



**SUPERIOR ENVIRONMENTAL HEALTH CODE
SEWAGE TECHNICAL MANUAL**

**WESTERN UPPER PENINSULA HEALTH
DEPARTMENT**

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Introduction

The Superior Environmental Health Code was adopted to promote public health, safety and welfare of the people of the Upper Peninsula of Michigan. Within the Code are the specifications for construction of sewage systems. Due to the dynamic and complex nature of on-site sewage systems governed by the Code, an on-going technical guidance document is necessary. This Technical Guidance Manual has been prepared to provide guidelines, specifications and standard practices used to implement the code. This manual will be altered to accommodate new research and technology as frequently as necessary to provide current guidance.

Sewage System Installer Licensing Procedures

Reference: Sections 3.1 & 3.2

These sections state that the department shall have the authority to promulgate standards for licenses, registrations, renewals, and examinations. In developing minimum standards for licensing or registration, the department shall consider equivalency and proficiency testing and where appropriate, grant credit for past training, education, or experience in related fields.

1. The applicant shall complete a written exam proctored by an environmental health representative of the local health department.
2. The exam may be taken at any of the local health department jurisdictions.
3. Upon satisfactory completion of the exam, the results will be reviewed and incorrect answers discussed with the applicant.
4. A separate license will be required for each local health department.
5. Licenses shall expire every three years. Expiration dates are 4-30-08, 4-30-11, etc. License fees will be prorated. If an application is made within a three year license period; full fee for three year license, 2/3 fee for 2 year period, 1/3 fee for applications received within one year of expiration date.

Application for Permit

Reference: Section 5.3.1

This section of the code states that an application to construct, alter, extend or replace a sewage system shall be submitted to the department by the property owner or his authorized representative. An application will not be acted upon unless the application is complete.

- 1) A sewage permit application must be accompanied by a completed sewage system layout sheet (mound system layout, drainfield bed layout, or trench system layout) to be considered complete. Copies of these layouts are enclosed in the appendix.
- 2) A sewage permit application must be accompanied by a property tax ID # for the parcel on which the sewage system is to be built.
- 3) For the purposes of this code, the property owner or the licensed sewage installer are considered authorized representatives.
- 4) A well permit will not be issued by the department unless there is an approved sewage system on-site or both sets of permits (sewage and well) are issued at the same time.

Alternative Sewage Systems

Reference: 5.3.2 (9)

This section of the code states that the health officer shall have the authority to issue a construction permit for an alternative sewage system if the site does not meet the minimum site requirements for a conventional system.

- 1) For the purposes of this code, a conventional sewage system includes: a bed system, a trench system, a gravity fed mound system, and a pump to gravity fed mound system (where the sewer or effluent line is pressurized only).
- 2) Alternative systems include but are not limited to: (Wisconsin) pressurized mound systems, aerobic treatment units, sand filters, peat filters, etc.
- 3) Alternative sewage systems are regulated under the “Western Upper Peninsula Health Department’s Alternative Technology Policy” and the “Pressure Mound Systems Policy” from the Department of Environmental

Quality. For further information on pressurized mound systems or alternative technology permitting please reference these policies. Copies of these policies can be obtained from an Environmental Health Secretary or a Sanitarian.

Minimum Test Excavations

Reference: Section 5.6.1

This section of the code states that the health officer shall conduct site evaluations of parcels for completed applications submitted to the department. The depth, number and location of the test pits will be determined by the sanitarian on-site. The site evaluation will be valid for no more than twelve months.

- 1) The department reserves the right to send back for completion or request more information for site evaluation applications it deems incomplete.
- 2) A backhoe or some other mechanical means of excavating test pits is required at all site evaluations with few exceptions.
- 3) All site evaluations expire after twelve months. A re-evaluation of the site may be requested at the departments' reduced fee under the following conditions:
 - A) The same test holes dug on-site during the original evaluation will be utilized for the sewage system.
 - B) The re-evaluation (without a backhoe) finds no major site activity has damaged the evaluated sewage system site. All isolation distances required by the code can be met.
 - C) The permit application clearly shows that the original site (where test holes were dug) is being used for the sewage system.

