Appendix 4.2: FHR 15.0 Supplement to 310 CMR 15.000

FHR-15.0 SUPPLEMENTS TO 310 CMR 15.000: THE STATE ENVIRONMENTAL CODE TITLE 5

NOTE: NEW OR ALTERED LANGUAGE HIGHLIGHTED

15.1 PURPOSE AND AUTHORITY.

The Falmouth Board of Health adopts these regulations in accordance with Massachusetts General Laws, Chapter 111 Section 31, Chapter 21A Section 13, and the regulations contained within 310 CMR 15.000 et seq. (as amended in 1995) to provide for the protection of public health and the environment. The supplements to 310 CMR 15.000 are adopted due to the unique conditions in Falmouth including, among others, rapidly percolating soils, the abundance of recreational and shellfish harvesting resources, extensive fresh water and salt water wetlands, public drinking water supply wells, and the occasional presence of private drinking water wells.

15.2 CONDITIONS THAT SHALL APPLY TO ALL SEPTIC SYSTEMS.

1. **Septic Systems on Lot Served.**
   All septic systems and septic system components designed to dispose of sanitary wastes shall be constructed on the same lot as the structure or structures that they serve except that shared systems pursuant to 310 CMR 15.290-291 shall be allowed. No easements or right-of-way for the installation, maintenance or service of any septic system on a different lot than the lot to be served shall suspend, diminish or invalidate this regulation.

2. **Manhole Covers.**
   All septic tanks, cesspools, pump chambers, and leaching pit covers on existing and new individual sewage disposal systems shall be of sound and durable materials. Cement covers used below grade shall be a minimum of twenty-four (24) inches in diameter, weigh at least 75 lbs., be free of all cracks and chips and in good repair.
   Septic system covers at grade level shall be of steel construction. The cover shall be set flush to the ground and not tilt when stepped on. The rim of a steel manhole cover shall be firmly cemented in, and the steel cover removable only with the use of some type of implement.**(SECTION ALTERED AND REWORDED)**

3. **Distribution Boxes. (NEW)**
   All distribution boxes must have an H-20 load rating.

4. **Observation Ports Required on Leaching Facilities.**
   A minimum of two (2) observation ports, enabling the inspection of effluent ponding levels, shall be installed in each leaching facility. The observation port shall have a minimum two-inch diameter and shall extend from the bottom of the leaching facility to within six (6) inches of final grade. All observation ports shall have securely sealed caps. If installed below grade, a metal object that will allow detection with a metal detector shall be placed immediately on top of the end cap. The location of all observation ports shall be noted on the septic plan and accurately indicated on an as-built illustration.

Any structure, such as a gallery or chamber, having an observation port extended to within six (6) inches of surface grade may substitute for a separately installed observation port, provided that at least two (2) ports are present and are evenly spaced in the soil absorption area. All observation ports shall be labeled or otherwise marked to provide identification and prevent misuse.

5. **Engineered Plans.**
   - **a.** The locus of the property on which a septic system is proposed shall be provided on the septic system site plan. The locus shall identify the nearest intersection and nearest three (3) streets to the locus. A separate sheet containing the locus shall not satisfy the requirement of this regulation.
   - **b.** An electronic copy of the approved plan, in a format specified by the Health Department, shall be submitted to the Board of Health prior to the issuance of a certificate of compliance.
   - **c.** In situations where the vertical separation distance of the bottom of the stone beneath the soil absorption system is within six feet of high groundwater in soils with a percolation rate of more than two minutes per inch and within seven feet of high groundwater in soils with a percolation rate of two minutes or less per inch, the system's final elevations must be certified by the septic engineer/designer and submitted to the Health Department. In these cases, the elevations shall be determined using the North American Vertical Datum of 1988, or any datum that supersedes this system. **(NEW SECTION)**
     (THE ENGINEER'S SIGN OFF SHEET WILL BE ALTERED TO INCLUDE A SECTION FOR ELEVATIONS)

6. **As-Built Illustrations.**
   At the time of final inspection, a legible as-built illustration that shows the location of all components of a septic system shall be signed by the installer and submitted to the Health Department. Each reference on the illustration shall contain, at a minimum, the distance from two (2) points on permanent structures for each of the following: all observation ports, the center of two (2) manholes for all tanks or watertight structures, the four (4) corners of the leaching facility or the beginning and end of each trench if applicable. The as-built illustration shall be submitted to the Health Department on a 5"x7" card, and a copy of the as-built illustration shall also be supplied to the homeowner.

