

CHAPTER 7

SANITARY SEWAGE DISPOSAL

BOARD OF HEALTH ROLE AT A GLANCE

- Review preliminary and definitive sub-division plans, as well as plans for individual septic systems, to ensure appropriate siting and design.
- Witness and record the results of deep hole observation and percolation tests.
- Consider and act upon applications for permits to install, modify and repair septic systems with design flows of less than 10,000 gallons per day.
- Inspect septic system installations, repairs and upgrades to determine their compliance with Title 5 of the State Environmental Code.
- Ensure proper septic system construction and appropriate handling of septage by considering and acting upon annually-renewable permits for disposal works installers and septage transporters.
- Order corrective measures and take necessary enforcement actions when Title 5 violations are found.
- Review septic system inspection reports to insure failed systems are upgraded within a timely period as required by the Code.

OVERVIEW

Approximately one-third of all households in Massachusetts, mostly in areas not served by sewers, rely on septic systems (and sometimes cesspools) for wastewater disposal.

The modern septic system consists of three components:

- Septic tank. A watertight container that retains sewage for at least 48 hours so that solid and liquid wastes can be separated and organic matter partially digested. As the solids settle to the bottom, the liquid portion flows to the distribution box.
- Distribution box. A watertight structure which receives liquid from the septic tank and which regulates the flow of liquid effluent to the leaching field, the final stage of treatment.
- Leaching field. A series of perforated pipes laid in trenches of coarse gravel. This allows the liquid effluent to seep into underlying soil where microorganisms further break down the

remaining organic material contained in the effluent.

The key to sanitary sewage disposal is the absorbency of the soil, which is why the soil must be tested before a septic system is designed and built. The soil must be permeable not only to allow the percolation of the liquid effluent but also to retain enough oxygen to promote the growth of the microorganisms needed to treat the effluent's organic content.

Department of Environmental Protection (DEP) regulations governing the subsurface disposal of sanitary sewage, found at 310 CMR 15.000, are known as Title 5 of the State Environmental Code. Title 5 establishes minimum statewide standards for the design, use, siting, and construction of septic systems.

Originally adopted in 1978, Title 5 was completely rewritten in 1994 and revised in 1995. In April 2006, the Code was revised to provide for the disposal of greywater and the renewal of septic system inspector/soil evaluator approval every three (3) years among other things.

Massachusetts General Laws, c.111, §31 authorizes local boards of health to adopt septic system regulations equal to or more stringent than the State Environmental Code. This authority is recognized in the DEP regulations. (310 CMR 11.02 and 15.003(3))

TITLE 5 PROVISIONS AND REQUIREMENTS

The Code is divided into subparts, the pertinent provisions of which are summarized in this chapter.

Subpart A: General Provisions and Enforcement (310 CMR 15.001 - 15.050)

Subpart A of the Code contains definitions, applicability rules, permitting procedures, and enforcement procedures. This subpart defines which systems may be governed by the 1978 Code and provides for continuing review of the implementation of the 1995 Code.

Applicability

Under the Code, the largest systems for which local health boards may now issue permits are those with design flows of less than 10,000 gallons per day (gpd). (310 CMR 15.004(2)(a)) Under the 1978 Code, health boards had jurisdiction over systems with design flows up to 15,000 gpd. These large systems are now regulated by DEP under either the Code or the groundwater discharge regulations found at 314 CMR 5.00 and 6.00.

Notwithstanding the 10,000 gpd jurisdictional threshold, the Code authorizes the local health authority to permit a system with a 10,000 gpd or greater flow under two circumstances:

- Subdivisions where an applicant has obtained a sewage disposal system construction permit for each lot and has demonstrated that the separate subdivision lots will be conveyed to independent owners is not considered a flow greater than 10,000 gpd because each system will be independently-owned and on a separate lot. (310 CMR 15.004(2)(c))
- Systems between 10,000 and 15,000 gpd with a plan and sewage disposal system construction permit approved by the local health

authority prior to March 31, 1995 are entitled to proceed in accordance with the 1978 Code and the transition rules which are explained further below. (310 CMR 15.004(2)(b))

