

January 4, 2021

Devens Enterprise Commission
c/o Mr. Neil Angus, AICP CEP, LEED AP
Environmental Planner
33 Andrews Parkway
Devens, MA 01434

RE: Nitsch Project #9419
King Street Properties
Site Plan and Stormwater Review
Devens, MA

Dear Mr. Angus:

Nitsch Engineering received and reviewed the Site Plans (the Plans) entitled, "45 Jackson Road – Lot 1 – Site Development Plan, Devens, Massachusetts", dated November 5, 2020 and revised December 24, 2020, prepared by Highpoint Engineering, Inc. (HEI). In addition, Nitsch Engineering has received and reviewed the following supplemental documents submitted by the Applicant:

1. Supplemental Project Narrative, prepared by HEI, dated December 24, 2020; and
2. Supplemental Stormwater Report, prepared by HEI, dated December 24, 2020.

Nitsch Engineering is providing responses to comments with respect to Site Plan and Stormwater Management in this letter. Please note that traffic and landscape review are being provided in separate letters.

Nitsch Engineering met with you, HEI, and Peter Lowitt via Zoom on December 31, 2020 to review the outstanding comments and discuss strategies to resolve the comments. The notes from this conversation are referenced within this letter for context. For clarity, we have provided our initial comments from December 4, 2020 in black font, the HEI response in red font, and our updated response is provided in **black bolded** font.

Many of our updated comments identify updates to be incorporated into the final plans and Stormwater Report for the project. **As an overall comment, we request that the final Stormwater Report be comprehensive in addressing all comments (i.e., not an additional supplement, but a final document with all required documentation).** This will provide a comprehensive record of the stormwater design for the project.

PROJECT UNDERSTANDING

King Devens LLC is seeking a Level 2 – Unified Permit including Site Plan approval and a Wetland Request for Determination of Applicability (RDA) for the construction of a +/- 150,000 gross square foot R&D/manufacturing building and associated site improvements on an easterly 14-acre portion of the ~24-acre parcel of land located at 45 Jackson Road. This application also seeks conceptual approval for the overall campus master plan (general size, location, and layout) for future development phases on 45, 57, 59, and 75 Jackson Road. The overall campus master plan includes a multi-phased five (5)-building, 750,000± GSF biomanufacturing campus to provide facilities for production of medicines and associated life science products.

This project site is part of a larger watershed area that was detailed in a report entitled *Roadway, Utility and Drainage Improvements – Jackson Road – Route 2 Gate to Hospital Road* by MassDevelopment, dated February 2000. A detention pond was constructed as part of this master plan and is located to the northwest of this site. This detention pond was designed with the intention of mitigating runoff from the entire larger watershed area. Therefore, the stormwater management plan for Lot 1 is only required to meet or decrease peak rates of runoff up to the 25-year storm event. Stormwater discharges exceeding the 25-year storm up to

and including the 100-year storm and including the 50-year storm can be released to the off-site regional detention pond.

Based on Nitsch Engineering's review of the submitted documents and the above-referenced regulations, we offer the following comments for consideration.

DEC SITE PLAN REVIEW DESIGN STANDARDS

1. The Application for Level 2 – Unified Permit, Site Plan Review indicates that the building gross floor area will initially be approximately 100,000 GSF, but that the project is being permitted for a maximum build out of 150,000 GSF. The Zoning Summary Table on Sheet G200 indicates the initial GSF of 100,000, but this number and associated calculations should be updated to reflect the 150,000 GSF as described in the Application.

High Point Response (12/14/2020): The Plans will be revised to amend the Zoning Conformance table to include maximum build-out of 150,000.

Nitsch Response (01/04/2021): The Zoning Summary Table has been updated. Comment closed.

2. The Existing Conditions Plan (Sheet C200) is not stamped by a Professional Land Surveyor (PLS). As this plan shows property line information, we recommend that it should be stamped by a PLS.

High Point Response (12/14/2020): The Plans will be revised to include an existing conditions plan stamped by a Professional Land Surveyor.

Nitsch Response (01/04/2021): The Existing Conditions Plan has been stamped. Comment closed.

3. The parking space counts within the Application for Level 2 – Unified Permit, Site Plan Review and in the Parking Summary table on Sheet C400 do not appear to be consistent with the parking shown on the plan, including the total number of parking spaces and the number of compact and rideshare spaces. The Applicant should review these discrepancies and confirm the proposed number of spaces is in accordance with 974 CMR 3.04(3)(a)1.

High Point Response (12/14/2020): The parking space count, including spaces dedicated to compact and rideshare uses summarized on the Level 2 Application and Report will be reconciled with the Plans.

