

# The Coonamessett River Trust

Dedicated to Protecting and Restoring the Coonamessett River



December 26, 2025

Andrew Osei P.E., Chief  
Wastewater Management Program  
Bureau of Water Resources  
Department of Environmental Protection  
20 Riverside Drive, Lakeville, MA 02347

RE: Draft GWDP #1018-0

Dear Mr. Osei:

The Coonamessett River Trust (CRT) has reviewed draft groundwater discharge permit to Falmouth Southerly LLC for a project at 375 Sandwich Road, Falmouth, MA. The project is located adjacent to the Coonamessett River, within the watershed of the Great Pond Estuary.

Great Pond has been officially designated as an “impaired water” by the MADEP under Section 303(d) of the federal Clean Water Act. Reductions in nitrogen loading to Great Pond are required to comply with the Clean Water Act. **Massachusetts DEP regulations require that projects in a watershed with impaired waters and TMDLs cause no net increase in nitrogen delivery to those waters. There are no specific actions stated in this permit that will offset the nitrogen released to the groundwater as result of this permit.** This permit will result in a net increase in nitrogen loading to the Great Pond Watershed. Therefore, it will result in violation of Massachusetts Surface Water Standards. It is clearly inconsistent with local needs to act in accordance with the federal Clean Water Act and the Massachusetts Department of Environmental Protection’s Watershed Permit Regulations that also require nitrogen loading reductions.

We request that this draft permit be modified to: **(1) require a limit of no more than 5 mg N/L of total nitrogen concentration in the effluent released to the groundwater allowed by this permit; and (2) require nitrogen offsets equal to any new nitrogen released by this project plus a margin of safety (suggested to be 20 percent) to account for any unintentional overages in the permit concentration limit. The mechanism (or mechanisms) by which these offsets will be achieved (e.g., by hooking up additional homes to the Falmouth municipal wastewater treatment facility) — whether by the Town or by the developer — and the timeline for implementation should be explicitly described in a modified permit.**

**Qualifications of the Coonamessett River Trust:** The Coonamessett River Trust (CRT) is a local Falmouth-based group was formed in May of 2006 to promote and preserve the natural heritage and ecological integrity of the Coonamessett River Watershed. The Trust engages in scientific, educational and recreational activities focused on the Coonamessett River and its

watershed. The CRT has an eight-person board consisting of Falmouth residents who are concerned citizens with considerable expertise in wetland and environmental science, environmental policy, and environmental education.

The CRT engages citizens in the protection and enjoyment of the Coonamessett River and its watershed in multiple ways. These CRT spearheaded and advocated for restoration of town-owned former cranberry bogs along the Coonamessett River. CRT members argued for multiple phases of bog restoration at Falmouth Town Meeting. The CRT has led efforts to monitor the water quality of the Coonamessett River, including where it discharges to Great Pond. The CRT has monitored the changes in the Coonamessett River's environment both before and after major restoration projects that took place in 2017-2018, 2019-2020, and 2024-2025. These include monitoring plant communities, the structure of the river channel, and the chemistry of the water in the river and incoming groundwater. Special projects supported by the CRT include studies of river habitats, the measurement of nitrogen uptake within the river channel, and deployment of game cameras at selected locations.

The CRT oversees a group of 40+ local volunteers who count river herring daily from mid-April to early June. The CRT organized a project to tag incoming river herring each spring for 10 years. That project included two years of video monitoring of the spring herring migration.

The CRT and its affiliated volunteers sponsor field trips for fourth and fifth graders in Falmouth public schools. Every Falmouth public school student now visits the Coonamessett River once in fourth and once in fifth grade to learn about local aquatic environments and the potential of ecological restoration to improve the quality of Falmouth's waters and environment.

**Falmouth's Investments in the Coonamessett River Watershed:** Issuance of this permit would cause serious environmental degradation to the Coonamessett River and its downstream estuary, Great Pond. Significant amounts of time and money have been spent to make this restored open space a "jewel of the town." Nearly \$8.5 million in grants from federal, state and local agencies have funded the restoration of the Coonamessett River. This tally does not include the "in-kind" contributions by Falmouth town departments, nor the many, many volunteer hours from individuals, including many volunteers organized by CRT. More than 50 partners of government agencies, non-profits, science institutions and schools have contributed to the success of the river's restoration. The Coonamessett River restoration is contributing to the return of alewives, blueback herring, American eels, white perch and brook trout to the Coonamessett River. More than 180 species of native plants have returned to the area providing food and shelter for birds and animals. The Coonamessett Greenway Heritage Trail is a hugely popular walking path. **This permit will put this stunning project at risk by allowing non-conforming additional wastewater discharges to the Coonamessett River and Great Pond.**

The Town of Falmouth recently spent almost \$30 million for the Little Pond sewer project, which also removed 1,000 kg/year of nitrogen from the Great Pond watershed. If no offsets are required, this project could potentially negate most of that improvement. Falmouth's November 13, 2024 Fall Town Meeting also voted to appropriate \$3.8 million for the engineering, design and permitting of the wastewater collection system for the northeastern part of the Maravista peninsula and the Teaticket Path peninsula in the Great Pond watershed. To protect the Town's

recent large investment to increase water quality, the DEP should require a wastewater plan, with details, that offsets all of the nitrogen that will be added by this project.

The new nitrogen that will be added to the Coonamessett River and to Great Pond directly contradicts two vital and expensive wastewater improvement projects being undertaken by the Town of Falmouth.

**Setting and Groundwater Flow:** The location of this project adjacent to the Coonamessett River will result in rapid movement of nitrate-containing effluent to the river. The direction of groundwater movement and the sandy, highly transmissive nature of the soils in the project area and between the project and the Coonamessett River are not in dispute. Studies show that once nitrate in incoming groundwater reaches the Coonamessett River, it will travel with little uptake or attenuation.<sup>1</sup> The short distance of the project from the Coonamessett River (about 1300 feet) means that, at rates of groundwater movement of 0.8 to 2.3 feet per day<sup>2</sup>, that discharged nitrate allowed by this permit will travel to the Coonamessett River within 1.5 to 4.5 years and then once in the river travels immediately to Great Pond little river uptake or attenuation.

**Mass DEP's Responsibility to Protect Impaired Waters:** Massachusetts DEP regulations require that projects in a watershed with impaired waters and TMDLs cause no net increase in nitrogen delivery to those waters.

MGL c.21 §§26 through 53, states that Mass DEP has a duty and responsibility to protect the public health and enhance the quality and value of the water resources of the Commonwealth. It directs MassDEP to take all action necessary or appropriate to secure to the Commonwealth the benefits of the Clean Water Act.

Massachusetts Groundwater Discharge regulations say that MassDEP “shall not issue a permit pursuant to 314 CMR 5.00 when the discharge will cause or contribute to a violation of 314 CMR 4.00: “*Massachusetts Surface Water Quality Standards*” (MSWQS). 314 CMR 5.06(1). These regulations provide that all permits shall contain limits that “are adequate to protect surface waters for their existing and designated uses and to assure the attainment and maintenance of the [water quality standards]. The regulations require that MassDEP consider natural background conditions and any TMDLs established by Mass DEP. They require DEP to protect existing uses of hydrologically connected downgradient ground waters and surface waters, and not interfere with the maintenance and attainment of beneficial uses in hydrologically connected downgradient waters [314 CMR 5.10(3)].