Soil Evaluators

The Code contains design standards based on different soil types (see summary of Subpart C) which must be analyzed by a soil evaluator a person with proven expertise in soil identification, topography, and groundwater hydrology. (310 CMR 15.018(1))

Registered professional engineers, registered sanitarians, certified health officers, engineers in training with a concentration in civil, sanitary or environmental engineering , registered land surveyors, DEP employees involved in administering the Code, and board of health members or agents may become approved soil evaluators by passing an examination demonstrating their knowledge of relevant issues. DEP administers a preparatory course, but this training is not mandatory. (310 CMR 15.017)

A DEP-approved soil evaluator must be on the site when soil conditions and groundwater elevations are determined. The evaluation must be done in the presence of the health board. (310 CMR 15.018(1))

Beginning January 1, 2007 the Code requires the renewal of soil evaluator approvals every three (3) years. Renewals after January 1, 2010 will require the demonstration of attending 10 contact hours of training as part of the renewal application.

Permitting and Enforcement Procedures

The Code attempts to bring greater clarity and consistency to the permitting and enforcement provisions of the 1978 Code, most of which were retained without major changes. Generally, the Code is implemented and enforced by the local health authorities with oversight by and assistance from DEP as necessary. (310 CMR 15.019 - 15.026)

Specifically, under the Code septic system additives or soil conditioners must be approved by DEP. This approval does not, however, suggest agreement with manufacturers' claims about product performance; DEP only certifies that these products will not harm the environment or the system. (310 CMR 15.027 and 15.028(3))

The Code prohibits the installation of a well within 100 feet of an existing septic system and retains the 1978 Code prohibition of new septic systems within 100 feet of existing wells. (310 CMR 15.029)

Where the board of health or DEP determines that ownership was devised to circumvent the requirement to use recirculating sand filters or equivalent enhanced nitrogen removal technologies for systems with a flow of 2,000 gpd or greater located in nitrogen sensitive areas (310 CMR 15.202) or the requirements of the groundwater discharge program which are applicable to systems in excess of 10,000 gpd (314 CMR 5.00 and 6.00), compliance and other action necessary to protect public health, safety, welfare or the environment may be ordered. (310 CMR 15.010 & 15.011)

Record Maintenance

The local board of health must keep complete and accurate records of all systems approved, repaired, altered, and upon which any notice of noncompliance or enforcement order has been issued by that health board. These records must be made available for review upon request and must be maintained until the system is abandoned or connected to a sewer. (310 CMR 15.030)

Review and Future Revisions

DEP is required to review the implementation of the Code, to conduct certain feasibility studies, evaluate the use of soil analysis and pollutant loading determinations in system siting and design, using shared and alternative systems, evaluating the effectiveness of the Code in protecting critical resources and upgrading failing systems, and analyzing septage disposal. (310 CMR 15.041)

The Code directs DEP to convene an advisory committee to assist it in evaluating and implementing the 1995 Code. (310 CMR 15.040)

Subpart B: Siting of New Systems

(310 CMR 15.100 - 15.107)

Subpart B of the Code standardizes practices for deep observation hole testing, including methods for determining the high groundwater elevation and soil profile. An approved soil evaluator (see summary of Subpart A) must be present at the deep observation hole test and must certify to both the health board and the system designer that the test was performed properly. The board of health must be present when the deep hole tests are performed. (310 CMR 15.102 - 15.103)

The Code also standardizes percolation testing. The board of health must be present when the percolation tests are performed. (310 CMR 15.104 - 15.105)

Identification of the topography and hydrogeologic properties (including proximity to water supply and nitrogen sensitive areas, e.g., Zone II) of the proposed disposal area is also required. (310 CMR 15.106 - 15.107)

Subpart C: Design and Construction

(310 CMR 15.201 - 15.293)

Subpart C of the Code contains rules for designing and building on-site systems, including specifications for each system component. Under the Code a system must consist of a septic tank and a soil absorption system (a distribution box and a leaching field). No modification or alteration is allowed except approved alternative technologies and shared systems or through local upgrade approval procedures or variance procedures (see summary of Subpart E). (310 CMR 15.201)

Systems with a Design Flow Exceeding 2,000 gpd Located in Nitrogen Sensitive Areas

