

133 Keyes Road
Concord, MA 01742



DATE: 11/04/2022

MEMORANDUM

TO: Elizabeth Hughes, Town Planner
TO: Delia Kaye, Natural Resources Director
COPY: Alan Cathcart, Director of Public Works
VIA: Steve Dookran, P.E., Town Engineer
FROM: Justin Richardson, P.E., Assistant Town Engineer
SUBJECT: Concord Academy: ZBA Special Permit, Site Plan Approval Application, and Notice of Intent

Concord Public Works (CPW) Engineering Division has reviewed the Notice of Intent and the ZBA Special Permit and Site Plan Approval Application, Plans, Calculations and Reports for Concord Academy West Campus, which were prepared by the Applicant, Don Kingman, and the design team, dated July 28, 2022, July 15, 2022, July 2022, and July 13, 2022, and provided comments dated August 31, 2022, seen below in bold and dated. The Applicant provided revised supplemental plans, reports, and calculations with a response letter to Engineering's comments, which were dated September 15, 2022 and September 16, 2022, respectively and seen below in italics and dated. Engineering provided a second comment letter dated September 26, 2022 seen below in bold and dated. The Applicant provided revised supplemental plans, reports, and calculations with a response letter to Engineering's comments, which were dated October 10, 2022, October 4, 2022, October 28, 2022, and October 5, 2022 respectively and seen below in italics and dated. The Engineering Division offers the following in bold and dated:

Engineering Division Comments (8/31/2022)

- 1. Please provide a Stormwater Pollution Prevention Plan (SWPPP) and make the appropriate filings with National Pollutant Discharge Elimination System (NPDES) for the site alterations that are to be performed. (8/31/2022)**
 - Applicant response 9/15/22: The applicant recognizes that the project will disturb more than one acre of land and will require coverage under the NPDES Construction General Permit (CGP). As part of this permit a site specific SWPPP is required. The project is a large-scale project and will require coordination of logistics with the Owner, project design team and contractor. At this time has been no contractor chosen for the project. Prior to the start of construction, a SWPPP will be prepared, in coordination with the project team, and the appropriate NOI for coverage under the CGP will be filed. The applicant will provide a copy of this filing and the SWPPP to the Town. (9/16/2022)*
 - Comment has been addressed and should be a condition of approval. (9/26/2022)**
- 2. The Traffic Study is required to determine if additional traffic will be generated by the development, and it should include trip generation for each driveway, peak hour volumes, estimated traffic for special events, frequency of events, and does the housing being moved affect the traffic volume for different driveways. Line of sight determinations for all driveways being utilized or improved should also be determined. (8/31/2022)**

- *Applicant response 9/15/22: The applicant is in the process of retaining a traffic engineer and the requested report will be submitted as soon as its complete. (9/16/2022)*
 - **CPW Engineering will review the report when it becomes available (9/26/2022)**
 - **The report was reviewed and comments are below. (11/4/2022)**

- 3. A Right of Way (ROW) and/or Driveway permit is required for the work being performed on Main Street and work inside the right of way shall comply with CONCORD PUBLIC WORKS DESIGN & CONSTRUCTION STANDARDS & DETAILS. This includes ADA compliant ramps at all driveway entrances. (8/31/2022)**
 - *Applicant response 9/15/22: The applicant will obtain a ROW and/or Driveway permit from CPW prior to starting work. All will comply with Concord Public Works Design & Construction Standards and Details. (9/16/2022)*
 - **Comment has been addressed and should be a condition of approval. (9/26/2022)**

- 4. The accessible space at the southeasterly edge of the parking lot do not appear to be graded at 2% or less. (8/31/2022)**
 - *Applicant response 9/15/22: Additional grading detail as well as a note has been added to sheet C-003 indicating a maximum grade for the accessible spaces. (9/16/2022)*
 - **Comment has been addressed. (9/26/2022)**

- 5. Please explain why in HydroCAD the Dynamic Storage-Indication method was used instead of the more typical Storage-Indication method? (8/31/2022)**
 - *Applicant response 9/15/22: We typically use this method to account for tailwater conditions within a system that can affect the flow through a system. The following is a description from HydroCAD about this method. "A dynamic routing method also calculates the nodes in flow order, but evaluates every node at each time step. This allows each node to respond to other conditions, such as varying tailwater or pump switching. For these situations, HydroCAD provides the Dynamic Storage-Indication method. DSI uses the same calculations as the Storage-Indication method, but permits automatic tailwater capabilities by updating the routing curves at each time step."*

