

Technical Memorandum

Date: February 9, 2021

To: Lynnfield Conservation Commission

From: Renee L. Bourdeau and Daniel Bourdeau, P.E., CPESC, CPSWQ, Geosyntec Consultants, Inc.

Subject: Second Letter for Third-Party Stormwater Peer Review, 1466 & 1480 Main Street, 2 & 6 Sagamore Place, Lynnfield, MA

As requested by the Lynnfield Conservation Commission (LCC), Geosyntec Consultants, Inc. (Geosyntec) reviewed the letter from Hayes Engineering, Inc., (Hayes), the Applicant's engineer, dated January 18, 2021 in response to Geosyntec's first peer review letter for the Stormwater Bylaw Permit package for the proposed subdivision at 1466-1480 Main Street, in Lynnfield, MA (Site). Geosyntec, the Town Engineer and Town Conservation Agent/Planner (Town), the Applicant and Hayes, had a meeting on January 27th to discuss the response to comments. Geosyntec has prepared this second response letter and reviewed the following additional documents, prepared by Hayes, and dated January 18, 2021:

- Response letter;
- Stone spillway sizing calculations;
- Revised runoff calculations;
- Operation and Maintenance Addendum; and
- Illicit Discharge Compliance Statement.

Geosyntec's first review comments are noted below, with the Applicant's response in *italics*. Geosyntec's response to the Applicant is in **bold**.

Standard 1: No Untreated Discharges or Erosion to Wetlands

1. The Applicant has installed riprap outlet protection at the discharge point from the stormwater basin. However, the Applicant has not provided riprap sizing calculations to demonstrate that the stone size selected will be enough to reduce velocities during the 2-year, 24-hour storm events and not cause erosion at the outfall. Geosyntec recommends the Applicant provide riprap sizing and velocity calculations.

Accompanying this report, please find riprap sizing calculations and velocity calculations for the two riprap discharges. I do believe, however, that such calculations are more applicable to much larger outfalls than occur on this project.

Geosyntec reviewed the provided riprap sizing calculations, which meet the requirements under Standard 1. The Applicant has addressed this comment.

Standard 2: Peak Rate Attenuation

2. The Existing Condition and Proposed Condition total areas do not match in the models. The Applicant should revise the Proposed Condition model (365,581 square feet) to include the total area, to match the Existing Conditions model (367,399 square feet) so that the pre-development and post-development peak discharges can be compared.

The existing and proposed conditions do not exactly match as they are areas computed by polyline in AutoCAD and subject to some round-off error such that the sum of the parts does not exactly equal the whole. The discrepancy in adding the multiple watersheds together is about 1/2 of 1%, or less than 2,000 square feet in 365,000. I am confident that that discrepancy does not change the outcome of the prediction of the model.

Based on discussions with Hayes, the Applicant and the Town, revisions to the model to account for this difference will not be made. The Applicant has addressed this comment.

3. The area from PR-2 on the Watershed Map (7,417 square feet) does not match the area in the model (7,565 square feet). The Applicant should make sure the proposed Watershed Map and the model are consistent.

We have reviewed the watershed areas for PR-2 and determined that the watershed map area had not been adjusted for small changes in that watershed on the latest plan. The 7,565 square-foot area in the model is correct. Again, it has no effect on the conclusions of the report.

The Applicant revised the watershed map to be consistent with the model. The Applicant has addressed this comment.

4. The stormwater basin is modeled to have exfiltration at a rate of 1.02 inches per hour consistent with sandy loam of soils with hydrologic soil group (HSG) B. The Applicant has modeled HSG C across the remainder of the Site and has indicated that there are poorly draining soils on-site. The Applicant should update the exfiltration rate from the stormwater basin to be consistent with the Rawls Rate for infiltration for HSG C soils (0.17 – 0.27 inches per hour).

