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July 24, 2024

Ms. Jacki Byerley, Planner
Andover Planning Board
Town Office
36 Bartlett Street
Andover, MA 01810

Ref: Second Peer Review of the Stormwater Design
Eden Estates – Definitive Subdivision
9 Bancroft Road, Andover, MA

Dear Ms. Byerley and Board Members:

The Horsley Witten Group, Inc. (HW) is pleased to provide the Andover Planning Board with this letter report summarizing our second peer review of the Stormwater Management for the proposed residential development for Eden Estates at 9 Bancroft Road in Andover, Massachusetts. We understand that Eden Lane LLC (Applicant) has applied for Approval of Definitive Plan for a three-lot subdivision on a 3.88-acre parcel. The Applicant is proposing to construct a 380-foot-long cul-de-sac, with sewer, water, and stormwater management to access three proposed house lots. To capture, treat, and manage the stormwater runoff from the proposed roadway, the Applicant is proposing to install a closed drainage system, a drainage swale, and a detention facility with a forebay. A subsurface drywell will be installed at each house to manage the proposed roof runoff. No wetlands are indicated on the Existing Conditions Plan.

The following additional documents and plans were received by HW in response to our initial peer review dated June 17, 2024:

- Letter to Planning Board regarding Response to Initial Peer Review, prepared by DK Engineering, LLC, dated July 14, 2024 (6 pages)
- Construction Sequence (1 page);
- Application for Special Permit for Earth Movement, dated May 26, 2024 (21 pages);
- Eden Estates, Project Stormwater Report, prepared by DK Engineering, LLC, revised July 14, 2024 (41 pages);
- Eden Estates Project Report on Drainage & Sedimentation Control & Project Stormwater Report; prepared by DK Engineering, LLC, revised July 14, 2024 (75 pages); and
- Definitive Subdivision Plan, Eden Estates, Andover, Massachusetts, prepared by DK Engineering, LLC, dated April 2, 2024, which includes:
    - Title Sheet 1 of 8
    - Definitive Subdivision Plan 2 of 8
    - Existing Conditions Plan 3 of 8
    - Grading & Erosion Control Plan 4 of 8
    - Plan & Profile Sheet 5 of 8

- o Detail Sheet – Drainage & Erosion Control 6 of 8
- o Detail Sheet – Miscellaneous 7 of 8
- o Landscape Plan 8 of 8

Stormwater Review

HW has reviewed the documents listed above and has the following comments concerning the stormwater management design in accordance with the Massachusetts Stormwater Handbook (MSH) dated February 2008, and the Town of Andover Stormwater Management and Erosion Control Regulations amended May 11, 2021 (Stormwater Regulations).

In accordance with Section VI. B. of the Andover Stormwater Regulations the Stormwater Management Permit and Narrative provided by the Applicant shall contain sufficient information to verify compliance with the local Stormwater Bylaw and the MassDEP Stormwater Management Handbook (MSH). Below are comments relating to the standards as presented in the MSH. Where the more stringent requirements of the Andover Stormwater Regulations are applicable, those comments are included.

The following comments correlate with our initial review letter dated June 17, 2024. Follow up comments are provided in **bold font**.

1. *Standard 1 states that no new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

   a. The Applicant has compared the pre-development and post-development peak flows and volumes along the western property boundary. Under pre-development conditions stormwater, from subcatchment SC-1, leaves the site at the northwestern corner of the property boundary at Bancroft Road and from subcatchment SC-2, at a low point on the western property boundary approximately 400 feet south of Bancroft Road.

      July 24, 2024: The Applicant has modified the subcatchment areas and the design points. The pre- and post-development conditions have been evaluated at two locations along Bancroft Road and a third location at a low point on the western property boundary. HW has no issue with the three design points evaluated.

   b. Under post-development conditions the discharge from the stormwater facility proposed for the project is on the northwestern corner of the parcel discharging towards Bancroft Road. The Applicant has proposed a swale along the western property boundary that directs the stormwater towards Bancroft Road. It is not clear why the Applicant has not evaluated the discharge point that pre-development SC-2 discharges to under proposed conditions. If the Applicant chooses to only discharge at Bancroft Road under proposed conditions the comparison should be between SC-1 and the Post-Dev Total rates. HW recommends that the Applicant separate pre-development SC-1 and SC-2 and evaluate the post-development discharge points at the same two locations on the western property boundary or justify the reasoning for the comparison presented.