The water quality standards state that MassDEP “will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained.” [314 CMR 4.03(1)(a)]. The Massachusetts Surface Water Quality regulations make clear that “discharges shall be limited or prohibited to protect existing uses and

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<sup>1</sup> Qian, A., C. Neill, M. Welsh, C. Kennedy. Impact of cranberry bog restoration in nutrient uptake and channel habitat in the Coonamessett River. 2023 Semester in Environmental Science, Final Project. Marine Biological Laboratory, Woods Hole, MA.

<sup>2</sup> LeBlanc, D. R. 1984. Digital modeling of solute transport in a plume of sewage-contaminated ground water. U.S. Geological Survey Open-File Report 84-475, p. 11-46.

not interfere with the attainment of designated uses in downstream and adjacent segments. Further, Mass DEP will provide a reasonable margin of safety to account for any lack of knowledge concerning the relationship between the pollutants being discharged and their impact on water quality.

The Massachusetts water quality standards require Mass DEP to apply additional minimum nutrient criteria requiring that all surface waters “shall not exceed the site-specific criteria developed in a TMDL [314 CMR 4.05(c)].

**Because Great Pond is an officially-listed 303(d) impaired water with a TMDL, any increase in nitrogen will exceed the TMDL criteria. No additional nitrogen releases should be allowed under this permit.**

By the issuance of new regulations on August 4, 2023 (314 CMR 21.00), the Mass DEP now requires towns to develop watershed management plans that describe how the watershed will meet Massachusetts Surface Water Standards within 20 years. The Falmouth Water Quality Management Committee voted to move ahead with preparation of watershed plans. These will involve combinations of: (1) expanded areas served by municipal sewerage, (2) conversion of current Title V septic systems to denitrifying systems, and (3) potentially some other technologies such as urine diversion.

The Town of Falmouth’s letter signed by Wastewater Superintendent Amy Lowell of May 1, 2025 states that the Town of Falmouth shall, in its watershed plan for Great Pond, “include a plan for removing the watershed load added to the watershed by the Easterly project.”

**This statement is totally inadequate for describing the removal of the nitrogen added by the proposed project and should not be used as the basis for issuing a permit.**

First, the Town’s promised offsets in the May 1 letter are based on a permit discharge limit of 5 mg N/L, not the 10 mg N/L allowed by this draft permit.

Second, **absolutely no details are provided in the Town’s letter about how or when these offsets will be achieved.** This lack of detail is completely inappropriate for the issuance of an actual groundwater discharge permit. The proposed one-time settlement payment of \$750,000 to the Town of Falmouth comes nowhere close to covering the cost of the appropriate level of nitrogen offsets required to reach net-zero nitrogen discharge for this project. It directly contradicts the Town’s claim, in a memo of June 30, 2023 written by Amy Lowell that, “there is no existing sewer line in the vicinity,” and that, “[M]ore importantly, the Town’s wastewater treatment and discharge facilities do not have the capacity to accommodate the wastewater flow from this development” unless the Town reduces the extent of planned sewerage elsewhere. This would require re-writing the state accepted Targeted Watershed Management Plans (TWMP) already in place for Great Pond and other estuaries, which is a multiyear process and a very expensive proposition.

The Town’s acceptance of \$750,000 for nitrogen offsets, an amount that is totally inadequate for the required level of nitrogen mitigation from this development in the Great Pond watershed, will be asking Falmouth residents to bear the burden of removing the nitrogen from this development. It is unfair to ask homeowners to shoulder a greater burden to remove nitrogen than will be

required of this project. It is unsound policy to allow an increase of nitrogen releases that will require the Town to request more taxpayer monies — which the Town may not vote to do — for the additional nitrogen clean-up this draft permit will undoubtedly require. Additionally, the money would not be transferred to the town until occupancy, which means a multi-year delay *after* the development is already polluting the river and estuary for any mitigation to begin.

### **Specific Comments:**

1. The Project is located within the watershed to the Coonamessett River and the Great Pond Estuary. It lies within the Great Pond Coastal Pond Overlay District. These areas have formal designations and minimum performance standards for water quality are required by federal, state, and local laws.
2. Great Pond has been officially designated as an “impaired water” by the MADEP under Section 303(d) of the federal Clean Water Act. Reductions in nitrogen loading from the Great Pond watershed are required to comply with the Clean Water Act.
3. The Massachusetts Estuaries Project (MEP) prepared a report that documented water quality degradation and required nitrogen loading reductions. The MEP report requires a reduction of 2,752 kg N/year for the Coonamessett River-Great Pond watershed<sup>3</sup>.
4. Based on the MEP report, the MADEP published a Total Maximum Daily Load (TMDL) report that official documents the water quality impairment in the Great Pond estuary and the required nitrogen loading reductions. The TMDL report requires a reduction of 2,752 kg/year Coonamessett River-Great Pond watershed<sup>4</sup>.
5. The town of Falmouth developed a Comprehensive Wastewater Management Plan (CWMP), a Targeted Watershed Management Plan (TWMP), land use regulations (Zoning Bylaw) to restrict future increases in nitrogen loading, and new regulations requiring denitrifying septic systems for new construction, thus demonstrating a commitment to federally and state-required nitrogen loading reductions<sup>5</sup>.
6. Falmouth’s CWMP and TWMP plans that address “local needs” have been formally approved by the Commonwealth of Massachusetts DEP. Falmouth has invested significant Town funds to develop these plans to reduce the required nitrogen loading in this watershed in conformance with state and federal laws.
7. According to the Hydrogeologic Report prepared by the Applicant’s consultant, Geohydrocycle, the Project will discharge 49,950 gallons/day of wastewater within the watershed<sup>6</sup>.

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<sup>3</sup> Massachusetts Estuaries Project, Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Great/Perch Pond, Green Pond and Bournes Pond, Falmouth, Massachusetts, 2005.

<sup>4</sup> Systems Total Maximum Daily Loads For Total Nitrogen (Report # 96-TMDL-6 Control #181.0), 2006.

<sup>5</sup> Falmouth Zoning Bylaw, ARTICLE 7 OVERLAY DISTRICTS, 240 – 7.2 Coastal Pond Overlay District and ARTICLE 13 PERFORMANCE REQUIREMENTS, 240 – 13.1 Specified Performance Standards.

<sup>6</sup> Geohydrocycle, Hydrogeologic Report (submitted to MADEP), October 9, 2024.

At the allowed treatment level and effluent concentration of 10 mg N/L, this represents an additional nitrogen load of 690 kg N/yr within the Coonamessett River-Great Pond watershed that will need to be offset.

At a potential treatment level and effluent concentration of 5 mg N/L, this would represent an additional nitrogen load of 345 kg N/yr within the Coonamessett River-Great Pond watershed that will need to be offset.

The project will also generate nitrogen loading from lawn runoff and stormwater. The proponent's Hydrologic Report states the nitrogen loading to be 8 kg N/yr from fertilizer and 33 kg N/yr from stormwater. Nitrogen from these sources are not proposed for N removal treatment, thus they add to the project's N load to the watershed.

