

REF.: MAX-2018131.00

December 9, 2019

Ms. Elizabeth Hughes
Town Planner
Concord Zoning Board of Appeals
141 Keyes Road
Concord, Massachusetts

SUBJECT: Stormwater Peer Review (3rd)
Center and Main Planned Residential Development
1440 & 1450 Main Street, Concord, MA

Dear Ms. Hughes and Members of the Board:

GPI has performed a third review of the stormwater design associated with the Planned Residential Development (PRD) at 1440 & 1450 Main Street (the Project) to determine if the Applicant has addressed comments from the previous two reviews. The following documents, submitted by the Applicant in November of 2019, served as the basis for this third peer review:

- *Stormwater Revision letter* dated November 17, 2019
- *Definitive Site Plan* as revised through November 12, 2019
- *Stormwater Report* as revised through November 18, 2019
- *Existing Watershed Map* as revised through October 18, 2019
- *Proposed Watershed Map* as revised through November 18, 2019
- *Rational Method Divide Plan* dated November 18, 2019
- *Construction Period Pollution Prevention Plan (CPPPP)* and *Construction Plan* dated November 12, 2019
- *Long Term Operation and Maintenance Plan* dated November 12, 2019

Based on GPI's review of these documents, the Applicant has addressed the previous outstanding peer review comments, which are summarized on the pages that follow. As a result of review of the revised design, GPI offers the following additional comments:

1. If the Board moves toward approval, GPI recommends that the Board consider including a special condition that prior to the start of construction, the applicant shall provide written authorization to allow representatives of the Town to enter the site to inspect erosion and sedimentation control measures prior to and during the period of land disturbance.
2. The stormwater management design relies heavily on infiltration and the careful construction and long-term maintenance of these systems to meet the stormwater standards. Additionally, due to their locations, replacement of these systems would likely be difficult in the event of failure. GPI recommends that the Board consider including a special condition which requires that the Applicant submit in writing that any unsuitable material encountered during construction of the subsurface infiltration systems will be removed and replaced with either on-site parent material or imported granular material. Should refusal/ledge be encountered during construction it shall be removed to a depth of four feet below infiltration system and backfilled with clean blasted rock fragments. The Town may consider requiring that a representative of the Town or a third party witness the construction of the subsurface systems to ensure compliance and proper construction. The Town may also wish to require the owner/operator provide an agreement related to proper long term maintenance of these systems. See Comment #6.
3. The Stormwater Checklist indicates that the Applicant has submitted documentation supporting use of the proprietary pretreatment BMPs and the associated TSS removal rate. GPI could not locate this information within the submission documents to verify the TSS removal rates used for the pretreatment units.
4. Stormwater Management Area 4P: As required by the Concord Drainage Standards, all subsurface infiltration systems must be designed to be offline systems, unless they are receiving rooftop runoff only. As designed, SWMA 4P appears to be designed as an online system, receiving overflow from upstream systems as well as roadway drainage. The Applicant should clarify or consider separating the overflow

from SWMA 1, 2, and 3 from the untreated inflow directed to SWMA 4P. Additionally, as designed the overflow from SWMA 4P is upstream of its pretreatment systems.

5. The Construction Period Pollution and Prevention Plan indicates that construction period Stormwater Management features are the same as those intended as Post-Construction BMPs. GPI assumes this is not what is intended by the developer. The CPPP should address stormwater management for the construction period, which should **not** utilize BMPs intended for post-construction. The temporary sediment basins and other proposed measures shown on the Construction plan should be included for discussion as well as a clarification that the **post-construction BMPS shall not be used for stormwater management of disturbed areas during construction**. This would increase the potential for clogging and system failure. There is a significant amount of earthwork proposed on the site and measures for stormwater management during periods of disturbance are significant to the protection of the wetlands and downstream receiving waters.
6. The Long-Term Operation and Maintenance Plan should be updated to include the party responsible for long term operation and maintenance of the BMPs, as well as the entity responsible for financing maintenance and emergency repairs, and an annual maintenance cost for the plan, once this detailed information is available. The Town may consider a condition that requires the owner to submit completed inspection and maintenance forms or the legal agreement(s) in place for performance of these tasks.
7. The Applicant should update page 10 of the final plans so that the 100-year storm elevations match those in the Hydrocad model and Stormwater Management narrative. Currently, the plan appears to be outdated. The numbers in the Hydrocad model and narrative match.

