August 7, 2019

Ms. Winifred Li
Chairperson
Zoning Board of Appeals
Town of Weston
Town House Road
Weston, MA 02493

RE: Third Review
Modera Weston, 751-761 Boston Post Road, Weston, MA

Dear Ms. Li:

With reference to the Modera Weston 40B project proposed for property located at 751-761 Boston Post Road in Weston, I am in receipt of the following materials:

1. Plan set entitled “Permit Set, Modera Weston, 751-761 Boston Post Road, Weston, MA”, consisting of 13 sheets, prepared by Howard Stein Hudson and dated July 22, 2019.
2. Existing and Proposed Watershed Delineation Plans, consisting of two sheets, dated July 22, 2019

All materials have been prepared by the civil engineer for the project, Howard Stein Hudson, and sealed and signed by Richard Latini, Professional Civil Engineer.

Prior to receiving these materials, I met with Mr. Latini and Lars Unhjem at my office on Monday, July 15, 2019 to review the overall scope of the materials required for a full review. At that meeting it was clear that it would not be possible for the applicant’s engineer to provide all the required material for a timely review by the August 12, 2019 scheduled public hearing. We therefore agreed to limit the submittal and review for the 8/12/19 hearing to drainage and grading, with additional aspects of the project to be reviewed subsequently. Thus, my current review focuses on drainage and grading, although I will comment on certain other aspects of the project where it will help keep the overall progress of the planning and peer review moving forward.

Before beginning my review, I inspected the subject property, as well as properties located at 741, 745 and 775 Boston Post Road and 3, 4 and 6 Elliston Road.

Executive Summary

As this report is both long and technical in nature, I have provided a brief executive summary to highlight some of the more important takeaways:
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Executive Summary

As this report is both long and technical in nature, I have provided a brief executive summary to highlight some of the more important takeaways:
1. The project proposes significant work within 25-feet of wetland resource areas. The Weston Conservation Commission has a long-standing and well-enforced policy of prohibiting work within 25-feet of a wetland resource. The applicant will have to request that the Commission waive this policy. Absent a waiver, the applicant will need to pursue an appeal with the MADEP, which can be a lengthy process. As this is an issue that impacts the basic layout of the development, it should be resolved prior to the ZBA completing its deliberations.

2. Discrepancies in the watershed delineation along the westerly border of the project near 775 Boston Post Road has made it impossible for me to ascertain whether or not the project will have any drainage impacts on that property.

3. The project proposes to fill the majority of a large depression behind Elliston Road to build a landscaping berm. The hydrologic analysis, however, failed to account for the fact that a significant area of off-site property, including portions of properties at 741 Boston Post Road, 745 Boston Post Road, 3 Elliston Road, 4 Elliston Road and 6 Elliston Road all drain into this depression. The displacement of this stormwater storage volume may create offsite flooding problems at these abutting properties. Additionally, grading errors in the proposed emergency extension of Elliston Road will divert water during major storm events from the depression, down the emergency extension driveway and into Buildings TH-9 and TH-10.

4. One of the major stormwater management systems for the project is proposed to be installed under a landscaping berm, where there will be as much as 14-feet of fill placed over the top of the drainage system. This makes inspection and maintenance of the system impossible and is contrary to accepted engineering practice.

5. A second major stormwater management component, an infiltration system located between Buildings A and TH-5, is located within the high groundwater table, based upon the soil borings provided by the applicant. This will require an adjustment to this system which may have significant grading ramifications.

6. The hydrologic analysis and stormwater report state that flows from the project to Cherry Brook, for the 100-year storm event, will increase in peak discharge rate by 16 percent and in total runoff volume by 34 percent. These are significant increases. Increases in runoff volume to Cherry Brook are also reported for the 10- and 25-year storm events. This has the potential to increase downstream flooding along Cherry Brook and is not permissible under either the MA Wetland Protection Regulations, MADEP Stormwater Management Requirements, or the Town of Weston Stormwater Management Bylaw and supporting regulations. This implies that the current stormwater management system does not provide sufficient capacity for the on-site retention of stormwater. It is surprising that the project engineer would submit a design and supporting analysis with such a clear non-compliance with the regulatory standards.