However, as required in the Town's drainage standards, the calculations have been revised using the Storage-Indication method. (9/16/2022)

 - **With the majority of the ponds having free discharge to reaches, and not many ponds in series except for drain manholes modeled as ponds the SI method is adequate for this project. Comment has been addressed. (9/26/2022)**

- 6. Please explain why in HydroCAD the Lag/CN method was used in calculating the Tc instead of the more typical TR-55 method? Additionally, on the Pre and Post Development Subcatchment Plan please label the "longest flow path" lines so that it is clear what was used in the calculations. (8/31/2022)**
 - *Applicant response 9/15/22: We typically use the Lag method as a simpler estimate of the Tc and this method is allowed in the MADEP Stormwater Handbook. However, the stormwater calculations were revised using the TR-55 method and the longest flow paths have been labeled on the Subcatchment plans. (9/16/2022)*
 - **In the Pre-development and the Post-development conditions it is rare to have a sheet flow length of more than 50-feet this occurs multiple times in the pre and post drainage**



plans. Please either provide an explanation as to why the sheet flow lengths are so long or revise the calculations to have sheet flow lengths closer to 50-foot max. Also, the Tc for Subcatchment A1 would become channelized at approximately elevation 117 in the grassed swale. (9/26/2022)

- Applicant response 10/5/22: The TR-55 User Guide, published January 2009 by the NRCS limits sheet flow in Time of Concentration (Tc) calculations to 100 feet. We have revised the Tc calculations to reduce the sheet flow lengths to generally 50' or less with the exception of a couple of location where a little bit longer sheet flow length (but less than 100 feet) is warranted. We have also revised the Tc calculation for A1 to use a channel flow where it enters the existing swale at the end of the flow path. (10/5/2022)
- Comment has been addressed (11/4/2022)

7. The Plastic Grid Reinforced Lawn, Permeable Concrete Unit Pavers, and Stabilized Stone Dust Paving while still pervious should be called out separately in the Subcatchments with the appropriate curve number that is based on the compacted base. (8/31/2022)

- Applicant response 9/15/22: The stormwater calculations have been revised with the areas of reinforced lawn, permeable pavers and stone dust areas have been separated out and classified as "gravel. (9/16/2022)
- Comment has been addressed. (9/26/2022)

8. Inspection reports from the LTOMP are to be submitted to the CPW Engineering Division annually. (8/31/2022)

- Applicant response 9/15/22: Comment noted. The applicant will submit all required reports and inspections. (9/16/2022)
- Comment has been addressed and should be a condition of approval. (9/26/2022)

9. The Water Quality Swale (that is essentially a Basin), basins and Sediment Forebay need to be detailed. These area shall comply with CPW Design and Construction Standards, Sections 2 "Drainage Standards". Currently, the basin does not have an emergency overflow and the appropriate amount of freeboard. In the 100 year storm event the basins overtop according to the calculations. Please revise the drainage calculations to incorporate the changes necessary to comply with CPW Design and Construction Standards. (8/31/2022)

- Applicant response 9/15/22: Water quality swale A has been revised to eliminate the outlet structure in favor of a longer conveyance with stone check dams to retain flow for treatment. Swale B has been revised to provide 1' of freeboard and a second area drain outlet structure has been added to serve as an emergency overflow. A detail for the sediment forebay outlet has been added to the Sheet C-008 and Sheet C-011 has been added to the plan set with details and sections for the swales. (9/16/2022)
- Comment has been addressed. (9/26/2022)

10. Water Quality Volume calculations should be provided. (8/31/2022)

- Applicant response 9/15/22: Water quality volume calculations have been included in Appendix D of the revised stormwater report. (9/16/2022)
- Comment has been addressed. (9/26/2022)

11. Why is no sediment Forebay provided for Basin B? Stormwater runoff from the driveway of #228 Main Street flows into the basin. (8/31/2022)