15.3 APPROVAL OF ALTERNATIVE ONSITE SEPTIC SYSTEMS.

1. **Purpose.**
   In certain situations, alternative septic systems, when properly designed, constructed, operated, and maintained, may provide enhanced protection of the public health and the environment. Notwithstanding the sound technical basis of many alternative technologies, the Falmouth Board of Health seeks, through these regulations, to ensure that those alternative on-site septic systems installed within its jurisdiction are operated in compliance with the appropriate Commonwealth of Massachusetts approvals for these technologies. In addition, by ensuring the completion of all required monitoring, the Board of health seeks to gain information on the efficacy of such technologies and modify its approval process accordingly.

2. **Definitions. (NEW SECTION 15.3.2 TO 15.3.13)**

Alternative Onsite Septic Systems (I/A's) / Enhanced Nitrogen Removal Systems.

Systems designed to provide or enhance on-site sewage disposal which either do not contain all of the components of an on-site disposal system constructed in accordance with 310 CMR 15.100 through 15.255 or which contain components in addition to those specified in 310 CMR 15.100 through 15.255 and which are proposed to the Falmouth Board of Health and/or the ***Massachusetts Department of Environmental Protection (MADEP),*** or an agent authorized by ***the MADEP,*** for remedial, pilot, provisional, or general use approval pursuant to 310 CMR 15.280 through 15.289.

Corrective Actions specific to Alternative Onsite Septic Systems.

Corrective action shall include, at minimum the following:

- A review of previous maintenance records and notes including the maintenance checklist;
- A review of water records for the home and all facilities serving the system identified as nonfunctioning;
- A verification that all water fixtures in the residence are sound and without leaks;
- A review with the homeowner and record of water use patterns, cleaning products, etc.;
- In the case of inadequate denitrification, a measure of alkalinity at the discharge point shall be taken and recorded;
- A review with the homeowner of the proper use of the system including practices recommended by the manufacturer;
- A consultation with the manufacturer of the treatment technology and a completion of any manufacturer recommendations;
- A report to the Board of Health on the actions and findings;

Should these corrective actions not result in findings that needed to be corrected and result in satisfactory system performance in accordance with the Board of Health Requirements, the maintenance provider's Corrective Action shall additionally include the performance of further diagnostic investigations that shall include, at minimum:

- Dissolved oxygen measurements at appropriate locations in the treatment train;
- Further in-depth listing of cleaning products used in the residence;
- Other actions that may be prescribed by the manufacturer of the treatment technology.
- A detailed report to the Board of Health on all consultations, actions and measurements taken.

Seasonal Dwelling

A dwelling unoccupied for three or more consecutive months in any one-year period.

3. Application Requirement.

a. All applications for disposal system construction permits involving the use of alternative septic system components purporting enhanced treatment shall be submitted to the Board of Health which shall hold a hearing to consider their approval. No abutter notification shall be required for this approval except as otherwise required. The Board of Health may deny the use of an alternative septic system if in its opinion the installation of said system is not in the interest of public health.

b. All applications for alternative septic systems shall be accompanied by a copy of the MA DEP Approval Letter appropriate for the technology indicating the level of approval (General Use, Remedial Use, Provisional Use, Piloting Use, or Site-Specific Pilot Approval).

c. All applications submitted under Piloting Approval shall be accompanied by performance data from all piloting sites where the alternative system has been similarly configured.

4. Requirements on Plans

All alternative septic systems shall have sampling ports appropriate for obtaining a representative sample and that are easily accessible and secured from unauthorized tampering. The design plans incorporating the use of alternative septic systems shall contain a clear illustration of all sampling ports, accompanied by an illustration and explanation for their use.

5. Monitoring Requirements.

The following monitoring requirements shall apply to the Town of Falmouth except that areas designated under an approved Targeted Wastewater Management Plan OR A Comprehensive Waste Water Plan shall follow all the requirements set forth by Mass DEP and the Responsible Management Entity of the Town of Falmouth. Also the following requirements are in addition to those stated in the Mass DEP Approval Letter for specific technologies.

a. The system effluent of all Innovative/Alternative (I/A) septic systems installed for the purpose of nitrogen reduction must undergo an initial probationary period of two years, during which the system shall be sampled and analyzed quarterly for parameters indicated by the Board of Health. Seasonally occupied homes shall be sampled two or three times during periods of occupancy with a minimum of six weeks between samples until eight measurements have been made.

