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August 31, 2022

VIA EMAIL

Robert Gray, Chair  
Bourne Conservation Commission  
24 Perry Ave  
Buzzards Bay MA 02532

Re: 176 Scraggy Neck Road, Bourne, MA

Dear Mr. Gray and Fellow Commissioners:

I have been retained by a group of abutters to the project including Maryfrances Galligan, 170 Scraggy Neck Road; Katherine and Kevin McCarey, 168 Scraggy Neck Road; and Susan Malcom, 11 Winsor Road to review the proposed project at 176 Scraggy Neck Road, Bourne, MA.

I have reviewed the revised site plans (August 22, 2022) and associated documents, and other relevant data and resources published by the Cape Cod Commission, Massachusetts Department of Environmental Protection (MADEP), Massachusetts Coastal Zone Management (MACZM), Massachusetts Geographic Information System (MAGIS), United States Geological Survey (USGS), USDA Natural Resources Conservation Service (NRCS), the Federal Emergency and Management Agency (FEMA) and United States Environmental Protection Agency (USEPA).

**Qualifications:** I have over 30 years of professional experience in the field of water resources management and on a broad range of water contamination and restoration projects. 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 wetlands protection, 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 served as an advisor on the Coastal Resources panel in the development of the Massachusetts Climate Change Adaption Plan. 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 courses in water resources policy, wetlands management, green infrastructure, and low impact development (LID). I also served as a consultant to the Cape Cod Commission in the

preparation of the 208 Water Quality Plan Update and assisted with the development of nitrogen loading calculations to estuaries.

**General Comments:** The majority of the project site lies within wetland resources areas. These include salt marsh, coastal banks, and lands subject to flooding. Additionally, four salt ponds surround the site and are hydrologically connected to the site (see Figure 1). The proposed project includes the expansion of a septic system with a design flow of 110 gallons/day to 440 gallons/day. My specific comments are as follows.



Figure 1 - Project Site and surrounding coastal embayments. The project site is outlined in red, and the blue arrows show approximate drainage areas.

**1. The site plans omit some of the applicable buffer zones and setbacks from the coastal bank.** The site plans prepared by Bracken Engineering, Inc. show three coastal banks on the subject property. However, the plans only show the “50-foot coastal bank buffer” areas for two of the coastal banks. Although the plans identify “coastal bank #2” on the property, there is no corresponding “50-foot coastal bank buffer” for this coastal bank.

**2. The applicant refers to a portion of the coastal banks as a “secondary coastal bank”.** The application submittal by LEC dated August 24, 2022 and the attached letter from ECR (Stan Humphries) dated August 19, 2022 refers to a portion of the coastal bank as a “secondary coastal bank”. I am not aware of any such designation or distinction anywhere in the MA Wetlands Protection Regulations or the Bourne Wetlands Bylaw. Coastal bank#2 is a jurisdictional wetland Resource Area, with the same setbacks and buffer zones provided in the applicable regulations as the other coastal banks on the property.

**3. The Bourne Wetlands Bylaw requires a 50-foot setback from coastal banks** and states, “no habitable dwelling or accessories thereto or roadway / driveway shall be allowed any closer than 50-feet from the boundary of a Wetland Resource Area unless permitted under this bylaw” (Section 3.7.4). I have added the missing 50-foot setback (dark blue dashed line) from coastal bank #2 (see figure 2). My analysis suggests that there might be a smaller allowable building envelope within the project site (see pink highlighted area) that is outside of the 50-foot setback for all the coastal bank resource areas, in compliance with the requirements in the Bourne Wetlands Bylaw.