- *Applicant response 9/15/22: Because of the sheet flow into the basin, a forebay is not practical for this basin. Alternatively, in combination with sediment removal from the moderately sloped lawn and landscape area upgradient of the basin, a pea stone diaphragm has been added to the top of the basin slope to help filter stormwater entering the basin. (9/16/2022)*
 - **Comment has been addressed, but recommend increasing the width of the diaphragm to 2 feet. (9/26/2022)**
 - *Applicant response 10/5/22: We have increased the width of the stone diaphragm as recommended. (10/5/2022)*
 - **Comment has been addressed (11/4/2022)**
- 12. A groundwater mounding analysis is required for all stormwater infiltration areas with less than 4-foot separation from estimated seasonal high ground water. (8/31/2022)**
- *Applicant response 9/15/22: The mounding calculations using the Hantoush Method for the proposed infiltration basins (Subsurface Infiltration Basins 1 and 2) can be found in Appendix D in the revised Stormwater Report. These calculations show that the groundwater mound below the infiltration basins will not reach a breakout level. (9/16/2022)*
 - **Comment has been addressed. (9/26/2022)**
- 13. The Subsurface Infiltration System is required to have an overflow per the CPW Design and Construction Standards, Sections 2 “Drainage Standards”. (8/31/2022)**
- *Applicant response 9/15/22: The Infiltration System 1 has been revised to include a grated opening on the inspection port in the northwest corner of the system where the grade is lowest. This will serve as an overflow for the system as well have aid in system venting. The downspout boot detail has been revised to specify an overflow that will spill to the ground is the system backs up. (9/16/2022)*
 - **Comment has been addressed. (9/26/2022)**
- 14. The Stormwater Report should provide rational method calculations in accordance with Concord Public Works Design & Construction Standards & Details, Section 2 - Drainage Standards requires “rational method for a 100 year frequency storm event”. Please provide these calculations, and also ensure that the grate capacities for catch basins are not exceeded. (8/31/2022)**
- *Applicant response 9/15/22: The required grate capacity and stormwater conveyance calculations using the rational method are included in Appendix C of the revised stormwater report. (9/16/2022)*
 - **Comment has been addressed. (9/26/2022)**
- 15. Flood Plain fill areas should also include at least portions of the emergency access road. CPW Engineering requires AutoCAD design plans that include the existing and proposed surfaces to confirm the flood plain alteration. Please provide AutoCAD .dwg files for review. (8/31/2022)**
- *Applicant response 9/15/22: Sheet C-009 has been revised to include the additional fill and compensatory storage area. The AutoCAD file will be forwarded directly to Engineering. (9/16/2022)*
 - **The Town’s Zoning Bylaw under Section 7.2 Flood Plain Conservancy District requires the following: “Plans showing compensatory storage at a 1.5:1 ratio for floodplain displaced by the proposed project, prepared by a registered professional engineer, detailed in tabular format, in 1-foot incremental elevations of fill and storage volumes in cubic feet,**

with cut and fill areas shown on a plan. The 1.5:1 Compensatory storage ratio does not need to be obtained at each 1-foot increment and may be obtained as a total over the floodplain area, but a minimum of 1:1 ratio shall be maintained at all 1-foot increments;" Calculations were provided but they are not in volumetric units, and there is no documentation of the 1.5:1 ratio where provided. In using the CAD file provided Engineering obtaining a ratio of approximately 1.3:1. Please provide revised calculations as requested per the Bylaw. (9/26/2022)

- Applicant response 10/5/22: We have revised some of the grading in the CAC parking lot to lessen the amount of fill and increase the compensatory storage to meet the 1.5:1 ratio required by the bylaw. Calculations are shown on Sheet C-009 and the CAD file has been provided to Engineering. (10/5/2022)
 - Comment has been addressed (11/4/2022)

16. The Engineering Divisions reserves the right to comment on future submittals related to any new or previously submitted information provided to the Town for review. (8/31/2022)

- Applicant response 9/15/22: Comment Noted. (9/16/2022)
 - Comment remains pertinent. (9/26/2022)

Engineering Division Comments (9/26/2022)

17. The discharge location for "Filter Strip A8" flows over the "Constructed Grass Paved Fire Lane" that is also a walkway/driveway. This could cause an issue during high storm events or icing conditions. Recommend either elevating the roadway and piping the discharge under the fire lane or obtaining Concord Fire Department approval of the condition. (9/26/2022)

- Applicant response 10/5/22: The Sheet C-003 has been revised to add 3-8" pipes to outlet the area bounded by the fire lane and the Academy Village parking. These culverts have been modeled in HydroCAD to ensure the area will not over top for the 100-year storm. (10/5/2022)
 - Comment has been addressed. (11/4/2022)

