

Scott Horsley  
Water Resources Consultant  
65 Little River Road • Cotuit, MA 02635 • 508-364-7818

March 4, 2024

Mr. John Lee, Chairperson  
Walpole Zoning Board of Appeals  
135 School Street  
Walpole, MA 02081

RE: Darwin Lane 40B

Dear Mr. Lee and Members:

I have been retained by Hill Law to review the proposed Chapter 40B development and related documents on behalf of the Darwin Lane abutters. The focus of my review is on drinking water quality impacts associated with the proposed development due to its close proximity to the Town's water supply well and compliance with applicable state and local laws and regulations designed to protect drinking water. More specifically, this letter focuses on recent comments made on behalf of the applicant in their attempt to obtain permits for the development under the Walpole Board of Health Regulations.

**Qualifications:** I have over 35 years of professional experience in the field of water resources management. I have been retained as a consultant to federal, state, and local government agencies, non-governmental organizations (NGOs), and private industry throughout the United States, Central America, the Caribbean, the Pacific Islands, Bulgaria, and China. I have served as an instructor for a nationwide series of U.S. Environmental Protection Agency (USEPA) workshops on drinking water protection and watershed management. I have also served on numerous advisory boards to the USEPA, the National Academy of Public Administration, Massachusetts Department of Environmental Protection (DEP), Massachusetts Executive Office of Energy and Environmental Affairs (EEA), and the National Groundwater Association. I have received national (USEPA) and local awards for my work in the water resources management fields. I serve as Adjunct Faculty at Harvard University Extension School and Tufts University, where I teach graduate-level courses in water resources policy, wetlands management, green infrastructure, and low impact development (LID). These courses focus on the critical role of local governments who have the primary responsibility and authority of regulating land uses in critical water resource protection areas.

**Comments:** I have reviewed the recent comment letters prepared by NGI (dated February 5, 2024) on behalf of the applicant and the town's peer reviewer TetraTech (dated January 9, 2024). I have also reviewed the revised Site Plans (dated February 5, 2024), and the Stormwater Report (dated February 5, 2024). My comments are as follows.

**Compliance with Walpole Regulations (Degradation of Groundwater Quality)**

1. The Massachusetts Drinking Water Regulations require towns to adopt Zone II wellhead protection regulations to protect public drinking water supplies. Specifically, 310 CMR 22.21 (2)(b)(7) states, "*Wellhead protection zoning and non-zoning controls submitted to the Department (by towns) in accordance with 310 CMR 22.21(1), shall collectively prohibit the siting of the following and uses within the Zone II,.....land uses that result in the rendering impervious of more than 15% or 2500 square feet of any lot or parcel, whichever is greater, unless a system for artificial recharge of precipitation is provided that will not result in the degradation of groundwater quality*".

2. In accordance with the state requirements, the town of Walpole promulgated local Health Regulations (Chapter 665) Groundwater Protection to protect its public drinking water supply. Within Zone II wellhead protection areas,

the Walpole Health Regulations prohibit impervious coverage over 15% in order to protect groundwater quality near the wells. They state, "*Land uses that result in impervious cover of more than 15% or 2,500 feet of any lot, whichever is greater, are prohibited; unless a system of artificial recharge of precipitation is provided that will not result in the degradation of groundwater quality*"<sup>1</sup>(emphasis added).

3. The proposed development includes 45.6 % impervious coverage, which exceeds the maximum allowed impervious area by a factor of three<sup>2</sup>. To put this amount of impervious surface in perspective, the city of Boston has approximately 48% impervious cover<sup>3</sup>.

4. The project is located entirely and well within the Zone II wellhead protection area to the Town's drinking water supply and adjacent to the Zone I boundary, approximately 500 feet from the drinking water well (see figures 1 and 2).

5. The proposed stormwater management system includes a Stormceptor swirl concentrator and an infiltration system. The Stormceptor is a pre-treatment systems that removes a minimal amount of sediments (total suspended solids) but does not provide any treatment of dissolved pollutants. The infiltration system is estimated to remove 80% of the total suspended solids (TSS). The proposed project will introduce nutrients, metals, hydrocarbons, and pathogens into the drinking water supply and poses a serious risk to public health. The pollutant load to (and degradation of) groundwater can be expected to be three times greater than a smaller project that has 15% impervious surfaces. This can only be interpreted as a net decline or "degradation" of groundwater quality.