Nitrogen sensitive areas are (1) Interim Wellhead Protection Areas, (2) mapped Zone IIs of public water supplies, (3) nitrogen sensitive embayments, and (4) other areas designated as nitrogen

sensitive. (310 CMR 15.215)

The Code requires the use of a recirculating sand filter or an equivalent alternative technology for a system with a total design flow of 2,000 gpd or greater that will be located in a nitrogen sensitive area. (310 CMR 15.203) The Code provides performance standards for recirculating sand filters. (310 CMR 15.203(4))

Once a design plan using alternative technology is approved by the board of health, DEP has 30 days in which to complete its review. The plan is deemed approved if DEP does not act within that period. (310 CMR 15.202)

System Design Flows

The health board must determine the design flow of a facility (as well as ownership) when an application for a disposal system construction permit is received. (310 CMR 15.010)

System designs are not based on actual water meter data, but rather on estimated generated flow into which are factored expected flow variations. The Code provides a listing, by facility type, of such system design flows. (310 CMR 15.203) For non-residential facilities the Code provides a mechanism for listed facilities to apply to the Department for alternative flows than those listed ((310 CMR 15.203(6)) Only schools are permitted to utilize actual water meter data when applying for a variance from DEP. (310 CMR 15.416(3))

The design flow for a family dwelling is based on number of bedrooms. To reduce disputes over the number of bedrooms in a residence, a bedroom is defined in the Code. (310 CMR 15.002) The Code allows for a deed restriction if the design is for something less than presumed by the bedroom definition, provided the board of health accepts the restriction. (310 CMR 15.002)

Setback Distances

The Code sets a minimum setback distance for septic tanks, holding tanks, pump chambers, I/A treatment units, grease traps and soil absorption systems, including the reserve area. (310 CMR 15.211) For example:

- The disposal system setback from a reservoir is 400 feet and 200 feet from tributaries to a reservoir.
- A leaching field must be 100 feet from a certified vernal pool unless the system is hydraulically downgradient, in which case the setback is 50 feet (vernal pool certification is described in 310 CMR 15.002).
- The Code establishes the leaching area setback at 15 feet from slopes or, if the applicant provides an approved retaining wall, the setback can be decreased.
- The construction of septic systems in a velocity zone or a regulatory floodway are prohibited if they were not in existences prior to March 31, 1995. (310 CMR 15.213)

Percolation Rate

The Code, provides a maximum allowable percolation rate for new construction of 60 minutes per inch. (310 CMR 15.245(1))

Soils with percolation rates between 60 and 90 minutes per inch may be allowed when failed systems are upgraded. (310 CMR 15.245(3)&(4))

Nitrogen Loading

The Code establishes nitrogen loading limits for new systems built on lots with a residential on-site water supply well or located in nitrogen sensitive areas (defined in the summary of Subpart C). Essentially, the Code requires a minimum of an acre of land for construction of a new four-bedroom house. (310 CMR 15.214 & 15.215)

This nitrogen loading limit may be satisfied by averaging the facility with other qualified land. (310 CMR 15.216) Further, a larger house or a smaller lot may be allowed if an applicant provides an enhanced nitrogen removal treatment. (310 CMR 15.217)

Soil Classes

Loading rates are based on the capacity of various soil types to absorb pollutants and effluent flow. The Code identifies four classes of soils as well as the loading and percolation rates for each soil class. For some soils, these values allow smaller leaching areas than the 1978 Code required; for others, larger areas are necessary. (310 CMR 15.242 - 15.244)

Alternative Technologies

Any proposed system which is designed or constructed in any manner other than described in the Code is an alternative system.

An alternative system may be authorized without a variance but the technology must be approved by DEP through its comprehensive review process. (310 CMR 15.280 - 15.288) This review process is based on the amount of information available on the effectiveness and proposed uses of each alternative. Data from other states with comparable conditions may serve as the basis for approval. (310 CMR 15.285(3)) It is a violation of the Code to sell or install an alternative system not approved by DEP. (310 CMR 15.281(3))

The Code requires DEP to maintain a list of approved alternatives and those currently being reviewed. This list must be published annually. (310 CMR 15.289; 310 CMR 15.004(1))

Recirculating sand filters and humus/composting toilets are approved for general use.