Out of the 100 Year Flood Plain

Reference: 5.7.1 (1) G. Minimum Site Requirements/100 Year Floodplain

This section of the code states that sewage systems shall not be located in a floodplain of less than one hundred (100) years, or in an area subject to seasonal flooding or ponding of surface waters. Historically there has been much debate

statewide regarding the interpretation of, “the site shall not be located in a floodplain”.

The property owner shall demonstrate that the following criteria are met when installing sewage systems in or near one hundred (100) year floodplains:

The sewage system and the four (4) feet of soil located immediately beneath the soil-stone aggregate interface shall be located above the one hundred (100) year floodplain elevation.

NOTE: Permits from MDEQ, Land and Water Management Division may be required prior to placing fill for a conventional sewage system in a 100 year floodplain elevation.

Conventional Gravity Mound Systems

Reference: Section 5.7.2 (2)

This section of the code states that the soil depth between the limiting zone or the seasonal high water table and the aggregate/soil interface shall not be less than forty-eight inches (48”).

In many cases, forty-eight (48”) inches of native soil is not available on-site between a limiting layer or seasonal high water table and original grade. In order to obtain this 48” for sewage treatment, fill material must be placed on-site. Gravity fed mound systems are required to meet the following standard construction practices.

Site Preparation and Construction

Ultimate success or failure of a mound relies on a clear communication and understanding of basic site preparation and construction principles. Critical issues include:

- Proper procedures must be followed to protect the mound area including a required greenbelt during and after construction. After establishing a suitable location for the mound and replacement area including greenbelt, it should be suitably fenced or otherwise unmistakably identified to prevent further disturbance until actual construction can occur. Site planning resulting in a construction location for the mound which is isolated from other anticipated home construction activities is encouraged.
- Soil smearing and compaction which can reduce infiltration capacity will occur if soils are worked when wet. Construction activities should be scheduled only when soils are sufficiently dry. Proper soil moisture

content of the soils in the upper foot can be evaluated by rolling a sample of the soil between the hands. If the soil can be rolled into a ¼ inch or smaller “wire” it is considered to be too wet and should be allowed to dry before preparing.

- Excess vegetation should be removed from the mound basal area. Trees should be cut flush to the ground and other vegetation over six inches in length should be mowed and cut vegetation removed.
- Placement of fill material is to be accomplished from the end and upslope sides utilizing a tracked vehicle or equipment with adequate reach to minimize soil compaction. A minimum of six inches of fill material should be maintained below the tracks to minimize compaction. Wheeled vehicles should be prevented from travel over the mound basal area and down slope green belt area.
- Final grading of the mound area should divert surface water drainage away from the mound. Sod the entire area or seed and mulch.

Fill Material

Clean medium sand with little or no fines is to be used to form a sand base to the elevation that is required on the permit and site evaluation. Sand fill is to be placed from the upslope side or ends to reduce site disturbance.

Five Foot Sand Extension

When constructing a gravity mound system, a five foot sand extension around the bed is required. This sand extension prevents effluent from leaching out of the toe of slope.

3:1 Slope

In addition to the five foot sand extension, a 3:1 slope to natural grade is required. It is recommended that a sand-based soil be used for this slope. This slope prevents effluent from leaching out the toe of slope while blending the system into the landscape. Note: The toe of slope must be 10 feet from the property line. Refer to the Mound System Layout in the appendix.

Isolation Distances

Mound systems must meet all applicable isolation distances including distances to wells, property lines, foundation walls, building/storm/subsoil drains, water lines embankments, surface water, etc.

Replacement/Repair of an Existing System

Reference 5.9.1 (1) and 5.9.2 (1)

Section 5.9.1 states that no person shall connect a dwelling to an existing sewage system or increase flow to an existing sewage system by greater than one bedroom or one hundred and fifty gallons per day except where allowed, in writing, by the health officer.

Section 5.9.2 states that the owner of a failing sewage system is responsible for its correction and the method of correction shall be approved by the health officer.