Table 1. Calculation of appropriate offsets based on 10 mg N/L or 5 mg N/L treatment levels and a project flow of 49,950 gallons per day.

| Treatment level | N loading from wastewater (kg) | N loading from lawns and stormwater (kg) | Total N loading | Margin of safety (20%) | Appropriate total N offset |
|-----------------|--------------------------------|------------------------------------------|-----------------|------------------------|----------------------------|
| 10 mg/L         | 690                            | 41                                       | 731             | 146                    | 877                        |
| 5 mg/L          | 345                            | 41                                       | 386             | 77                     | 463                        |

8. The draft permit is internally inconsistent. It states a concentration limit of 10 mg total N/L but also states an annual nitrogen load limit of 346 kg N/yr that is based on an average annual concentration of 5 mg N/L.

9. The draft permit does not require the elimination of fertilizer, fertilizer reduction, or even any fertilizer management. Fertilizer is a known source of nitrogen to Falmouth's estuaries<sup>7</sup>. Fertilizer management was expected to be incorporated into the groundwater discharge permit but is not in this draft permit.

10. The original plan for the Easterly development called for a permeable reactive barrier (PRB) to be installed between the groundwater discharge site and the Coonamessett River. PRBs have been shown in Falmouth to be effective in removing nitrate from the groundwater that flows through them and have the potential to treat not only water released on the Saxon Partners property but in ambient groundwater. Not requiring the PRB as part of the permit requirement significantly increased the total nitrogen that will reach the Coonamessett River and Great Pond from this project.

### **Comment on Transparency Within the Town of Falmouth:**

The Town of Falmouth's decision to accept \$750,000 to bring this project to net zero nitrogen released by this project was made behind closed doors and without public discussion. No plan—not a single detail or even a generic approach planned—is provided as to how the \$750,000 will achieve the offset. Bringing this project to net zero nitrogen—as required by law—will undoubtedly require approval of more public funds by Falmouth Town Meeting. Approval of

<sup>7</sup> Valiela, I., G. Collins, J. Kremer, K. Lajtha, M. Geist, B. Seeley, J. Brawley, C. H. Sham. 1997. Nitrogen loading from coastal watersheds to receiving estuaries: a new method and application. *Ecol. Appl.* 7(2): 358-380.

such funds is not guaranteed; therefore this permit cannot ensure that the nitrogen reductions stated in Amy Lowell's May 1, 2025 letter can be achieved by the Town.

Sincerely,

A handwritten signature in blue ink that reads "Wendi Buessler". The signature is written in a cursive, flowing style.

Wendi Buessler, President

158 Lakeview Ave.  
Falmouth, MA 02540



# TOWN of FALMOUTH

## DEPARTMENT OF PUBLIC WORKS, WASTEWATER DIVISION

416 GIFFORD STREET, FALMOUTH, MASSACHUSETTS 02540  
TELEPHONE (508) 457-2543 x 3018

AMY LOWELL  
WASTEWATER SUPERINTENDENT

## MEMORANDUM

To: Town Manager

Cc: Town Planner, Zoning Administrator

Date: June 30, 2023

**Re: Wastewater Division Comments on Saxon Partners' Comprehensive Permit Application for Proposed Development at 375 Sandwich Road**

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Saxon Partners has submitted a Comprehensive Permit application for a plan to construct a 300 unit residential development at 375 Sandwich Road. The way the proposed development is concentrated on one third of the available lot area (with no conservation or other restriction proposed on the rest of the area) indicates that additional development of up to 600 additional units may be envisioned for the property. Saxon Partners has estimated that the average wastewater flow would be 30,550 gallons per day for the development at 300 units (91,670 gallons per day at 900 units). However, at a standard design flow of 110 gallons per day per bedroom and the planned 470 bedrooms, the wastewater flow from the 300 unit development would be 51,700 gallons per day.

The utilities plan in the developer's permit application shows a "proposed connection to existing sewer main" on Sandwich Road. However, there is no existing sewer main in the vicinity. The closest municipal sewer collection main is about 1.4 miles away on Route 28 at Sandwich Road. More importantly, the Town's wastewater treatment and discharge facilities do not have capacity to accommodate the wastewater flow from this development, unless the Town either reduces the scale of the Town's planned Teaticket-Acepesket sewer project or reduces the flow allocation for redevelopment within the existing sewer area (including Main Street and Davis Straits). There are additional constraints as well, as explained below.

The parcel at 375 Sandwich Road is currently undeveloped and is within the watershed to Great Pond. The water quality and habitat of Great Pond is significantly impaired by nitrogen, primarily from septic systems (Massachusetts Estuaries Project report, 2005). The state issued a Total Maximum Daily Load (TMDL) for nitrogen for Great Pond in 2006 in order to restore its water quality.

On June 21, 2023, the state issued new regulations, including changes to septic system regulations (310 CMR 15.000) and new watershed permit regulations (314 CMR 21.00). These new regulations designate all water bodies on Cape Cod with TMDLs as Nitrogen Sensitive Areas (NSAs). The regulations then require that towns obtain watershed permits for all NSAs and implement plans to meet their TMDLs within 20 years, *or* that all property owners within each NSA replace their septic system with a denitrifying septic system.

According to the Massachusetts Estuaries Project, meeting the TMDL for Great Pond will require reducing the nitrogen load to Great Pond by 12,154 kilograms per year (kg/yr). Any additional nitrogen discharged to the Great Pond watershed will then *also* need to be removed in order to meet the TMDL. Saxon Partners has indicated that they could construct a wastewater treatment facility onsite that would discharge 6 milligrams per liter (mg/L), (or even 3 mg/L) of total nitrogen. However, we must assume unless/until that limit is made a requirement for the project, the state that the Department of Environmental Protection would issue a standard groundwater discharge permit for this private treatment plant of 10 mg/L. At 10 mg/L and 30,550 gallons per day, Saxon Partners' proposed 300 unit development would add 422 kilograms of nitrogen per year to the Great Pond watershed, if the wastewater treatment facility consistently achieves a permit limit of 10 mg/L. At 10 mg/L and 51,700 gallons per day, the 300 unit development would add 714 kg of nitrogen per year to the Great Pond watershed.

In 2017, the Town completed the Little Pond sewer project which, for a cost of more than \$20 million dollars, removed 1000 kg/yr of nitrogen from the Great Pond watershed (as well as more than 4,000 kg/yr of nitrogen from the Little Pond watershed).

After years of data collection and evaluation, the Town sent a final plan for reducing nitrogen load to Great Pond to the state in late 2022, the Great Pond Targeted Watershed Management Plan (TWMP). The state approved the TWMP for Great Pond in January 2023. The TWMP involves:

- Expansion of the Town's existing wastewater collection and transmission system to include approximately 2,000 properties in the lower watershed to Great Pond (the Teaticket and Acapesket sewer areas or TASA, both south of route 28), in two phases over approximately 8-10 years,
- Constructing significant improvements at the town's wastewater treatment facility,
- Expanding the town's existing recharge beds north of the treatment plant to accommodate additional wastewater flow, and
- Several alternative nitrogen removal technologies including aquaculture, a permeable reactive barrier, fertilizer reduction and stormwater management.

That plan will remove sufficient nitrogen load from the watershed to meet the TMDL for Great Pond. Saxon Partners' proposed development at 375 Sandwich Road was not envisioned in the TWMP; the plan does not account for the additional 422 kg/yr (or 714 kg/yr) nitrogen load from this development. Any additional load from this development will need to be removed from the watershed (or offset by removing a nitrogen load from a different source), in order to meet the TMDL.