With that as background, I offer the following comments which offer a more detailed review of the project as currently formulated:
General Comments

Wetland Impacts

The project proposes extensive work within the 100-foot buffer zone to wetland resources and will require that an Order of Conditions be obtained either from the Weston Conservation Commission (WCC) or, if an appeal of the local order is necessary, the Massachusetts Department of Environmental Protection (MADEP). Of the work in the wetland buffer zone, substantial work is required within 25-feet of the wetland border, with some work as close as 5-feet to the wetland border. The WCC has a policy that no work occurs within the 25-feet of the resource edge and has identified this area as a No Disturb Zone (NDZ). The WCC has been consistent in enforcing this policy on both public and private projects. The WCC does have a written waiver policy for working in the NDZ, but the present proposal likely does not meet the standards set forth in that policy. Weston does not have a local wetland bylaw, so the policy does not carry the weight of a local regulation and the state wetland protection regulations, 310 CMR 10.00 do not call for a similar NDZ. In the event that the WCC does not grant a waiver from its NDZ policy, the applicant would either have to make significant design changes to receive local approval or seek a Superseding Order of Conditions from MADEP. Should MADEP intervention be sought, a significant delay in permitting process will occur and the MADEP review could result in project changes that require the ZBA to amend any approval that may have been granted. I recommend that this issue be addressed as quickly as possible as it is a critical element for the project as proposed to move forward.

Fire Department Access Review

The largest of the proposed apartment buildings, Buildings A and B, have emergency access limited to the front of the building, with no emergency equipment vehicular access along the rear of the buildings. The applicant should confirm with the Weston Fire Department (WFD) that the emergency access provided is sufficient. Any requirement for emergency access to the rear of these buildings will result in major design changes.

Elliston Road Emergency Access

Prior to the current proposal my firm had performed a property survey of the subject property. In performing that survey, we researched the history of Elliston Road at the Weston Town Clerk’s Office. We found that the full 50-foot width of the road was accepted by the Town to a point about 50-feet to the south of the locus. A 25-foot wide highway easement was also taken by the town on the westerly half of Elliston Road, extending from the accepted portion of Elliston Road to the southerly boundary of the locus. It thus appears that the subject property has rights to extend its emergency access lane only to the west half of Elliston Road, and not to the east half of the road. The applicant’s land surveyor and land attorney should review the town acceptance of Elliston Road along with the relevant Land Court Documents and confirm that the emergency access proposed is consistent with the actions of Town Meeting in accepting the road and the easement. I have enclosed a copy of the plan for Elliston Road.
City of Cambridge Watershed Management Division of Water Department

Cherry Brook, a tributary to The City of Cambridge Stony Brook Reservoir public water supply, runs through the locus. The applicant should request that the Cambridge Water Department review the project and provide written comments to the Board.

Topographic Survey

The topographic survey of the Existing Conditions was performed by an aerial survey, which is generally acceptable. There are, however, certain areas of the site that require additional details that is best accomplished by supplementing the aerial survey with an on-ground survey. Specific needs are as follows:

1. An existing catch basin is located on Boston Post Road about 100-feet east of the driveway at 775 Boston Post Road. The catch basin and its outlet should be added to the plan.

2. The above-referenced catch basin discharges flow into a channel that runs over the locus and then over the 775 Boston Post Road driveway. This channel should be located and shown on the plan.

3. The hydrologic model (discussed later) routes flow through a “southwest depression”. This is not well-documented on the Existing Conditions Plan. Spot grades should be added to verify the depth, lateral extent and storage volume in the depression as well as the length of the overflow spillway, as input into the model.

4. Spot grades should be added along Boston Post Road between the properties at 741 Boston Post Road and 4 Elliston Road. This data is needed to identify where the high point is along Boston Post Road to determine the contributing watershed to the previously mentioned catch basin and channel near 775 Boston Post Road.

5. Additional spot elevations are required around the house and driveway at 751 Boston Post Road to confirm the watershed boundary used in the model. Also, the plan does not appear to identify all of the existing driveway on the east side of the house.

6. The existing trees within the portion of the project to be developed should be added to the plan so that an assessment may be made of trees to be removed and trees to remain. Additionally, tree along the common boundary lines with the properties at 741 and 745 Boston Post Road and 3 and 4 Elliston Road should be located and shown on the plan, as these trees could potentially be impacted by construction.

7. Trees and stonewalls along the Boston Post Road frontage should be shown. Boston Post Road is a scenic road and any removal of trees or stonewall within the right-of-way will require a scenic road permit as part of the Comprehensive permit.