6. The Applicant has not provided any calculations, modeling, nor any enhanced treatment to claim otherwise.

7. The relative risk of contamination to the drinking water supply is based upon two factors – density and distance. Higher density percentages (greater than 15%) of impervious surfaces translate to greater volumes of stormwater and higher pollutant loads infiltrated into the aquifer/groundwater system. Shorter distances provide less opportunity for attenuation of pollutants before they reach the well. For example, viruses are attenuated via an inactivation process related to groundwater travel time. In Massachusetts a two-year travel time is utilized to protect against virus transport. The travel time from the proposed stormwater infiltration system to the pumping wells is estimated to be less than two years.

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<sup>1</sup> Walpole Bylaws, Section 665-4(E).

<sup>2</sup> Section 3.2.11 – List of Requested Exemptions and Waivers

<sup>3</sup> "Tree and impervious cover change in U.S. cities", David J. Nowak, Eric J. Greenfield  
USDA Forest Service, Northern Research Station, 5 Moon Library, SUNY-ESF, Syracuse, NY 13210, United States, 2012.

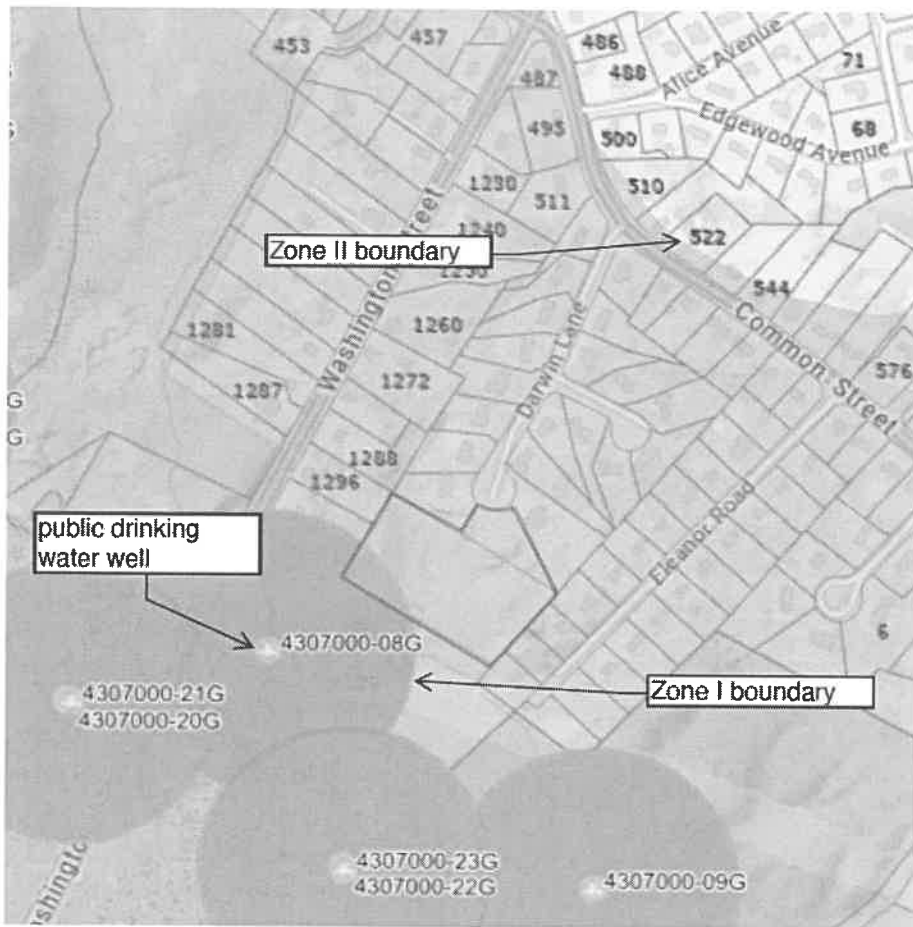


Figure 1 – Wellhead Zone I and II Protection Areas (MAGIS)