Nitsch Response (01/04/2021): The Applicant has updated the plans and Parking Summary Table. We noted two (2) small discrepancies for the electric vehicle and ride share spaces (both have 10 rather than eight and nine [8 and 9] as noted in the Table). This provides enough to meet the 5% minimum for both types of spaces. We also note that one (1) of the rideshare spaces also has an accessible label – there are sufficient accessible spaces without this space. Comment closed pending the incorporation of this information.

4. **974 CMR 2.07(2), Table 1** provides design standards by roadway classification. It is unclear if the proposed roadways would be classified as internal driveways or local roads. In either case, the proposed roadway width is currently 26 feet, which exceeds the design widths for both classifications.

The Applicant should evaluate the potential to reduce the roadway width and meet the appropriate design standards.

Highpoint Response (12/14/2020): The project driveways are not subdivision roadways as defined in 974 CMR 2. The driveways serve multiple buildings and therefore the wider driveway design is established to provide 2 – 12' drive lanes together with a 1' fog line at each curb, resulting in a total design width of 26'.

Nitsch Response (01/04/2021): During the call on December 31, 2020, it was discussed that the roadways shall be reduced to a maximum of 24 feet wide to meet the DEC regulations. HEI agreed to incorporate this change into the final plan set and will update the impacted stormwater calculations as required. We note this should result in a decrease in the sizing of the subsurface systems. Nitsch Engineering understands the final plan set will be provided for our review prior to the submittal of the Building Permit application.

5. **974 CMR 2.07(3)** requires traffic calming measures to be integrated into roadways. The Applicant should provide traffic calming measures accordingly, including reduced roadway width, raised intersections, signalized/raised crosswalks, or speed humps.

Highpoint Response (12/14/2020): The Project roadways are not subdivision roads as defined in 974 CMR 2.0. The driveways were designed at 26' width to accommodate access to multiple building sites within the development, providing 2 – 12" fog lines at the curbs and 12' travel lanes. The Applicant does not intend to install additional traffic calming measures within the driveway network.

Nitsch Response (01/04/2021): During the call on December 31, 2020, it was discussed that traffic calming measures shall be implemented on the primary entrance drive to meet the intent of the DEC regulations, protect pedestrians, and reduce speeds. HEI noted that they would review raised crosswalks or speed tables and would incorporate this change into the plans as part of the Conditions for DEC Approval. This includes evaluation of grading and drainage changes and updated stormwater calculations as required. Nitsch Engineering understands the final plan set will be provided for our review prior to the submittal of the Building Permit application.

6. **974 CMR 2.07(3)** requires cement concrete or vertical granite curbing (VGC). The Layout and Materials Plan appears to provide precast concrete curb (PCC) and vertical granite curbing. However, details are provided for cape cod berm curbing and VGC. The Applicant should confirm that asphalt berm curbing is not proposed at the site and should provide a detail for the PCC.

Highpoint Response (12/14/2020): A pre-cast concrete curb detail will be added to the Plans.

Nitsch Response (01/04/2021): A pre-cast concrete curb detail was not added to the plans. The Applicant should add the detail to the detail sheets. Comment closed pending the incorporation of this information.

7. 974 CMR 2.07(f) requires that proposed water mains shall be designed to form a continuous loop within the existing system. Based on the existing conditions information, it is unclear if this requirement is being met. Additionally, we recommend that the Applicant consider extending the proposed water tee within the Lot 1 driveway to the existing main in Jackson Road.

Highpoint Response (12/14/2020): The proposed 10" water main will connect to an existing 10" water main stub located within Jackson Road. The proposed 10" water main will connect to an existing 8" water main located at the north end of the site, creating a water loop. This design has been previously reviewed and approved by Devens Utilities.

Nitsch Response (01/04/2021): Based on the Applicant's response, we understand that the proposed service forms a loop as required and that this proposed water layout has been approved by Devens Utilities. Comment closed.

8. **974 CMR 3.04(3)(a)1.c** requires six (6) accessible parking spaces when parking totals are between 201 and 500 spaces. For full build-out of Lot 1, the Applicant is providing greater than 200 spaces; however, only five (5) accessible parking spaces are currently provided. The Applicant should review this requirement and provide adequate accessible spaces.

Highpoint Response (12/14/2020): An additional accessible parking space will be added to the Plans to satisfy ADA minimum parking requirements in the event the banked parking is constructed exceeding 200 spaces.

Nitsch Response (01/04/2021): The additional accessible parking space has been added. There is one (1) space that is labeled both rideshare and accessible parking space. This should be clarified by updating the notation on the plans. Comment closed pending the incorporation of this information.

9. **974 CMR 3.04(3)(a)1.h** requires bicycle storage facilities for all developments. The bicycle storage area appears to be located on the southeast corner of the proposed building. However, it should be labeled on sheet C400 and detailed within the Site Details. We note that it appears that eight (8) racks are provided and that they should be covered if the intention is to comply with LEED requirements.