If during the course of an existing system inspection the sewage system has been determined to be failing or contain significant violations of the Superior Environmental Health Code, this system will not be approved for use. In addition, if the system is already or will be in use, the department will require repair/replacement of that sewage system.

A failing system is defined in the code on page 10 as having any of the following conditions:

- 1) The sewage system fails to accept effluent at the rate of application.
- 2) Sewage effluent seeps from, or ponds on or around the sewage system.
- 3) The health officer has determined that the sewage system has contaminated the groundwaters or surface waters of the state.

Examples of significant violations of the Superior Environmental Health Code include:

- 1) Direct discharge of sewage to ground surface or surface waters,
- 2) Sewage backing up into the tank from the field,
- 3) High water table over the level of the field,
- 4) Collapsed tank,
- 5) Other circumstances as deemed by the health officer.

The method and time frame for correction will be furnished in writing.

Sewage System Abandonment

Reference: Section 5.9.3

This section is provided to guide industry and regulators in the proper abandonment of a septic tank and/or absorption system. Regardless of the abandonment method chosen, a potential safety hazard must not be created.

Septic Tank

Abandonment shall not proceed until the septic tank is pumped and the contents properly disposed of by a licensed septage waste hauler. Alternative methods of septage and tank disposal may be approved in writing by the health officer. Proper abandonment of a septic tank shall consist of one of the following methods:

1. Collapse tank when feasible; otherwise completely fill it with material approved by the health officer. Provide compaction during the filling process to eliminate the potential to develop a sinkhole or any other safety hazard.
2. Remove and haul the tank to a licensed Type II landfill. The tank shall be pumped by a licensed septage hauler prior to removal.

Absorption System

When it is practical to do so, the absorption system should be left in place. When the area is needed for other purposes, the absorption system may be removed. The disposal method to be used shall be one of the following:

1. Remove and haul the contaminated material to a licensed Type II landfill. Containment of the contaminated material is required with particular attention paid to over-the-roadway hauling so as to avoid exposing the public to a health hazard.
2. A property owner may choose to bury the abandoned absorption system on their own premises, or the premises of another with that owner's permission. All components of the system shall be buried in a manner that does not create an environmental health hazard.

Aggregate/Filter Material

Reference: 5.10.1.

Aggregate/filter material shall be washed stone or other material approved by the Health Officer that complies with all of the following specifications:

1. One hundred percent (100%) passing through a two and one-half inch $\frac{1}{2}$ " sieve.
2. No material shall pass a one-half inch ($\frac{1}{2}$ ") sieve except for fines. Fines are material that will pass through a number two hundred (200) sieve.
3. The total fines content passing through a number two hundred (200) sieve, as determined by a loss by wash method, shall not exceed one-half percent ($\frac{1}{2}$ %).
4. Rate 3 or more on Moh's scale of hardness. Stone aggregate may be field evaluated for hardness acceptability by determining whether it can scratch a copper penny without leaving any rock residue.
5. Twelve inches in depth (6 inches below pipe and 2 inches above pipe).
6. Extend 2 feet beyond the pipe on all sides of the absorption field.

Aggregate shall be transported, stockpiled, and/or otherwise manipulated in a manner which will not contaminate it with fines exceeding one-half percent ($\frac{1}{2}$ %) loss by wash method.

Chipped rubber, synthetics, concrete pavement, and other alternative aggregate may be approved in writing by the health officer.

Approved Piping and Distribution Products

Reference: Section 5.10.4.1. (F)

This section of the code states that all piping and distribution products shall be approved. A list of approved piping and distribution products is in the appendix.

Aggregate Cover

Reference: Section 5.10.5

This section states that prior to backfilling the absorption system, the aggregate shall be covered with approved filter fabric or other approved materials.

Filter Fabric Specifications:

Strength: 25 psi

Air Permeability: 500 cfm/sq.ft.