      July 24, 2024: As noted above the Applicant has revised the design points and subcatchment areas evaluated.

      i. Design Point 1 is to the east of the existing 2-sty Building at Bancroft Road,

      ii. Design Point 2 is at the northwest corner of the parcel at Bancroft Road,

and

iii. **Design Point 3 is along the western property boundary, approximately 400 feet south of Bancroft Road.**

c. There does not appear to be any wetlands within 100 feet of the property boundaries. Therefore, the Applicant will not be causing erosion in a wetland.

July 24, 2024: HW has no further comment.

2. *Standard 2 requires that stormwater management system shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.*

a. The Applicant has provided a HydroCAD model for the existing and proposed stormwater conditions to determine the peak rates and runoff volumes for the 2-year, 10-year, 25-year, and 100-year storm events. As noted above the Applicant has compared Pre-Dev Total Link 3 to Post-Dev Total Link 8. HW recommends that the Applicant compare the pre- and post-development flow rates and volumes at two separate locations along the western property boundary.

July 24, 2024: The Applicant has adjusted the catchment areas as noted above and compared the pre- and post-development design points as suggested. HW has the following comments regarding the proposed grading as provided on Sheet 4 of 8.

i. **HW recommends that the Applicant provide the proposed 298-contour at the intersection with Bancroft Road and Eden Lane.**

ii. **HW notes that the 286-contour provided west of the infiltration basin adjacent to the property line does not appear correct. It appears that the 286-contour is primarily located west of the property boundary.**

b. The catchment area that includes the runoff from the existing house is delineated differently under pre-development conditions and post-development conditions. HW recommends that the Applicant clarify why the catchment area that includes the existing house is delineated differently when the surrounding topography has not changed.

July 24, 2024: The Applicant has adjusted the catchment area delineation at the existing house to be consistent under pre- and post-development conditions. HW has no further comment.

c. In accordance with Section IX.E.2 of the Stormwater Regulations, *the applicant shall account for all run-on and run-off (including off-site impacts) in both pre- and post-development conditions.* It is not clear if there is stormwater flowing onto the site from the southeast (Bancroft School). HW recommends that the Applicant include any off-site areas that may be flowing onto the property from the east.

July 24, 2024: The Applicant has noted that a storm drain was installed along the property line between Lots 59-29A and 59-30. HW was not able to locate this drain and recommends that the Applicant clarify if it is proposed or existing.

d. Curve numbers (CN) per Table 1 for pre-development and post-development conditions should be used in accordance with Section IX.E.4 of the Stormwater Regulations. HW notes that the Applicant's CN values for woods and grass are not consistent with Table

1. HW recommends that the Applicant revise the HydroCAD model accordingly.

July 24, 2024: The Applicant has adjusted the curve numbers as suggested. HW recommends that the Applicant clarify whether the area between the proposed 288-contour and the existing 290-contour on the west side of Lot #2 will be altered and has been modeled accurately. This area is outside of the Construction Limits.

e. In accordance with Section IX.E.6 of the Stormwater Regulations, *the calculation of runoff volumes and peak rates shall be based on precipitation data provided in National Oceanic and Atmospheric Administration (NOAA) – National Weather Service "NOAA Atlas 14" unless otherwise authorized by the Planning Board*. The Applicant has utilized precipitation depths based on the Northeast Regional Climate Center (NRCC). The values are similar to Atlas NOAA 14 but are not identical. HW recommends that the Applicant revise the HydroCAD precipitation depths in accordance with the Stormwater Regulations.

July 24, 2024: The Applicant has adjusted the precipitation depths as suggested. HW has no further comment.

f. HW recommends that the Applicant clarify the time of concentration flow path for subcatchment area SC-5 that includes the roadway.

July 24, 2024: The Applicant has clarified how the time of concentration (Tc) value was calculated. HW has no further comment.

g. The Applicant has modeled Pond 6: Basin with an exfiltration rate of 0.17 inches per hour (iph). HW has no objection to this rate. The Applicant has also modeled the outlet control structure with a 12-inch orifice at elevation 286.50 and a 15-inch orifice at elevation 287.00. HW recommends that the Applicant include a detail illustrating where the two orifices will be located on the outlet control structure. The discharge pipe from the outlet control structure is set at elevation 280.74, almost 6 feet below the 12-inch orifice. HW recommends that the Applicant adjust the detail to more proportionally illustrate the orifices, the discharge pipe, and the grate.

