



# TOWN OF HINGHAM

## BOARD OF HEALTH

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March 6, 2018

To: Hingham Zoning Board of Appeals  
From: Hingham Board of Health  
Re: Riverstone – Hingham MA (Viking Lane)



Dear Chairman Fisher:

### **Project Scope:**

The Hingham Board of Health (the Board) has reviewed the comprehensive permit application filed on 3/29/16 for a proposed housing development on Viking Lane in Hingham called "Riverstone - Hingham MA ". The applicant is seeking an expedited permitting of its project under the state's chapter 40B statute. The Board is in possession of the following documents contained in the application: 14-page architectural plans dated 10/7/15, with revision dates of 1/8/18, 1/19/18 and 2/2/18, and 411-page preliminary hydrologic analysis for comprehensive permit plan River Stone companion document dated 1/8/18 revised 2/2/18.

The proposed project encircles Viking Lane, an existing undeveloped short cul-de-sac located off of northern Ward Street. The project property encompasses seven (7) individual residential lots. The proposal envisions thirty-two (32) separate housing units and the construction of 1820 linear feet of roadway. The proposed project's footprint encompasses 6.67 total acres, which 6.31 is reportedly upland and 0.36 wetland. Although not identified in the applicant's initial application and assorted revised plans, a separate document produced in response to a January public hearing indicates the application is for ninety (90) total bedrooms. The extent of information on the proposed sewage disposal system consists of a rectangular shaded area on the Grading and Utility Plan C-2 of the architectural plans and accompanying single sentence that reads "Approx. Location of Prop. Soil Absorption System (24-93' long, 2'x2' trenches)".

### **Water Supply:**

The municipal water supply for the towns of Hingham, Hull and parts of northern Cohasset presently comes for a single source aquifer within the Weir River Watershed sub-basin. The proposed project is expected to receive its water supply from this municipal system operated by the Aquarion Water Company (Aquarion). The Board has not seen any documentation indicating whether Aquarion has the ability to supply water to this project.

Hingham's water supply is currently hovering at its state registration limit of 3.51 million gallons per day. A few years ago Aquarion withdrew 97% of this registered amount, the year



before 99%. In October of 2016, the Massachusetts Department of Environmental Protection (MA-DEP) notified Aquarion that it needed to identify an additional supply source to supplement its registration allotment. Aquarion is presently in the process of identifying potential options as requested by MA-DEP. A cost-effective option under exploration is to obtain an additional supply source from within Aquarion's franchise area that is however outside of the Weir River Watershed sub-basin. State GIS mapping show only two areas in Hingham yet outside of the Weir River Watershed sub-basin that possesses a subsurface "high to medium yield" aquifer required for a municipal water supply production well. One small area is at the very tip of southwestern Hingham along Sharp Street. An exploratory well drilled by Aquarion at this location last fall proved insufficient to support a production well. However, the second area is much more promising and its untapped aquifer significantly larger. In addition, about a third of the aquifer is located under Weymouth – but its waters inaccessible to the Town of Weymouth for their own water supply purposes. The aquifer is classified as a "non-potential drinking water source area" only on the Weymouth side but not on the Hingham side. This prohibition is not based on any environmental or water quality concern, but simply because of the housing density in this region of Weymouth that prohibits having a Zone I wellhead protective area in Weymouth of adequate radius. On the Hingham side, this viable aquifer is located beneath the extensive wetlands adjacent to the applicant's property right across the other side of Ward Street. The aquifer is classified by the state as a "potentially productive aquifer". Once the construction season returns this spring, Aquarion is expected to renew its exploration for a new water supply source at this very location. To permit the applicant's project as presently submitted without any septic nitrogen groundwater protections would likely doom this potentially productive aquifer from future water supply production purposes. This would be a serious and irreversible set-back to our town's water supply needs.

**Surface Water Flow and Groundwater Connectivity:**

The proposed project has been designed to manage surface water onsite by means of an engineered storm water mitigation system. This includes construction of a collection/retention basin on the property. The proposed project is located within a very-small, somewhat-round watershed sub-basin that has an average radius of about 1,000 feet. This watershed sub-basin is unnamed. Presently, most of the surface water from the property seems to flow westerly toward the expanse of wetlands located across Ward Street mentioned previously. The proposed retention basin will eventually accept most of the onsite surface water and convey it southeast toward the existing small wetland area on the property. What is uncertain is where the groundwater on this site migrates. Does it migrate west toward the Ward Street wetlands or to the southeast toward the existing small wetland and eventually to the Weir River Watershed sub-basin? This question about groundwater migration is significant since the Weir River Watershed sub-basin boundary, along with this sub-basin's protective status against excessive nitrogen loading, is a mere 700 feet from the proposed project. As we know, Hingham's current water supply comes from this state-classified stressed watershed sub-basin which is a "sole source aquifer".