Highpoint Response (12/14/2020): The bicycle storage spaces depicted on Sheet C400 will be clearly identified. The Applicant does not intend to seek LEED certification for the Project and therefore bicycle storage coverage is not proposed.

Nitsch Response (01/04/2021): The bicycle storage area has been labeled on sheet C400 and added to the site details. The title of the detail is incorrect and should be updated. Comment closed pending the incorporation of this information.

10. **974 CMR 3.04(3)(a)1.d** requires reflective yellow or reflective white paint for parking lot striping. The note in the detail on Sheet C702 should be revised to note that the paint shall be reflective.

Highpoint Response (12/14/2020): The detail on Sheet C702 will be revised on the Plans to note that traffic markings shall be reflective white paint.

Nitsch Response (01/04/2021): The detail has been revised to note that traffic marking shall be reflective white paint. Comment closed.

11. **974 CMR 3.04(3)(a)1.e** encourages parking lots less than 10,000 square feet in area to utilize an open drainage system rather than a closed drainage system. The front parking lot should be considered under this approach as there appears to be an opportunity to integrate bioretention or similar measures for stormwater treatment. As noted in Comment 14, alternative pavement types including porous asphalt should also be considered for the parking stalls.

Highpoint Response (12/14/2020): The Applicant will evaluate feasibility of locating a rain garden at the northeast corner of the service driveway that extends around the east and north side of the building. The feasibility of this will be predicated on the ability to modify the landscape mound east of the building and maintain on-site soil storage volume in this area. The Applicant is obligated to store excess soils on site and minimize soil export in accordance with the requirements of Devens Soil Management Policy and the Land Disposition Agreement.

Nitsch Response (01/04/2021): An additional rain garden has been added to the northeast corner of the site to treat the front parking lot and address this requirement. Comment closed.

12. **974 CMR 3.04(4)(g)** requires standard “STOP” at the intersection of driveways with streets and roads. The Applicant should evaluate the intersections of the internal driveways and curb cuts at Jackson Road to provide adequate signage for traffic safety.

Highpoint Response (12/14/2020): Standard regulatory signage and traffic markings for “Stop” control will be added to the driveway entrance locations and included on the Plans.

Nitsch Response (01/04/2021): Stop signs were added to the plans for the proposed intersections at Jackson Road and the detail was added to the detail sheet. Comment closed.

13. **974 CMR 3.04(5)** requires that the Applicant shall obtain a letter from Fire Chief stating there is adequate access for fire equipment. This should be provided to the DEC.

Highpoint Response (12/14/2020): Noted. The Applicant will coordinate with the Fire Department for approval of the site access plan and submitted to the DEC staff.

Nitsch Response (01/04/2021): Comment closed pending submission of the requested letter to DEC.

DEC STORMWATER DESIGN STANDARDS

14. **974 CMR 3.04(4)(b)(4)** requires that catch basins or other drainage features in loading/unloading and/or fueling areas shall be equipped with post-indicator valves (which are to remain in the closed position) on the outlets for containment in the event of any spills. There appears to be an unlabeled catch basin in the loading dock; however, it is unclear how this drainage condition will function. Please clarify how the loading dock will be drained and include a post-indicator valve in any drain inlet in the loading dock area.

Highpoint Response (12/14/2020): The catch basin depicted on the plan is inadvertently shown from the existing conditions background and is to be removed during site demolition. This will be removed from the plan. The loading dock area is not a traditional truck well but is graded away from the loading platform. A trench drain will be added at the edge of the concrete loading pad to collect flows from the immediate loading area. A post-indicator valve (PIV) will be added in-line on the exit drain, however leaving the PIV in the closed position will prohibit normal flow to the Project drainage system. We recommend leaving the post indicator valve in the open position and place signage that directs loading operator to close the valve in the event of a spill.

Nitsch Response (01/04/2021): A detail of the trench drain should be included on the detail sheet and the label on sheet C400 should be updated to “trench drain” rather than “area drain.” The Applicant should add a water quality structure between the trench drain and SWM-02 for pretreatment. During the call on December 31, 2020, it was agreed that it is acceptable for the post-indicator valve to be left in the open position with signage that directs the operator to close the valve in the event of a spill. These plan changes and supporting calculations (i.e., sizing calculations for the water quality structure) should be incorporated into the final documents. Nitsch Engineering understands the final plan set will be provided for our review prior to the submittal of the Building Permit application.

15. **974 CMR 4.08(2)(c)(ii)** requires irrigation water shall be derived from detained treated stormwater (stormwater harvesting) or roof drainage to the maximum extent feasible. On-site cisterns may be installed to store water for irrigation. Can the Applicant please confirm if irrigation is intended? If so, the Applicant should review and address this requirement.