Water Flow: 500 gpm/sp.ft. at 3 inches of head

Opening Size: 70 to 100 sieve

Straw/Hay is an approved material for covering the aggregate. This straw/hay must be of sufficient thickness that fines cannot filter through and clog the drainfield (enough so that no aggregate can be seen when covered).

Soils used to cover the drainfield should not be clay based soils in order to maximize evapo-transpiration. A minimum of 4-6 inches of cover is required.

The field area shall be seeded and mulched to provide grass growth and prevent erosion of the field. The area around the field shall be landscaped to drain surface runoff away from the field area. Trees should not be grown on or near the field area as the roots will eventually plug the laterals. Grass is the best cover for the drainfield.

The drainfield should not have structures built upon it and vehicle traffic should not be allowed to avoid compaction and breakage of drainfield materials.

Septic Tanks

Reference: Section 5.12(1)

This section states:

“Septic tanks shall be watertight and constructed of concrete or other materials approved by the health officer.”

- 1) In order to provide technical guidance to meet the standard, the following specifications have been established:

- a) Pre-cast concrete tanks shall have a minimum wall, compartment and bottom thickness of two and one half inches (2½”) and shall be adequately reinforced. The top shall be at least four inches (4”) thick and able to withstand the load for which it is intended.
 - b) When concrete block tank is permitted by the health officer, it shall be constructed of concrete block with a minimum thickness of eight inches (8”), laid on a four inch (4”) minimum poured concrete foundation. All block joints shall be adequately mortared. All block holes or cells shall be filled with mortar or concrete. The tank shall be watertight by application of a waterproofing sealant.
 - c) A cast-in-place concrete tank shall be approved by the health officer prior to construction and comply with all specifications listed in part a).
 - d) The use of polyethylene septic tanks or tanks manufactured with materials other than concrete shall be limited to sites where water table and large boulders/cobbles are not a problem.
- 2) Manufactures shall demonstrate, upon request of the health officer, that the septic tanks which they manufacture, are watertight. Testing procedures for determining if a tank is watertight can be found on the last page of the “Advisory for Pre-cast Septic Tank Installations and Inspections” located in the appendix.
 - 3) Multiple compartment tanks shall comply with the following:
 - a) As measured from the invert elevation of the outlet, the first compartment shall have at least (2/3) of the total required capacity
 - b) Each compartment within a tank shall have an inspection port situated above the outlet baffle.
 - 4) The minimum liquid depth of any compartment shall be thirty-eight inches (38”). Liquid depths greater than seventy-eight inches (78”) shall not be considered in determining the working liquid capacity.
 - 5) When a high water table is present, septic tanks shall be weighted to prevent floating or shifting.
 - 6) Access ports shall be provided for maintenance. They shall be a minimum of twelve inches by twelve inches (12” x 12”), twelve inches (12”) in diameter. Each access port cover should be provided with corrosion resistant strap or handle to facilitate removal.

- 7) Inspection ports with a minimum opening of six inches (6") shall be located above all baffles. Access ports may be substituted for inspection ports.
- 8) The access ports for cleaning and maintenance purposes shall extend to within eighteen inches (18") of the ground surface.
- 9) A tank shall be located to assure accessibility for inspection and cleaning. No other obstruction or landscaping shall impede the tank's accessibility. If the top of the tank is to be buried more than 12" below grade, it is recommended that a riser to the surface be installed to provide for easy maintenance.
- 10) A tank should be located on the same side of a building that the sewer line exits the foundation wall. The building sewer shall be at least five feet (5') in length, as short as possible, and contain not more than (2) forty-five degree (45) bends.
- 11) The inlet and outlet specifications are as follows:
 - a) Have a minimum diameter of four inches (4").
 - b) Be placed on opposite ends of the tank, unless otherwise specified by the health officer.
 - c) The invert elevation of the inlet shall be at least two inches (2") higher than the invert elevation of the outlet.
 - d) The outlet shall be equipped with a baffle extending below the tank's liquid level a distance equal to but not less than thirty-five percent (35%) or greater than fifty percent (50%) of the liquid level.
 - e) The tank inlet and outlet should be installed with rubber or neoprene gaskets to provide watertight connections. The health department officer may approve in writing other watertight connections.
- 12) Tank ventilation shall be provided by means of a minimum of eight inches (8") of air space between the underside of the top of the tank and the top of the "tee" fitting.
- 13) A multiple compartment tank shall have a four inch (4") minimum diameter "tee" placed on each common wall, utilizing the same specifications as established for the outlet baffle in section 12.