*Saxon partners has proposed that the wastewater from their proposed development be conveyed to the Town's WWTF for treatment. The property at 375 Sandwich Road is not located within a planned sewer service area in the approved TWMP. The Massachusetts Environmental Policy*

Act requires that if the Town did wish or need to modify its TWMP to change the sewer service area, (or to increase the treatment plant capacity or increase its wastewater discharge or change wastewater discharge location), the Town would need to prepare a Notice of Project Change to the TWMP, go through the Massachusetts Environmental Policy Act review process again and receive state approval for the change.

The Town has just gone out to bid for construction of the estimated \$34.5 million dollar WWTF TASA Improvements Project planned in the approved TWMP. The total capacity of the WWTF will be 1.21 million gallons per day. That capacity is allocated for: existing sewer areas, the Teaticket and Acapesket sewer areas, and for redevelopment within the existing sewer areas. The Town's WWTF does not have treatment capacity for the >30,000 gallons per day of flow from the proposed Saxon partners development (or the > 50,000 gallons per day assuming standard design flow per bedroom).

*Saxon Partners has suggested that flow from their development (and/or potentially from adjacent properties) be discharged at the Town's existing discharge sites.* The Town's wastewater discharge capacity at existing discharge areas is severely limited. It would not be possible to increase treated wastewater discharge to the Town's existing discharge beds 1-15 beyond what is planned in the Town's approved TWMP. Discharge to beds 1-13 is strictly limited to 450,000 gallons per day by the TMDL for West Falmouth Harbor (and by the treatment plant's groundwater discharge permit). Discharge to the remaining beds, 14 and 15, is limited by the available area and by the downgradient receptors; the town's approved TWMP maximizes the discharge potential at beds 14 and 15. The Town's WWTF does not have discharge capacity for the additional flow from the proposed Saxon partners development.

*Saxon partners has also suggested that treated wastewater flow could be discharged to new discharge beds on the abandoned sand pit north of 375 Sandwich Road.* This site is within the watershed to Great Pond, so any nitrogen load returned to this site would add nitrogen to Great Pond. However, if the property is developed, this is the appropriate location for its treated wastewater discharge.

*Saxon Partners has suggested that perhaps an arrangement could be made whereby the Town could own and operate the discharge site at the sand pits north of 375 Sandwich Road, and could therefore use the site for discharge of treated wastewater from other properties (beyond that from their development).* It is true that the Town has very limited discharge capacity. However, the issue is not so much the availability of land (the nearby town-owned Augusta site is still being considered a "back-up" future discharge site). The issue is that 375 Sandwich Road (like the Augusta site) is located within the watershed to already nitrogen-impaired Great Pond, so any additional nitrogen discharged there will impact Great Pond water quality and must be offset, in order to meet the TMDL for Great Pond.

Under these circumstances, the only viable option for wastewater management from this site is onsite treatment and discharge. If this site is to be developed as proposed, the developer must: (a) construct and maintain a high quality wastewater treatment system onsite (developer has indicated that they could consistently produce an effluent containing 6 mg/L or even 3 mg/L of total nitrogen; this should be made a project and permit requirement), (b) discharge the treated wastewater onsite and, (c) to the degree possible, offset the additional nitrogen load that this discharge would contribute to the watershed.



# TOWN of FALMOUTH

DEPARTMENT OF PUBLIC WORKS, WASTEWATER DIVISION

416 GIFFORD STREET, FALMOUTH, MASSACHUSETTS 02540  
TELEPHONE (508) 457-2543 x 3018

AMY LOWELL  
WASTEWATER SUPERINTENDENT

May 1, 2025

Drew Osei  
MassDEP-SERO  
20 Riverside Drive  
Lakeville, MA 02347

**Re: 375 Sandwich Road Nitrogen Load in Great Pond Watershed**

Dear Mr. Osei,

You requested a letter stating how nitrogen load from the development at 375 Sandwich Road (the Easterly) would be handled in the Town's watershed plan for Great Pond.

The Town will, in its Watershed Plan for Great Pond, include a plan for removing the nitrogen load added to the watershed by the Easterly project. This plan will take into account the 5 mg/L total nitrogen effluent limit expected in the DEP's groundwater discharge permit for the Easterly's WWTF and will involve use of the \$750,000 project settlement for nitrogen mitigation in this watershed.

Sincerely,

Amy Lowell

cc via email:

Brian Harrington, MassDEP  
Mike Renshaw, Falmouth Town Manager  
Peter Johnson-Staub, Falmouth Assistant Town Manager  
Maura O'Keefe, Town Counsel  
Peter McConarty, Falmouth DPW Director  
Noreen Stockman, Zoning Board Administrator  
David Calhoun, Saxon Partners

Scott Horsley  
Water Resources Consultant  
65 Little River Road • Cotuit, MA 02108 • 508-364-7818

March 10, 2025

Mr. Jeff Gould  
MassDEP Southeast Regional Office  
20 Riverside Drive  
Lakeview, MA 02347

Ms. Susan Murphy, Chair  
Falmouth Zoning Board of Appeals  
59 Town Hall Square  
Falmouth, MA 02540

Ms. Amy Lowell, Wastewater Superintendent  
Town of Falmouth  
416 Gifford Street  
Falmouth, MA 02540

Mr. George Pucci, Special Counsel to the town of Falmouth  
KP Law  
101 Arch Street, 12 Floor  
Boston, MA 02110

RE: The Easterly - 375 Sandwich Road in Falmouth, Massachusetts

Dear Mr. Gould, Ms. Murphy, Ms. Lowell, and Mr. Pucci:

I have been retained by concerned abutters to the above-referenced project including Fran Chevarley at 40 Meredith Drive to review the water quality impacts of the above-referenced project.

**Experience and Qualifications:** I am a hydrologist with over thirty years of experience in evaluating water resources projects designed to protect and/or restore water quality. I have worked as a consultant to federal, state, and local government agencies, non-governmental organizations, 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 United States Environmental Protection Agency (USEPA) workshops on drinking water protection and watershed management and am currently working for the USEPA, Office of Research and Development. I have also served on numerous advisory boards to the USEPA, the National Academy of Public

Administration, Massachusetts Department of Environmental Protection (MADEP), Massachusetts Executive Office of Energy and Environmental Affairs, and the National Groundwater Association. I have received national (USEPA) and local awards for my work in the water resources management fields. I currently serve as Adjunct Faculty at Harvard University and Tufts University, where I teach graduate level courses in water resources policy, wetlands management, green infrastructure, and low impact development. 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. I have served as an expert witness in several prior litigation matters in federal court on behalf of the USEPA and the U.S. Department of Justice (DOJ) as well as state court and administrative appeals before the MADEP.

I am currently serving as a consultant to the towns of Wellfleet and Truro, MA where I am providing wastewater management design advice on three MGL Chapter 40B projects which will add over 600 affordable housing units. All three of these projects will be served with on-site wastewater treatment plants and will achieve a “net zero” nitrogen load, as required by state and federal laws.

**General Comments:** The proposed Project is located within a critical watershed to the Coonamessett River and Great Pond, both of which have been documented to be nitrogen-sensitive areas (under state law) and where water quality restoration efforts are required by the Clean Water Act (federal law). I understand that Chapter 40B projects are not exempt from and must comply with state and federal laws. Furthermore, and additionally, they must consider valid “local needs”.

