



November 16, 2021

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

**Re: Response to Review Comments**  
887 Boston Road, Haverhill, MA

Dear Mr. Moore:

Howard Stein Hudson has received review comments from the CEI, dated November 9, 2021 and have prepared the following responses:

*“Standard 1:... Deep sump catch basins, hydrodynamic separator (CDS) and subsurface infiltration systems with isolator rows are proposed to provide treatment.”*

**No response required**

*“Standard 2:... A HydroCAD model was provided to represent pre and post-development drainage systems. The model results show post-development peak discharge and runoff volume is reduced at two analysis points along Boston Road. CEI has provided comments that may require revisions to the HydroCAD model.”*

1. *The Watershed Plans provided with the Supplemental Data Report indicate the Infiltration Basin is located within Hydrologic Soil Group D (HSG D) soils. The model uses an exfiltration rate that is consistent with HSG A soils (1.02 inches/hour) and should be revised with a HSG D soils exfiltration rate (0.09 inches/hour) or remove the infiltration component for the basin in the model.*

*CEI recommends removing the infiltration component for the Infiltration Basin since the proposed Outlet Control Structure (OCS-1) includes an 8” orifice that is the same elevation as the floor of the basin and would not provide storage to promote infiltration.*

**HSH has revised soil classification on site to correspond with deep hole soil testing that occurred throughout the site. The B and D soil division was taken from the NRCS Web Soil Survey but based on site specific knowledge we have revised the line to show the area of the wetland as D soils and the rest of the site as B. Sandy loam and fine loamy sand was the subsoils found on sitetherefore the infiltration rate used corresponds with a Rawls rate of 1.02 in/hr.**

**Infiltration Basin 1 has been revised to a detention basin and we are no longer taking credit for infiltration of the system. The outlet control structure has been revised but orifices remain at the elevation of the bottom of the basin.**

2. *The outlet pipe for proposed Infiltration Basin is sized as an 18” HDPE. Stormwater from the basin is conveyed through the 18” outlet pipe and ties into an existing 12” pipe on Boston*



*Road. HydroCAD models the basin with capacity of an 18” outlet pipe but the restriction would occur from the existing, downstream 12” pipe. The HydroCAD model should be revised to account for the existing 12” pipe to evaluate potential flow restrictions and determine the effect on the basin’s capacity to attenuate peak flows.*

**The proposed detention basin was revised with new outlet and weir elevations when the infiltration was removed to maintain our pre to post development compliance with rate of outflow to the wetland. The discharge pipe was reanalyzed and reduced to a 15” pipe which was designed to pass the 100-year storm event. If sizing the pipe for a 10 or 25-year storm a 12” would be sufficient. The final pipe that ties into the existing drainage system in Boston Road has also been reduced to a 15”, sized for a 100-year storm. In a 10-year storm the final discharge pipe is less than half full at its peak.**

3. *The design plans do not fully show the existing drainage system along Boston Road. It’s not clear if the entire system conveys flow north, to South Main Street, or a portion is directed toward the existing culvert that crosses Boston Road. If a portion is directed to the culvert, the HydroCAD model should be revised to account for this additional inflow.*

*CEI recommends the Applicant check with the Haverhill Engineering Department to confirm the configuration and flow direction of the existing drainage system.*

**We have had our surveyor contact the City of Haverhill to assist with the survey of the existing drainage system. We are still waiting on a response from the Town at this time, but will be happy to provide the information once collected.**

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

1. *The Watershed Plans provided with the Supplemental Data Report indicate the Infiltration Chamber (IC-1) is primarily located within Hydrologic Soil Group D (HSG D) soils. The CN values to represent surface types in the HydroCAD model represent HSG D soils, however the model uses an exfiltration rate that is consistent with HSG A soils (1.02 inches/hour).*
  - a. *Proposed conditions HydroCAD should be revised to model IC-1 with a HSG D soils exfiltration rate (0.09 inches/hour).*
  - b. *72 Hour Drawdown calculations for IC-1 should also be revised with a HSG D soils exfiltration rate.*