18. Provide a detail of the DMH P2 showing the weir construction. (9/26/2022)

- Applicant response 10/5/22: A detail for DMH P2 has been added to Sheet C-008. (10/5/2022)
 - Comment has been addressed. (11/4/2022)

19. Please identify material stock pile areas on the Site Preparation Plan. Also, add a note to avoid heavy equipment in the infiltration areas. (9/26/2022)

- Applicant response 10/5/22: We have added a note to Sheet C-003 indicating the infiltration areas shall not be used for stockpiling and heavy equipment should avoid these areas. Additionally, we have discussed the location of stockpiles and laydown areas with the Natural Resources Director. We have indicated that the project will be complex and multi-phased and it is likely that most areas within the disturbed limit of work will be used for temporary stockpiles and/or material storage laydown areas. A contractor has not been selected yet to provide logistic plans. We have proposed a condition to limit the areas used for stockpiling and will provide a construction staging plan and schedule to the town prior to the pre-construction site visit. (10/5/2022)
 - Comment has been addressed. (11/4/2022)



-
20. The 118 Contour around the Water Quality Swale is incorrect. It crosses the Fire Lane at the “118.0 (ex)”, but also continues on and closes on its self in the swale. Please revised the grading of the swale.
- Applicant response 10/5/22: The contour have been corrected on Sheet C-003. (10/5/2022)
 - Comment has been addressed. (11/4/2022)
21. On the “FLOODPLAIN IMPACT AND MITIGATION PLAN” the Legend in the “Floodplain Fill Areas” has two green hatches. It is presumed that the 120.0-120.3 has is supposed to be magenta and not green, but please revise the plan for the final plan set.
- Applicant response 10/5/22: The legend has been corrected on Sheet C-009. (10/5/2022)
 - Comment has been addressed. (11/4/2022)

Engineering Division Comments (11/4/2022)

22. In the October 28, 2022 Transportation Impact Assessment it is stated that the project will reduce the number of campus parking spaces from 204 to 147 and that “a potential parking deficit of 24 spaces may exist during the peak parking demand period to accommodate actual observed parking demands within the campus”. How is the parking deficit being addressed? Where will the 155 faculty and staff mentioned in the assessment park during the deficit times? Additionally, do any students drive to school, and how many school visitors are there on a daily basis?
23. A further zoning relief request for parking will result in a total relief of 54%, which seems excessive? How common is this for institutions like Concord Academy?
24. Can the dispersing of trips at the two main gates with on-site circulation be demonstrated graphically?
25. The Transportation Impact Assessment states that “the Project will not result in a material increase in traffic or parking demands over that associated with current campus activities”, but during the summer camp season (drop off and pickup) there is an existing traffic issue that exists. The reduction of on-site parking will only exacerbate this issue. What traffic mitigation(s) is planned during the summer camp season?
26. The Transportation Impact Assessment states “When special events are scheduled at the campus, they are typically scheduled in the evening or on weekends ...” If the site plan is approved, a condition is should be added to strictly limit special events to evenings and weekends.
27. What is the difference between the two peak demand periods (12 pm Wednesdays and Fridays, and 12 pm Tuesdays and Thursdays) for parking mentioned?
28. Is there any information to substantiate that the 240 available on street parking spaces in a 5-minute walking distance identified in the 2019 parking demand study are still available?
29. Because of the concern that on-street parking may not be adequate for the proposed changes and the drop off/pick up problems will grow worse, a post construction review of the traffic



and parking after 6 months of issuing occupancy should be performed and reported to the Town.

- 30. In the October 28, 2022 Transportation Impact Assessment it is stated “Lines of sight at the intersections of Main Street with the relocated West Gate and the reconstructed (widened) west driveway will meet or exceed the recommended minimum sight distance for safe operation with consideration of prohibiting parking within 20 feet of the driveways.” How this 20 foot is prohibited parking being addressed? Are existing parking space revisions required? Does VAI recommend any other parking layout changes to improve safety? If so they should be shown on the plans for review, and these changes should be included in the Right of Way (ROW) and/or Driveway Permit Application to CPW.**
- 31. In VAI’s review of the existing conditions of the street proximate to the campus, have they identified any safety issues with pedestrian crossings and bicycle use given that nearby locations are listed as “high bicycle crash cluster locations”?**