The proposed Project will add significant wastewater disposal and associated nitrogen loading within these watersheds where reductions are required by federal and state laws. The Project will contribute to violations of the Massachusetts Surface Water Quality Standards, is inconsistent with “local needs” to comply with the federal Clean Water Act and the Massachusetts Watershed Permit Regulations and does not comply with the Massachusetts Groundwater Discharge Permit Regulations. My specific comments are as follows.

**Specific Comments:**

1. The Project is located within the watershed to the Coonamessett River, the watershed to Great Pond, and within the Great Pond Coastal Pond Overlay District. These critical areas are formally identified in and along with minimum performance standards in federal, state, and local laws.

2. Great Pond has been officially designated as an “impaired water” by the MADEP under Section 303(d) of the federal Clean Water Act. Reductions in nitrogen loading are required to comply with the Clean Water Act and the Massachusetts Watershed Permit Regulations (314 CMR 21.00)<sup>1</sup>.
3. The Massachusetts Estuaries Project (MEP) was commissioned by MADEP and documented water quality impairments and required nitrogen loading reductions. The MEP report requires a reduction of 33% of the existing nitrogen load and 50% of the existing nitrogen load from septic systems for the Coonamessett River/Great Pond watershed<sup>2</sup>.
4. Incorporating the MEP report, the MADEP published a Total Maximum Daily Load (TMDL) report officially documenting the water quality impairment and the required nitrogen loading reductions. The TMDL report requires a reduction of 33% of the existing nitrogen load and 50% of the existing nitrogen load from septic systems for the Coonamessett River/Great Pond watershed<sup>3</sup>.
5. The town of Falmouth has committed to these federally and state-required nitrogen loading reductions by developing a Comprehensive Wastewater Management Plan (CWMP), a Targeted Watershed Management Plan (TWMP) and implementing land use regulations (Zoning Bylaw) to restrict future increases in nitrogen loading<sup>4</sup>.

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<sup>1</sup> Necessary Nitrogen Load Reductions – The proportion of the total Controllable Attenuated Nitrogen Load that must be reduced in order to restore the waterbody to applicable water quality and habitat quality restoration goals that have been identified in a TMDL, Alternative Restoration Plan, MEP Report, or Scientific Evaluation as being necessary to meet the designated uses of the waterbody established by the Department under 314 CMR 4.00: *Massachusetts Surface Water Quality Standards*.

<sup>2</sup> Massachusetts Estuaries Project, Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Great/Perch Pond, Green Pond and Bournes Pond, Falmouth, Massachusetts, 2005. Tables VIII-3 and VIII-4.

<sup>3</sup> Massachusetts Department of Environmental Protection, FINAL Great, Green and Bournes Pond Embayment Systems Total Maximum Daily Loads For Total Nitrogen (Report # 96-TMDL-6 Control #181.0), 2006.

<sup>4</sup> Falmouth Zoning Bylaw, ARTICLE 7 OVERLAY DISTRICTS, 240 – 7.2 Coastal Pond Overlay District and ARTICLE 13 PERFORMANCE REQUIREMENTS, 240 – 13.1 Specified Performance Standards.

6. All three local initiatives and commitments address “local needs” and have been formally approved by the Commonwealth of Massachusetts. MADEP has approved the CWMP and TWMP plans and the Massachusetts Attorney General has approved the Zoning Bylaw. The town of Falmouth has invested significant funding to develop these plans in conformance with state and federal laws and has appropriated public funds to reduce the required nitrogen loading in this watershed.
7. According to the Hydrogeologic Report prepared by the Applicant’s consultant, Geohydrocycle, the Project proposes to discharge 49,950 gallons/day of wastewater within the watershed<sup>5</sup>. At a presumed treatment level and effluent concentration of 3 mg/liter this represents an additional, increased nitrogen load of 207 kg/yr within the Coonamessett/Great Pond watershed. Including stormwater infiltration and lawn fertilizers, the total project nitrogen load is estimated at 247 kg/yr (see Table 1).
8. To offset this nitrogen load the Project will have to connect 57 existing homes in the neighborhood to the proposed wastewater treatment plant. According to the MEP report each home generates approximately 4.93 kg/year<sup>6</sup>. Connecting these homes to the wastewater treatment plant would lower their effluent nitrogen concentration from 26.25 mg/liter to 3 mg/liter resulting in a net reduction of 4.37 kg/year per home. To achieve the offset of 247 kg/year the Project would have to connect 57 homes to the wastewater treatment plant (see Table 2).

Table 1 – Nitrogen Load Impact (Proposed Project)

|                             |     |
|-----------------------------|-----|
| wastewater (kg/yr)          | 207 |
| fertilizer (kg/yr)          | 8   |
| stormwater (kg/yr)          | 33  |
| Total Load Addition (kg/yr) | 247 |

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<sup>5</sup> Geohydrocycle, Hydrogeologic Report (submitted to MADEP), October 9, 2024.

<sup>6</sup> Massachusetts Estuaries Project, Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Great/Perch Pond, Green Pond and Bournes Pond, Falmouth, Massachusetts, 2005, Table IV-3.

Table 2 – Potential Nitrogen Offsets with Sewer Connections

|                                      |      |
|--------------------------------------|------|
| existing load/home (on septic)       | 4.93 |
| load/home with wastewater treatment  | 0.56 |
| load reduced/home (kg/yr)            | 4.37 |
| number homes required to be sewerred | 57   |
| Total Load Reduced (kg/yr)           | 247  |

9. As currently designed, the Project does not comply with the Falmouth Zoning Bylaw performance standards for nitrogen loading, is inconsistent with the TWMP and will contribute to violations of Surface Water Quality Standards (314 CMR 5.00)<sup>7</sup>.
10. The town of Falmouth was formally designated as a “waste management agency” under the federal Clean Water Act, making the town legally responsible to restore water quality by reducing nitrogen loads to Coonamessett River and Great Pond<sup>8</sup>.
11. The Falmouth Zoning Board of Appeals conditionally-approved the Comprehensive Permit with the understanding (and presumption) that the Project would connect neighboring properties currently on septic systems to the Project’s wastewater treatment plant as an offset to achieve a “net zero” nitrogen loading. However, there is no requirement or funding provided to either construct the treatment plant with this capacity or for the collection system to connect the neighboring homes. Apparently, the developer is assuming or expecting (incorrectly) that the neighbors will pay for the collection system to achieve the required “net zero” performance standards for the benefit of the developer of the Project.

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<sup>7</sup> The Zoning Board of Appeals Decision (Waiver #4), filed with Falmouth Town Clerk July 29, 2024, specifically states that the waiver to comply with the Coastal Protection District was not approved and must be complied with. This retains the performance standard of net zero nitrogen loading.

<sup>8</sup> Cape Cod Commission, Cape Cod 208 Plan Update (2015)

**Summary and Conclusions:**

In summary, this Project does not comply with the town of Falmouth Zoning Bylaw and performance standards and is inconsistent with and in conflict with the MADEP-approved Comprehensive Wastewater Management Plan (CWMP), the MADEP-approved Targeted Watershed Management Plan (TWMP), the MADEP Total Maximum Daily Load (TMDL) report, the federal Clean Water Act, the Massachusetts Groundwater Discharge Permit Regulations, and the Massachusetts Surface Water Quality Standards Regulations.