**See response to comment 1 for hydrologic soil groups and exfiltration rates. Drawdown calculations have been updated with the most recent numbers.**

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

*TSS Removal Calculation Worksheets were provided with the Stormwater Report.*

4. *The Applicant should provide supporting calculations to demonstrate the proposed isolator rows provide sufficient the Water Quality Volume (WQV) storage. Calculations were included in the Supplemental Data Report but the “Volume Provided” calculation is presented as a flow*



rate, not a volume. Please refer to the Stormwater Handbook design standards for sizing the isolator rows.

**“Volume provided” has been revised as “peak flow”. The calculations have been updated as the isolator row is designed based upon flow rate and not volume.**

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

*The proposed project does not meet thresholds or characteristics of a LUHPPL.*

**Concur.**

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

*The Applicant has confirmed the Site is not within or adjacent to a Critical Area.*

**Concur.**

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

*The proposed project is considered a redevelopment and meets the definition outlined by Standard 7.*

**This project is not a redevelopment project as our post development impervious areas are greater than the existing impervious areas.**

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

5. *The Demolition and Erosion Control Plan should identify locations of the following:*

- *erosion/sediment controls throughout the Site, HSH: Added to Site Plan Revision.*
- *staging and stock pile locations, HSH: Will be added to SWPPP at later date.*
- *temporary sediment basins, HSH: Will be added to SWPPP at later date.*
- *dewatering containment areas, HSH: Will be added to SWPPP at later date.*
- *concrete cleanout containment basin, HSH: Will be added to SWPPP at later date.*
- *inlet protection locations, including existing catch basins along Boston Road and South Main Street that are adjacent to the Site. HSH: Added to Site Plan Revision.*
- *snow storage areas during the construction period, HSH: Will be added to SWPPP at later date.*
- *installation of temporary fencing (orange snow fencing) around the proposed infiltration areas to provide an additional visual indicator to prevent encroachment of construction equipment into the areas. HSH: Added to Site Plan Revision.*



*Note: Details of these stormwater controls should also be added to the plans. HSH: Added to Site Plan Revision.*

**The demolition plan has been revised to show erosion and sediment control throughout the site, inlet protections on adjacent catch basins to the site, installation of temporary fencing around the proposed infiltration and detention areas. The other items will be completed in the SWPPP and NPDES permit.**

6. *Additional information should be included in the Erosion Control Plan Notes to help prevent potential stormwater related impacts:*
  - a. *Revised Note 6 to read “prior to the start of any site work...”. This should be the first note listed.*
  - b. *Inspections of the site will be performed once every 7 days, or once every 14 days and within 24 hours of the end of a storm event of ½ inch or greater.*
  - c. *Remove trapped sediment when depth is half the height of compost filter sock.*
  - d. *Additional sediment controls (siltsock) should be stockpiled on-site for use in repairing damaged sections and emergencies.*
  - e. *Any sediment tracked onto the public right-of way shall be swept at the end of each working day.*

**The erosion and control notes have been revised both on the plan and within the Supplemental Data Report.**

7. *CEI recommends replacing the proposed straw wattle with compost filter socks (silt sock). Silt socks are generally more durable and heavier barrier to provide a better protection.*
  - a. *Minimum 12” sock should be required.*
  - b. *The silt sock installation detail should show overlapping ends with a minimum 2-foot requirement.*

**The silt fence has been replaced with 12” silt sock and details have been provided.**

8. *The Stabilized Construction Entrance detail should be revised to show minimum 50’ length.*

**The construction entrances and detail have been revised to 50’ in length and the detail updated.**

9. *Two construction entrances are proposed at existing driveway entrances along Boston Road. The Site is sloped toward these entrances, which creates a concern for sediment being washed off-site during storm events. The Applicant may consider locating sediment basins at each construction entrance to direct runoff and help prevent off-site sediment migration.*