8. The Walpole Health Regulations place the burden on the applicant to prove that their project design will not introduce pollutants into the Town’s public drinking water supply and cause *degradation of groundwater quality*. The applicant has hired a consultant NGI to provide an opinion (that they refer to as a certification) that the groundwater will not be degraded. However, no analysis has been provided regarding impacts associated with the proposed stormwater discharges. Nor has any enhanced treatment technologies such as activate carbon been provided as an additional precautionary measure. They could have provided solute transport models on various pollutants and their attenuation or a treatment system such as granular activated carbon (GAC) to treat a broad range of synthetic organic pollutants known to be present in stormwater. However, these would require significant cost expenditures. This suggests that it may be “uneconomic” (or too costly) to propose such as dense, highly-impervious project and provide state-of-the art analysis (solute transport modeling) and treatment (possibly including granular activated carbon or biochar) within such close proximity to a public drinking water supply. It is simply too expensive at this location to do the right thing. A high-density project such as this (which exceeds the threshold of 15% impervious surfaces) is better suited to a less environmentally-constrained site and location.

9. The NWI report provides a background on the geology and hydrology of the site. However, there is no quantitative analysis (such as pollutant or solute transport modeling) provided to support their opinion that groundwater quality will not be degraded. The applicant must prove and confirm that the project will not cause

degradation. That has not been provided. The burden of proof is on the applicant. The town and its residents deserve a definitive analysis and more than an opinion.

The town's regulation prohibits degradation of water quality. First, let's discuss the definition of the term "degradation". It is not defined within the Walpole Health Regulations. Therefore, we can look to other reliable sources. Table 1 provides some definitions of "degradation" from well-known and relied upon sources. This suggests that any reduction in water quality or impairment would constitute a degradation.

*Cambridge Dictionary: to reduce the quality of something:  
degrading water/air quality*

*Collins Dictionary: To degrade something means to cause it to get worse*

*Merriam Webster: environmental degradation - the gradual degradation of organic matter*

Figure 1 – Definitions of Degradation

10. The Applicant's Requested Waivers and Exemptions claim that the project will meet the MADEP Stormwater Standards but not the town of Walpole's requirements. The MADEP Stormwater Standard 6 (Critical Areas) requires that, "proponents must comply with local source water protection ordinances, bylaws, and regulations"<sup>4</sup>. If the proposed system does not comply with Walpole's local water protection requirement, then it also fails to comply with Standard 6 of the MADEP Stormwater Standards.

11 The Walpole Health Regulation requirement is more stringent than the MADEP Stormwater Handbook and Standards. The MADEP Stormwater Standards are designed and are primarily focused to protect wetlands (not drinking water supplies) and treat particulates or total suspended solids (TSS). The Walpole regulation is broader because it focuses on drinking water supplies -- and encompasses all treatment to ensure groundwater quality, not just TSS and particulates.

12. Infiltration systems (as proposed by the applicant) remove some of the particulate (solid) pollutants (TSS) but provide little or no treatment for dissolved pollutants that will pass into the underlying groundwater and drinking water supply. Dissolved pollutants routinely found in stormwater include nitrates, and organic compounds such as 1,3-dichlorobenzene, pyrene, fluoranthene, and PFAS<sup>5</sup>. Stormwater runoff from parking lots commonly contain petroleum hydrocarbons and gasoline derivatives that can be seen showing a sheen (see figure 2). Sources of these pollutants include automotive emissions, tire rubber, asphalt pavement and asphalt roofing shingles. Recent studies are showing that PFAS are present in a wide variety of construction materials including roofing materials, paints and coatings, sealants, caulks, and adhesives<sup>6</sup>.

13. These dissolved pollutants are not attenuated in infiltration systems. On Long Island, New York, toxins were detected in groundwater beneath stormwater recharge basins, including: benzene (groundwater concentrations of 2±3 ug/l); bis(2-ethylhexyl)phthalate (5±13 ug/l); chloroform (2±3 ug/l); methylene chloride (stormwater concentration of 230 ug/l and groundwater concentrations of 6±20 ug/l); toluene (groundwater concentrations of 3±5 ug/l); 1,1,1-trichloroethane (2±23 ug/l); p-chlorom-cresol (79 ug/l); 2,4-dimethyl phenol (96 ug/l); and 4-nitrophenol (58 ug/l) (Ku & Simmons, 1986)<sup>7</sup>.

<sup>4</sup> MADEP Stormwater Standards, Volume 1, Chapter 1, Table CA3, Standard 6.

<sup>5</sup> Trogan et al, "Groundwater Impacts from Stormwater Infiltration Practices", Encyclopedia of Water: Science, Technology, and Society, edited by Patricia A. Maurice, Copyright ~ 2019 JohnWiley & Sons, Inc. and Pitt et al, "Groundwater contamination potential from stormwater infiltration practices", Urban Water 1999.