GPI is appreciative of the opportunity to assist the Town of Concord with the review of this Project. Should you have any questions, or require additional information, please contact me directly at 978-570-2997.

Sincerely,

GREENMAN-PEDERSEN, INC.



Lindsey DiTonno, P.E.
Project Manager

PREVIOUSLY OUTSTANDING COMMENTS

Initial Technical Peer Review (completed)

GPI prepared an initial technical peer review letter in September of 2018. The following documents, submitted by the Applicant in July of 2018, served as the basis for that Stormwater Design review:

- *Board of Appeals Application and Narrative (Special Permit, Variance, Planned Residential Development) for Center & Main A Planned Residential Development at 1440 & 1450 Main Street* as prepared by Stamski and McNary, Inc., dated July 12, 2018 (10 pages)
- *Center & Main A Planned Residential Development Site Plans* as prepared by Stamski & McNary, Inc., dated July 11, 2018 (13 sheets)
- *Landscape Plan* as prepared by Kim Ahern Landscape Architects for Stamski and McNary, Inc., dated June 28, 2018 (1 sheet)
- *Site Evaluation*, as prepared by Stamski and McNary, Inc., undated (3 pages)
- *Pre Development Drainage Map and Post Development Drainage Map* as prepared by Stamski and McNary, Inc., dated July 2, 2018 (2 sheets)
- *Stormwater Management Report For 1440, 1450, 146b Main Street, Concord, MA*, as prepared by Stamski and McNary, Inc., dated July 2, 2018 (263 pages)

Second Peer Review (completed)

GPI prepared a second technical peer review in August of 2019. The following documents, submitted by the Applicant in July of 2019 served as the basis for the second Stormwater Design peer review:

- *Revision Letter*, as prepared by Williams Sparages, dated July 16, 2019 (5 pages)
- *Definitive Site Plan for Center & Main A Planned Residential Development at 1440 & 1450 Main Street* as prepared by Williams Sparages, dated December 6, 2018 and revised through June 14, 2019 (12 sheets)
- *Existing Watershed Map and Proposed Watershed Map* as prepared by Williams Sparages revised June 14, 2019 and July 11, 2019 (2 sheets)
- *Stormwater Report* as prepared by Williams Sparages dated July 11, 2019 (466 pages)
- *Post-Development HydroCAD Nomenclature Map* (1 sheet)
- *Floor Plans and Elevations* as prepared by Elise Braceras Stone Architects dated March 10, 2019 (30 sheets)
- *Landscape Plan* as prepared by Kim Ahern Landscape Architects dated June 12, 2019 (1 sheet)

SECTION 1: INITIAL REVIEW – STORMWATER DESIGN COMMENTS

Comment #2: In accordance with Section 2.2.3 (A.6) of the Standards, the Applicant shall provide the depth to groundwater at each test hole location on the Existing Conditions Plan.

This comment has been addressed.

Comment #3: Details for the subsurface infiltration structures should include the assumed/interpolated depth to estimated seasonal high groundwater (SHGW) elevation. Since test pits did not occur within the location of many of the infiltration structures, the applicant should indicate what the seasonal high groundwater elevation has been assumed to be at each location where infiltration is proposed, and how the elevation was determined. The Applicant should include the SHGW elevation on the details for each structure.

First Review: Additional test pits have been performed at the locations of proposed subsurface infiltration areas. GPI recommends that the Applicant include on the plans the estimated SHGW elevation at the location of each subsurface infiltration system for clarity.

This comment has been addressed.

Comment #6: Section 2.2.3(D.) of the Standards requires that a Rational Method Divide Plan be provided, showing subcatchment areas for each conveyance BMP. The Applicant has provided Rational Method calculations, however a plan showing catchment areas for each conveyance structure is not provided.

First Review: Since the original submission made available to GPI for review in August of 2018, the overall site layout and closed drainage system has been revised substantially. Rational Method calculations (Section 2.2.1F of the Standards) and a corresponding Rational Method Divide Plan (Section 2.2.3D) for the new design have not been provided for review.

This comment has been addressed.