Shared Systems

The Code allows more than one homeowner to use a common leaching area, distribution box, or septic tank.

Except for condominiums built before December 31, 1995 (see summary of Subpart A, transitional rules), and cluster developments the total design flow of new construction using a shared system cannot exceed the volume of sewage that could have been constructed if separate systems were used. (310 CMR 15.290 - 15.293)

Subpart D: Inspection and Maintenance (310 CMR 15.300 - 15.354)

This subpart of the Code contains inspection and maintenance requirements for all systems, both existing and proposed.

Inspection Time

Under the Code a septic system must be inspected no more than two years prior to the transfer of property title (three years if the system is pumped annually). If weather conditions preclude, and the seller notifies the buyer, the inspection may be postponed, but only until the weather permits and no later than six months after the property transfer. (310 CMR 15.301(1))

The Code describes specific title transfer situations and requires an inspection whenever there is a change in use or an expansion requiring a building permit. (310 CMR 15.301 (3) & (5)) No inspection is required if there is no increase in flow despite a change in a building's footprint; however, the septic system components must be located to ensure that the proposed construction will not be placed upon any system component. (310 CMR 15.301(5); 310 CMR 15.302)

System Inspectors

The Code specifies that only authorized or approved persons may inspect septic systems. (310 CMR 15.340)

- Registered professional engineers with a concentration in civil, sanitary or environmental engineering; registered sanitarians; and certified health officers are authorized to perform inspections by virtue of their professional registrations.
- Health board members or agents, engineers in training with a concentration in civil, sanitary or environmental engineering, professional home inspectors, licensed septage haulers or installers and others experienced in the field must take a training course and pass an examination administered by DEP to become approved inspectors.

Failed Systems

The Code defines the specific conditions under which systems are considered to be failing and must be upgraded. These include obvious hydraulic failure (breakout or backup); system siting within the

Zone I of a public water supply well, within 100 feet of a reservoir or one of its tributaries, or within 50 feet of a private water supply well; and where the system threatens specific health or environmental problems. (310 CMR 15.303(1)(a)&(c) and (2))

Failing systems must be upgraded within two years of the problem being discovered. The health authority may require the work to be done sooner if there is an imminent health hazard. If more time is needed, the local health authority may allow up to five years under an enforceable agreement. (310 CMR 15.305)

If the system cannot be brought into compliance with the 1995 , the upgrade standard is maximum feasible compliance with the Code (see summary of Subpart E).

Large Systems

Existing facilities with design flows between 10,000 gpd and 15,000 gpd must have their systems inspected by December 1, 1996, and every three years thereafter.

Because large systems have a history of operational problems and high failure rates, the 1995 Code classifies as "significant threats" those that are located within 400 feet of water supply reservoirs, within 200 feet of reservoir tributaries, or within a nitrogen sensitive area. These systems must be replaced by treatment plants within five years of discovery, unless the owner demonstrates that the Massachusetts water quality standards are being met at the property boundary and in the receiving water. DEP may extend the deadline, under an enforceable agreement, if more time is needed to achieve a level of environmental protection that is at least equivalent to that provided by the DEP groundwater protection regulations, 314 CMR 5.00 and 6.00. (310 CMR 15.304(2)&(3))

Pumping

The Code requires the pumping of septic tanks and cesspools in certain circumstances and recommends that pumping occur at least once every three years — annually if a garbage grinder is in use. (310 CMR 15.351)

Subpart E: Local Upgrade Approvals and Variances (310 CMR 15.401 - 15.422)

Maximum Feasible Compliance

When full compliance with the Code is not physically possible or economically feasible, the health authority may issue a disposal system construction permit that diverges from full compliance with the Code. Any deviation from the Code should be only to the extent necessary to achieve the best feasible upgrade within the borders of the lot and should have the least possible negative effect on public health and safety and the environment.