b. Excluding the first quarter, if at any time thereafter during this initial sampling period a value exceeds the permitted level of any contaminant by greater than 25%, the maintenance contractor must notify the property owner, the Board of Health, and the Barnstable County Department of Health and Environment within 48 hours of receipt of the laboratory results, determine a plan for additional sampling, and initiate corrective actions referenced in FHR 15.3.2 within 30 days. ***Should these corrective actions not result in findings that needed to be corrected and result in satisfactory system performance in accordance with the Board of Health requirements, the maintenance provider's corrective action shall additionally include the performance of further diagnostic investigations that shall include at the minimum:***

- ***Dissolved oxygen measurements at appropriate locations in the treatment train***
- ***Further in-depth listing of cleaning products used in the residence***
- ***Other actions that may be prescribed by the manufacturer of the treatment technology***
- ***A detailed report to the Board of Health on all consultations, actions and measurements taken***

c. Reported results of corrective actions must include the results of all follow-up samples taken, and must be submitted within 60 days from the initial non-compliant value.

6. Probationary Period.

The probationary period shall conclude after two years of consecutive quarterly measurements, or in the case of seasonal homes after eight samples taken during periods when the home is occupied, if the following requirements are met:

a. No more than two measurements of the primary parameter, as defined by the Board of Health approval letter, exceed the permitted value by more than 25% **and**

b. The average of the eight measurements is equal to or less than the value permitted for the use of the technology.

Samples taken in conjunction with the corrective actions referenced in FHR 15.3.2 shall not count toward the eight consecutive quarterly samples except that a sample resolving the deficient performance sample may be substituted for the failed sample from that quarter.

7. Reduction of Testing Schedule.

Following successful completion of the probationary period, the applicant may petition to the Board of Health for a reduction of the testing schedule, provided that all of the permitted requirements have been satisfied, except in cases superseded by Mass DEP requirements.

8. System Failure.

If the Board of Health determines that a system is in failure it may at its discretion mandate corrective actions as defined in FHR 15.3.2 and may additionally include system upgrades or replacement. The system will be considered in failure if at the end of the probationary period or following a reduced schedule of testing the concentrations of the permitted parameters repeatedly fail to meet the system requirements through either standard sampling results or through the use of mass loading calculations as defined in FHR 15.3.9.

9. Calculating Compliance Using Mass Loading Calculations.

a. If the I/A system is considered to be failed using standard sample results, compliance may still be achieved if it can be demonstrated by use of influent concentration of total nitrogen (TN) and/or concurrent documented reduced water use that the system meets or exceeds the permitted reduction in nitrogen loading. For example, in a system permitted at 19 mg/l TN, the system would need to meet or exceed a 50% reduction in TN, a system permitted at 12 mg/l TN would need to meet or exceed a 70% reduction in TN, and a system permitted at 10 mg/l TN would need to meet or exceed a 75% reduction in TN.

b. Information required for use in this alternate means for determining system performance shall include:

- Influent TN concentration and the means by which this value was determined;
- Concurrent water use records in the form of a statement from the Falmouth Water Department;
- The number of occupants during the period of consideration;
- Any additional information the applicant considers relevant to the explanation of system performance.

c. When it is not feasible to obtain a system influent TN concentration, a qualified wastewater professional may submit information for consideration for alternate means of determining system performance, which shall be considered by the Board of Health.

10. Reporting Requirements.

Any person or entity that owns an alternative on-site septic system or septic system ***with pressure distribution*** **(replaced pressure dosed)** in Falmouth shall cause the results of all monitoring and inspections to be submitted to the Barnstable County Department of Health and Environment in a format

designated by that department. All reports regarding maintenance, monitoring, or inspections of alternative septic systems ***or systems with pressure distribution*** shall be submitted within thirty (30) days of the time when the maintenance, inspection, or monitoring was performed.

11. Notification with Registry of Deeds.

No certificate of compliance for a septic system that incorporates an alternative septic system that has any regular inspection or service requirement under the MA DEP Approval Letter shall be issued until the applicant has filed with the deed for the property a notice indicating the presence of an alternative septic system and the requirement for a service contract for the life of the system.

12. Requirement for Use of Shared Systems.

All subdivisions subject to the requirement of denitrification by any Board or Commission in the Town of Falmouth, shall be required to construct a shared septic system as defined in 310 CMR 15.002 and shall meet a limit of twelve (12) mg/l TN at the point where the treatment unit discharges to the soil absorption system. Individual on-site denitrifying septic systems shall be prohibited in subdivisions subject to denitrifying requirements.

13. Requirement for Accessory Apartments.

If an I/A system is required to meet the Falmouth Accessory Apartment Bylaw, that I/A system shall achieve a limit of 12 mg/L Total Nitrogen (TN) or achieve 70% TN removal.