<sup>6</sup> Green Policy Institute, Building A Better World - Eliminating Unnecessary PFAS in Building Materials, 2019.

<sup>7</sup> Pitt et al, "Groundwater contamination potential from stormwater infiltration practices", Urban Water 1999.



Figure 2 – Hydrocarbon sheen on stormwater entering stormwater system.

The reliance solely on state standards and rules does not prevent the degradation of drinking water. As NGI states on page 6, “landscaping practices can be a source of non-point source pollution of fertilizers, pesticides, and herbicides as shown by the detection of Simazine in one of the Town wells”. Simazine is an “approved” herbicide for use in Massachusetts (see Figure 3).



Enter the Product Name (or part of the name):

(Any Product Name  containing  this search-string will be displayed)

Product Name	EPA Reg. No.	Registration Status	Expiration Date
SIMAZINE 90DF	19713-252	Approved	6/30/2024
DREXEL SIMAZINE 4L	19713-60	Approved	6/30/2024
Simazine 90WDG Herbicide	34704-686	Approved	6/30/2024
SIMAZINE 4L FLOWABLE HERBICIDE	34704-687	Approved	6/30/2024
SIMAZINE 4L	9779-296	Approved	6/30/2024
SIM-TROL 4L SIMAZINE FLOWABLE HERBICIDE	35915-11-60063	Approved	6/30/2024

Figure 3 – Massachusetts Registration for Herbicide Simazine

13. To meet the required performance standard of *no degradation of groundwater quality* (due to the excessive amount of impervious coverage), the applicant must demonstrate that drinking water standards are maintained beneath the site. PFAS is contained in various construction materials and has been detected in stormwater runoff. It is a “forever chemical” meaning that once it is introduced into the groundwater it will not be attenuated and will flow into the well and drinking water supply. The town of Walpole should interpret its standard consistent with the EPA standard to meet the definition of *no degradation of groundwater quality*. EPA has proposed lowering the drinking water standard to 4 ng/liter. On March 14, 2023, EPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS, including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA, commonly known as GenX Chemicals), perfluorohexane sulfonic acid (PFHxS), and perfluorobutane sulfonic acid (PFBS). EPA anticipates finalizing the regulation by the end of 2023.

14. The proposed project is located within coarse glacial stratified drift deposits as mapped by the United States Geological Survey (USGS) – see figure 4. These materials are highly permeable and are vulnerable to contaminant transport. They provide limited attenuation of some contaminants such as total suspended solids (TSS) but do not treat dissolved pollutants such as herbicides, PFAS, or other synthetic organic compounds.

