suite N110
Ladysmith, WI 54848
(715) 532-2156

* All forms and applications must be complete and signed in permanent ink. *

1) Sanitary Permit Application (SBD-6398)

- I. Applicant Information
- II. Type of Building
- III. Type of Permit
- IV. Type of POWTS System
- V. Dispersal / Treatment Area Information, including system elevation
- VI. Tank Information

2) Soil and Site Evaluation Report

- Include or indicate "On File" at Zoning Office

3) Plot Plan (To Scale or To Dimension)

- Absorption Area
- Bench Mark
- North Arrow
- Contour Lines
- Wells
- Structures
- Existing Systems
- Fire Number and Nearest Road
- Surface Elevation of Body of Water
- Filter Information
- Tank Information and Location
- Wetlands / Navigable Bodies of Water
- Property Lines
- Boring Locations

4) Cross-Section of the System

- Lateral Elevation
- Position of Observation Pipes
- Dimensions and Depths
- Type of cover Material

5) Pump Tank Information

- Pump Tank Cross Section
- Pump curve

6) Contingency Plan / Management Plan

-

7) Maintenance Agreement

- Owner's Original Signature

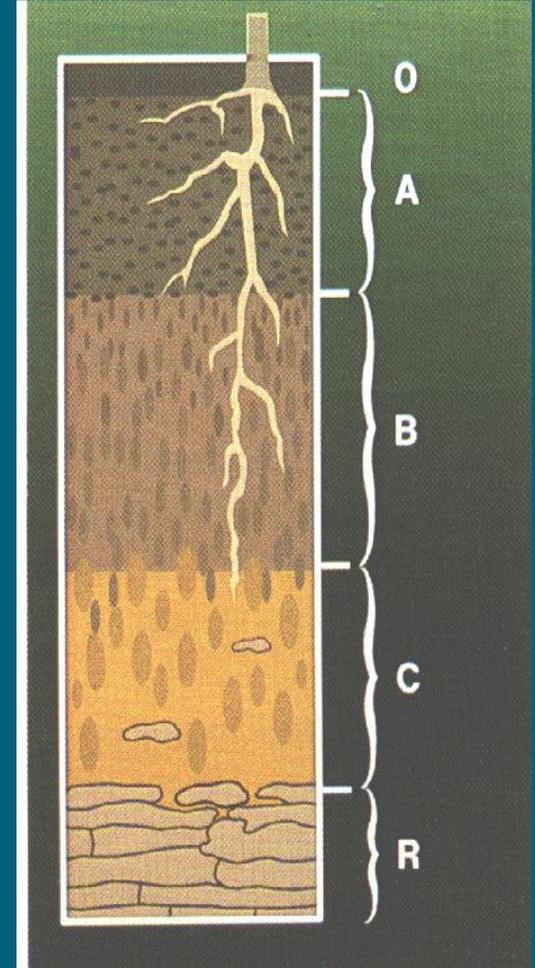
8) Fees

-

Soil and Site Evaluation



- Intro to Onsite WWT
- Soil Fundamentals
- Describing and Interpreting Soil Profiles
- Site Mapping and Drafting Techniques
- Wisconsin POWTS Design Rules and Principles
- Soil Testers: Field Practicum
- Offered in New Richmond and Hayward WITC and Rhinelander Nicolet College - March 2017



Helpful Resources

Product Approval

- <http://dsps.wi.gov/Plan-Review/Products-Materials>

Standard Plans

- <http://dsps.wi.gov/Programs/Industry-Services/Industry-Services-Programs/Private-Onsite-Water-POWTS/POWTS-Plan-Pages/Table-of-Contents/>

EISA Chart for Infiltrator

- <https://dsps.wi.gov/sb/docs/sb-ppalopp/20150111A.pdf>

What is the minimum size for a septic tank?

- A. As required in table SPS 384.30
- B. Whatever size the owner wants to have
- C. There are no minimum code requirements

Septic Tank Sizing

There are no minimum requirements for septic tank sizing in the code or component manuals.

<http://dsps.wi.gov/Plan-Review/Products-Materials> -
Plumbing Products Database

A standard way to determine the minimum size of a septic tank that will be serviced about once every 3 years, is to multiply 2.088 x DWF – for example $2.088 \times 450 = 939.6$ gallon minimum.