Highpoint Response (12/14/2020): Irrigation is intended for the Project consisting of short-term, temporary irrigation to provide watering during the initial 2-3 year growing period. A permanent irrigation system will be installed for turf grass areas and select landscape zones around the building. The master planned development includes three buildings which presently anticipates a centralized irrigation system for the development. The Applicant intends to install an irrigation well for irrigation water source for the development, to be approved by Devens Utilities.

Nitsch Response (01/04/2021): During the call on December 31, 2020, Neil Angus and Peter Lowitt requested that HEI evaluate the potential to use stormwater runoff from the building as the primary source of irrigation water rather than the irrigation well to meet the DEC Regulations. As noted above, the irrigation well requires separate approval and should be considered a secondary source of water. HEI agreed to evaluate a rainwater harvesting system and will provide an update to the DEC.

16. **974 CMR 4.08(2)(c)(vi)** requires that all projects incorporate low impact development (LID) techniques for stormwater management to the maximum extent feasible. The proposed stormwater management design primarily uses a large number of proprietary water quality structures for pretreatment prior to discharging to underground infiltration systems. To comply with this requirement, the Applicant should evaluate incorporating LID techniques throughout the site for pretreatment or provide justification for why this is not feasible. We note that there appear to be locations on the site where LID techniques may be appropriate, such as porous pavement on sidewalks or parking stalls, roadside swales, and additional bioretention basins in parking islands. The Applicant should review and address this requirement.

Highpoint Response (12/14/2020): To address this requirement, the Applicant offers to install pervious pavers in select locations outside of the east and west building entrances. Roadside swales are not feasible given the density of the development plan. Additional bioretention areas were considered west of the building but not proposed due to the access road location being curbed, insufficient width of island, and need to achieve tree planting requirements. Installing a bio-retention area at the western parking field is not feasible due to slope grading and adjacency to future Lot 3 development. Applicant will consider construction of a rain garden at the northwest corner of the site. However, this area is in a cut condition so additional considerations regarding adequate depth to avoid ledge removal or significant groundwater control need to be evaluated before this commitment can be made. If feasible a rain garden will be added to this area.

Nitsch Response (01/04/2021): An additional rain garden has been added to the northeast corner of the site and permeable pavers have been added to the east and west entrances of

the building. During the call on December 31, 2020, HEI agreed to evaluate additional pervious pavement for the parking stalls in the westernmost parking lot, which may allow for the reduction or removal of subsurface system SWM-05. These changes should be incorporated into the final plan set and Stormwater Report. Nitsch Engineering understands the final plan set will be provided for our review prior to the submittal of the Building Permit application.

17. **974 CMR 4.08(3)(a)** requires that biofiltration basins shall be the preferred method to reduce curbing, piping, and structures and provide additional overland treatment and recharge. They shall be designed in accordance with the Handbooks. The Applicant should review and address this requirement.

Highpoint Response (12/14/2020): Due to the density of the development it is not feasible to install additional biofiltration basins within the Project area with the exception of what is proposed, and to meet tree planting requirements within the other parking and roadway landscape island locations. A rain garden area will be proposed at the northwest corner of the site pending additional design considerations due to location within cut condition of the site. Recharge is provided via underground infiltration chambers spread out through the west area of the site at three locations.

Nitsch Response (01/04/2021): A rain garden has been added to the northeast corner of the site to capture the runoff from the parking area on the east side of the building. Comment closed.

18. **974 CMR 4.08(3)(b)** requires, in addition to compliance with the SMS, the post-development peak rate of stormwater discharge off-site shall not be greater than the pre-development peak rate of stormwater discharge for the 2, 10, 25, 50, and 100-year storm events from any point of discharge on the site. The 50-year storm was not analyzed at all and the 100-year was analyzed but the post-condition HydroCAD report was not included in the appendix. Although it is not necessary to mitigate peak rates for storms larger than the 25-year for this site, it would be helpful to include the calculations in the report in order to verify the stormwater design's performance on the site. The Applicant should review and address this requirement.

Highpoint Response (12/14/2020): The Applicant's engineer will run the hydrologic model for the 50 -year and 100-year storm recurrence intervals and provide summaries for the peer reviewer's consideration. As noted, the design achieves the required 25-year design storm mitigation prior to discharge as mandated by Devens Engineering.

Nitsch Response (01/04/2021): The 50- and 100-year design storms were provided in the HydroCAD model for the post condition. After the call on December 31, 2020, the pre-development HydroCAD was also provided. The 50-year storm was not included in the pre-development HydroCAD report, but the peak rates of runoff were decreased for the 2-, 10-, and 25-year storm for the three (3) points of analysis. The 50-year storm for the pre- and post-conditions should be provided in the final Stormwater Report to meet this requirement. Comment closed pending the incorporation of this information.