The board of health may issue a maximum feasible compliance construction permit only for:

- upgrades of existing systems that are in failure or not in compliance (increased flows are not allowed under local upgrade approvals); and
- When a system failure is due solely to the malfunction of a particular component, only that component must be upgraded to current standards. (310 CMR 15.404)

Although the Code gives the board of health flexibility in crafting a maximum feasible compliance construction permit (310 CMR 15.405), in evaluating a septic plan under the maximum feasible compliance approach, the health board must apply the following minimum standards:

- the system must include three components (septic tank, distribution box, and leaching area) with a tank capacity of at least 1,000 gallons and a leaching area at least 75 percent as large as the Code requires;
- there must be a four-foot separation (in soils with a recorded percolation rate greater than two minutes per inch) or five-foot separation (in soils with a recorded percolation rate of two minutes per inch or less) between the bottom of the leaching area and the high groundwater elevation;¹ and
- the system must be at least 100 feet from reservoirs and their tributaries, 50 feet from private wells, and outside the protective area (typically 400 feet) around public wells.

If an upgrade cannot meet these minimum requirements, the applicant must seek a variance or tight tank approval. (310 CMR 15.402(2))

Notwithstanding the minimum standards, the board of health has flexibility under the Code to allow a reduction of setbacks from property lines, buildings, and water resource areas; the use of 60 to 90 minute percolation rates (for upgrades only); and a reduction of 25 percent or less in the required leaching area size.

Variances

Except where variances are specifically prohibited (310 CMR 15.415) and for schools, the health authority may vary the provisions of the Code when enforcement would be manifestly unjust and the applicant can prove that the proposed system design achieves the same degree of environmental protection as the Code.

- *New construction*

To claim manifest injustice, the applicant must demonstrate that substantially all use of the property would be lost if the variance were denied. (310 CMR 15.410(2))

- *Increased flow to an existing system*

DEP and the board of health, in evaluating whether manifest injustice will occur, must consider all relevant facts and circumstances, including contrasting the costs of compliance

with 1 Code with the costs associated with the variance and whether an upgrade in full compliance with the Code is feasible without increased flow. The applicant must also show that the system cannot be brought into full compliance through use of an upgrade, an alternative treatment system, a shared system, or a sewer connection, and that the system will provide better public health and safety and environmental protection than the existing system with no increased flow. (310 CMR 15.414 (2) & (3))

Only DEP may grant a variance for publicly or privately-owned elementary, middle or secondary schools, and the criteria differ from other variance applications. (310 CMR 15.416)

Limited emergency work may be conducted without a variance, but the health board must grant permission for the work prior to the work beginning, and the applicant must request a variance within 30 days after the work is completed. (310 CMR 15.411(2))

Variations may be conditioned as necessary to protect public health and safety and the environment. These conditions, which must be in writing, include monitoring and reporting requirements, recorded deed restrictions, financial assurances, and restrictions on use of the system. (310 CMR 15.413(1))

Where a variance is denied, the board of health may order the applicant to upgrade the system. (310 CMR 15.413(2))

Under the Code, DEP reviews all variances granted by the health board except for variances from property line or building setbacks, and, in some circumstances, for reductions of the surface water setbacks (siting of a system more than 200 feet from a reservoir, more than 100 feet from a tributary to a reservoir; or siting of a septic tank more than 25 feet or a soil absorption system more than 50 feet from surface water. (310 CMR 15.412)

A description of the variance procedure can be found in 310 CMR 15.410 - 15.422. (see also 310 CMR 11.11)

- Every variance request must be in writing, stating the specific variance sought and the reasons for the variance. At least ten days before the public hearing the applicant must notify abutters, by certified mail, of the date, time and place of the meeting; the specific provisions of the Code from which a variance is being sought; and a statement of the variance standards (manifest injustice, equivalent or more environmental protection). (310 CMR 15.411; see also 310 CMR 15.410)
- In the case of a residential facility of less than five units, if the health authority fails to act on a completed application for a variance within 45 days, this constitutes constructive approval. No work may be done until this period has elapsed. (M.G.L. c. 111, s. 31E)
- Every variance decision, whether an approval or a denial, must be in writing. In the event of a denial, the health authority must briefly list the reasons for its action. A copy of the variance must be posted for 30 days after it is issued. (310 CMR 15.411(3))
- The applicant has the burden of providing DEP with a copy of the variance granted by the

board of health. After receipt of the variance, DEP has 30 days in which to approve, disapprove, or ask for additional information. No work may be done under any variance for which DEP approval is required until DEP approval has been granted or 30 days have elapsed without DEP comment. (310 CMR 15.412)