8. The Existing Conditions Plan should be signed and stamped by a MA Registered Professional Land Surveyor.
Proposed Grading Plans

The proposed grading for the project is shown on Sheets C3.00 and C3.01. I have a number of grading concerns, some serious, as follows:

1. The parking lot grading along the north side of the entrance drive to the wastewater treatment plant (see Sheet C3.00) is in error and contains a two-foot bust in the grading contours. The plans indicate a back of curb/bottom of curb grade of 202-feet/200-feet at one location and 204-feet/202-feet at another location, indicating a two-foot elevation change at the curb line. Given that the bituminous asphalt curb has a 6-inch reveal, this is not possible.

2. A more significant grading error is present along the proposed emergency extension of Elliston Road. The grading, as shown on sheet C3.01, shows the existing end of Elliston Road with an elevation of 176-feet. The extension meets the main project road between Buildings TH-8 and TH-9 at elevation 172-feet, plus or minus. The plan shows the emergency road dividing two large landscaping berms, with a road grade of about 174-feet. This is a problem given the toe of the slope of the westerly berm, immediately adjacent to the road, is at elevation 178-feet, four feet higher than the road. There is 4-foot grading error here at a critical location of the project. This is a point where a road crossing, a significant landscaping berm and a major drainage system all converge at a confluence point. It is essential to get the grading issues right at this location.

3. The landscaping berm to the east of the Elliston Road extension fills a substantial portion of an existing depression, referred to in the design documents as the “Southeast Depression”. This depression straddles the boundary line between the subject property and property at 6 Elliston Road. At present, this depression serves as a stormwater collection and storage basin for about 3-acres of the locus. More importantly, this same depression collects and stores stormwater for several acres of property that is off-locus, including runoff from Elliston Road, properties at 3, 4 and 6 Elliston Road and properties at 741 and 745 Boston Post Road. All of these properties flow into the “Southeast depression”. The proposed grading plan (construction of the landscaping berm) eliminates about 60 percent of the stormwater storage volume in this depression. This grading scheme therefore has the potential to displace stormwater from the locus and onto the property at 6 Elliston Road, thereby damaging that property. This topic will be discussed in greater detail in the section of this report that discussed the hydrologic model and hydrologic impacts.

4. A significant landscaping berm is also proposed along the entrance driveway, adjacent to the property at 745 Boston Post Road (BPR). The natural topography at the 745 BPR property is such that under present conditions, stormwater flows from 745 BPR and onto the subject property, before eventually reaching a swale on property located at 741 BPR. The proposed landscaping berm will alter this natural flow pattern by creating a new slope along the boundary between the locus and 741 BPR. This will channelize flows to a greater degree than exists now and has the potential to create a distinct drainage channel where none now exists. This could in turn create long-term erosion and sedimentation issues and may impact the health of mature trees on the property at 741 BPR. The applicant should quantify the flow expected along the joint property boundary and assess the potential for adverse impacts. An arborist should be consulted with to evaluate the potential long term impact of the grading and drainage alterations to the health of mature trees on the property at 745BPR.
5. Similar to the above discussion, the proposed landscaping berm behind the properties at 741 and 745 BPR will direct runoff from the south side of the berm onto those properties. The toe of slope for the berms adjacent to abutting properties should be adjust so that it does not reside right at the property boundary. A ten-foot offset between the property boundary and the toe of slope of berms along abutting properties should be maintained. Additionally, the engineer should assess whether the newly formed swale along the common property boundaries will convey greater flow than in the existing condition.

6. The grading shown on Sheet C3.00 is incomplete in the vicinity of the west end of building TH-3. The proposed building is located just outside of the NDZ. The first-floor elevation is 177.12-feet and the elevation 30-feet to the west is 160-feet, a difference of 17-feet. It is unclear how this grading will be accomplished without intrusion into the NDZ. I also note that the plan calls for grading within 60-feet of a vernal pool. The Conservation Commission may raise concerns over the proximity of work to the vernal pool.

7. Similarly, incomplete grading is shown on the north (rear) sides of Buildings TH-3 and Th-4. The plans should be revised to indicate the full extent of required grading and any additional intrusions into the NDZ.

8. It is unclear whether the proposed grading for the proposed stormwater infiltration system behind buildings TH-5 and A can be completed without disturbing the wetland. Additional detail is required.