**These details will be included in the SWPPP and NPDES permit to be submitted at a later date.**



10. *Temporary construction fencing is recommended along the limit of work. Fencing helps contain trash and debris during the construction period and backing support for perimeter erosion and sediment controls.*

**The erosion control line has been revised to be erosion control and construction fencing on the demolition plan and details provided.**

11. *A double row of erosion/sediment controls is recommended adjacent to the wetland area due to the close proximity of the proposed retaining wall, infiltration basin and grading. This could include a silt sock, backed by a row of silt fence along the temporary construction fencing.*

**A double row of erosion and sediment control (silt sock and silt fence) has been placed at the 25' no disturb adjacent to the wetland.**

12. *The Applicant is required to submit NPDES Construction General Permit filing with EPA. The site owner and the contractor are each considered "operators" under that permit, and each will need to file an EPA Notice of Intent for coverage under that permit. Prior to filing a Notice of Intent, the applicant and its contractor must prepare a Stormwater Pollution Plan (SWPPP).*

- a. *The Applicant shall provide the Conservation Commission with a copy of the SWPPP before land disturbance commences.*
- b. *The Applicant shall provide the Commission with evidence that all "operators" (as defined in the NPDES Construction General Permit) have filed for coverage under the permit.*
- c. *The Applicant shall obtain authorization from the Conservation Commission or its agent prior to filing a Notice of Termination under the EPA permit.*

**A SWPPP and NPDES permit will be completed before the beginning of construction and can be submitted to the Agent of the Conservation Commission for review.**

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

13. *A Site plan should be included with the O&M Plan to identify the locations of stormwater BMPs. Snow storage areas should also be identified on the plan at locations where snow melt runoff will be directed to stormwater BMPs for proper treatment. YES*

- a. *Snow storage requirements should be outlined in the O&M Plan. YES*

**Locations on snow storage have been added to the layout and materials plan with notes relative to when these areas are fully inundated. Snow storage requirements have also been outlined in the Operation and Maintenance plan.**



14. *Outfall riprap apron inspection and maintenance procedures should be included in the O&M Plan to require removal of sediment and debris and repair of any erosion channels or vegetation loss.*

**The Operation and Maintenance Plan has been revised to include the above items.**

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

15. *Upon completion of the drainage system construction, the Applicant shall furnish documentation to the Conservation Commission, which states illicit discharge inspections were performed following the construction of the drainage system. Inspections are required prior to the discharge of any stormwater to post-construction BMPs.*

**An illicit discharge statement will be signed prior to discharge of any stormwater to post-construction BMP's.**

16. *Dumpster locations should be included on the plans. The dumpster pad should include curbing to direct runoff to an adjacent catch basin for proper treatment.*

**A compactor area has been added to the plans and shown on the layout and materials plan.**

#### **General Comments**

17. *IC-2 includes a header pipe only for chamber rows with 11 chambers. This configuration would require stormwater to flow through the voids in the crushed stone bed to reach the other chamber rows, which could potentially result in upstream surcharging if the flow rate entering the infiltration system exceeds the flow rate that can be achieved through the stone voids.*

*CEI recommends extending the header pipe to all chamber rows to better distribute stormwater in the infiltration system.*

**IC-2 has been revised to add an additional header pipe on the other side of the system to distribute the stormwater entering the system.**

18. *A detail should be added to the plans for each DMH located at the inlet of the infiltration chamber systems.*

- a. *The details should illustrate invert elevations for all inlet and outlet pipes;*

**Details of all BMPs have been provided on sheet 15 and 16 that include inlet and outlet details and elevations.**

- b. *The structures should convey the first flush volume (equivalent to the WQV) in the isolator rows before flow is directed to the infiltration chambers. This is typically achieved with an overflow weir wall within the DMH. The weir wall also provides a method to contain sediment in the isolator row. Please refer to the figure provided on page 2 of the Stormtech Isolator Row O&M Manual that was included in Appendix A: Operation and Maintenance Plan.*