15.4 CONDITIONS THAT SHALL APPLY TO *PRESSURE DISTIBUTION SYSTEMS*.(was pressure dosed

1. All systems with pressure distribution shall be designed in accordance with the most recent guidelines for the design and construction of pressure-dosed systems as available through the Massachusetts Department of Environmental Protection.
2. The calculations for the sizing of pumps, diameter of discharge orifices, diameter of all wastewater conveyance lines, and the spacing of orifices shall be provided at the time of application for a disposal works permit. The permit application shall be considered incomplete until this information is submitted.
3. The report from the mandatory annual inspection (required under 310 CMR 15.254) of all systems with pressure distribution shall be submitted to the Barnstable County of Health and Environment in a format designated by that Department.

15.5 VARIANCES.

1. **General Requirements.**
   - **a.** Variances may be granted only as follows: The Board of Health may vary the application of any provisions of this regulation with respect to any particular case when, in its opinion, the applicant has demonstrated that:
     - The enforcement thereof would do manifest injustice after considering all the relevant facts and circumstances of the individual case; and
     - A level of public health and environmental protection, that is at least equivalent to that provided under these regulations, can be achieved without strict enforcement of the provision of the regulation from which a variance is being sought.

b. Every request for a variance shall be made in writing and shall state the specific variance requested and the reasons therefore. All variances required shall be noted on the plan and specify which requirement of in 310 CMR 15.000 or Falmouth Board of Health regulation(s) cannot be met. Any variance granted by the Board of Health shall be in writing. Any denial of a variance shall also be in writing and contain a brief statement of the reasons for the denial. A copy of any variance granted shall be available to the public at all reasonable hours in the office of the Town Clerk or the Health Department while it is in effect.

c. Any variance or other modification authorized to be made by these regulations may be subject to such qualification, condition, revocation, suspension or expiration as the Board of Health expresses in its grant. A variance or modification authorized to be made by these regulations may otherwise be revoked, modified, or suspended, in whole or in part, only after the holder thereof has been notified in writing and has been given an opportunity to be heard in conformity with the requirements of 310 CMR 11.00 for orders and hearings.

d. All variances to Title 5 granted by the Board of Health shall be recorded at the Barnstable Registry of Deeds in the chain of title of the subject property. The cost of recording shall be paid by the applicant. A copy of the recorded variance shall be returned to the Health Department. Variances shall be valid for two (2) years unless a certificate of compliance for the associated construction works permit application has been obtained.

2. Abutter Notification.

For the purpose of notifying property abutters required by an action of the Board of Health as provided by Massachusetts General Laws or a Commonwealth of Massachusetts Regulation, abutters to a property shall include all owners of property falling entirely or in part within a one hundred (100) foot radius taken from any point on the property line of the subject lot. Abutters shall be identified through a certified list of abutters obtained from the Falmouth Board of Assessor's and said list shall be presented at the Board of Health hearing as evidence that the abutters have all been properly identified.

3. Standard Conditions.

The following conditions may be applied to variances granted from the requirements of Title 5 and these regulations. The Board of Health shall have the discretion to apply the conditions as they deem appropriate. The purpose of these conditions is to obtain the same degree of environmental protection as would have been provided if the system conformed to Title 5 ***or this local regulation***. The Board may add other conditions which it deems necessary to mitigate environmental damage considering all the relevant facts and circumstances of the individual case. For any variances, the Board of Health may require:

a. The installation of flow-restrictor devices on all faucets and shower fixtures in the house.

b. A retrofitting of the toilets in the house to low-volume flush toilets in addition to the placement of flow-restrictor devices on all faucets and shower fixtures in the house.

c. Design changes to the proposed plan which reduce the application rate of the septic effluent.

d. That there shall be no increase in the number of bedrooms or rooms that could be adapted for use as an additional bedroom. A bedroom is defined in DEQE (now DEP) correspondence 935-2160, dated 22 October 1985, which states "Bedroom" means any portion of a dwelling which is so designed as to furnish the minimum isolation necessary for use as a sleeping area and includes, but

is not limited to, bedroom, den, study, sewing room, but does not include kitchen, bathroom, dining room, halls or unfinished cellar.

e. That the existing system must be pumped dry and filled with clean soil before the new system is in service, or the system removed and the resulting void filled.

f. That the excavation area must be adequately shored during construction so as to prevent the roadway or abutting property from caving in or being undermined.

g. That the septic tank must be pumped at least every five years or as determined by inspection in compliance with 310 CMR 15.351. **(previously every two years)**

h. That no garbage grinder shall be allowed.

i. That the leaching area must be redesigned to provide a distribution line to each leaching component.

j. That wells near the property must be moved to meet the one hundred (100) foot lateral separation.

k. That irrigation wells located within fifty (50) feet must be decommissioned and their use discontinued.