9. A recreation center is proposed between Buildings A and B. The north edge of the recreation center is buttressed by a massive retaining wall with a height approximately 22-feet above existing grade. The north face of this wall is proposed to be as close as 9-feet from the wetland resource, an issue that will undoubtedly raise concerns with the Conservation Commission, not withstanding the fact that the wall is well within the previously discussed NDZ. It is likely that excavation for the footing or wall support base will extend even closer than 9-feet to the wetland. The plans provide for a generic detail of a precast, modular block wall, but given the mass of the load that this wall will retain, it is very likely that this detail is not representative of what the final wall design will require. Given the sensitivity of the wall location, a detailed design, prepared by a structural engineer, should be provided to the ZBA so that the full impacts of its construction may be ascertained. Also, given the height of the wall and its location on the south side of the wetland, the wall has the potential to adversely impact the health of the wetland due to shading and root intrusion. The potential impact on the wetland should be assessed.

10. A three-foot tall wall is shown at the edge of pavement around the cul-de-sac by Building TH-3. The applicant should confirm that this wall will not interfere with the turning movements of fire equipment, as the fire truck chassis will overhang the wheels as it maneuvers around the cul-de-sac.

Hydrologic Model and Potential Impacts

There are several issues, some significant, with the hydrologic analysis and hydrologic impact assessment as discussed below:
Curve Number Selection

The model, for both existing and proposed conditions, considers the grass and woods on the premises to be in “fair” condition, thereby assigning a higher curve number to these areas. During my site inspection, I noted very few areas that were not densely vegetated. The model should consider the existing state of vegetative cover as in “good condition” and select an appropriate runoff curve number for the model based on that designation. Appropriate curve numbers are 25 for woods in good condition, 30 for meadow in good condition and 39 for lawn in good condition. Lawn, meadow and woods should be calculated separately in the analysis of runoff curve numbers, and a weighted average assigned within each sub-watershed.

Analysis of runoff to abutting property at 775 Boston Post Road (775BPR)

The watershed delineation along the boundary with property at 775 Boston Post Road is inaccurately depicted in both the existing and proposed watershed maps and in the hydrologic analysis. The model shows all runoff headed towards 775BPR as flowing through a “southwest depression”. In reality, only a small portion of the watershed, WS-4 in the existing conditions model and WS-4B in the proposed condition model, flows through into this depression. As noted earlier, additional survey data is needed to define this basin. Also, WS-4 includes property that is actually on the 775BPR property and is downgradient of the locus. This inclusion is inappropriate as it adds the impervious area of the 775BPR driveway to the existing condition model, masking impacts of the proposed development. Also, drainage from Boston Post Road bypasses the depression and flows overland toward the driveway at 775BPR.

The watershed delineation should be revised to subdivide watershed WS-4 into three smaller basins. One basin should include the flow from Boston Post Road to the catch basin; the second basin should include the area that flows into the “Southwest depression”, while the third basin should include the portion of the basin to the north of the 775 BPR property that flows overland. None of the 775BPR property should be included in the delineation.

The engineer should also clarify, by identifying the area on the watershed delineation plans, the impervious areas being used in the model. The figures used in the existing conditions model seem high and should be verified by depicting the areas clearly on the watershed delineation plan.

Based on the issues with the watershed delineation and the model, I cannot opine on whether or not the 775BPR property will be impacted on the project. Hopefully the revised information will allow me to better assess what impacts, if any, the project may have on the 775BPR property.

Watershed WS-1 runoff curve numbers (Existing and Proposed Model)

The curve numbers selected for the both the existing and proposed hydrologic models indicates that the majority of this watershed consists of “grass in fair condition” (9.3-acres in existing model, 4.8-acres in proposed model). My site inspection, as well as a cursory review on Google Earth, indicates that most of this area is actually in a wooded condition and should be assigned a lower curve number. Clarification from the modeler is requested.
Watershed WS-2 runoff curve numbers (Existing and Proposed)

The curve numbers selected for both the existing and proposed hydrologic model indicates that the majority of this watershed is in a wooded condition but with Hydrologic Group D (very poorly drained) soils. While this assumption is somewhat supported by the Middlesex County Soil Survey, the modeler should add the Soil Survey lines to the delineation map to demonstrate that all soils within this sub-watershed belong in the Hydrologic Group D classification.

Analysis of hydrologic Impacts to Elliston Road Abutters, Watershed WS-3 Delineation and Hydrologic model

The analysis of Watershed WS-3 is significantly flawed in several respects and the result is a drainage analysis and design that is erroneous and has the potential to create both on-site and off-site flooding and damage. There are several issues in play, as described below.