- 14) The health department recommends installation of a gas baffle in all tanks to prevent passage of sludge or scum from the septic tank to the soil absorption system.
- 15) Installers should assure that the septic tank is bedded properly, level, and does not have any major defects before installation. Refer to the “Advisory for Precast Septic Tank Installations and Inspections” in the appendix for this information.

Effluent Filters

Reference: Section 5.12

- 1) The health department recommends installation of an effluent filter. The filter shall be installed and used in accordance with the manufacture’s recommendations.
- 2) An effluent filter shall meet the following specifications:
 - a) Be constructed of durable and corrosion-resistant materials.
 - b) Be designed to prevent the escape of suspended solids during normal operation or maintenance.
 - c) Retain all particles greater than one-eighth inch (1/8”) in size.
 - d) Be designed to accommodate the effluent discharge for the system it serves.
- 3) If an effluent filter is installed, a maintenance access riser shall extend from the top of the septic tank to the ground surface

Privies

Reference: Section 5.13

This section of the code states that the base of an earth pit privy shall be a minimum of forty-eight (48”) inches above the limiting zone or the seasonal high water table. Vault privies may be approved.

Sealed vaulted privies are required on sites that do not have enough isolation between the base of the proposed pit and any limiting layer. Sealed vaulted privies must have a minimum tank size of three hundred (300) gallons. Vaulted

privies must abide by the construction and isolation distance requirements noted on the sealed vaulted privy diagram (see appendix).

A sealed vaulted privy may be approved for sites that do not meet the requirements for a conventional sewage system under the Superior Environmental Health Code with the following conditions. Pressurized plumbing or gray water discharges (plumbing that drains to the ground surface) are not allowed. A completed privy permit agreement (see appendix) must be notarized and attached to any permit application for a sealed vaulted privy for a site which does not meet the Code requirements for a conventional on-site sewage system.

Compost Toilets/Incinerating Toilets

A composting toilet or incinerating toilet may be substituted for a sealed vaulted privy. They must be used and operated according to manufacturers instructions. Designs that incorporate a discharge to a pit or overflow are not approved by this department. If the site does not meet the requirements for a conventional sewage system, a self-contained composting/incinerating toilet agreement must be notarized and attached to any permit application (see appendix).

Final Inspections

Reference: 5.15.1

This section of the code states that before any portion of the system has been covered and/or placed into operation, the installer shall notify the department. This notification shall occur at least one department working day prior to the completion of the system. The department shall inspect the installation within three working days to determine if it is in compliance with the code. The department shall reserve the right to extend the notification period for weekends and legal holidays.

- 1) For purposes of this code, the minimum components of a sewage system that must be installed for a full final inspection are as follows: septic tank, aggregate, sand fill (if required), drainfield piping network (header and footer connections), and five foot sand extensions (if required).
- 2) If all components of a system are present except for the septic tank, a partial inspection will be conducted by the department. An affidavit will then be mailed to the installer. The installer must complete the affidavit and return it to the health department within 10 days. A copy of the affidavit form is included in the appendix.

- 3) If any other components of the sewage system are missing or there are deficiencies in construction, the system will be “red tagged” as not meeting permit/code requirements. Systems not approved will require corrections to be made in accordance with Article 7 (Enforcement) of the code. Proof of correction will be required, most likely by a follow-up inspection by a sanitarian.

Appendix

- 1) Mound System Layout
- 2) Drainfield Bed Layout
- 3) Trench System Layout
- 4) Approved Piping/Distribution Products
- 5) Advisory for Precast Concrete Septic Tank Installation and Inspections
- 6) Sealed Vaulted Privy Diagram
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