4. Penalties.

Penalty for failure to comply with any provision of this regulation shall be governed by Massachusetts General Laws, Chapter 111, Section 31. Each day's failure to comply with an order shall constitute a separate violation. Further, the Board of Health, after notice to and after a hearing thereon, may suspend, revoke, or modify any permit issued hereunder for cause shown.

15.6 SEPTIC SYSTEM LOCATION AND CONSTRUCTION – SEPTIC SYSTEMS NEAR SURFACE WATERS AND WETLANDS.

Purpose: On-site sewage disposal systems designed to meet 310 CMR 15.000 have not proven to be adequate protection from viruses, pathogens, and other contaminants of groundwater and surface water, particularly in areas where there is a lack of filtration due to rapidly percolating soils. Scientists have observed virus entrainment in groundwater to distances of greater than two hundred (200) feet from where they were introduced to the subsurface through a conventional on-site sewage disposal system. In saturated groundwater flow, viruses can travel unattenuated in medium-to-coarse sands for distances exceeding the minimum requirements set forth in 310 CMR 15.211. Human consumption of viruses, pathogens and other contaminants which enter shellfish resource areas, swimming areas, and/or within zones of contribution to public water supply wells can place the public at risk to disease.

1. Prohibition of Systems Within One Hundred (100) Feet of Resource Areas That Serve New Construction.

No septic system leaching facility serving new construction (as defined in 310 CMR 15.002) shall be constructed within one hundred (100) feet of a surface water or wetlands (as defined in 310 CMR 15.002) or within one hundred (100) feet of a water body or a bordering vegetated wetland (as defined in 310 CMR 10.000). Further, no system shall be located on a coastal beach, barrier beach, or dune (as defined in 310 CMR 10.000). The minimum distance of a completely sealed septic tank shall be fifty (50) feet from a surface water or wetland as defined above.

2. Conditions That Shall Apply to Repair of Septic Systems Within One Hundred (100) Feet of Surface Waters or Wetlands.

The following conditions shall be required for the repair of those septic systems proposed within one hundred (100) feet of surface waters or wetlands. These regulations proceed on the principle that localized hydraulic loading resulting from gravity fed soil absorption systems results in decreased hydraulic retention, decreased wastewater treatment, and removal of pathogens. This situation compromises the public health near sensitive receptor sites such as surface waters, including wetlands. This regulation incorporates the principle that increased vertical separation between the bottom of the soil absorption system, afforded by pressure distribution networks, or alternative technologies, may compensate for horizontal setback deficiencies. Accordingly, where the health agent has determined that all feasible means have been taken to minimize the incursions toward the resource area, the following design features shall be incorporated. Notwithstanding the incorporation of the following design features, the health agent may, at his/her discretion refer any plan to the Board of Health for a hearing when, in their opinion, the applicant has not adequately demonstrated that all feasible means have been taken to minimize excursions toward resource areas.

- **a.** Where no increased design flow is proposed and where the bottom elevation of the soil absorption system (SAS) is greater than ten (10) feet from the adjusted seasonal high groundwater and where the maximum achievable horizontal separation between the SAS and a surface water or wetland is at least fifty (50) feet, but less than one hundred (100) feet, the applicant shall demonstrate that they have achieved the maximum separation between the SAS and the resource area, and the approval shall be subject to the conditions of FHR 15.5.3 a, d, g, h, i, j, and k.
- **b.** Where no increased flow is proposed and the bottom elevation of the SAS is less than ten (10) feet but at least five (5) feet from the adjusted seasonal high groundwater (but is otherwise in compliance with 310 CMR 15.**242**) and where the maximum achievable horizontal separation between the SAS and a wetland or surface water is at least seventy-five (75) feet but less than one hundred (100) feet, the applicant shall demonstrate that they have achieved the maximum separation between the SAS and the resource area and the approval shall be subject to the conditions of FHR 15.5.3 a, b d, g, h, i, j, and k.
- **c.** Where no increased flow is proposed and the bottom elevation of the SAS is less than ten (10) feet but at least five (5) feet from the adjusted seasonal high groundwater (but otherwise in compliance with 310 CMR 15.202), and where the maximum achievable horizontal separation between the SAS and a wetland or surface water is at least fifty (50) feet but less than seventy-five (75) feet, a pressure distribution system shall be required that conforms to guidelines issued by the MA DEP. The approval shall be subject to the conditions of FHR 15.5.3 a, b, d, g, h, i, j, and k.
- **d.** Where no increased design flow is proposed and where the bottom elevation of the SAS is greater than ten (10) feet from the adjusted seasonal high groundwater and where the maximum achievable horizontal separation between the SAS and a wetland or surface water is less than fifty (50) feet but at least forty (40) feet, a pressure distribution system shall be required that conforms to guidelines issued by the MA DEP. The approval shall be subject to the conditions of FHR 15.5.3 a, b, d, g, h, i, j, and k.
- **e.** Where no increased design flow is proposed and where the bottom elevation of the SAS is less than ten (10) feet from the adjusted seasonal high groundwater (but is otherwise in compliance with 310 CMR 15.202) and where the maximum achievable horizontal separation between the SAS and a wetland or surface water is less than fifty (50) feet but at least forty (40) feet, an alternative on-site septic system in conjunction with a disinfection unit having no chemical