SECTION 2: INITIAL REVIEW – NPDES COMPLIANCE REVIEW COMMENTS

Comment #1: The Applicant has submitted a Long-Term Operation and Maintenance (LTO&M) Manual, including an Operation and Maintenance Plan and a Sample Inspection Log. In accordance with the Standards, the Long-Term Operation and Maintenance Plan shall include a plan outlining the location of and access points to all BMPs proposed. The plan shall be prepared for this purpose and clearly depict these locations. A plan shall be included with the LTO&M manual to be used as a stand-alone document once construction is completed.

This comment has been addressed.

Comment #3: The Applicant has submitted a Stormwater Pollution and Prevention Plan (2 sheets). The plan includes pollution prevention measures to be provided during the construction period. On the same sheet, the plan also lists the Long-Term Pollution Prevention and Drainage and System Operation and Maintenance Plan. GPI recommends that the Applicant provide separate plans for the Construction Period Pollution Prevention and the Long-Term Pollution Prevention. The Construction Period Pollution Prevention Plan shall include Construction Sequencing in addition to the sedimentation and erosion controls proposed. The Long-Term Pollution Prevention Plan shall indicate locations of BMPs to be inspected and maintained and be included as part of the O&M Plan.

This comment has been addressed.

Comment #10: The Applicant shall submit written authorization from the property owner for representatives of the Town to enter the site to inspect erosion and sedimentation control measures during the period of land disturbance.

GPI recommends that the Board consider including a special condition of permit approval that prior to the start of construction, the applicant shall provide written authorization to allow representatives of the Town to enter the site to inspect erosion and sedimentation control measures during the period of land disturbance.

August Submission Review – Stormwater Design Review Comments

1. In accordance with Section 2.2.1 (F), storm drain capacity calculations shall be performed for all conveyance BMPs. Capacity calculations shall be provided utilizing the Rational method for a 100-year frequency storm event. Rational method calculations have not been provided. In accordance with Section 2.2.3(D), a Rational Method Divide Plan is also required.

This comment has been addressed.

2. The Topographic Plan (Sheet 4), Utility Plan (Sheet 5), and Plan and Profiles (Sheets 6 and 7) provide labels for only some of the drainage structures proposed. Most structures are not labeled and no detailed information is provided. At least two of these structures contain duplicate labels (DMH D). Additionally, not all of these structures are shown on the Profile Plans (Sheets 6 and 7) and structures are mislabeled or not labeled at all in several cases. This makes it difficult to review the design and confirm appropriate structure elevations and inverts for the closed drainage system, stormwater management system, and bypass and overflow devices.

This comment has been addressed.

3. The Profile on Sheet 7 does not show elevations along the vertical axis.

This comment has been addressed.

4. GPI recommends that the Applicant provide a detail for each Stormwater Management Area proposed and inverts and elevations for the related drainage, pretreatment, and bypass structures associated with them, along with the test pit information summarized for the location of each SWMA, so that design elevations are clear. Some of the systems are shown on the plan and/or the profile and HydroCAD model, but there are several inconsistencies, including the following:
 - a. Plan and Profile Sheet 6 shows the overflow elevation from SWMA 1P at 150.25. Table 9.0 in the Stormwater Report indicates that the overflow elevation is at 150.00. The inlet from the manifold is at elevation 150.25. Please correct the discrepancy and clarify the intent.
 - b. A structure labeled DMH 3 is shown on the Profile on Sheet 6 but is not shown on the plan.
 - c. The Profile on Sheet 6 indicates the invert out of CB3 and CB4 is 139.70. The downstream DMH (unlabeled on the plan and profile) is labeled with an invert in of 140.00 and invert out of 139.90, which would indicate reverse flow.
 - d. Plan and Profile Sheet 6 labels the SWMA at Station 4+35 as SWMA 6P. Based on the locations of the SWM areas shown on the plans, it appears that this should be SWMA 7P. The overflow elevation on the profile is shown as 131.25, which is consistent with the overflow elevation for SWMA 6P in Table 9.0 of the Stormwater Report. However, the overflow for SWMA 7P in the Table is given as 134.25. Please clarify the labeling errors on the Profile Sheet. If the profile is intended to show SWMA-7P, please also show SWMA-6P, which is not shown on the Profile sheet, nor is any detail provided on the proposed system shown on the plan as SWMA-6P.
 - e. The following stormwater management structures are not shown on the profiles, nor is there a plan or detail providing information on the system and design elevations and inverts:
 - i. SWMA-4P, SWMA-5P, SWMA-6P, SWMA-8P, SWMA-9P, and several of the proposed Drain Manholes, Catch Basins, and Oil Gas Separators.
 - ii. Sheet 7 Plan and Profile shows an unlabeled DMH at STA 10+74 connected to SWMA 2P. This DMH is not shown on the plan and it is unclear what this structure is.
 - iii. The Profile on Sheet 7 does not appear to show SWMA-3P in the correct location. It is shown between Stations 9+50 and 10+00, but based on the plan is located between Station 9+75 and 10+50.
 - iv. The Profile on Sheet 7 labels CP9 & CB10 at Sta 9+50. Based on the plan, these structures should be CB11 & CB12. If this is the case, CB9 & CB10 are not shown on the profile and no detailed information is provided. There is no detail on the structures connecting CB11 and CB12 to SWMA -4P or a detail on SWMA-4P itself.
 - v. The structure labeled as DMH D at Station 9+50 is not shown on the profile.

