



COMPREHENSIVE
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August 3, 2026

Robert Moore, Conservation Agent
Haverhill Conservation Commission
4 Summer Street, City Hall Room 300
Haverhill, MA 01830

**Re: Peer Review Services
890 North Broadway
Haverhill, MA**

Dear Mr. Moore:

As requested by the City of Haverhill, CEI has completed a technical review of the materials and information listed below for the proposed development project located at 890 North Broadway in Haverhill, MA. Our review focuses on elements of the proposed project that pertain to the stormwater management design, based on the following information furnished to the Conservation Commission:

- a. Stormwater Management Report, revised July 22, 2026, prepared by Civil Design Consultants Inc.;
- b. NOI Report, dated February 26, 2026, prepared by Civil Design Consultants Inc.;
- c. Site Plans, revised July 22, 2026, prepared by Civil Design Consultants Inc.;
- d. Stormwater Management Report, dated November 12, 2009, prepared by Civil Design Consultants Inc.;
- e. Watershed Plans, dated May 10, 2009, prepared by Civil Design Consultants Inc.;
- f. Site Plans, dated October 14, 2009, prepared by Civil Design Consultants Inc.;
- g. Fuel Pad Tank Sketch, dated February 26, 2026, prepared by Civil Design Consultants Inc.

The purpose of this supplemental review is to either ensure that CEI's prior review comments have been addressed or to provide additional comments. Only review comments that required a response have been included. CEI's initial review comments are below, followed by Civil Design Consultants (CDC) responses in *italic text*, with CEI response comments below that in [blue text](#).

I. Compliance with Massachusetts Stormwater Management Standards

Standard 2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

1. The applicant is comparing the post-development discharge of the proposed clubhouse area

to the post-development discharge of the previously approved 2009 design, as the clubhouse drainage area was originally part of a larger system of stormwater BMPs with a design point at the outlet of the downstream irrigation pond.

- a. The post-development discharge rate from the 2009 design appears to have been taken as the discharge from the subcatchment tributary to the previously proposed wet swale, rather than the discharge from the wet swale itself. As the wet swale provided additional attenuation in the originally approved design, using the upstream subcatchment discharge does not represent the correct allowable discharge rate. Please revise the allowable release rate to reflect the wet swale outlet discharge from the 2009 TP-40 based analysis.

CDC Response (May 14th): *Peak discharge rates have been revised to reflect discharge from the wet swale, consistent with the previously approved 2009 drainage report. The drainage report has been revised accordingly.*

CEI (June 4th): There are some minor oscillations occurring for pond S-1 in the HydroCAD model. While the severity is low, it may be fixed by adding in a phase-in-dept of 0.01' for more accurate results.

CDC Response (July 22nd): *Minor revisions were made to the outlet control structure 2 (OCS-2) to eliminate oscillation within the HydroCAD model. The HydroCAD model and corresponding plan details have been revised accordingly.*

CEI: Comment Addressed.

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).

1. Stormwater management systems on new development shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of total suspended solids (TSS) related to the total postconstruction impervious area on the site and 60% of the average annual load of total phosphorus (TP) related to the total post-construction impervious surface area on the site.

CDC Response (May 14th): *A water quality unit has been incorporated into the parking lot treatment train to provide a 90% average annual removal of total suspended solids (TSS). EPA SCM Performance Removal Curves have been provided to demonstrate that the proposed BMPs achieve 60% average annual total phosphorus (TP) removal.*

CEI (June 4th): The SCM curves show that the proposed infiltration trench and infiltration basin will provide 60% average annual TP removal but the calculated TP removal for the wet swale was not included, which is meant to treat 1.61 acres of impervious area. The total site wide TP removal should be calculated to ensure compliance.

CDC Response (July 22nd): *The proposed wet swale has been replaced with a wet pond BMP designed to treat the required Water Quality Volume and retain 1.3 inches of runoff from the parking lot. The revised stormwater management system achieves a weighted Total Phosphorus removal efficiency of 61%, exceeding the minimum 60% removal requirement. Supporting phosphorus removal calculations are provided in the Stormwater Management Calculations (Section V) in the revised Drainage Report.*

CEI: Comment Addressed.

2. The contributing drainage area to any deep sump catch basin should not exceed $\frac{1}{4}$ acre of impervious cover.

CDC Response (May 14th): *Inlet grate capacity calculations have been provided in the revised drainage report to demonstrate that the proposed structures can adequately convey the design flows.*

CEI (June 4th): While the inlet capacity shows that the catch basin has the ability to accept the runoff directed to the catch basin, the $\frac{1}{4}$ acre limit is for sediment and pollutant loading capacity of the sump relative to the volume and velocity of stormwater runoff it must handle.