**State Title 5 Nitrogen Loading Standards:**

The ingestion of drinking water with excessive nitrates/nitrites (nitrogen) can cause death related to methemoglobinemia (blue baby syndrome) in infants, and has been linked to

deaths diagnosed as Sudden Instant Death Syndrome, fetal and birth defects, and miscarriages. Protecting drinking water sources from excessive nitrogen contamination is of paramount responsibility for any Board of Health. Unlike bacterial pathogens or toxic heavy metals, the treatment process for a community's water supply or a residential water supply well cannot filter excessive nitrogen from its groundwater source. The only protection our residents have against excessive nitrogen groundwater contamination is to limit its introduction.

State Title 5 regulations 310 CMR 15.215 subsections (1) and (2) identify two nitrogen loading standards that are applicable to the Weir River Watershed sub-basin. These include protection for Aquarion's production wells within a state-designated Zone II and protection for the entire Weir River Watershed sub-basin which has been designated through public process as a vulnerable water body. In addition to the above, the state has two Title 5 regulatory policies concerning the topic of nitrogen loading. They are Policy No. BRP/DWM/PeP-P99-7, Nutrient Loading Approach to Wastewater Permitting and Disposal promulgated in 1999 and Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading 310 CMR 15.216 promulgated in 2009. Both of these state Title 5 regulatory policies address septic nitrogen loading in Nutrient Sensitive Areas (also Nitrogen Sensitive Areas). They go on to describe what constitutes a Nitrogen Sensitive Area, including "Areas dependent on private wells" (also "private well areas").

There are distinct areas within Hingham where residential access to the town's municipal water supply system is unavailable. In these areas, homeowners rely on private wells for their potable water supply. The areas reliant on private wells include clusters of homes on Cushing Street, Lazell Street, Leavitt Street, Popes Lane, Turkey Hill Lane, Windjammer Road and Ward Street. Of these, the most significant area with the greatest concentration of private wells is along Ward Street. There are about a dozen residential properties that immediately surround the proposed Viking Lane project that depend on private well water. All of these properties are within 750 feet of the proposed project and within the same very-small watershed sub-basin as the proposed project. In fact, an abutting property to the proposed project located at 90 Ward Street is dependent on its well water for both domestic and community purposes. This particular well is uniquely classified as a Public Water System under 301 CMR 22.02(1) - specifically defined as a "Transient Non-Community Water System". It is unclear if this proposal could ever move forward based strictly on the required zone of protection need for a public water supply well. But regardless of whether this abutting well is considered a public water system or resorts back to supporting a neighboring single-family home, this particular private well and the dozen immediately surrounding the proposed project deserve protection.

The Board deems the proposed project to be within an "Area Dependent on Private Wells" as described in state Title 5 policy and therefore required to adhere to state Title 5 nitrogen loading standards for lot-size sq. ft. area per bedroom and the required imposition of innovative and advanced denitrification treatment plant technology for septic flows that exceed 2,000 gallons/day. At ninety (90) bedrooms, the proposed project will generate some 9,900 gallons of septic effluent/day, almost 5x over the state Title 5 policy threshold. And at 6.67 total acres, the state septic nitrogen limit of 10,000 s.f. of land per bedroom would

suggest no more than twenty six (26) to twenty nine (29) total bedrooms may be constructed on this relatively small site.

**5mg/l Groundwater Nitrogen Standard:**

The maximum groundwater nitrogen contaminate levels at the property line from all sources, may never exceed 10mg/l of nitrogen. However, Title-5 policy identifies numerous circumstances and criteria for imposing a more restrictive 5mg/l standard. These criteria include “Areas Dependent on Private Wells” and “Potentially Productive Aquifers” which are both applicable to this proposed project.

**Nitrogen Load Calculations:**

The Board conducted nitrogen load calculations for the proposed project using the following information and coefficients.