GPI recommends that the Applicant revise the plans and profiles to be consistent, and provide adequate details and/or labels for the design elevations of all drainage structures and stormwater management systems proposed.

This comment has been addressed through design revisions.

5. A Bioretention Detail is shown on the Detail Sheet; however, it is not clear where the Bioretention system is proposed. Please clarify.

This comment has been addressed.

6. Page 4 of the Stormwater Report indicates that recharge is provided by subsurface infiltration systems which lie within areas of loamy sand and sands, and that an exfiltration rate of 8.27 inches per hour was used. The Report also states that the site is analyzed using HSG A, B, and D soils. The HydroCAD model uses a rate of 8.27 inches per hour for all subsurface infiltration systems, regardless of location. Based on Rawls Rates, only those systems proposed in sand should be assumed to have an infiltration rate of 8.27 inches per hour. Loamy sands would be estimated at 2.41 inches per hour. Based on review, it appears that the systems may all be installed within the sand layer identified at each proposed location; however the Applicant should summarize

this information more clearly for each system and confirm that the 8.27 inches per hour is appropriate for the locations of proposed infiltration areas.

This comment has been addressed.

7. Utility Plan Sheet 5 indicates that Lawn Area Drain AD-3 drains to Roof Drywell 4500 1R6C6, while the plan shows that it drains to Roof Drywell 3500 2R3C. The HydroCAD model does not break out A.D. 3 in a Subcatchment. Please clarify.

This comment has been addressed through design revisions.

8. Pond 9P: 4500 1R9C: The HydroCAD model for the pond shows that it is designed as 6 chambers of the MC-3500, although it is labeled as 9 chambers. The plans show that it is designed as 12 chambers of the MC-4500. Table 9.0 of the Stormwater Report indicates that it is 12 chambers of the MC-4500 chambers. Please clarify the discrepancies and update either the model or the Report and Plan to provide consistency.

This comment has been addressed through design revisions.

9. Pond 4P: 4500 2R10C: The HydroCAD model for the pond shows that it is designed as 2 Rows of 20 Chambers, while the label indicates that it is 2 Rows of 10 Chambers. The Utility Plan Sheet 5 shows the system as 2 Rows of 18 Chambers. These inconsistencies should be corrected so that the plans, labels, and HydroCAD model are consistent.

This comment has been addressed through design revisions.

10. The Recharge Volume and Water Quality Volume calculations in the Stormwater Report for Pond-9P indicate that they are calculated for MC-4500 chambers. The HydroCAD model for Pond 9P utilizes MC-3500 chambers. Please clarify and correct the inconsistency.

This comment has been addressed through design revisions.

11. Utility Plan Sheet 5 indicates with a label that Units 19, 20, & 21 are to be connected to 3500 2R3C. The plan and HydroCAD model indicate that Units 18, 19, and 20 are connected to the SWM Area. Please correct and clarify.

This comment has been addressed through design revisions.

12. The HydroCAD model indicates that CB11, CB7, CB13, and DMH K discharge to SWMA-5P. It is not clear on the plans that CB11 discharges to SWM-5P, and DMH K is not labeled anywhere on the plans. Please clarify or correct the structure labeling or locations.

This comment has been addressed through design revisions.

13. The HydroCAD model does not include the overflows and their respective discharges to the resource areas from the SWM Areas. The model assumes that there is not outlet provided beyond the exfiltration modeled at each SWMA. The model should include the overflow outlets from the SWM Areas so that the model is consistent with the design.

This comment has been addressed through design revisions.