July 24, 2024: The Applicant has provided the Outlet Control Detail as suggested on Sheet 6 of 8. The Applicant has also adjusted the exfiltration rate for the infiltration basin to 1.02 iph from the previous design of 0.17 iph. The Applicant has noted that the test pits documented sandy loam which correlates to an exfiltration rate of 1.02 iph. HW has no further comment.

h. The Applicant has included an overflow spillway. HW recommends that the Applicant add the width, elevation, and material proposed for the spillway.

July 24, 2024: The Applicant has revised the detail as suggested. HW has no further comment.

i. The Applicant is proposing to discharge the post-development stormwater runoff to the existing municipal drainage system in Bancroft Street. HW recommends that the Applicant call out the existing pipe size and material and confirm with the Town of Andover Department of Public Works that the municipal system can manage the proposed flow from the project site.

July 24, 2024: The Applicant is proposing to discharge stormwater from the basin

via a 12-inch pipe set at a slope of 9.5%. HW recommends that the Applicant reduce the slope if feasible to avoid a 10-foot trench excavation. HW further recommends that prior to approval confirmation from the Department of Public Works is obtained, confirming that the municipal pipe can manage the flow.

j. The Applicant is proposing a riprap swale. It is not clear how wide or how deep this swale is. HW recommends that the Applicant provide additional information on the detail and draw the swale to scale with spot grades on the grading plan.

July 24, 2024: The Applicant has removed the riprap swale and replaced it with a 100-foot-long grass swale located near the western property boundary. The grass swale has spot grades of 290.4. It is not clear where the proposed 290-contour appears in this area. HW recommends that the Applicant confirm the spot grades provided are accurate.

k. The Applicant has included a detail on Sheet 6 for Infiltration Basin #2 Outlet Detail. HW recommends that the Applicant clarify where this outlet is located.

July 24, 2024: The Applicant has clarified where the outlet control structure is located. HW has no further comment.

l. HW recommends that the Applicant consider adding individual stormwater systems to manage the roof runoff from each of the proposed houses. The systems could be subsurface chambers or surface rain gardens to reduce the proposed flow to the detention system.

July 24, 2024: The Applicant has provided individual drywells to manage the roof runoff. The drywells consist of crushed stone and are 22 feet long, 15 feet wide, and 3.5 feet deep. A 12-inch perforated pipe is proposed down the center of the crushed stone. HW recommends that the Applicant include two 12-inch pipes set 5 feet on center, instead of one set 7.5 feet on center to more evenly distribute the roof runoff.

m. The Applicant has included Summaries for Subcatchment 9 and Pond 11P in the HydroCAD model. It is not clear where this subcatchment or pond are located, and it does not appear that either were included in the routing diagram. HW recommends that the Applicant clarify the purpose of Subcatchment 9 and Pond 11P or delete them from the model.

July 24, 2024: The Applicant has clarified the purpose of these extra nodes and eliminated them from the revised HydroCAD model. HW has no further comment.

n. July 24, 2024: The Applicant has routed subcatchment area SC-5 through a grass channel located on the east side of the proposed road. It appears that subcatchment SC-6 should also be routed through a channel shown along the western property boundary

3. *Standard 3 requires that the annual recharge from post-development shall approximate annual recharge from pre-development conditions.*

a. The Applicant has provided recharge calculations in Section V of the Project Stormwater Report. It appears that the Applicant has provide the required volume of recharge in the proposed stormwater basin.

July 24, 2024: In our initial review letter, HW had noted that the estimated seasonal high ground water (ESHGW) elevation for the infiltration basin was 282.43 based on Test Pit #1. However, it appears that Test Pit #2 which is less than 25 feet from the revised basin has documented the ESHGW elevation at 286.5. The size of the basin has increased significantly, and the bottom of the basin is at elevation 285.5. HW recommends that the Applicant raise the bottom of the basin to be at elevation 286.5 and eliminate the exfiltration rate in the HydroCAD model. The Applicant will need to update the recharge calculations incorporating the other stormwater practices proposed. HW suggests that the Applicant consider revising the grass channel on the east side of the roadway to a bioretention swale or an infiltration swale if feasible, including a pea stone diaphragm along the edge of the roadway to provide pretreatment.

b. The Applicant has provided a drawdown calculation. However, the K value used of 1.02 iph is not consistent with the exfiltration rate used in the HydroCAD model of 0.17 iph. Furthermore, the recharge volume included in the calculation should be the total volume available (1,590 cf) and not the recharge volume required (645 cf). HW recommends that the Applicant revise the calculation.