- A local variance decision not requiring DEP review may be appealed to Superior Court. (310 CMR 15.420 and 15.421; see also M.G.L. c.249, s. 4)
- An adjudicatory hearing before a DEP administrative law judge is available for persons dissatisfied with decisions made by DEP in its variance review. (310 CMR 15.422)
- A variance may be revoked, suspended, or modified after the holder has been notified in writing and has been given an opportunity for a hearing.

Subpart F: Transportation and Disposal of Septage (310 CMR 15.500 - 15.505)

The Code clarifies the requirements for the removal, transportation, and disposal of septage, and encourages regional solutions to septage management.

BOARD OF HEALTH RESPONSIBILITIES

Under MGL c.111, s. 31, and the Code, as to septic systems with a design flow of less than 10,000 gallons per day (gpd) of sanitary wastes, the board of health is empowered to:

- Examine sites of proposed sewage disposal system installations for the purpose of witnessing and recording both deep observation hole and percolation tests so that high groundwater elevation may be measured and soil conditions evaluated; determining if lot size is compatible with the proposed sewage disposal system; and ascertaining if the location of the system is consistent with Title 5.
- Consider and act upon applications for permits to construct, install, alter, or repair (including emergency repair) individual sewage disposal systems.
- Inspect the installation of all septic systems and, at any stage of construction, require necessary modifications if conditions are encountered that were not originally observed (e.g., unexpected soil conditions, enlargement of system capacity).
- Issue a certificate of compliance to the permit holder upon receipt of written certification from installer and designer that all work has been completed in accordance with the terms of the disposal system construction permit, the approved site plan, and Title 5. The health board is required to conduct a final inspection of all installations. For systems with a design flow of 2,000 gpd or higher, the board of health must also require a certification by the designer that the system complies with the 1995 Code.

- Order the upgrade of a system where the system threatens public health or safety or the environment, or causes or threatens to cause damage to property, or creates a nuisance.
- Order compliance with Title 5 upon the discovery of any violation.
- Require the installation of meters, dosing counters, or other measuring devices to accurately record the flow of sewage.
- Grant a variance from certain regulatory requirements when, in the health board's opinion, enforcement would be manifestly unjust and the applicant has proven he can achieve equal or better public health and environmental protection than the 1995 Code. DEP must review and make final decisions on all local variances, except variances from property line or building setbacks, and, in some circumstances, for reductions of the surface water setbacks.

The health board may also:

- Consider and act upon applications for annually-renewable disposal works installer permits, which are required for any person or firm engaged in the construction, alteration, installation, or repair of septic systems.
- Ensure proper handling and disposal of septage by considering and acting upon applications for annually-renewable septage handlers permits, which are required for any person or firm engaged in the pumping or transport of the contents of individual sewage disposal systems; obtaining from DEP criteria for evaluating septage handlers; and identifying disposal sites for pumped septage for DEP review and approval.
- Establish and assess fees for disposal system construction permits and for septage handling permits.
- Adopt local regulations that are equivalent to or more stringent than the Code, including requirements for additional permits and fees.

State Responsibilities (DEP)

Under Mass. Gen. Laws, c.21A §13, and the Code, DEP is empowered to:

- Consider and act upon applications for sewage disposal system construction permits if the total volume of sanitary sewage will be 10,000 gpd or greater to a single system.
- Review and approve variances issued by local boards of health. Certain variances from property line or building setbacks, and, in some circumstances, for reductions of the surface water setbacks do not require DEP approval. Issue variances for elementary, middle and secondary schools.
- Approve disposal locations and disposal methods for pumped septage and notify in writing local health boards of the acceptance.

- Order compliance with Title 5 upon the discovery of any violation.

^{1/} Health boards with members or agents who are approved soil evaluators may allow a three-foot minimum separation (in soils with a recorded percolation rate greater than two minutes per inch) or four foot separation (in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the leaching field and high groundwater elevation, but only for upgrades and only when all other water resource setbacks are met.
