



NANTUCKET HEALTH DEPARTMENT

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MEMORANDUM

DATE: 2/16/17

TO: Members of the Board of Health

FROM: Roberto J. Santamaría, Director, Nantucket Health Department

RE: Regulations 51 & 78

This memorandum is intended to provide background and reasoning behind the two proposed regulations set to be heard at a Board of Health public hearing on February 16th, 2017. The information detailed below is for informational purposes only, in an attempt to assist the Board of Health in its decision making.

Regulation 51 “Regulations Affecting Madaket”:

Within the Madaket Watershed district, the two largest nitrogen contributors are landfill runoff and septic system loading. As such, the Town of Nantucket has attempted to seek State Revolving Fund (SRF) subsidies to design and install a sewer system in Madaket. This, coupled with a continued effort to remove waste from unlined sections of the landfill, is expected to reduce the amount of nitrogen loading in the groundwater and meet the Total Maximum Daily Loading rate (TMDL) set forth as part of the Massachusetts Estuaries Program (MEP). However, though the sewer vote passed at the Special Town Meeting of 2016, the project was ultimately defeated in a ballot vote in December 2016.

This regulation and a proposed water regulation is part of an effort to meet the recent regulatory limits of nitrogen loading set forth by the MEP, and detailed in the Comprehensive Wastewater Management Plan (CWMP). Innovative/Alternative (I/A) septic systems are a proven technology that reduces the amount of nutrient pollution in septic system effluent. In theory, when used properly, an I/A system will remove a minimum of 50% of nitrogen in septic system effluent. According to the data presented in the CWMP, 58% of all controllable nitrogen entering the Madaket watershed is from septic system effluent, and 24% coming from the landfill. By requiring I/A systems in the Madaket Watershed, overall controllable nitrogen entering the groundwater will be reduced by 29%. Coupled with landfill waste removal, this regulation will result in a 53% total reduction in controllable nitrogen pollution by the close of calendar year 2022. Though not the 82% reduction that would be expected with sewer expansion and landfill reduction, it is still a significant reduction in controllable nitrogen removal and potential groundwater contamination.

In an effort to maintain precedent, this regulation mirrors the exact process set forth by Board of Health regulation 64. All properties without access to sewer will be required to install an I/A system upon system failure (Hydraulic & Technical), property transfer, and/or new construction.

Regulation 78 “Connection to Town Water”:

The Nantucket Health Department has begun collating collected data on potable water wells in an effort to assess the extent, if any, of groundwater contamination by septic system effluent and saltwater intrusion caused by sea-level rise and erosion. Private water wells are not subject to the same scrutiny of public water supplies and tend to be subjected to maintenance abuses or neglect. However, the Wannacomet Water Company (WWC) is certified as a public water supply, and as such, must submit primary and secondary contaminant testing on a yearly basis. The Nantucket Health Department believes that the WWC provides the essence of primary prevention efforts to protect public health.

As part of this prevention, it is the opinion of the staff that those who have access to a public water supply, connect to it. This connection serves the public health for the following reasons:

1. In nitrogen sensitive areas served by onsite wastewater systems (septic systems), town water will increase the level of nitrogen dilution present in groundwater recharge. Whereas, if the property is served by an onsite well, nitrogen present in the groundwater can be “recycled” through the potable water system in the home and discharged back into a septic system thus compounding/concentrating the level of nitrogen being added, unfiltered, to the groundwater. An example of how this compounding may work is below:
 - a. Well water reading 8 mg/L of nitrate, when cycled through the potable water system of a house, the septic effluent can read ~ 48 mg/L of nitrate. After percolation and natural denitrification, the onsite well can draw this same effluent recharge at ~ 9 mg/L in its “recycling”. As the cycle continues, nitrate level can continue to rise.
 - b. Using town water in the same home will result in septic effluent of ~ 40 mg/L of nitrate. This is a 17% reduction in nitrate entering the groundwater with a net negative change in nitrate molarity.
 - c. When coupled with I/A technology, the same home will result in septic effluent of ~ 19 mg/L or less. This is a 60.42% reduction in nitrate found in septic effluent entering the groundwater (ANSI Standard 245).
2. High levels of nitrates and nitrites (>10 mg/L) in drinking water are known to cause Methemoglobinemia (Blue Baby Syndrome) among infants (Harper, 2015)
3. Moderate levels of prenatal nitrate intake (≥5 mg/L) have been linked to birth defects in newborns. Illnesses range from Spina Bifida to Cleft Palates (Brender Et Al. 2013).
4. Sodium has been identified as a primary contaminant of drinking water by the Massachusetts Department of Environmental Protection with a level of 20 mg/L. Exceedance of this Maximum Contaminant Level (MCL) can result in health issues related to increased sodium intake. Especially among sodium sensitive individuals (Massachusetts DEP Drinking Water Guidelines).

5. Water with low pH is known to cause corrosion in piping leading into and within structures. This corrosion can leach metal ions into the drinking water (Water Research Center, 2014). Leaching metals can cause increased risk of moderate to severe illnesses (EPA National Primary Drinking Water Regulations). Examples of potential metal ions caused by corrosion are as follows:
 - a. Copper: Short term exposure can cause Gastrointestinal distress, Long term exposure can cause liver or kidney damage
 - b. Lead:
 - i. Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities
 - ii. Adults: Kidney problems; high blood pressure
6. Private wells are more shallow than public drinking wells. This increases the risk of contamination from road salt, fertilizers, septic effluent, and other runoff (Waller, 1994).
7. The US Court of Appeals for the Third Circuit has affirmed that “protecting the health, safety, and general welfare of township inhabitants ... is plainly in the public interest”. And therefore “Because pure water is a precondition for human health, regulating the water supply is a basic and legitimate governmental activity”. In its decision, the Third Circuit also affirmed that an “overwhelming” number of courts across the country have found that mandatory connection to public water is considered a “legitimate exercise of police power” under the United States Constitution. (Stern v. Halligan, 1998)

Furthermore, this is not an unprecedented regulation in the Commonwealth of Massachusetts. The Township of Mashpee enacted a public water supply requirement on September 13, 1990 which requires connection to the public water supply. On April 23, 1998 the Town of Mashpee also placed a moratorium on all groundwater wells in “documented or anticipated” areas where the Town’s Board of Health believe there may or may not be groundwater contamination present.

For the aforementioned reasons, the staff of the Health Department for the Town and County of Nantucket recommends the approval and implementation of both regulations, as amended at the public hearing of February 16th, 2017.

Respectfully Submitted,



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Director of Public Health
Town of Nantucket

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