First, watershed WS-3 flows to a closed depression (Southeast Depression) that straddles the property line between the subject property and properties at 741BPR, 745BPR, 3 Elliston Road and 6 Elliston Road. Water stored within this depression has the potential to impact all these properties. The grading as presently proposed will construct a tall landscaped berm within a significant portion of the depression of the subject property and thereby reduce the available stormwater storage capacity within the depression.

The first significant flaw in the applicant’s analysis is the failure to recognize that a significant area of offsite property, including significant portions of the 741BPR, 745BPR, 3 Elliston Road, 4 Elliston Road and 6 Elliston Road all flow into the depression. The watershed delineation and hydrologic model fail to account for this contributing flow area and underestimate the stormwater volume flowing into the depression. Even without including this area, the existing condition model shows that the depression fills up to elevation 176-feet, which is essentially full capacity. Above elevation 176-feet, the abutting property at 6 Elliston Road will experience driveway and lawn flooding. I have attached a watershed delineation plan using the town’s GIS system to identify the unaccounted-for area. While Elliston Road does have a drainage system that will divert some flow beyond the depression, the system likely does not have the capacity to convey larger storm events, as street drainage systems are typically designed for smaller storm events. Any future analysis will have to account for flows in larger storm events that will bypass the drainage system in Elliston Road.

The proponent proposes to reduce the effective storage (elevation 176-feet and below) capacity in the depression by 58-percent by construction of the landscaping berm. This reduction, coupled with the error in the watershed delineation, has the potential to displace stormwater onto the abutting properties and create significant flooding issues.

The second significant flaw lies in how the model analyzes the hydraulic conveyance of stormwater during intense storms. The proposed condition model assumes that an overflow spillway, to serve as an emergency outlet, will be constructed at elevation 175.0-feet. The overflow spillway is assumed in the model to have a crest length of 25-feet and will allow flows to pass into the wetlands on the east end of the property. This spillway would thus keep water levels in the depression at a maximum elevation of about 175-feet for the 100-year storm event. The proposed grading plan, however, shows the crest elevation of the emergency outlet set at elevation 176.5-feet. While this elevation is reasonable based
on the existing contours, it will result in flood water rising to elevation 176.5-feet, again flooding the property at 6 Elliston Road.

A third, and even more significant flaw in both the analysis and design is the grading of the emergency access extension of Elliston Road. The emergency access road, constructed adjacent to the depression and between the two landscaping berms, will slope from elevation 176-feet at the existing end of Elliston Road to elevation 172.5-feet at its intersection with the driveway between buildings TH-8 and TH-9. The road is graded with a constant pitch, meaning there is neither a sag nor a crest along the road.

The issue with this grading scheme is that the road grade is actually lower than the emergency spillway elevation. The road near the depression is at elevation 174-feet, 1.5-feet lower than the spillway elevation of 176.5-feet. As the water level rises in the depression during a storm event, water will begin to flow over and along the emergency access road at elevation 174-feet. Stormwater will follow the emergency road and then spread out across the project driveway and landscaping areas, potentially flooding the buildings TH-9 and TH-10.

Any overflow from the depression that does occur will ultimately flow into Watershed WS-2 and then into Cherry Brook. The hydrologic model does not account for this flow.

It is clear that the design and analysis of the interaction of the stormwater depression with both the abutting properties and the subject property has significant issues would have benefited from closer review by the applicant’s engineer.

Proposed Watershed WS-8

The proposed watershed plan and hydrologic model indicates that all of WS-8 is directed to Infiltration system S-M-1. However, a portion of the project driveway discharges to a water quality catch basin, WQ-3. This basin then discharges to a surface outlet near the NDZ to the north of building TH-10. This drainage design is inconsistent with the hydrologic model. Either the basin must be re-directed, or the model must be adjusted.

Impacts on Cherry Brook and Downstream Abutters

Given the numerous analysis and design errors contained in the submittal, the values reported in the analysis cannot be relied upon. However, even assuming the analysis and design was error-free, the Stormwater report indicates that flooding in Cherry Brook will increase significantly as a result of the project. The analysis indicates, as stated in Appendix C of the Stormwater Report, that peak flows in Cherry Brook will increase, for the 100-year storm event from 57-cubic feet per second (CFS) in the existing condition, to 66 CFS in the proposed condition. Total runoff volume into Cherry Brook will increase, for the 100-year event, from 4.4 acre-feet (AF) in the existing condition to 5.9 AF in the developed condition. These values represent increases in peak discharge rate and runoff volume of, respectively, 16 percent and 34-percent. Increases in runoff volume to Cherry Brook are also reported for the 10-year event (29%) and the 25-year event (30%). These are significant increases and may lead to an increase in flooding along Cherry Brook, downstream of the project.