The 1.02 inches per hour consistent with the sandy soil of hydrologic group B was based on the original design and also two independent percolation tests; one by Hayes Engineering and one by Beales Associates, which indicated that soils in the area of the basin were better than the soils on the steep slopes of the site itself, which were modeled as hydrologic soil group C. It was reported to us that the basin was holding water and not infiltrating. We are not certain as to why the infiltration of the soils was not consistent with the two independent tests that were previously conducted. Based on that report, we are eliminating infiltration in the basin. It does not affect meeting the performance standards of the rate attenuation.

The Applicant revised the model as noted above. Based on a conversation with the Applicant, Hayes and the Town, modifications will be made to the basin, when weather permits, to

ensure that the basin will infiltrate as designed. The modifications should include the following:

- **Repair and stabilize the basin side slopes**
- **Remove any sediment from the basin and forebay**
- **Remove the existing stone on the bottom of the basin**
- **Remove a minimum of 6-inches of the native soil below the bottom of the basin**
- **Add a minimum of 6-inches of clean, washed sand to the bottom of the basin**
- **Add stone on top of the clean washed sand**
- **Following the first rain event, photo document that the basin fully drains with 72 hours**

Should this project get approved by the LCC, a condition should be added to the Order of Conditions to ensure that the basin functions as an infiltration basin, as the design intends. The Applicant has addressed this comment.

5. The Applicant has not provided sizing calculations for the two proposed swales. The Applicant should provide calculations that meet the Stormwater Handbook including providing 1-foot of freeboard during the 10-year, 24-hour storm event.

We do not believe that sizing calculations are necessary for the two small swales that are to be graded in the yards simply to control the water flowing towards the basins. These watersheds are small and are just there to ensure that the nuances of the lot grading are maintained.

Based on the Applicant’s response above and a conversation with the Applicant, Hayes and the Town, the Applicant will not provide sizing calculations for the two swales proposed on-site based. The Applicant has addressed this comment.

6. The Applicant should provide an updated pre-development and post-development peak discharge analysis based on the updates above.

This letter constitutes an update of the pre- and post-development peak discharge analysis.

Geosyntec reviewed the revised model based on the comments above. The Applicant has addressed this comment.

Standard 3: Stormwater Recharge

7. The Applicant does not demonstrate that the annual recharge from the post-development Site approximates the annual recharge from the pre-development site using appropriate methodologies and sizing criteria prescribed in the Stormwater Handbook. The Applicant in the letter dated December 21, 2020, states that “soils on site were HSG C, providing little infiltration with steep slopes.” It is noted that the soils “did not infiltrate” and therefore infiltration has been provided to the extent practical.

Geosyntec is aware that infrastructure has already been constructed and therefore recommends to the LCC to determine whether they want to Applicant to provide additional controls for groundwater recharge (i.e., dry wells for roof runoff).

Recharge on this site is discussed above, and we agree that the Commission should provide recommendations as to how they would like this approached. It is the applicant's engineer's position that any further recharge should not be required.

The Applicant should provide calculations to demonstrate that the infiltration basin provides the required groundwater recharge volume on-site. As stated under comment #4, when weather permits, modifications will be made to the basin to ensure that it infiltrates as designed.

Standard 4: Water Quality

8. The provided calculations do not demonstrate that the design provides a minimum of 80% TSS Removal. The TSS removal calculation provide credit for an infiltration basin; however, the Applicant has stated that the soils below the basin are poor and infiltration is limited. If the basin does not function as an infiltration basin, it should not be credited as one. The design and calculation should be updated to achieve a minimum 80% TSS removal efficiency to comply with the Stormwater Standards.

Geosyntec is aware that the infrastructure has already been constructed and therefore recommends to the LCC for the Applicant to update the calculations to include the forebay and a dry extended detention basin instead of an infiltration basin. This would provide a TSS removal efficiency of 72%, which is less than the required 80% removal efficiency. The LCC should determine whether they want the Applicant to provide additional TSS removal or approve the design as proposed.