19. **974 CMR 4.08(3)(d)** requires that side slopes above the design water level shall be 3:1 (horizontal to vertical) or flatter and conform to the slope of the existing topography without abrupt or unnatural breaks in slope. The detail for the rain garden shows the side slopes as 2:1. The Applicant should review and address this requirement.

Highpoint Response (12/14/2020): Rain Garden RG-1 includes a 6:1 approach slope for 3', and 2:1 slope for 12" water depth. Therefore, average the average slope from the surface water entrance location to bottom of RG-1 is greater than 3:1. The detail will be revised to reflect this condition.

Nitsch Response (01/04/2021): The detail was revised. Comment closed.

20. **974 CMR 4.08(4)(f)** requires that the bottom of all infiltration structures be a minimum of 4 feet above high groundwater elevation. According to the Geotechnical Report, the design groundwater elevation for Building 1 is 336, which is above the bottom elevation of all five (5) of the underground infiltration systems. The design groundwater elevation does not appear to align with the groundwater information shown on the Test Pit Plan dated November 5, 2020 in the appendices of the Stormwater Report. The Applicant should review and address these inconsistencies.

Highpoint Response (12/14/2020): The Engineer has reviewed in more detail the geotechnical report with respect to the soil testing performed. Based upon the geotechnical data, the peak groundwater elevation measured at the Bldg. 2 site of 335.9. Groundwater measurement at the Bldg. 1 site is 334.5.

Based upon the testing results, the groundwater is elevated at the east area of the site, likely attributed to shallow bedrock and presence of fill soils that may result in perched water conditions. The groundwater elevations drop across the site east to west, which is coincident with the drop in topography. Groundwater was encountered at lower depths with respect to existing grade at the west area of the site, which is demonstrated in the soil test logs prepared by the Engineer. The subsurface infiltration facility designs were verified to maintain a minimum 4' groundwater separation based upon the test pits and boring data.

Regarding proposed recharge facility SWM-01, this will be converted to a subsurface detention facility with impervious liner due to the elevation of groundwater. The discharge from this facility will be controlled under the hydrologic model and routed to the west side of the building for recharge.

Nitsch Response (01/04/2021): The plan set does not provide the locations of the soil testing with respect to the footprints of the subsurface infiltration systems. However, it appears that the estimated seasonal high groundwater used in the design of the subsurface infiltration systems was based on the groundwater elevation measured in TP-136. TP-115, which is also in the vicinity of the systems and closer to SWM-02 and SWM-03 than TP-136, has an estimated seasonal high groundwater elevation of 323 ft which would mean a separation of less than 4 ft between the bottom of the systems and groundwater.

Given the differences between the test pits in proximity of the systems, the Applicant should perform test pits within the footprint of each infiltration system (SWM-02, SWM-03, SWM-04, SWM-05, and SWM-06) prior to construction to ensure that the proper assumptions were made for soil texture, groundwater, and infiltration rate, and a mounding analysis is not required.

21. **974 CMR 4.08(4)(g)** requires conducting permeability tests in infiltration basins before the basin design in all infiltration basins. The Geotechnical Report included a permeability test near Building 1. Additional testing should be performed within the footprints of each proposed basin. We note that the infiltration rate utilized within the design calculations (1.02 inches/hour) appears conservative based on the observed permeability rate of approximately 5 inches/hour. We also note that the Hydrologic Soil Group (HSG) is referenced in the Stormwater Report narrative as HSG A but the soil type used in the infiltration calculations is HSG B. The Applicant should review these items for consistency.

Highpoint Response (12/14/2020): The Engineer took into consideration the in-situ field permeability testing results with the estimated Rawls' rates associated with classification as

defined in the DEP SWMP. Based upon the peer reviewer's suggestion, the Engineer has re-evaluated the infiltration rate assumptions and propose a 3 inch/hour infiltration, being the average of the field-measured infiltration rate (5 inch/hr) and associated Rawl's infiltration rate (1 inch/hr) based upon soil classification. This takes advantage of the faster rate to reduce infiltration system size but incorporates design contingency for potential variations in natural in-situ soil density that may affect rate. The hydrologic model and infiltration system design will be revised to reflect this proposed rate and submitted to the peer reviewer for comment.

Nitsch Response (01/04/2021): The differences in infiltration rates have been reconciled and 3 inches/hour is an acceptable infiltration rate. Comment closed.

STORMWATER DESIGN AND CALCULATIONS

22. The stormwater management report indicates that rainfall data used in the calculations references "TP-40 – Rainfall Frequency Atlas of the United States." Nitsch Engineering recommends using NOAA Atlas 14 Data as it represents the accurate current rainfall.