Septic Tank Sizing

If an undersized tank will be put in, the system will need to be serviced more frequently and a maintenance contract may need to be signed.

Septic Tank Sizing
Domestic Wastewater Based

Residential Septic Tank Sizing

<input type="text" value="3"/>	Number of bedrooms
<input type="text" value="1"/>	Service frequency (yrs)
<input type="text" value="12"/>	Service frequency (months)
<input type="text" value="800"/>	Minimum septic tank size (gal)

Commercial Septic Tank Sizing

<input type="text" value="450"/>	Design wastewater flow (gpd)
<input type="text" value="3"/>	Service frequency (yrs)
<input type="text" value="36"/>	Service frequency (months)
<input type="text" value="940"/>	Minimum Septic tank size (gal)

Residential

Service Frequency Based on Tank Size

<input type="text" value="800"/>	Tank volume (gal)
<input type="text" value="3"/>	Number of bedrooms
<input type="text" value="1.00"/>	Service Frequency (yrs)
<input type="text" value="12"/>	Service Frequency (months)

Commercial

Service Frequency Based on Tank Size

<input type="text" value="1250"/>	Tank volume (gal)
<input type="text" value="600"/>	Design wastewater flow (gpd)
<input type="text" value="2.97"/>	Service frequency (yrs)
<input type="text" value="36"/>	Service frequency (months)

Aggregate SAS / Synthetic SAS / TDH-OK / **ST Size-OK** / Anchor / Manifold / Laterals-OK / Elevations

Flows and Loads Determinations

- SPS 383.43 (3)(b) & (6)(b)
 - A detailed estimate of wastewater flow based upon per capita occupancy or per function occurrence is allowed
 - No undersized system affidavits allowed
 - Must meet flows criteria or system enlarged
- SPS 383.43 (7)
 - May be estimated, but must include a detailed analysis and address contaminants specified in s. 383.44 (2)(a) as a monthly average
 - 30 mg/L FOG, 150 mg/L TSS, and 220 mg/L BOD₅
- No state forms for this purpose

Flows Determinations

- Examples
 - Existing 3 BR house occupied by 4 persons wants additional BR
 - System designed for 450 gpd DWF
 - $75 \text{ gal/day/occupant} \times 4 = 300 \text{ gpd}$ actual per capita design wastewater flow (DWF)
 - System would not be undersized
 - Sizing affidavit should be attached to the deed that indicates flow may not exceed 450 gpd or 6-person occupancy

Cleanouts - SPS 382.35

Frost sleeves – SPS 382.35(5)(a)2.



Bedding and Backfill – See Product Approval letters



Tank Installation



Joints between tanks – Pipe Bedding



Alternative Tank Materials

Note Product Approval conditions



Pressure filters, unions, float trees



Force main and Mulching



Be sure the force main has proper drainback and frost protection in ALL areas.

Mulching – Component Manual



Mound Systems

- Quality of mound sand (sieve analysis)
- Contours
- Proper mound dimensions
(I, J, K, L, W dimensions)



Refer to Component Manual



If there is 6" of drop in 70' of building sewer, is this sufficient pitch?

Building Sewer Pitch

- Question
 - A building sewer is 70 feet long
 - The elevation at the building is 98.00 ft
 - The elevation at the septic tank inlet is 97.5 ft
- What is the pitch?
 - $98.00 \text{ ft} - 97.5 \text{ ft} = 0.5 \text{ ft}$
 - $(0.5/70) 100 = .7\%$
 - OK if 1% or greater as long as DFU's are ≤ 180
 - This pitch is NOT acceptable

Building Sewers

SPS 382.30

- Minimum diameter is 4 inches
 - Size is dependant on pitch and load (DFU)
- Minimum pitch as per Table 382.30-3
 - 1/8 in/ft or about 0.01 ft/ft or 1%
 - Velocity of 2 ft/sec when half full
- Setbacks to wells - SPS 382.30 (11)(d)
 - 8 ft for gravity CI and PVC pipe
 - 25 ft for all other materials
 - 25 ft for pressurized pipe
- Insulation requirements

True or False. If a tank with no outlet is converted to a septic tank, it is OK to core drill a hole in the end wall.