• Total Number of Bedrooms:	90		
• Total Lot Area:	290,311.00	s.f.	(6.664623508 acres)
• Total Lawn Area:	119,411.00	s.f.	
• Total Natural Area:	39847.00	s.f.	
• Total Paved/Roof Surface Area:	131,053.00	s.f.	
• Av. Annual Precipitation:	43.56	inches/year	
• Lawn Fertilization Rate:	3.00	pounds/1,000s.f./year	
• Amount of Fertilizer Reaching Groundwater:	0.25	% of total	
• Infiltration Rate Lawn/ Natural Area:	0.45	% of total	
• Nitrogen Concentration T5 Wastewater:	35.00	mg/l	
• Nitrogen Concentration Recharge (pervious):	1.50	mg/l	
• Nitrogen Concentration Recharge (impervious):	0.75	mg/l	
• Title 5 Recharge:	37,471.50	l/d	
• Roof Area Recharge:	0.00	l/d	
• Paved/Roof Surfaces Recharge:	36884.78	l/d	
• Natural Areas Recharge:	5050.28	l/d	
• Lawn Area Recharge:	15134.35	l/d	
• (Total Recharge)	94540.90	l/d	
• Title 5 Nitrogen Additions:	1,311,502.50	mg/d	
• Roof Area Nitrogen Additions:	0.00	mg/d	
• Natural Areas Nitrogen Additions:	55327.17	mg/d	
• Lawn Area Nitrogen Additions:	111,395.74	mg/d	
• (Total Nitrogen Additions)	1478225.41	mg/d	

**Resulting Nitrate Concentration at Property Line: 15.64 mg/l**

Nitrogen loading calculations demonstrate that the proposed project, in its current scale, will contaminate the surrounding groundwater with excessive nitrogen to a factor of more than three-times (3x) the acceptable safe limit. This is unacceptable. Nitrogen load contamination to this level will seriously endanger the health and welfare of Hingham residents with private wells living next to the proposed project.

### Massachusetts Case Law:

Numerous examples in Massachusetts case law describe the expertise, responsibilities and importance of local boards' of health involvement in the 40B application process. Case law also clearly identifies the primacy of public health protection over the social-economic goal of affordable housing. In Holliston v. Housing Appeals Committee (2011) it says: "the HAC may still uphold denial of the permit as 'reasonable and consistent with local needs' if the community's need for low or moderate income housing is outweighed by valid planning objections to the proposal based on considerations such as **health**, site, design, and the need to preserve open space." Tortorella v. Board of Health of Bourne (1995) describes the supremacy of the local board of health to enact local health standards to best protect their citizens. In Goldberg v. Board of Granby (2005) this appreciation of a local board of health's "experience, technical competence, and specialized knowledge of the [local] agency" is further codified.

The Board recognizes our own responsibility to identify and explain the health-related concerns of our local community before imposing any limitation on a developer's right to develop its property, including a 40B developer. Again in Holliston v. Housing Appeals Committee (2011) it says: "[the Board of Health has] the burden, proving, first that there is a valid health, safety, environmental, design, open space or other Local Concern which, supports the denial, and then, that such Local Concern outweighs the Housing Need". Further, "Local Concern" is defined in Massachusetts regulation 760 CMR as: "**the need to protect the health or safety of the occupants of proposed housing or of the residents of the city or town, to protect the natural environment, to promote better site and building design in relation to the surroundings, or to preserve open spaces**".

A recent legal appellate court case seems to parallel the very concern identified in this Viking Lane project regarding protecting an abutter's water supply from excessive septic nitrogen from a large proposed development. In Reynolds v. Town of Stow ZBA (2015), it says: "**The judge's finding that the [septic] system would contaminate the groundwater such that unacceptable levels of nitrogen would reach an abutter's well demonstrates that compliance with the State standards, which SEHC contends are applicable and the judge found to be applicable, are insufficient to protect the groundwater from being contaminated by the proposed project**". The decision goes on to conclude: "We [the MA appellate court] conclude that the plaintiff has identified **an important local health issue, maintaining clean groundwater servicing local private wells, that is not adequately protected by compliance with applicable State standards**".

### Conclusion:

The Hingham Board of Health insists that the Zoning Board of Appeals (ZBA) hold the applicant to every state Title 5 standard, regulation and policy, including a property line nitrogen load standard of 5mg/l. In addition, we expect the ZBA hold the applicant to the local Hingham Supplemental Septic Regulations (HSSR) standards under section IV.8 (denitrification treatment plant requirement) and section VI.8 (minimum land area per bedroom requirement). However, the Board suggests the ZBA "modify" the local HSSR standard section IV.8 from the typical 12,500 s.f. of land area per bedroom to the state standard of only 10,000 s.f. of land per bedroom.

The Board believes imposing these two local Hingham standards is important to extenuate the specific health and safety protections they address relative to particularities of the proposed Viking Lane project. Even though the Board believes the local protections are already identified in multiple state Title 5 policies, (including a stronger state standard relative to treatment plant septic flows/day), we think the prudent approach is to identify both the state and our local safeguards in any permit the ZBA may eventually grant this applicant.

The Board remains a resource to the ZBA regarding this application or with any other health and safety matter of concern affecting the visitors, residents and businesses of Hingham.

HINGHAM BOARD OF HEALTH

Peter Bickford, Chairman

Elizabeth Eldredge, M.D.

Kirk Shilts, D.C.