Highpoint Response (12/14/2020): The Engineer used TP-40 Rainfall Frequency data as outlined in 974 CMR 4.08 and as acknowledged in discussions with Devens Engineering. We note that the design of the existing stormwater management facilities that serve the property and surrounding watershed area were designed using TP-40 Rainfall Frequency data. Therefore, the Engineer designed the proposed stormwater facilities using the same TP-40 rainfall data for consistency.

Nitsch Response (01/04/2021): Noted. Comment closed.

23. The rain garden/bioretenion basin referenced on Sheets C400 and C500 is not described in the narrative. It is included in the TSS removal calculations but is not described in the watershed descriptions. The bioretention basin should be incorporated into the hydrologic calculations for the site to confirm that the 1-inch water quality storm will be filtered through the basin without bypassing and to confirm that larger storms can be adequately accommodated without damaging the basin.

Highpoint Response (12/14/2020): The hydrologic model will be evaluated to confirm that the 1-inch water quality storm will be filtered through the basin without bypass, and to confirm the larger design storms can be conveyed through the bypass drainage system. If required adjustments will be made to the contributing watershed areas to meet the 1-inch requirement. The revised Stormwater Management Report will be submitted for review.

Nitsch Response (01/04/2021): Supporting calculations showing that the rain gardens can filter the 1-inch storm were provided after the call on December 31, 2020. The rain gardens to have capacity to filter the 1-inch storm. We note that in the 100-year storm, Rain Garden #2 appears to pond slightly (approximately 1 inch) into the adjacent roadway. The Applicant should review this condition and incorporate revisions into the final plan set such that runoff is contained within the basin limits. Nitsch Engineering understands the final plan set will be provided for our review prior to the submittal of the Building Permit application.

24. The plans and details refer to the rain gardens as "rain gardens" when the Stormwater Management Report refers to them as "bioretention." Please use one (1) name for clarity and to avoid confusion. As it is proposed for pretreatment, the rain garden/bioretention basin should include an underdrain and be lined to prevent infiltration. Nitsch Engineering also recommends that the filter fabric be removed from between the mulch and soil in the location shown in the detail on sheet C703, as this has been found to

cause clogging. We recommend that the Applicant review the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Handbook and the UNH Stormwater Center bioretention design standards for alternative sections that do not include filter fabric.

Highpoint Response (12/14/2020): The rain garden/bioretention area nomenclature will be reconciled between the Plans and the Stormwater Management Report for consistency. An underdrain and liner will be added to the rain garden/bioretention area designs. The filter fabric will be removed between the mulch and soil as depicted on the detail. All revision will be made to the Plans.

Nitsch Response (01/04/2021): The naming for the rain gardens has been reconciled and the detail has been updated based on Nitsch Engineering's initial comments. Comment closed.

25. The naming and numbering of the infiltration basins and the watersheds drain to them is inconsistent between the narrative, drawings, and HydroCAD. Stormwater Management System 1 is labeled as Stormwater Management System 2 in the design plans. In the Post-Development Conditions section of the narrative, it is stated the PR WS-6 discharges to Stormwater Management System 2 when it appears to discharge to Stormwater Management 3 on the design plans. PR WS-5a and 5b are not described separately in the narrative but are shown as two (2) separate areas on the watershed plan. The Applicant should review these items for consistency.

Highpoint Response (12/14/2020): The infiltration basin and watershed area designations will be reconciled for consistency between the Plans and the Stormwater Management Report. Descriptions of PR WS-5a and 5b will be added to the narrative for consistency with the Post-Development Watershed Plan. The revised Stormwater Management Report will be submitted for review.

Nitsch Response (01/04/2021): An update to the narrative descriptions of the watersheds was not provided with the Supplemental Stormwater Report. However, it appears that the post development watershed plan and HydroCAD match. For clarity, the Applicant should incorporate the requested narrative into the final Stormwater Report for consistency with the HydroCAD and watershed plan. Nitsch Engineering understands the final Stormwater Report will be provided for our review prior to the submittal of the Building Permit application.

26. The post-development watershed areas are inconsistent between Table 4 in the narrative and the proposed condition HydroCAD model. The description of Table 4 also states that times of concentration are included in the table when they are not. The Applicant should review these items for consistency.

Highpoint Response (12/14/2020): Table 4 in the narrative will be revised accordingly to reconcile the watershed areas with the watershed areas defined in the HydroCAD model. Times of concentration for each watershed will be added to the narrative. The revised Stormwater Management Report will be submitted for review.

Nitsch Response (01/04/2021): Watershed areas have been reconciled between the narrative and the HydroCAD model. Times of concentration were not added to the table but were added to the Watershed plan and match the times of concentration in the HydroCAD model. Comment closed.