July 24, 2024: The Applicant has clarified the use of 1.02 iph as the K value and revised the recharge volume calculation. However, as noted above, HW recommends that the Applicant provide recharge calculations using an infiltration practice on the east side of the proposed road and the drywells for each of the proposed houses. Additional soil testing may be necessary if the Applicant uses these practices to meet its recharge requirement.

c. It appears that the proposed stormwater basin with a bottom elevation of 286, has less than 4 feet of separation from the estimated seasonal high ground water of 282.43. HW recommends that the Applicant provide a mounding analysis as required per Volume 2, Chapter 1, page 28 of the MSH.

July 24, 2024: The Applicant has provided a mounding analysis as requested. HW recommends that the Applicant provide documentation clarifying how each of the input values was determined.

4. *Standard 4 requires that the stormwater system be designed to remove 80% Total Suspended Solids (TSS) and to treat 1.0-inch of volume from the impervious area for water quality.*

a. The Applicant has included the TSS worksheet as required per the MSH. However, the Applicant has included the sediment forebay before the water quality swale when it should be included after the swale. Furthermore, the proposed swale appears to be more of a drainage channel than a water quality swale. HW recommends that the Applicant provide additional details and design criteria for the swale or eliminate it from the TSS worksheet.

July 24, 2024: The Applicant has adjusted the TSS worksheet and provided a detail for the drainage swale. HW notes that the detail appears to be for a stormwater conveyance and not for a water quality swale. Additional information is needed, potential check dams and plantings to contain the stormwater with the intention to slow down the runoff and provide treatment.

b. The Applicant has included an extended dry detention basin in the TSS worksheet. It is HW's opinion that the proposed basin is designed as an infiltration basin. HW recommends that the Applicant clarify the intention of the proposed basin and revised the TSS worksheet accordingly.

July 24, 2024: The Applicant has adjusted the TSS worksheet as suggested. HW now questions the ability of the proposed basin to provide infiltration if the groundwater is higher than the bottom of the basin. HW recommends that the Applicant reconsider the design.

c. In accordance with IX.D.1. (2) of the Stormwater Regulations. A new development is required to retain 1.0 inch multiplied by the total post-construction impervious surface. HW recommends that the Applicant provide this calculation.

July 24, 2024: The Applicant has included the calculation as requesting using a total impervious area of 0.3 acres. HW was not able to confirm this value and recommends that the Applicant clarify how it was determined.

d. In accordance with IX.D.1. of the Stormwater Regulations the pollutant removal from a new site is required to be 90% of TSS and 60% of Total Phosphorus. HW recommends that the Applicant provide both calculations.

July 24, 2024: The Applicant has noted that it met this requirement by retaining 1.0 inch of stormwater by the total post-construction impervious surface area. As noted above HW was not able to confirm the value of 0.3 acres and recommends that the Applicant clarify how it was determined.

5. *Standard 5 is related to projects with a Land Use of Higher Potential Pollutant Loads (LUHPPL).*

a. HW notes that a residential development is not considered a land use of higher potential pollutant load. Therefore, Standard 5 is not applicable.

July 24, 2024: HW has no further comment.

6. *Standard 6 is related to projects with stormwater discharging into a critical area, a Zone II or an Interim Wellhead Protection Area of a public water supply.*

a. The site does not discharge to a critical area, a Zone II or an Interim Wellhead Protection Area of a public water supply. Therefore, Standard 6 is not applicable.

July 24, 2024: HW has no further comment.

7. *Standard 7 is related to projects considered Redevelopment.*

a. The proposed development is considered new development. Therefore Standard 7 is not applicable.

July 24, 2024: HW has no further comment.

8. *Standard 8 requires a plan to control construction related impacts including erosion, sedimentation or other pollutant sources.*

a. The Applicant has provided an Erosion Control Plan as part of the Grading Plan, Sheet 4 with details on Sheet 6, as well as a narrative in Section X of the Project Stormwater

Report. The details include a Filtrexx Sediment Control barrier, catch basin protection, and a Construction Entrance. HW recommends that the Applicant increase the size of the erosion control barrier to a minimum of 12-inches.