The proposed Project will add nitrogen loading in a watershed where reductions are required by federal and state laws and it will contribute to violations of the Massachusetts Surface Water Quality Standards. The Project does not comply with the required offsets and net-zero nitrogen loading performance standards. I recommend that MADEP require that the Project comply with a net-zero nitrogen loading performance standard.

Please contact me directly with any questions that you might have.

Sincerely,

A handwritten signature in black ink, consisting of several overlapping loops and a final horizontal stroke, representing the name Scott W. Horsley.

Scott W. Horsley

Water Resources Consultant

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### Areas of Expertise

- Targeted Watershed Planning
- Wastewater & Stormwater Management
- Water Quality Impacts & Restoration
- Green Infrastructure & Nature-Based Solutions
- Hydrologic Modeling & Assessment
- Integrated Water Management
- Smart Growth/ Low Impact Development
- Education & Training

### Professional Affiliation

- Tufts University, Graduate Department of Urban and Environmental Planning and Policy
- Harvard University, Extension, Graduate Department of Sustainability
- Massachusetts Stormwater Advisory Committee
- Massachusetts Sustainable Water Management Initiative Advisory Committee
- Massachusetts Climate Change Adaptation Advisory Committee
- MADEP Title 5 Advisory Committee
- Charles River Watershed Association Advisory Board

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## Scott W. Horsley

Water Resources Consultant and University Lecturer  
Curriculum Vitae

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Scott Horsley has over 30 years of professional experience as a consultant to federal, state, and local government agencies, non-profit organizations, and private industry throughout the United States, Bulgaria, Nicaragua, the Caribbean, the Pacific Islands, and China. Scott has been an innovator in the environmental profession and thrives on bringing innovative and interdisciplinary approaches to challenging projects. Scott has a strong understanding of the full range of technical, planning, and policy issues associated with water resources and land use management projects. Scott has served as an expert witness in the field of hydrology in numerous state and federal court cases. He has served as an instructor for a nationwide series of U.S. Environmental Protection Agency (EPA) workshops on water resource management. He has also served on numerous advisory boards and committees to the EPA, the National Academy of Public Administration, Massachusetts Department of Environmental Protection (MADEP), Massachusetts Executive Office of Energy and Environmental Affairs (EEA), National Groundwater Association, and Massachusetts Audubon Society. Scott has received national (EPA) and local awards (Mashpee Conservation Commission) for his work in the wetlands and stormwater management fields. Scott Horsley serves as Adjunct Faculty at Tufts University in the Graduate Department of Urban & Environmental Policy & Planning and at the Harvard Extension School in the Graduate Department of Sustainability.

### **REPRESENTATIVE PROJECTS**

**Lake Tashmoo Targeted Watershed Plan – Town of Tisbury (Martha’s Vineyard), MA:** Working with the Tisbury Water Resources Committee to develop a restoration plan for Lake Tashmoo. According to the Massachusetts Estuaries Project (MEP) Lake Tashmoo is receiving nitrogen loading from wastewater, stormwater and fertilizers and requires a 32% reduction to achieve compliance with the Clean Water Act. The plan will include a sewer collection system, advanced septic systems that use a woodchip bioreactor system, fertigation wells, and stormwater retrofits. A responsible management entity (RME) is being developed to manage the operation, maintenance, and monitoring of the plan.

**Wellfleet Targeted Watershed Management Plan – Town of Wellfleet, MA:** As a consultant to the Town of Wellfleet prepared a Targeted Watershed Plan including an adaptive management plan integrating non-traditional (nature-based) and traditional (wastewater treatment facilities) nutrient reduction technologies. The plan includes a permeable reactive barrier (PRB), shellfish and aquaculture, ecosystem restoration, stormwater remediation, fertilizer management, and the use of decentralized, on-site septic systems that utilize innovative and alternative technologies. The overall goal of the project is to provide the town guidance in obtaining a MADEP Watershed Permit and compliance with the Clean Water Act. The Targeted Watershed Plan was unanimously approved by the Wellfleet Select Board, was confirmed to be

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## Awards

- Harvard University, Petra Shattuck Excellence in Teaching Award (2023)
- Mashpee (MA) Conservation Commission Annual Environmental Achievement Award (2002)
- EPA Environmental Technology Innovator Award for Stormwater Treatment Design (1999)

## Patent

United States Patent Number 5,549,817 for Stormwater Treatment System/Apparatus

## Academic Background

Master of Arts, Marine Affairs - Environmental Protection, University of Rhode Island (1981)

Marine Ecosystems Research Laboratory, University of Rhode Island (1980)

Princeton Groundwater Pollution & Hydrology Course with David Miller, John Cherry, and Robert Cleary (1985)

Bachelor of Science, Biology, Southeastern Massachusetts University (1976)

consistent with the Cape Cod 208 Plan by the Cape Cod Commission. The advanced septic system program was approved by the Massachusetts Clean Water Trust for SRF funding and placed on the Intended Use Plan (IUP).

**Water Resources Management - Manchester-by-the Sea, MA:** Scott is serving as a consultant to the town of Manchester-by-the-Sea and their Water Resources Protection Task Force. He is advising on drinking water supply management issues including sustainable yield, source water protection, future water sources, and water rates. Scott has supervised a thermal survey to determine groundwater discharge areas to Gravelly Pond, the town's surface water reservoir and has prepared a hydrologic budget.

**Watershed Restoration Research Project:** Scott is currently working as a member of a research team that includes USEPA Office of Research & Development, United States Geological Survey (USGS), The Nature Conservancy, the Town of Barnstable and the Barnstable Clean Water Coalition. The project is designed to research, develop, and pilot-test multiple nature-based technologies to reduce nutrient loads to the coastal embayment known as Three Bays. Scott assisted in the design of a woodchip-based bioreactor/ permeable reactive barrier (PRB) and is now working with the research team to construct and monitor it as part of a wetland restoration project in a cranberry bog at the headwaters of the watershed. He is also advising on a project to evaluate the use of a new class of innovative and alternative septic systems that utilize a woodchip-based bioreactor. Preliminary data from these systems indicate nutrient reductions of 90%. The project includes the development of a Responsible Management Entity (RME) to oversee the operation, maintenance, and monitoring of the systems.

**Expert Witness, Hydrologist - United States Environmental Protection Agency and United States Department of Justice – United States v. Charles Johnson (437 F.3d 157, First Circuit Court, 2006):** Expert Witness for U.S. Environmental Protection Agency (EPA) and U.S. Department of Justice (DOJ) in a federal Clean Waters Act enforcement case involving the filling of wetlands in Carver, MA by the construction and operation of cranberry bogs. Scott served as the Hydrology Expert Witness and provided testimony regarding the hydrologic interactions (or “nexus”) between the subject wetlands, groundwater, and the adjacent stream. He provided advice on the application of the guidance from the Rapanos U.S. Supreme Court decision relative to the jurisdiction of wetlands in the Weweantic River watershed. He also developed a nutrient-loading and attenuation model and has provided expert witness testimony regarding the nutrient attenuation capabilities of wetlands and their nexus to the Weweantic River. Scott has also prepared a wetland restoration plan for the cranberry bogs to enhance the nutrient attenuation capabilities of wetlands (abandoned cranberry bogs) in the watershed. The case resulted in two favorable decisions for the United States enforcing the Clean Water Act.