**The manifold is provided for the Stormtech systems that provides a lower invert to the isolator row to convey the first flush, and a higher outlet to the manifold. Elevations can be seen on the details on Sheet 15 and 16.**

- c. *Inlet DMHs should be located in line with the isolator rows to provide maintenance access for sediment removal.*

**DMH for Stormtech systems have been revised to be in line with the isolator row for ease of inspection and maintenance.**

- 19. *The plans do not include a detail of 12" outlet pipe connections for each infiltration system. CEI recommends including an outlet DMH (downstream end of header pipe) in order to provide access for future maintenance or repairs. This configuration is illustrated in the Stormtech figure referenced above.*

**This detail has been provided on the details on Sheet 15 and 16.**

- 20. *Infiltration system inspection/cleanout ports are needed at the ends of chamber rows to provide proper maintenance access to remove sediment and debris. Locations of risers, inspection ports and cleanouts should be indicated plans.*

*CEI recommends locating the cleanout ports along the header pipe to allow a JetVac to flush water back into the header pipe and direct it to the outlet DMH. A vacuum truck can be used at the outlet DMH to collect water and pollutants while jetting the chambers and prevent downstream discharge to the City's drainage system.*

**Cleanout ports with risers have been proposed on outlets pipes and shown within the detail sheets.**

- 21. *Plans indicate parking spaces are included under Proposed Building #2 and a 1<sup>st</sup> Floor Garage for Proposed Building #3.*
  - a. *Are drainage structures proposed for either parking garage?*

**Structures will be proposed in the parking garage and will be connect to an oil/grit separator and discharge to the sewer system.**

- 22. *CEI recommends installation of erosion control fabric to better stabilize the embankment adjacent to the wetland area.*

***Erosion control fabric has been added within this area of the site and can be seen in the embankment detail on Sheet 15.***

- 23. *The Infiltration Pond #1 Detail (Sheet C.12) is not consistent with the Proposed Infiltration Basin shown on the plans.*

**Infiltration Basin has been revised to a Detention Basin and the detail has been removed.**



24. *A detail of the Infiltration Basin outlet control structure (OCS-1) should be added to the plans.*

*a. A steel mesh grate or basket, covering the 8" orifice, should be proposed to help prevent debris from clogging the outlet.*

**The 8" orifice has been revised to three 4" orifices, and mesh has been added. This can be seen in the outlet control structure detail on Sheet 15.**

25. *A detail of the Infiltration Basin emergency overflow is needed with supporting sizing calculations.*

**A detail of the weir has been provided on Sheet 15, and calculations are included as part of the secondary outlet for DB-1 in the HydroCAD model.**

26. *One foot of freeboard is not provided for the proposed Infiltration Basin.*

**Detention basin 1 has been revised to have a berm of 62.25, with a peak elevation in the 100-year storm of 61.25 to accomplish one foot of freeboard.**

27. *Subcatchment areas that drain to CB-1 and CB-13 include impervious surfaces that are greater than ¼ acre. MassDEP Stormwater handbook design guidelines for deep sump catch basins state contributing drainage areas to any deep sump catch basin should not exceed ¼ acre of impervious surface.*

**CB-13 has been revised to take less than a quarter acre of impervious surfaces. An additional catch basin has been added to the sub-catchment area of catch basin 1 (new double catch basin 16). Double catch basin 16 does take more than a quarter acre of impervious area, however the area is from Lot 1. Lot 1 is remaining as the existing parking lot until it is developed by a separate owner than this project. Once that lot is developed this catch basin will capture less than a quarter acre.**

Please do not hesitate to reach out to Howard Stein Hudson's Chelmsford Office with any further questions or concerns regarding this proposal. We look forward to working with you to develop and Order of Conditions for this property at the meeting of November 18, 2021.0

Sincerely,

Kristen LaBrie, EIT

Katie Enright, P.E.