This leads me to several conclusions:
1. If these numbers prove out to be reliable, the project is not approvable either under the MADEP Wetland Regulations or the Town of Weston Stormwater Bylaw

2. It is evident that the more experienced engineers responsible for the submittal did not fully review the hydrologic analysis and stormwater report.

3. The fact that the peer review engineer is reporting these facts to the ZBA suggests that the submittal was premature. This has led me to spend much more time than warranted on this review and will likely require additional peer review time on the same topic, adding expense to the review.

Drainage Collection, Conveyance and Disposal Systems

The following comments are specific to the drainage design system layout and details:

1. System specific details are required for each infiltration system (a generic detail is provided). If “isolator rows” are proposed to trap sediment prior to infiltration, they should be sized and depicted on individual details for each infiltration system.

2. A soil evaluation to establish the seasonal high-water table and infiltration capacity is required at Infiltration System S-M-4.

3. Will the wastewater treatment plant have roof drains connected to the infiltration system? The drawings are unclear.

4. The plans indicate that drainage components will be located closer than 10-feet to some of the wastewater treatment tanks. MADEP design standards for the separation between wastewater treatment tanks and storm drains is 25-feet.

5. Overflow outlets from all infiltration systems should be directed to stone-protected level spreaders and that discharge at a maximum rate of 0.1-cfs per linear foot at maximum design discharge.

6. There are two stormwater treatment units labeled as WQU-4. Please clarify.

7. All water quality treatment units should be designed and configured in an “off-line” configuration to allow high flows, those in excess of one inch of runoff, to bypass the treatment unit to avoid the re-suspension of sediments.

8. The roof drainage from buildings Th-1 and TH-2 should not discharge directly into the water quality unit. An additional manhole should be added down-gradient of the WQU to allow the roof drainage to flow into the conveyance system.

9. The roof drainage from building TH-4 is being discharged into a water quality unit. This drainage must bypass the unit.
10. A roof drainage manhole is located between buildings TH-3 and TH-4. This manhole is connected to a street catch basin, CB-23. This connection is not permissible, as the roof drainage needs to bypass the catch basin.

11. DMH-17 needs to be a Water Quality Inlet to treat runoff from the street prior to infiltration.

12. The design of Infiltration system S-M-2 requires more detail. It is not clear what the two small rectangular elements on either end are for. Also, roof drain inlets should connect beyond isolator rows, whereas connections from street drainage components should be fed into isolator rows.

13. The trench drain leading from the garage bay at Building A should discharge into a sump prior to connection into the infiltration system.

14. Soil Boring number GZ-3, located at Infiltration System S-M-2 recorded a water table at elevation 161.0-feet. The bottom of infiltration system is proposed at elevation 160.0-feet, or a foot below the water table. MADEP Stormwater management regulations require a minimum of two feet of separation between the bottom of the infiltration system and the high-water table. As such, this infiltration system will have to be raised a minimum of three feet. Additionally, if the system has less than a four-foot offset to the water table, a hydraulic mounding study must be submitted. I also note that raising this system may have additional wetland impacts, increasing the disturbance within the NDZ and possibly encroaching into the actual wetland resource area.

15. The overflow outlet for Infiltration System S-M-2 needs to be a level spreader placed at the bottom of the fill slope.

16. A sub-surface stormwater detention basin, S-M-1, is proposed under the landscaping berm to the south of Building TH-10. I have several serious concerns related to this system. First, the system is proposed under the landscaping berm. In places there will be as much as 14-feet of fill over the plastic chambers. The berm will also have trees and other vegetation on its surface. Access to the system for inspection and maintenance of the system will be impossible. This is contrary to accepted and sound engineering practice. Also of concern is the depth of the system relative to the water table. No soil testing has been conducted within the confines of the proposed system to the depth required to confirm whether or not the system will have the proper offset to the water table to allow it to function properly. While the MADEP mandated testing has not been performed at this location, testing at other locations suggest that the water table may be found at elevations near 160-161-feet. If so, this places the bottom of the system at or just above the water table. The engineer will need to provide testing, by a MADEP certified soil evaluator, within the confines of the system and to a depth a minimum of four feet below the proposed bottom of the system. Should the proposed bottom of the system be located less than four feet above the water table, a groundwater mounding study must be conducted. My opinion is, however, that the system should not be located under the landscaping berm. I suggest that an alternative location for this detention basin be considered. One possible location is to the rear of the west wing of Building B. I would also recommend that the engineer consider an open bio-retention basin or rain garden. Such a system offers the advantages of easier inspections, simplified maintenance, increased biodiversity and enhanced wildlife habitat.
17. Appropriate means to inspect, access and clean all stormwater infiltration systems is needed.