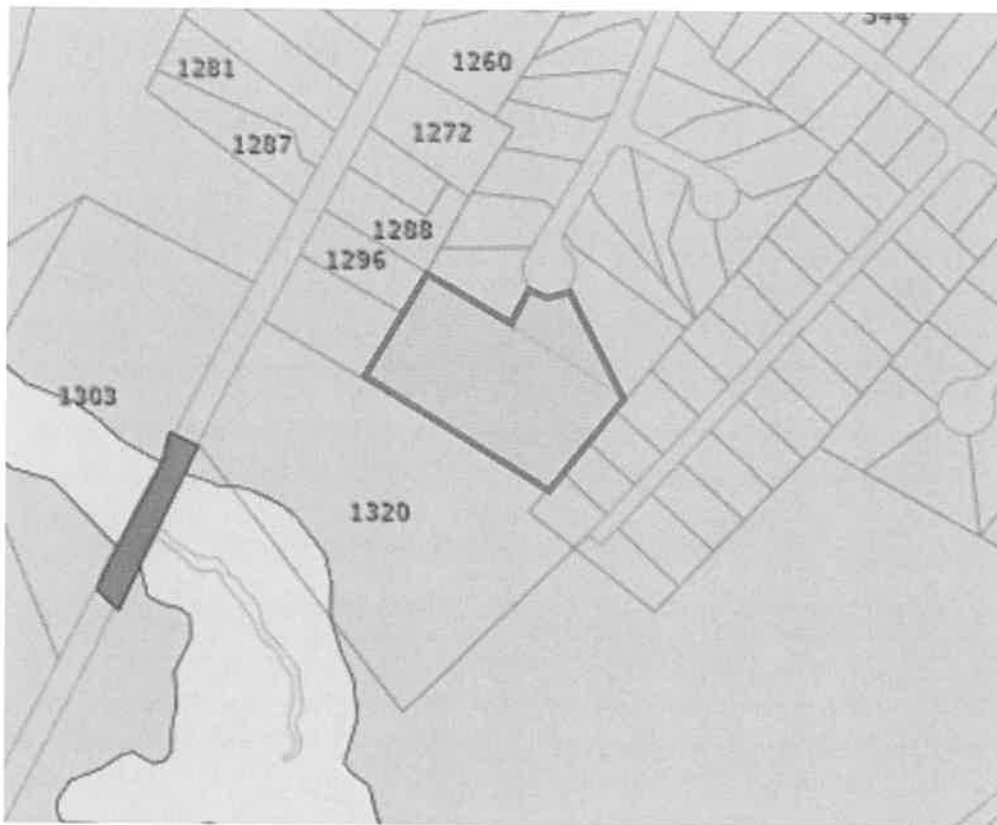


Figure 4 – Surficial Geology (USGS, MAGIS)

**Compliance with MADEP Stormwater Handbook (Estimated Seasonal High Groundwater)**

2. The MADEP Stormwater Standards require a minimum 2-foot separation between the bottom of the infiltration facilities and the estimated seasonal high groundwater (ESHGW) elevation. The Standards also require a groundwater mounding analysis for infiltration systems within 4 feet of ESHGW to ensure that the systems will function properly during the larger design storms (10, 25, and 100-year events). The applicant has provided test pit data at three locations within the proposed infiltration system.

3. None of the test pits within the proposed stormwater infiltration basin provide data on groundwater levels or ESHGW as required by the MADEP Stormwater Standards. No groundwater levels were measured or redoximorphic features were identified. Test pit 5 is referenced in the Site Plan Details Sheet 7 as “bottom of test pit 5” and is relied upon as the depth to groundwater for the primary infiltration basin but it was conducted on November 13, 2023, a period of the year when groundwater levels are at their minimum elevations (see Figure 5). The bottom of test pit 5 (elevation 204.58) shows a 4.42 feet separation to the bottom of the infiltration basin stone layer (elevation 209.0). The MADEP Stormwater Handbook (Volume 3, Chapter 1) indicates that if no ESHGW is identified by redoximorphic features that monitoring wells should be installed and water level measurements should be conducted during the spring months (March, April, and May) and water levels compared and adjusted to nearby USGS index wells. This was not done by the applicant.

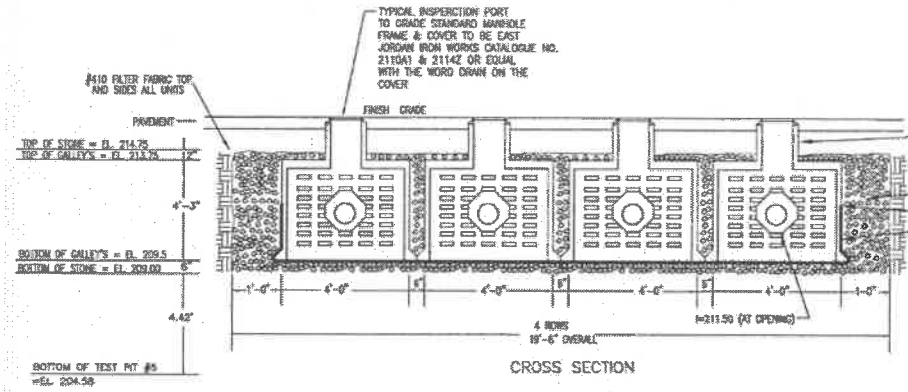


Figure 5 – Cross Section of Proposed Infiltration System

4. Furthermore, the proposed stormwater system is within the drawdown area of the public supply wells where the water table is drawn down several feet as result of pumping (see figure 6). Therefore, water level measurements in the test pits or wells that are taken during pumping of the Walpole public supply wells may not be representative of static ESHGW conditions. A groundwater model (MODFLOW) could be used to determine water table drawdowns and to adjust measured water levels during the spring high groundwater period. This data has not been provided. Therefore, the applicant has not provided credible data to ensure that the minimum vertical separation distances are provided.