**Cape Cod 208 Water Quality Management Plan:** Consultant to the Cape Cod Commission for the preparation and implementation of the Cape Cod 208 Water Quality Plan. Fifty-three estuaries are impacted by excessive nutrient loading derived from wastewater, stormwater, fertilizers and natural sources. The Cape Cod 208 Plan presents an innovative alternative approach that

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includes a broad range of traditional (sewage collection and treatment plants) and non-traditional (or nature-based) technologies including fertigation wells, shellfish restoration, permeable reactive barriers, fertilizer management, innovative & alternative septic system technologies, ecotoilets and other decentralized solutions. An adaptive management plan provides a practical framework to implement and optimize an integrated array of strategies to attain compliance with the Clean Water Act. Mr. Horsley led a team of scientists and engineers in the development of a non-traditional/nature-based approach and conducted dozens of public stakeholder workshops.

**Expert Witness, Hydrologist - Massachusetts Supreme Judicial Court - Reynolds v. Stow Zoning Board of Appeals:** Mr. Horsley served as an expert witness on wastewater impacts and groundwater hydrology. He conducted an assessment of water quality impacts associated with a proposed Chapter 40B high-density affordable housing project on neighboring private drinking water supplies. The case involved a proposed waiver of a local regulation governing wastewater impacts that the Court upheld the finding that the local board of health requirements were valid and the project was not permitted.

**Massachusetts Department of Environmental Protection (MADEP) Title 5 (Septic System) and Groundwater Discharge Permitting Advisory Committee and Designation of Nitrogen Sensitive Areas:** Mr. Horsley was invited by MADEP to participate in an advisory group tasked with updating and revising Title 5 Regulations and the associated Groundwater Discharge Permit program. This includes the designation of “Nitrogen Sensitive Areas”, the development of wastewater loading standards, the use of alternative septic system technologies, and the roles of local Boards of Health in regulating wastewater and septic systems.

**Three Bays Watershed Implementation Plan – Cape Cod Commission and Barnstable Clean Water Coalition, Inc.:** Consultant for the design and implementation of integrated watershed restoration plan designed to reduce excessive nutrient loads. Mr. Horsley prepared conceptual designs for wetland restoration, pond restoration, alternative septic system technologies, stormwater bioretention, woodchip bioreactors, and permeable reactive barriers. He designed a Watershed Calculator tool to track the incremental and cumulative nutrient reductions associated with these projects.

**Massachusetts Sustainable Water Management Initiative (SWMI):** Mr. Horsley was asked by MADEP and MAEEA to serve as an advisor to an interdisciplinary panel to develop guidelines to implement the Massachusetts Water Management Act for the restoration of stream flow in Massachusetts Rivers. The Massachusetts Water Management Act provides the regulatory structure for water withdrawals in the state. The guidance was developed to provide ecological criteria for the decision making related to water withdrawal permit issuance. The criteria were based upon scientific relationships between flow characteristics and two indicator fish species - trout and black dace. The guidance includes a series of possible mitigation measures and offset practices that are designed to either reduce consumptive withdrawals and/or provide return flows to balance the hydrologic budget.

**River Restoration for the Atlantic Salmon – United States Army Corps of Engineers and State of Maine:** Served as a consulting hydrologist to the U.S. Army Corps of Engineers and the State of Maine for a hydrologic study of river systems in northeastern Maine to assess the relative impacts of various

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water users including irrigation pumping associated with the blueberry industry on the flow regime of the Narragausus and Pleasant Rivers. The project included numerous meetings with a broad range of stakeholders including the U.S. Army Corps of Engineers, the State of Maine, blueberry industry representatives, and local government officials. The project resulted in a decision-making model and adaptive management plan to restore natural flows within the rivers for the purpose of providing an adequate habitat for the Atlantic Salmon.

**California Water Code – Department of Water Resources:** Served as Facilitator and Trainer for the implementation of Assembly Bill (AB) 3030. This project integrated groundwater and surface waters and provides the framework to develop local groundwater management plans to balance water withdrawals and recharge projects to mitigate impacts water resources. Mr. Horsley facilitated a series of workshops with stakeholders throughout the State of California.

**Ipswich River Watershed Management Plan:** Project Manager to develop a Management Plan for restoration of the Ipswich River. The Ipswich River is one of the most impacted rivers in the United States with significant flow alterations caused by excessive water withdrawals and inefficient land use practices. This Plan provides an analysis of the development patterns within the study area and the resulting hydrologic impacts of water supply withdrawals, sewerage systems, and stormwater management. The project included coordination with an interpretation of a USGS watershed modeling project. It also provides an “Integrated Water Management” approval to a series of recommendations designed to balance the hydrologic budget. These include water conservation, alternative water supplies, stormwater management, and land use planning. Mr. Horsley provided facilitation at a series of meetings with a broad range of stakeholders including federal and state agencies, water suppliers, local government officials and others.

**Smart Growth and Smart Energy Toolkit, Massachusetts Executive Office of Environmental and Energy Affairs (EEA):** Served as a consultant to the EEA to design an outreach tool for local governments and the development community. The Toolkit includes descriptions of twenty techniques, including transfer of development rights (TDR), transit-oriented development (TOD), village center zoning districts, open space residential design (OSRD), LID, agricultural preservation, integrated water, and wastewater management, brownfields redevelopment, and the newly-legislated Chapter 40R smart growth overlay districts. It also includes case studies and model bylaws on the twelve subject areas.

**Massachusetts Climate Change Advisory Committee:** Scott served as a member of the Coastal Zone and Oceans Subcommittee of the Climate Change Advisory Committee convened by the Secretary of Massachusetts Environmental and Energy Agency. The Committee was assembled to develop recommendations, strategies, and criteria to implement the *Global Warming Solutions Act* passed by the Massachusetts legislature last year. The main task of the subcommittee is to analyze strategies for adapting to the predicted impacts of climate change in the Commonwealth of Massachusetts. Among other recommendations, Scott proposed regulatory changes to accommodate the landward migration of wetland systems that will result from sea level rise.

**Nicaragua Source Water Protection Project:** As a consultant to U.S. Environmental Protection Agency (USEPA) and U.S. Agency for International Development (USAID), Scott conducted a two-year case study of three communities (Matagalpa, Esteli, and Ocotal) designed to strengthen the sustainability and resilience of local public drinking water supplies. The project included delineation of wellhead protection areas, identification of contaminant sources and the development of management strategies. It included numerous public hearings and the development of a comprehensive training manual.