residual and a system with pressure distribution shall be required that conforms to guidelines issued by the MA DEP. The approval shall be subject to the conditions of FHR 15.5.3 a, b, d, g, h, i, j, and k.

15.7 CRITERIA FOR DETERMINING A SEPTIC SYSTEM REPAIR OR REPLACEMENT.

To protect the public health against potential sources of contamination of the ground and surface waters in the Town of Falmouth, the Board of Health adopts the following regulation. The Board of Health may require the repair or replacement of a septic system if any of the following apply:

1. The results of an inspection of the septic system pursuant to 310 CMR 15.300 – 310 CMR 15.304 reveal that the system is failed.
2. Any of the following observations is made independent of a complete inspection pursuant to 310 CMR 15.300 – 310 CMR 15.304:
    - There is evidence of sewage flow to the surface of the ground, there is structural damage to the components of the system which prevent it from functioning as required
    - the system was pumped more than two (2) times in a ninety (90) day period (excluding maintenance pumping of grease traps),
    - there is evidence of breakout, there was sewage back-up into the house resulting from a non-functioning leaching area
    - the system is damaged or destroyed by storm or flood.
3. In the case where the septic system serving a facility is comprised of a cesspool(s), and where the seasonal high groundwater is less than two (2) feet from the bottom elevation of any cesspool, the system shall be considered failed and shall be replaced with a system in compliance with 310 CMR 15.000. Observations of these conditions in the course of an inspection pursuant to 310 CMR 15.300-15.305 shall be referenced on the certification statement part of the inspection form in the words "Needs Further Evaluation by Approving Authority". **(previously only cesspools within 100 to a water body or wetland required 2' of separation)**

15.8 SEPTIC SYSTEM INSPECTION REQUIREMENTS. (NEW)

1. A certified septic inspector who has failed a soil absorption system shall not conduct an installation, upgrade, repairs, or emergency repairs without the Board of Health or its agents certifying the system is in failure.
2. All domestic wells shall be located from two (2) points on permanent structures and included on the "As-Built" section of the inspection report.
3. Upon transfer of a property, if the dwelling is serviced by a domestic well and has not been tested in the previous twelve (12) months, a new water quality analysis report shall be submitted to the Board of Health with the inspection report. The Board of Health may also require a Volatile Organic Compound test to be performed. This test shall be performed at the discretion of the Board of Health or its agents.
4. Risers shall be brought to within 6" of grade for access to septic tanks and distribution boxes for accessibility. Should the soil absorption system be exposed during the process of the inspection, the risers shall be brought into compliance. If a system or component fails the inspection, then installation of risers is no longer required, as this will be corrected when the system is replaced or repaired.

Revised 2-26-19 – eliminated 15.7.4

Revised 3-8-19 – shown in green highlight from J. Waterbury/ Brian Dudley MADEP

Appendix 4.2: Draft 6-27-19 TMDL Impementation Plan

DRAFT 06-27-19

Implementation Plan to meet TMDL Compliance for the Oyster Pond Watershed, Falmouth, MA. using Advanced Innovative/Alternative Septic Systems

1.0 Definitions

BOD Biological Oxygen Demand
DEP Department of Environmental Protection
I/A Innovative/Alternative
RME Responsible Management Entity
TMDL Total Maximum Daily Load of Nitrogen in mg/l
TN Total Nitrogen [nitrite, nitrate and Total Kjeldahl Nitrogen [TKN]]
TSS Total Suspended Solids
TWMP Targeted Watershed Management Plan

2.0 Watershed Boundaries

The boundaries of the TWMP watershed will be those defined in the Massachusetts Estuaries Project Linked Watershed/Embayment Model for Oyster Pond, as adopted by Massachusetts DEP and by the Falmouth Town Meeting. The TWMP will designate which properties within the watershed will be required to install an Advanced I/A System.