We believe this basin functions as a wet basin because it has a water quality volume (actually in excess of that required due to the way the outfall pipe was constructed). We do not, however, think that it functions as a dry basin, and both an infiltration and wet basin have 80% TSS removal efficiencies in the stormwater standards. A dry basin would have a low flow channel and low flow discharge, which we do not have. We do have a pond drain which will flow very slowly, but there will be plenty of opportunity for TSS removal in the water quality volume.

As stated under comment #4, modifications will be made to the basin by the Applicant, when weather permits, to ensure that the basin will infiltrate as designed. Should this project get approved by the LCC, a condition should be added to the Order of Conditions to ensure that the basin functions as an infiltration basin, as the design intends.

Standard 5: Land Uses with Higher Potential Pollutant Loads

Not applicable.

Standard 6: Critical Areas

Not applicable.

Standard 7: Redevelopment

Not applicable.

Standard 8: Construction Period Controls

9. The project disturbs more than 1 acre (43,560 square feet) of earth and therefore meets the requirements for a Construction General Permit (CGP). It is unclear if the Applicant filed for a Notice of Intent under the CGP. A Stormwater Pollution Prevention Plan (SWPPP) has not been provided to demonstrate construction period erosion, sedimentation and pollution prevention plan requirements outlined in Standard 8. Geosyntec recommends that the Applicant prepare and provide the SWPPP in accordance with the EPA NPDES permit for review.

Geosyntec completed a visit to Site to review the erosion control practices installed at the Site to reduce the migration of sediment. Geosyntec provided a report to the Town with several items that needed to be addressed to stabilize the Site.

To the best of our knowledge, no Construction General Permit Notice of Intent has been filed. Hayes Engineering was prepared to file that document and has prepared a Stormwater Pollution Prevention Plan. The certification was provided to the contractor, but he never signed it and, as a consequence, we could not file it.

The Applicant has indicated that they would file a Notice of Intent to US Environmental Protection Agency for coverage under the Construction General Permit. A permit authorization should be provided to the LCC and Town. Further, a copy of the SWPPP should be provided to the LCC and Town for review.

Standard 9: Operation and Maintenance Plan

10. The Operation and Maintenance Plan (OMP) does not include procedures for maintaining the swales and riprap outlet protection.

We are including procedures for maintaining swales and riprap outlet protection, although we would think that if any maintenance of those devices were required, it would be obvious when the stormwater management inspection was completed.

The Applicant provided an addendum to the OMP with the maintenance requirements for swales and riprap. The addendum should be included with the final OMP. The Applicant has addressed this comment.

11. The OMP maintenance form does not include the sediment forebay, swales or riprap outlet protection.

OMP maintenance recommendations have been provided for the forebay.

The Applicant did not provide an updated maintenance form with the sediment forebay, swales or riprap outlet protection. The Applicant should provide this to the LCC and Town for review.

12. The OMP should include an estimated annual cost to conduct maintenance on the Site in accordance with the requirements of the Stormwater Handbook.

We have attempted to determine what we believe the annual maintenance costs might be, although they could vary widely, depending on the amount of maintenance it required based on the time in service. We would budget \$1,500.00 annually.

The Applicant should update the OMP with the annual maintenance budget. The revised OMP should be provided to the LCC and Town for review.

13. The Applicant should update the OMP to include the items identified above.

This response provides an update as to the identified items.

See responses above.

Standard 10: Illicit Discharge to Drainage System

14. The Applicant did not provide an Illicit Discharge Compliance Statement in the documentation provided. The Applicant should provide an Illicit Discharge Compliance Statement.

Accompanying this letter, please find an illicit discharge statement by the applicant.

The Applicant has provided an illicit discharge statement. The Applicant has addressed this comment.

Other Items

15. **The construction drawings show the roof leaders from the proposed homes being connected to the stormwater closed drainage system. The Town and Geosyntec recommend that the roof leaders not be connected to the closed drainage system and instead the roof leaders should be directed to flow onto vegetated areas on each parcel.**