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## **PROFESSIONAL EXPERIENCE**

|                |                                                                      |
|----------------|----------------------------------------------------------------------|
| 2014 - Present | Scott Horsley, Water Resources Consultant                            |
| 2014 - Present | Harvard University, Adjunct Faculty                                  |
| 1986 - Present | Tufts University, Adjunct Faculty                                    |
| 1988 - 2019    | Horsley Witten Group, Inc., Founder and President                    |
| 1984 - 1988    | IEP, Inc., Senior Environmental Scientist                            |
| 1981 - 1984    | Cape Cod Commission, Water Resources Coordinator                     |
| 1979 - 1981    | Barnstable County Health Department, Environmental Research Director |

## **PUBLICATIONS**

- Erban, Laura, Wigginton, Sara, Baumgaertel, Brian, Horsley, Bryan, McCobb, Tim, Gleason, Tim, Crocker, Zenus, Horsley, Scott 2024, “Reducing wastewater nitrogen loading by >90% with carbon-amended (woodchip bioreactor) septic systems: a field demonstration in Barnstable, (Cape Cod) Massachusetts”, *Journal of Environmental Management*.
- Horsley, S. 2023, “Colorado River Compact – Seven Western States Compete for Water”, *Harvard Gazette*.
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- Twitchell JH., Mulvaney KK, Hubbell B, Erban LE, Berry W, Chintala MM, Crocker Z, Gleason TR, Horsley S, Munns, Jr. WR, Rea AW, Amith SN, Soto Reves S. 2019 “Solutions-Driven Research Pilot Problem Formulation Workshop: Report and Evaluation”, U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Laboratory, Atlantic Ecology Division, Narragansett, RI, EPA 600-R-19/107.
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- Horsley, S. 2002. Groundwater, drinking water and stormwater protection: science and policy, in 2002 National CLE Conference, Environmental and Land Use Law, Law Education Institute, Steamboat, Colorado, January 4-9, 2002.
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- Cheney, P. and S. Horsley. 1980. Nonstructural Flood Plain Management Planning in the Connecticut River Basin, New England River Basins Commission.

January 16, 2025

Mr. David Calhoun, Director of Acquisitions  
Saxon Partners  
25 Recreation Park Drive, Unit 204  
Hingham, MA 02043

Re: Nitrogen Loading – The Easterly Falmouth WRRF  
375 Sandwich Road, Falmouth, Massachusetts  
Fuss & O'Neill Project No. 20240652.A20

Dear Mr. Calhoun:

As requested, we have prepared this letter that details the planned approach relative to Total Maximum Daily Loads (TMDL) compliance for nitrogen that will be discharged from the proposed water resource recovery facility (WRRF) at your planned multi-family development known as The Easterly Falmouth, located at 375 Sandwich Road in Falmouth. As the project is proposed with a Title 5 design flow of 49,950 gallons per day, a Massachusetts Department of Environmental Protection (MassDEP) issued groundwater discharge permit (GWDP) is required to comply with the State regulations (314 CMR 5.00) that govern domestic sewage discharges to groundwater that are greater than 10,000 gallons per day. Furthermore, this site is located in the Coonamesett/Great Pond Watershed, which has been designated as a Nitrogen Sensitive Area (NSA).

As detailed in the preliminary design program for the WRRF, the system will employ what MassDEP considers best available technology (BAT), which is a tertiary level treatment process that utilizes a Membrane BioReactor (MBR). MBRs are unique in the decentralized wastewater treatment space in that they are always configured with a membrane system at the end of the process. That membrane forms a physical barrier between the wastewater and treated effluent so that the effluent must be pulled through the membrane via a vacuum pump to be discharged. This barrier allows for a very high concentration of biological organisms to perform organic and nutrient (nitrogen) removal from the wastewater, which can result in very low concentrations of nitrate-nitrogen in the effluent. For this facility, we anticipate a GWDP limit of 5 mg/L with best operational efforts made to achieve an annual average concentration of 3 mg/L. It is important to note that this is the same two-stage permit configuration that the Town of Falmouth has on their municipal WRRF, so this has been standardized somewhat by MassDEP for this watershed. This level of effluent quality is generally considered by the industry to be the most stringent limits possible to achieve and therefore the maximum possible treatment and nitrogen removal for these types of systems.

Given this high level of treatment, these nitrogen levels would be well below the amount of nitrogen discharged if this site were developed into single family home lots with conventional septic systems under the site's current zoning based on the site analysis completed by Allen & Major Associates. That analysis shows that this site could be approved for thirty-one (31) 4-bedroom single family homes, which we estimate would impart a nitrogen load of 494 kilograms per year (kg/yr) to the watershed. In contrast, the proposed MBR WRRF discharging 49,950 gpd of effluent with a concentration of 5 mg/L nitrogen would impart a nitrogen load of 345 kg/yr (i.e. almost 30% less). It is worth noting that the proposed project includes recharging all stormwater directly into ground as well as a setting aside a large area of the parcel to be left in its natural

Mr. David Calhoun  
January 16, 2025  
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state in perpetuity. Those features provide additional benefits in the dilution of the nitrogen discharge and maintaining groundwater recharge levels to what is currently occurring.

In addition to the advanced treatment levels and benefits of the project's open space and groundwater recharge features, two additional measures can be employed to decrease the proposed nitrogen load: (i) a permeable reactive barrier (PRB) to remove any additional nitrogen discharged from the leaching facility; and (ii) placing a nitrogen fertilizer restriction on the property.

The PRB is a concept that has been in use for decades in the site remediation space for groundwater plume cleanup and has more recently been used in several nitrogen removal projects in Barnstable County, with at least two ongoing in Falmouth. The PRB concept utilizes a reactive barrier as a carbon source and substrate to encourage denitrification bacterial growth within it, which will then use the dissolved nitrate-nitrogen in groundwater as an oxygen source. Data from the several PRB pilot studies on the Cape and in other nitrogen impaired watersheds show that properly sized and constructed PRBs can reliably remove 99% of all nitrates from the groundwater flow that passes through the barrier. This is critical to understand because a PRB sited downgradient from the Easterly's WRRF effluent disposal system would capture not only the nitrates from the project's WRRF, but also any background nitrates that would be present in groundwater from upgradient septic system discharges. The overall effect of this approach is to reduce the Easterly's discharge to net-zero for nitrogen while also removing background nitrogen from groundwater, thereby improving (reducing) the overall TMDL in the watershed.

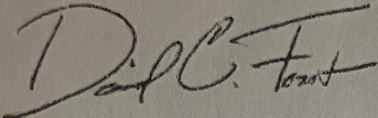
To complete this work, Fuss&O'Neill has partnered with Paul Dombrowski, PE at Isotec Remediation Technologies, who has extensive experience in the design, installation and monitoring of PRBs for plume reduction and over a decade's experience specific to PRBs and nitrogen reduction on Cape Cod. Based on the hydrogeological studies completed for the proposed WRRF discharge, we have developed the attached figure that details the extent of the nitrogen discharge from the effluent disposal field as it migrates downgradient in groundwater and have selected a preliminary location of the planned PRB.

Finally, we have reviewed the benefits of incorporating a nitrogen fertilizer deed restriction for the property and have consulted the Buzzard's Bay Coalition calculation tool for fertilizer nitrogen discharges in connection with such deed restrictions. The Coalition's calculation tool suggests that providing a deed restriction for fertilizer use at this site would further reduce the nitrogen discharge into the watershed and might allow for the Town of Falmouth to become eligible for nitrogen credits from MassDEP as part of their TMDL watershed compliance planning.

Mr. David Calhoun  
January 16, 2025  
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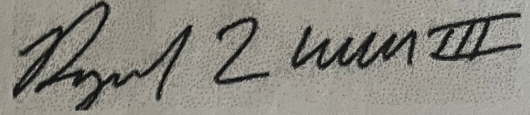
We hope this description of the project's multi-faceted approach to nitrogen removal and assistance with the TMDL challenges are helpful and that you will contact us if we can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "David C. Formato".

David C. Formato, PE  
Vice President | Business Line Manager

Reviewed by:

A handwritten signature in black ink, appearing to read "Raymond L. Willis, III".

Raymond L. Willis, III, PE  
Associate

Attachment