3.0 Plan: The Town of Falmouth proposes to meet the TMDL for Oyster Pond through a two-phase program using Advanced I/A Systems to remove 2280 lbs/yr of Total Nitrogen from the watershed.

3.1 Advanced Innovative/Alternative Septic Systems: I/A systems meeting less than 10 mg/l TN or at least 75% removal of TN will be used for all the systems required to be installed in the watershed. To calculate % removal of TN refer to local Board of Health Regulation FHR 15.0 Approval of Alternative Onsite Septic Systems, 15.3.9 Compliance Using Mass Loading Calculations. A conceptual model and specifications of systems that might meet these requirements are provided in Appendix I.

3.1.1 Candidate vendors are referred to the State of Florida Onsite Sewage Nitrogen Reduction Strategies Study(www.floridahealth.gov/environmental-health/onsitesewage/research/b15report.pdf andwww.floridahealth.gov/environmentalhealth/onsitesewage/research/_documents/rrac/hazensawyervol0iireportrappend.pdf) for examples.

3.2 Phased Implementation

3.2.1 Phase 1: This phase will include (190) dwelling units (Wright Pierce, CWMP, May 2019, Section 6.5.3) and will have a duration of 14 years from the start date to evaluate the impact on watershed compliance.

3.2.2 Phase 2: This phase (Wright Pierce, as above) will be initiated after ten years if compliance has not been achieved in Phase 1.

4.0 Management

4.1 Property Owner Requirements

Owners of designated properties within a watershed who are required to install an Advanced I/A System must obtain a Disposal System Construction Permit (DSCP) from the municipality within one year of the Start Date (see section 4.3 below). Owners must have completed installation of an Advanced I/A System within three years of the issuance of the DSCP and must grant a right of access to the municipality and its designee to periodically inspect, monitor total nitrogen and other constituents as necessary, maintain and pump the Advanced I/A Systems.

4.2 Municipal Participation

The Town of Falmouth will purchase and supply the designated property owners with the physical components of the Advanced I/A systems, at no charge. The designated property owners will be responsible for the site engineering plans, permitting from town agencies, components of a normal Title 5 System and the installation of the system including landscaping.

4.3 Responsible Management Entity (RME)

The Executive branch of the Town of Falmouth will designate an appropriate town department as the Responsible Management Entity (RME). The RME will be responsible for record keeping, inspecting, nitrogen and other monitoring, pumping and other maintenance, enforcement, and reporting to DEP on watershed nitrogen TMDL compliance. The RME may engage public or private contractors to perform some or all of these duties. The RME will designate the Start Date for installation of the Advanced I/A Systems within the watershed.

4.4 Advanced I/A Systems Approval

The RME will issue a Request for Proposals (RFP) to vendors of Advanced I/A Systems who wish to have their systems installed in the Town of Falmouth. Responsive vendors must meet the qualifying requirements of the RME, provide bonded warranties and train local technicians in the operation and maintenance of their systems. The RME will designate which vendors' Advanced I/A Systems will be approved for installation in the Town of Falmouth's watersheds.

4.5 Performance Monitoring

4.5.1 Probation Period: Monitoring for TN, BOD and TSS will be conducted by the RME or its designee. There shall be no ownership, management or employee connection between any monitoring contractor and any system or maintenance vendor. Upon installation, all systems will be considered under probation and sampled every other month for one year. However, if a system is not in use for any months during probation (as determined by water meter readings) then the RME at its discretion may alter the schedule to obtain the six required readings during occupied months that may be contiguous. If there are fewer than six occupied months in the year, the probation period may extend up to three years.

4.5.2 After Probation Period: If after the probation period the mean or equivalent nitrogen load reduction has not reached the required standard of 10 mg TN/L or 75% TN removal, the owner shall be responsible for the cost of bringing the system into compliance within one year of notification of this exceedance and shall resume probation period sampling.

4.6 Compliant System Monitoring

Following the Probation Period, 1/12 of the I/A systems in the watershed will be monitored for effluent total nitrogen each month. Properties chosen for sampling that month will be picked with a random number generator that excludes properties already sampled since the previous September 1 (start of the monitoring calendar year) and unoccupied seasonal homes. Each property will be sampled at least once per year at an unpredictable time. If at any future time a system is found to exceed the 10 mg TN/L standard or equivalent nitrogen load (75% removal), it must be resampled within 60 days. If that result still exceeds the standard, then it reverts to probation status.[see Section 4.5.1 above].

