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June 4, 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, dated May 11, 2026, prepared by Civil Design Consultants Inc.;
- b. NOI Report, dated February 26, 2026, prepared by Civil Design Consultants Inc.;
- c. Site Plans, dated May 11, 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.

CEI's initial review findings were in a letter dated April 8, 2026. The purpose of this supplemental review is to either ensure that CEI's initial comments have been addressed or to provide additional comments. Only initial 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 1:** No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

1. As not all impervious areas are being collected and directed towards the treatment system, the applicant should show that these areas are de minimis per Volume 3 Chapter 1 of the Massachusetts Stormwater Standards.

**CDC Response:** *An infiltration trench has been added along the edge of the cart path at the clubhouse to provide water quality treatment prior to runoff discharging towards the wetland resource area.*

**CEI:** Comment addressed.

**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:** *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:** 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.

- b. The previously approved discharge rate for the clubhouse area was based on TP-40 rainfall depths. While it may be appropriate to maintain consistency with the originally approved stormwater system sizing using TP-40 rainfall assumptions, the applicant should also demonstrate how the proposed conditions would perform using NOAA Atlas 14 rainfall depths.

**CDC Response:** *The revised drainage report now includes HydroCAD modeling using NOAA Atlas 14 rainfall depths. The results demonstrate that the proposed 2026 post-development peak flows are less than the 2009 post-development discharge peak rates.*

**CEI:** Comment addressed.

- c. CEI also recommends that the applicant consider the effects on the downstream irrigation pond.

**CDC Response:** *Since the proposed drainage system has been designed so that the current post development peak flows are equal or less than the previously approved 2009 conditions, we do not anticipate any adverse impact to the downstream irrigation pond.*

**CEI:** Comment addressed.

2. It appears that there was also a proposed wet pond at the 18<sup>th</sup> green in the 2009 approved plan that doesn't seem to be accounted for in the new calculations or appear to have been constructed.

**CDC Response:** *The pond shown near the 18th green on the 2009 approved plans was intended as a water feature. This feature was not included in the 2009 drainage analysis and was never construction.*

**CEI:** Comment addressed.

**Standard 3:** Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures.

1. The recharge calculations only show that recharge is being provided for the proposed buildings but not for the 1.62 acres of paved parking. This area does not appear to have been accounted for in the recharge calculations in the 2009 report either as only 1.98 acres of impervious area were provided recharge while about 6.1 acres of impervious area was proposed.

**CDC Response:** *Attached is the Stormwater Management Compliance Summary provided to the Commission during the 2009 Notice of Intent review process. As detailed in the summary, type C and D soils, high groundwater, and relatively steep slopes presented a significant challenge to meet the minimum recharge volume along Front Nine Drive.*

*Chapter 1 – Volume 1 of the Massachusetts Stormwater Handbook specifies that for sites comprised solely of C and D soils....”proponents are required to infiltrate the required recharge volume only to the maximum extent practicable.” At the time of the original approval, both the Commission and its peer review, Horseley Whitten, agreed that infiltration measures should be provided where site conditions allow. Under the previously approved design, the proposed clubhouse grading allowed portions of the parking area to be filled to allow for a subsurface infiltration system, providing a total recharge volume of 235-CF.*

*Under the current proposal, the revised grading results in slight cuts to the existing grade, prohibiting the placement of a subsurface infiltration system while maintaining the required groundwater separation. To compensate, an infiltration basin has been added east of the cart barn, providing a total recharge volume of approximately 383-CF, or 148-CF more volume than the previously approved design.*

**CEI:** Acknowledged.

2. Exfiltration within HydroCAD should be modeled as exfiltration over surface area, not wetted area, as Volume 3 Chapter 1 of the Massachusetts Stormwater Standards states that exfiltration should be limited to only the bottom surface.

**CDC Response:** *The HydroCAD model has been updated to represent exfiltration over surface area in accordance with the Massachusetts Stormwater Handbook.*

**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:** *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:** *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.*

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

**CDC Response:** *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:** *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.*

3. CEI recommends adding curbing around the cart building to ensure pretreatment of any runoff before it enters the stormwater BMPs.