18. Calculations should be provided for the sizing of storm drains for both the street and roof drainage conveyance systems

Demolition and Erosion Control Plan

The proposed project will require major earth moving activities including significant cuts and fills. The project will likely require several years to complete and during that period there is the potential for erosion and sedimentation issues to both sensitive resource areas such as wetlands, vernal pools and public water supplies, and to abutting properties. Such a project requires a well-planned construction-sequencing plan as well as a detailed plan to control erosion, sediment, dust and water runoff during construction. At this time, no such plan has been forwarded as the information provided on Sheets C1.00 and C1.00 can at best be considered placeholders and not representative of any real effort to define the construction process and potential impacts related to the site work. Given the rudimentary state of the plans, I will refrain from commentary until such time as a serious attempt is made to address the potential impacts and develop realistic mitigation measures. Such a plan should consider earthwork moving requirements, material stockpile and stabilization areas, worker parking and worker sanitation facilities, project phasing, truck deliveries and truck exports, among the numerous other factors that must be considered when managing a large construction project within a developed neighborhood.

I will note that the proposed construction entrance requires an alteration of the stonewall along a scenic road.

Utility Plans

At this time, I have not performed an extensive review of the submitted utility plans, Sheets C4.00 and C4.01. I would generally expect that any utility-related issues can be resolved relatively easily, especially compared to the more complex grading and drainage issues. I do recommend that the applicant obtain written comments from both the water department and the fire department on the proposed water system.

Site Details

Similar to my comments on the Utility Plan, I have not reviewed the construction details very closely, as I expect many will change as the project is revised to address my comments. As such I will offer only the few comments below, reserving the right to provide additional comments as revised plans are provided:

1. The details for the water quality treatment devices show one inlet pipe and one outlet pipe. The site plans depict water quality inlets with as many as three inlets and one outlet. The engineer should confirm with the supplier of these proprietary devices that such configurations are feasible and revise the details accordingly.

2. As discussed earlier, customized details are required for each infiltration system.

3. As discussed earlier, the generic modular block wall detail proposed for the 22-foot tall retaining wall seems unlikely to be sufficient. A structural engineer should review this wall and provide a detail specific to this wall.
Long Term Operation and Maintenance (O & M) Plan

The submitted long term O & M plan needs refinement. As submitted the plan is generic and short on specifics. No consideration at all is given to the inspection and maintenance of infiltration systems, which is the primary means of stormwater control proposed for this project. I will refrain from additional commentary until such time that a more robust plan is provided. I do note that this is a topic that should be coordinated with the Conservation Commission.

Stormwater Report and Checklist

This entire document will require revision when revised plans with a workable drainage system are provided. The final report will require certification by a Professional Engineer.

Other Issues and Topics

There are various other issues that have not yet been submitted and reviewed. As I noted at the outset of this report, the primary focus at this point in the review was the grading, drainage and hydrology. As this report has hopefully made clear, these issues remain unresolved and additional effort will be required to move past this topic. However, future topics should consider impacts such construction management, tree removal, sound impacts, and local waiver requirements.

Conclusion

As may be inferred by this lengthy report, I have found that there are numerous problems with the design and analysis of the drainage system that has been presented. A closer and more focused review by the Engineer of Record for the project likely would have caught many of these issues prior to the plans being released for public review. I hope that future submittals will take the time necessary to prepare a high-quality design product so that the effort required to conduct a thorough peer review may be reduced.

Please feel free to contact me with any questions or if you require any clarifications.

Sincerely yours,

Robert A. Gemma, PE, PLS
President

CC: John Field
    Modera Weston
    Richard Latini, Howard Stein Hudson

Enclosures:
Elliston Road rights plan
Watershed delineation, southeast depression