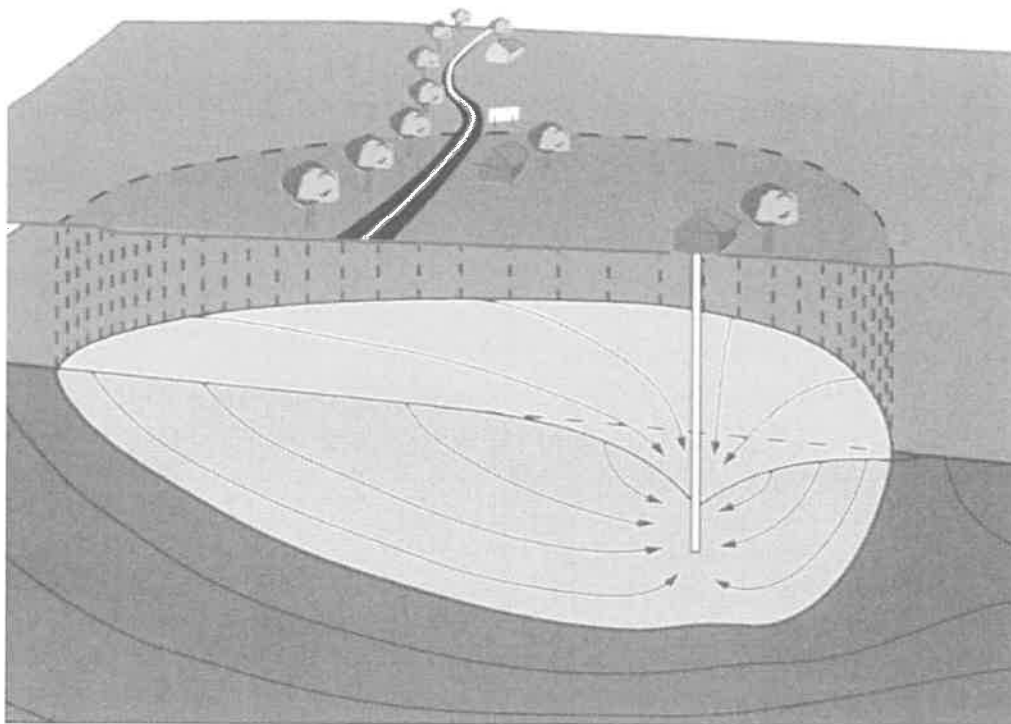


Figure 6 – Wellhead Zone II Protection Area Showing Drawdown of the Water Table within the Cone of Depression

### Summary and Conclusions

15. The Walpole Department of Health has indicated their concern with the proposed project. In their March 24, 2021 Memorandum from Melissa Ranieri, Health Director to Town Administrator, *“The Health Department does have concern regarding the protection of the town’s groundwater since the site lies within the Zone II ...of the wellhead protection areas.”*



16. The town's peer review consultant has stated, "It's important to note that the Project will be one of, if not the, closest developed property to a Walpole drinking water supply well with a proposed density that presents a greater risk than zoning compliant developments while severely limiting available options for protection of the water supply. As such we recommend the Board require the applicant to clearly demonstrate and document its compliance with the Massachusetts drinking water supply regulations and the applicable local regulations and/or bylaws including providing the information required to support granting of a special permit per Section 12 of the Walpole Zoning Bylaw"

17. MADEP provided comments to the town that support my position. In their October 17, 2023 letter to the town they state, "MADEP's WHP Regulations do not limit the density of development in a Zone II; however the Board of Water and Sewer Commission's considerations (5/23/22) along with those provided by consultants Scott Horsley (8/30/23) and TetraTech (10/08/23) are consistent with protecting public drinking water supplies and are supported by MassDEP's Drinking Water Program..."

18. In closing, I applaud the town of Walpole for promulgating the local regulations to protect their drinking water supply. I also applaud the MADEP for providing guidance and support of the local efforts. These regulations are consistent with USEPA and MADEP initiatives and should be upheld in the public interest of drinking water protection. The applicant's hiring of a consultant to render a mere opinion or "certification" is inadequate to meet the higher standard of protecting a public drinking water supply. The town and its residents deserve better and should deny this permit application. The applicant has not met the requirements of the local public health regulation.

Thank you for the opportunity to submit these comments. I look forward to discussing them further with the Board and feel confident that a denial of this permit is defensible and in the public interest. Please contact me directly with any questions that you might have.

Sincerely,



Scott W. Horsley  
Water Resources Consultant