July 24, 2024: The Applicant has increased the size of the erosion control barrier as suggested. HW has no further comment.

b. The Applicant has not noted if any trees will be removed or if tree protection is proposed. HW recommends that the Applicant provide this information.

July 24, 2024: The Applicant has included a Tree Removal Exhibit in the Stormwater Report. It is not clear how many trees will be removed though there is a 10-inch Apple tree within the right of way and a second Apple tree along the path of the drainpipe. HW defers to the Planning Board if additional clarification for the total number of trees being removed is required.

c. HW recommends that the Applicant increase the length of the construction entrance to be a minimum of 50 feet and show the location on the grading plan.

July 24, 2024: The Applicant has increased the construction entrance to a minimum of 50 feet as suggested. HW has no further comment.

d. The Applicant has indicated an erosion control line around the property boundaries. It is not clear if the limit of disturbance needs to extend to the boundaries or can be reduced to protect some of the trees. HW recommends that the Applicant revisit the erosion control barrier location.

July 24, 2024: The Applicant has included a Limit of Construction designation within the property boundaries. As noted previously, HW recommends that the Applicant clarify whether the area between the proposed 288-contour and the existing 290-contour on the west side of Lot #2 will be altered.

e. The proposed project requires land disturbance of greater than 1 acre. Therefore, a Stormwater Pollution Prevention Plan (SWPPP) per the EPA NPDES Construction General Permit will be required. HW recommends that the Applicant provide a copy of the SWPPP to the Town a minimum of 14 days prior to land disturbance. The Planning Board may choose to require receipt of the SWPPP as a condition of approval.

July 24, 2024: As stated previously, the Planning Board may choose to require receipt of the SWPPP as a condition of approval.

9. *Standard 9 requires a Long-Term Operation and Maintenance (O & M) Plan to be provided.*

a. The Applicant has included a narrative regarding long term maintenance in Section IX of the Project Stormwater Report. HW recommends that the O&M Plan be submitted as a separate standalone document that is signed by the property owner/responsible party.

July 24, 2024: The Planning Board may choose to require receipt of the signed O&M Plan or the Home Owners Association documents as a condition of approval.

b. HW recommends that the Applicant include a maintenance budget and a log for the long-term operation and maintenance of the stormwater practices within the O&M Plan.

July 24, 2024: The Applicant has included the maintenance budget as suggested. HW has no further comment.

c. HW recommends that the Applicant include a simple plan that is drawn to scale and shows the location of all stormwater practices to be inspected and maintained.

July 24, 2024: The Applicant has included a simple plan as suggested. HW has no further comment.

10. Standard 10 requires an Illicit Discharge Compliance Statement to be provided.

a. HW recommends that the Applicant submit an Illicit Discharge Compliance Statement signed by the property owner. The Planning Board may choose to require receipt of an Illicit Discharge statement signed by the property owner prior to land disturbance as a condition of approval.

July 24, 2024: The Planning Board may choose to require receipt of the signed Illicit Discharge Compliance Statement as a condition of approval.

11. Earth Movement Permit

a. The Applicant has provided documentation regarding the soil material and the cut and fill volumes for the earth movement anticipated for the proposed project. The Applicant has included an exhibit in the permit application "Earthwork Quantities Cut/Fill Map" that illustrates the cut and fill depths within the limit of work. HW notes that the proposed swales are not included in the figure, which also calls out the limit of clearing. HW recommends that the Applicant include the excavation required to install the swales on the Cut/Fill map and indicate the limit of clearing on the site plan set.

July 24, 2024: The Applicant has updated the Earthwork Quantities Cut/Fill Map. However, HW notes that the area between the proposed 288-contour and the existing 290-contour on the west side of Lot #2 has not been included. HW recommends that the Applicant revise the proposed grades within this area or add the fill quantities that will be needed.

Conclusions

HW recommends that the Planning Board require that the Applicant provide a written response to address these comments as part of the review process. The Applicant is advised that provision of these comments does not relieve him/her of the responsibility to comply with all Town of Andover Codes and By-Laws, Commonwealth of Massachusetts laws, and federal regulations as applicable to this project. Please contact Janet Bernardo at 857-263-8193 or at jbernardo@horsleywitten.com if you have any questions regarding these comments.

Sincerely,

HORSLEY WITTEN GROUP, INC.

Janet Carter Bernardo, P.E.
Principal