CDC Response (July 22nd): *The deep sump catch basin has been removed from the proposed treatment train and is no longer relied upon to provide TSS removal credit. The revised stormwater management system independently achieves the required 90% TSS removal without any treatment credit assigned to the deep sump catch basin. Additionally, as noted in the Operations and Maintenance Plan, catch basin inspection and cleaning are required for a minimum of four (4) times per year to minimize sediment accumulation and maintain its hydraulic performance.*

CEI: Comment Addressed.

Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The Applicant has provided a Long-Term Operation and Maintenance Plan for the Site.

1. The proposed wet swales are designed with permanent standing water. Stormwater BMPs that maintain standing water may create conditions conducive to mosquito breeding if not properly designed and maintained. In accordance with Volume 2, Chapter 5 of the Massachusetts Stormwater Handbook, the applicant should provide documentation describing how mosquito breeding potential will be minimized through design measures and long-term maintenance practices.

CDC Response (May 14th): *Mosquito breeding mitigation measures have been incorporated into the Operation and Maintenance Plan.*

CEI (June 4th): It does not appear that the mitigation measures were included in the provided O&M manual dated May 1, 2026. The newly proposed infiltration trench should also be included in the operation and maintenance manual. The estimated cost appears to be low given the multiple components within the stormwater management system.

CDC Response (July 22nd): *The proposed wet swale has been replaced with a wet pond that has been designed to minimize conditions favorable to mosquito breeding. The permanent pool provides sufficient water depth to avoid shallow, stagnant conditions. The wet pond includes a defined flow path and forebay to promote water circulation and facilitate sediment removal. Routine maintenance, including sediment removal, vegetation management, and debris removal, will be performed in accordance with the approved 2009 Long Term Operation and Maintenance Plan to maintain proper pond function and discourage mosquito breeding. The proposed trench drain has been included in the revised Long-Term Operations and Maintenance Plan.*

CEI: Comment Addressed.

II. Other Comments

1. The Applicant has proposed the use of a wet swale and an infiltration basin on the development, however no details of these practices of been provided. CEI recommends the Applicant include cross section and plan view details of the above noted stormwater management practices on their Construction Detail Sheet.

CDC Response (May 14th): *A cross-section detail of the wet swale and infiltration basin have been added to Sheet D-4.*

CEI (June 4th): The provided details and the HydroCAD model do not match. HydroCAD has the outlet pipe from the Wet Swale as 18" but the detail shows a 24" pipe. It also appears that the wet swale will have 2 emergency overflows, a broad crested weir in the OCS and the emergency spillway over the embankment, but only the broad crested weir in the OCs was included in the model. Some elevations in the details do not match the HydroCAD model either.

CDC Response(July 22nd): *The wet pond and infiltration basin cross-section detail have been revised to be consistent with the elevations and dimensions reflected in the HydroCAD model. In addition, the emergency spillway has been added into the HydroCAD model for OCS-1.*

CEI: Comment Addressed.

2. There appears to be substantial encroachment in the 25' no-disturb zone with the proposed wet swale that could be avoided by moving the wet swale slightly to the west.

CDC Response (May 14th): *The proposed wet swale remains in the same location as previously approved under the 2009 design. To provide additional mitigation measures, additional plantings have been added within the 25-FT No Disturb Zone.*

CEI (June 4th): CEI recommends that the applicant use the Massachusetts replication area planting density guidelines as the target for the proposed mitigation plantings. Additionally, native trees should be provided along the northern limit of work between the parking area and the wetland resource area. The proposed seed mix for the wet swale should also be provided for review.

CDC Response (July 22nd): *Additional native shrubs have been incorporated within the 25-FT No Disturb Zone to provide greater buffer enhancement than what currently exists on the site. The approved 2009 plans proposed a total of forty-five (45) shrubs within the buffer enhancement area. However, as documented on the Front Nine Drive Roadway As-Built Plan dated August 1, 2023, with revisions through May 5, 2024, and accepted under the Certificate of Compliance issued by the Haverhill Conservation Commission on November 14, 2024, only nine (9) blueberry shrubs were installed (see attached Certificate of Compliance). Of those nine (9) existing shrubs, three (3) are located within the current proposed grading limits and must be removed, while the remaining six (6) shrubs will be preserved. To mitigate the proposed work and enhance the buffer, the revised plans include forty-two (42) additional native shrubs within the 25-foot No Disturb Zone (see Sheet C-4). Upon completion, the buffer enhancement area will contain a total of forty-eight (48) native shrubs (six existing shrubs to remain and forty-two new shrubs), which exceed both the existing condition and the number of shrubs originally proposed under the approved 2009 design. Additionally, the proposed seed mix for the buffer area has been added to Sheet C-4.*

CEI: Comment Addressed.

We appreciate the opportunity to provide the City with peer review services. If you have any questions or comments regarding this report, please contact me at 774-843-2007 or cosullivan@ceiengineers.com.

Sincerely,

COMPREHENSIVE ENVIRONMENTAL, INC.



Conor O'Sullivan
Project Review Engineer



Matthew Lundsted, P.E.
Principal Engineer