27. Catch Basin #7 appears to be used as both an inlet and an outlet for SWM-01. There is some concern about this design. First, stormwater flowing backwards through a water quality structure could cause

problems. Second, the catch basin is in the driveway and if it overflows this would be a significant amount of overland flow over this impervious area. This could lead to ponding, icing, or flooding. We recommend either piping the overflow from SWM-01 to SWM-02 or rerouting the catch basins that discharge to SWM-01 into SWM-02 instead.

Highpoint Response (12/14/2020): SWM-01 will be redesigned as a subsurface detention facility with impervious liner due to elevated groundwater elevations east of the building. The controlled outlet of SWM-01 will be routed via pipe network to one of the three subsurface infiltration facilities located west of the building. This will eliminate potential backwatering and surcharging through open drains in the driveway. The revised Plans will be submitted for review.

Nitsch Response (01/04/2021): SWM-01 has been redesigned as a subsurface detention facility and routed via pipe network to SWM-04. Comment closed.

28. Many of the subsurface infiltration systems do not have a specified overflow. In the event of a surcharge condition, the Applicant should evaluate where the water would overflow to confirm that it will not impact the buildings or abutting properties.

Highpoint Response (12/14/2020): The subsurface infiltration systems will be redesigned with overflows to downgradient locations either at the existing municipal drain at the south end of the site, or to a temporary drain outfall located at the north end of the site at the limit of work. Under the future Lot 3 development plan, this drain outfall will be eliminated and overflow drainage from the Lot 1 development will be conveyed through future Lot 3 drainage infrastructure to discharge to the existing westerly Devens municipal stormwater basin.

Nitsch Response (01/04/2021): The revised plans provide for overflows from the subsurface systems to downstream systems or to the outfalls along the western project limits. During the call on December 31, 2020, Nitsch Engineering requested that HEI update the HydroCAD methodology to use dynamic simulation that will allow for tailwater impacts from the system interconnections to be accounted for within the modeling. We received the revised HydroCAD after the call and noted the following:

- a. The HydroCAD model for the 100-year storm in System 2 indicates ponding slightly over top of stone;
- b. The HydroCAD model for System 3 notes 36-inch pipes, but the plans show 48-inch pipes. Additionally, the outlets in the HydroCAD model should be updated so that the orifice is routed through the culvert (outlet pipe);
- c. The HydroCAD model for the 100-year storm in System 4 indicates ponding about 6 inches over top of stone;
- d. The HydroCAD model for System 5 indicates ponding about 9 inches over top of stone; and
- e. Details for each outlet control structure (consistent with the outlets modeled in HydroCAD) should be provided in the final plan set.

The Applicant should review the ponding depth in the 100-year storms and revise the designs so that the storms are contained within the system section. We note that there may be an opportunity to optimize the volume of the system using chambers, rather than pipes. These changes should be incorporated into the final plans and Stormwater Report. Nitsch Engineering understands the final plan set and Stormwater Report will be provided for our review prior to the submittal of the Building Permit application.

29. SWM-04 and Catch Basin #1 discharge at the edge of the limit of work onto the adjacent parcel which is a significant distance away from the existing detention pond. Draining onto the parcel could cause problems with the development of the adjacent site in the future. We recommend piping directly to the detention pond rather than assuming it will reach the pond via overland flow.

Highpoint Response (12/14/2020): The Engineer is aware of the temporary drainage outfall location discharging to Lot 3 (future development parcel contemplated under the Master Plan), which provides overflow discharge for design storms exceeding the 25-yr storm event from the Lot 1 subsurface infiltration facilities. Under the future Lot 3 development plan, this drain outfall will be eliminated and drainage from the Lot 1 development will be conveyed through future Lot 3 drainage infrastructure to discharge to the existing westerly Devens stormwater management basin. It is premature to design the Lot 1 overflow drain across Lot 3 until final design of Lot 3 development plan is completed.

Nitsch Response (01/04/2021): Based on the Applicant's response, we understand that the Lot 1 development discharge may be relocated or rerouted in the future when Lot 3 is constructed. Comment closed.

30. In the post-condition HydroCAD model, Pr-WS 9 and Stormwater Management System 5 do not discharge to one (1) of the two (2) identified points of analysis (POA). If this area discharges to the proposed storm drain main, it needs to be identified as another POA in both the existing or proposed condition or it needs to route to one (1) of the already identified POAs so that the pre- and post-runoff comparisons are accurate.

Highpoint Response (12/14/2020): A separate POA will be established for the analysis of the discharge to the municipal drain to be relocated under the south driveway. The design assumes the connection from SWM-5 to the municipal drain is an overflow to allow discharges associated with events exceeding the 25-year rainfall frequency as described in prior stormwater management analyses conducted for this area. The Stormwater Management Report will be revised to include analysis of the additional POA.