Watertight Tank Joints



Pipe to tank joints must be an approved type as well as watertight



True or False

Backhoe teeth are acceptable to use for plowing mound areas as long as the operator knows how to do it properly.

Plowing Implements

Chisel Plow



It is acceptable to rough up soil with backhoe teeth around stumps.

Moldboard Plow



Erosion Control



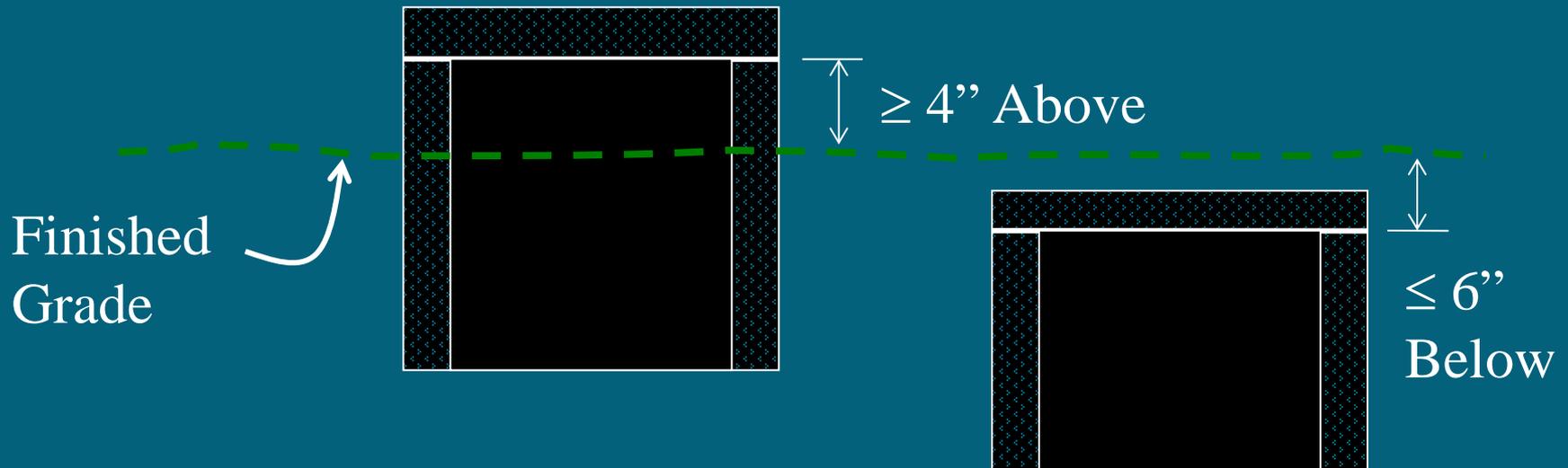
Does the county do follow-up inspections?





Manholes - SPS 384.25(7)

- Max. depth of manhole opening bury is 6 in.
- Min. height above grade for manhole opening is 4 in. when over a treatment device or pump.
- Note that the measurement is from the manhole opening, not the top of the manhole cover.
- + LOCKING!!!



Maintenance and Education



Roots



How often must a septic tank be pumped?

- A. Once every 3 years
- B. When it is 1/3 full of sludge and scum
- C. Whenever the owner gets the postcard from the county

Servicing Requirements

SPS 383.54 (3) and (4)

- Septic tanks pumped when 1/3 full of sludge and scum
- Holding tanks pumped when the liquid level is at 12" below the inlet invert.
- All systems require inspection once every 3 years unless the county has their inventory completed then seasonal homes can extend to once every 5 years.

Education is Important!

- Build Partnerships
- Homeowners
- Installers
- Service Providers
- Public
- Board Members



Steel Tank Issues



Steel Tank Issues



Contaminants of Emerging Concern



System Failure

- Discharge to surface water or groundwater
- Discharge into seasonally saturated soils
- Discharge into drain tile or bedrock
- Discharge to the surface of the ground
- Back up into structure



Questions?

- Go to DSPS website
 - <http://dsps.wi.gov/Home>
- Click on "Industry Services (Safety & Buildings)"
- Click on "All Division Programs"
- Click on "Private Onsite Wastewater Treatment Systems Program (POWTS)"

- WCCA - <http://www.wccadm.com/resources>