4.7 Operation and Maintenance (O&M)

Advanced I/A Systems must be maintained by the RME in accordance with Mass. DEP standards. In addition to the annual nitrogen monitoring described in section 4.6, the RME will inspect the control panel and other above ground components of the system twice yearly, either by means of remote sensing or onsite examination. An annual system inspection that includes operation and maintenance of the system shall be performed by vendor-trained and certified technicians under contract to the RME within a reasonable time following said annual nitrogen monitoring.

4.8 Pump-Outs

Septic systems will be pumped every five years by RME -approved contractors or as determined by inspection in compliance with 310 CMR 15.35, with cost assumed by RME semi-annual fee.

4.9 Record Keeping

Records will be kept by the RME for each property within the watershed and will be tied to the municipal geographic information system. Records shall include:

4.9.1 Engineered and "as built" plans submitted electronically;
4.9.2 Water readings (from transponder equipped water meters at each property);
4.9.3 Monitoring results;
4.9.4 Operation and Maintenance [O&M] records; and
4.9.5 Pumping records

4.10 Reporting

The RME will report watershed compliance to DEP on an annual basis. Compliance may be demonstrated by any of the following:

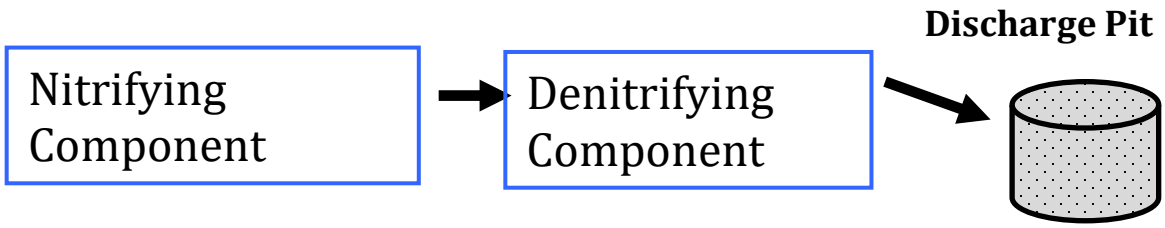
4.10.1 All systems meet the effluent standard of 10 mg TN/L or 75% removal of TN; or
4.10.2 Systems that fail to meet the standard are balanced by systems that exceed the standard; or
4.10.3 The TMDL-mandated water column nitrogen concentration for Oyster Pond is met at the sentinel station; or
4.10.4 The watershed load meets the target load needed to achieve TMDL compliance. The watershed load is calculated quarterly, based on water usage and the twelve month rolling average of accumulated nitrogen documented in the annual sampling data for total nitrogen.

5.0 Fees

Each dwelling unit with an Advanced I/A System will be assessed a fee semi-annually that will cover appropriate RME costs.

Appendix I

Conceptual Model for Nitrogen Removal using Advanced Innovative Alternative Septic Systems to: Achieve < 10mg/L TN or >75% removal of TN



System Performance Requirements:

1. Effluent Total Nitrogen (TKN + nitrate + nitrite) < 10 mg/L or >75% TN removal
2. Effluent BOD, TSS < 30 after 4 months of operation
3. Systems shall be configured such that no more than one pump for the conveyance of fluid is necessary and the total power usage for entire system shall not exceed 2.5 kWh/day
4. Denitrifying medium must have a replacement requirement of not less than five years and be easily replaced without system excavation .

Nitrifying Component:

There are a number of candidate technologies that might meet the requirements for nitrification. Refer to DEP web site: www.mass.gov/guides/title-5-innovativealternative-technology-approval-letters

Denitrifying Component:

Technologies that might meet the criteria for denitrification would have enclosed chambers with a cellulosic medium such as used in the Nitrex™ and NitROE™ systems.

Discharge Component:

Discharge is proposed with variously sized pits using loading and design criteria from the pre-1995 Code. Tests* indicate that these pits when receiving effluents with a treatment level of TN< 10mg/L and BOD and TSS levels <30mg/L after 4 months of operation will be as effective as currently required field configurations and do so at considerable cost savings.

*Component evaluated at the Massachusetts Alternative Septic System Test Center, a Division of the Barnstable County Department of Health and Environment (Viral Travel Time Studies are funded and will be tested on pits as described above)