**CDC Response:** *Curbing has been added around the cart barn, and an additional deep sump catch basin has been incorporated to provide pretreatment prior to discharge to the infiltration basin.*

**CEI:** *Comment addressed.*

**Standard 5:** For Land Uses with Higher Potential Pollutant Loads (LUHPPL), source control and pollution prevention shall be implemented.

1. The applicant should clarify the proposed use of the cart barn. If the uses include vehicle and/or equipment maintenance and service areas, it would be considered a LUHPPL.

**CDC Response:** *The proposed cart barn will be used solely for golf cart storage. No vehicle or equipment maintenance/service activities are proposed, and therefore, the proposed use is not considered a LUHPPL.*

**CEI:** *Comment addressed.*

**Standard 6:** Stormwater discharges near or to any critical area require the use of specific source control and pollution prevention measures and the specific structural stormwater best management practices.

The project site is not located within any critical areas.

**Standard is met.**

**Standard 7:** Redevelopments projects are required to meet the Massachusetts Stormwater Management Standards only to the maximum extent practicable.

The project is considered new development.

***Standard is met.***

**Standard 8:** A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities.

The applicant has provided an Erosion and Soil Control Plan.

1. A concrete washout should be specified in the erosion control plan.

**CDC Response:** *A concrete washout area has been added to Sheet C-3.*

**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 Operation and Maintenance plan must specify where on-site snow will be stored.

**CDC Response:** *Snow storage areas have been identified on Sheet C-4 and referenced in the Operation and Maintenance Plan.*

**CEI:** Comment addressed.

2. 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:** *Mosquito breeding mitigation measures have been incorporated into the Operation and Maintenance Plan.*

**CEI:** 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.

3. To ensure compliance with Standard 9, the Order of Conditions should include the continuing conditions set forth below.
  - a. All stormwater BMPs shall be operated and maintained in accordance with the design plans and the Operation and Maintenance Plan approved by the issuing authority.
  - b. The responsible party shall:
    - i. maintain an operation and maintenance log for the last three years, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);
    - ii. make this log available to MassDEP and the Conservation Commission upon request; and allow members and agents of the MassDEP and the Conservation Commission to enter and inspect the premises to evaluate and ensure that the responsibility party complies with the Operation and Maintenance Plan requirements for each BMP.

**CDC Response:** *The Applicant acknowledges that the referenced operation and maintenance requirements will be included in the Order of Conditions.*

**CEI:** Comment addressed.

**Standard 10:** All illicit discharges to the stormwater management system are prohibited.

1. The Applicant has not provided an Illicit Discharge Compliance Statement in compliance with Standard 10.

**CDC Response:** *A signed and dated Illicit Discharge Statement will be provided to the Conservation Commission prior to construction.*

**CEI:** Comment addressed.

## II. Other Comments

1. An inlet capacity analysis should be performed as the catch basins are placed more than 300 feet apart and runoff may pond above the curb with the proposed design.

**CDC Response:** *An inlet capacity analysis for the catch basins has been included in the revised drainage report, under Tab 5.*

**CEI:** Comment addressed.

2. Stormwater drainage pipes should not decrease in size in the downstream direction. At Manhole PDMH-2, a 15" pipe and a 12" pipe enter the structure, but the outlet pipe is 12" in diameter. The outlet pipe must be increased to a minimum of 15" in diameter to match the largest incoming pipe size.

**CDC Response:** *The downstream pipe at PDMH-1 has been upsized to a 24-inch HDPE pipe. Updated pipe sizing calculations have also been provided in the revised drainage report.*

**CEI:** Comment addressed.

3. 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:** *A cross-section detail of the wet swale and infiltration basin have been added to Sheet D-4.*

**CEI:** 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.

4. CEI would like to confirm if the catch basins on the east side of Front Drive are existing or proposed. The catch basins are not shown consistently between sheets and the catch basins are not seen in any aerial images.

**CDC Response:** *The catch basins near the eastern driveway on Front Nine Drive are existing structures.*

**CEI:** Comment addressed.

5. 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:** *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:** 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.

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](mailto:cosullivan@ceiengineers.com).

Sincerely,

COMPREHENSIVE ENVIRONMENTAL, INC.



Conor O'Sullivan  
Project Review Engineer



Matthew Lundsted, P.E.  
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