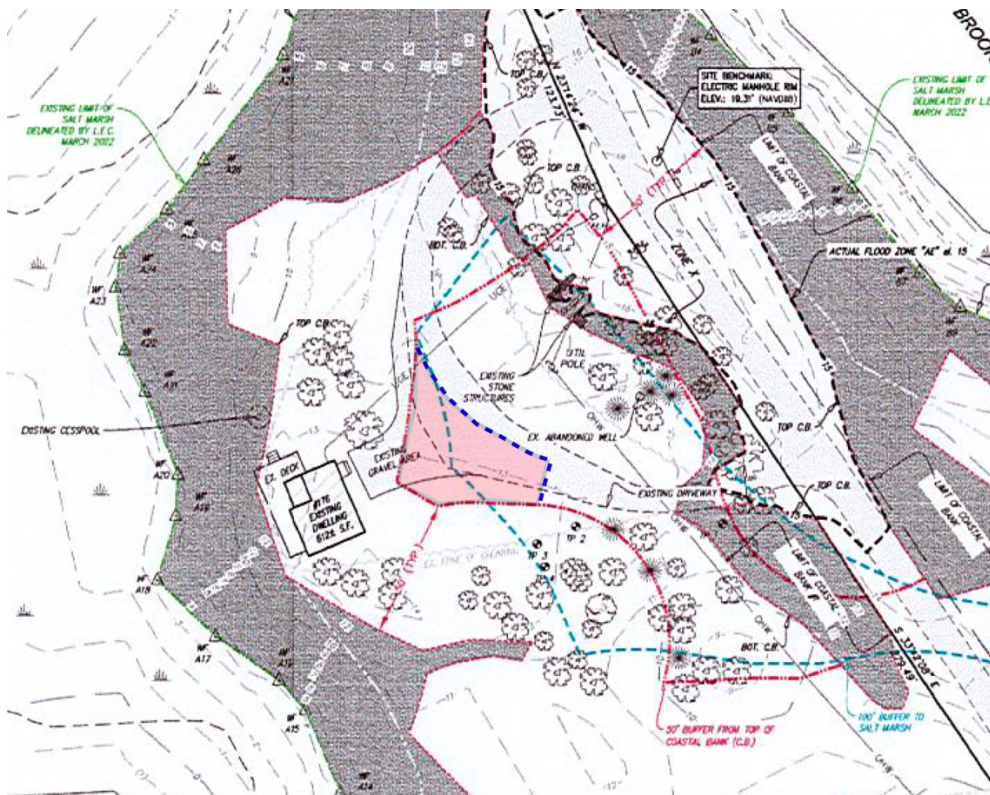


Figure 2 - Site Plan with 50-foot Setbacks and Potential Allowable Building Envelope

**4. The proposed project will result in a net increase in alterations to wetland resource areas.** The applicant claims that the project “will result in a significant improvement over the existing conditions”. Although the project proposes to relocate the existing house further from one of the coastal banks, the scale of the proposed new construction and the significantly increased wastewater discharge will substantially increase alterations to wetland resource areas. These alterations included increased nitrogen loading to coastal waters, increased hydrologic loading to the coastal banks, and alterations due to removal of mature vegetation that currently acts to stabilize the coastal banks.

I have calculated the net change in nitrogen loading in Table 1, below. I have included the proposed innovative and alternative (I&A) septic technology in these calculations, using a 19 mg/liter effluent concentration. The 26.25 mg/liter effluent is consistent with the Massachusetts Estuaries Project (MEP) models for standard Title 5 systems.

My analysis indicates that the nitrogen loading will be increased from 10,929 mg/day to 31,643 mg/day as a result of increasing the size of the home and the septic system from 1 bedroom to 4 bedrooms (see Table 1 below).

*Table 1 - Nitrogen Loading Calculations*

N Loading Calculations			
		existing	proposed
		1-bedroom	4-bedrooms
flow (gals/day)		110	440
concentration (mg/liter)		26.25	19
N load (mg/day)		10929	31643
Net Increase (mg/day)			20713
Percent Increase			190%



**Summary:** The project site is highly constrained by coastal wetlands, both on and surrounding the parcel. As proposed, the project does not conform with the Town of Bourne’s Wetlands Bylaw Section 3.7.4, which requires a minimum 50-foot setback for dwellings and accessory structures from wetland resource areas, including coastal banks. As designed, the project would also cause a significant increase in nitrogen loading (almost triple) compared to existing conditions.

Thank you for the opportunity to provide these comments. Please contact me directly with any questions that you have.

Respectfully and sincerely,

A handwritten signature in black ink, appearing to be 'S. Horsley', written in a cursive style.

Scott Horsley  
Water Resources Consultant