Nitsch Response (01/04/2021): POA-3 was added to the post-development HydroCAD model showing where SWM-6 (formerly SWM-5) and PR-WS9 discharge offsite. Following the call on December 31, 2020, the pre-development HydroCAD was sent. The HydroCAD report and the table in the Supplemental Stormwater Report do not match for the 25-, 50-, and 100-year post-development for POA-1. The 50-year storm was also not included in the pre-development HydroCAD. However, peak rates of runoff were matched or decreased for the 2-, 10-, and 25-year storm for all points of analysis. The final Stormwater Report should be updated to resolve these discrepancies. Comment closed pending the incorporation of this information.

31. Stormwater Management System 5 has no outlet shown in the HydroCAD other than infiltration. The plans show it discharging to the 30-inch storm drain line south of the site; however, it is not routed to any of the design points for comparison in the existing and proposed conditions. This should be reviewed and updated as necessary so that all stormwater is accounted for at the design points.

Highpoint Response (12/14/2020): A separate POA will be established at the entrance of SWM-5 to the municipal drain to be relocated. The design assumes the connection from SWM-5 to the municipal drain is an overflow to allow discharges associated with events exceeding the 25-year rainfall frequency as allowed in prior stormwater management analyses conducted for this area. The Stormwater Management Report will be revised to include analysis of the additional POA.

Nitsch Response (01/04/2021): POA-3 has been added to capture discharge from SWM-6 (formerly SWM-5). Comment closed.

32. Sheet G100 includes a note regarding use of basins during construction. We note that all basins proposed are infiltrating – not detention – and are not recommended for use during construction.

Highpoint Response (12/16/2020): Subsurface infiltration basins are not proposed to be used for temporary sediment basins during construction. Note 26 will be removed from the Grading/Drainage/Utility Notes section of the Plans.

Nitsch Response (01/04/2021): Note has been removed. Comment closed.

33. The Application for Level 2 – Unified Permit, Site Plan Review mentions a GrassPave area on-site. The GrassPave area should be called out on the plans and included in the details.

Highpoint Response (12/14/2020): The GrassPave surface treatment is proposed to be installed at the turnouts of the Lake George Street dead end reconstruction referenced on Sheet C401. A note will be added to describe this condition and limits of the installation. This surface treatment has been previously reviewed with the Devens Engineering and Fire Department.

Nitsch Response (01/04/2021): The note and detail has been added to the plans. Comment closed.

CONFORMANCE WITH THE MASSDEP STORMWATER STANDARDS

In accordance with **974 CMR 4.08(2)(a)**, Nitsch Engineering reviewed the stormwater design and calculations for general conformance with the MassDEP Stormwater Standards. Based on this review, Nitsch Engineering offers the following comments:

34. **Standard 2** requires stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. The post-development rates are greater than the pre-development rates for the 100-year storm. However, we understand that the Applicant is only required to mitigate up to the 25-year design storm prior to discharge to the regional basin.

Highpoint Response (12/14/2020): Noted. The Applicant concurs with this assumption and the Project has been designed accordingly.

Nitsch Response (01/04/2021): Comment closed.

35. **Standard 3** requires that the project provide adequate groundwater recharge consistent with MassDEP methodology. The recharge volume calculation in the Stormwater Report states that the total volume provided by the basins is 89,385 cubic feet. This appears to be approximately the entire volume of each of the systems and surrounding stone. The recharge volume should be revised so that it only includes the storage volume below the outlet of each of the systems.

Highpoint Response (12/14/2020): The stormwater infiltration basins are designed to store and infiltrate up to the 25-yr storm rainfall event. The presumption is the DEP recharge requirement of 0.6 inches over impervious area) as achieved through this design. The revised Stormwater

Management Report will demonstrate that the minimum recharge required under the DEP Stormwater Management Handbook is achieved below the outlet of each infiltration facility.

Nitsch Response (01/04/2021): The recharge volume has been revised to exclude SWM-1 and to include only the volume below the outlets of the infiltration systems. Comment closed.

36. **Standard 3** requires that infiltration structures must be able to drain fully within 72 hours. Please provide drawdown calculations for the underground infiltration chambers.

Highpoint Response (12/14/2020): The underground infiltration chambers have been designed to fully drain within 72 hours. The HydroCAD model will be run at an extended time period to demonstrate the approximate number of hours required to fully drain, if it does not occur within the standard 24-hour model run time period.

Nitsch Response (01/04/2021): The required drawdown calculations have been provided. Comment closed.

37. **Standard 3** requires that a mounding analysis be provided if the separation between the bottom of the infiltration chambers and seasonal high groundwater is less than 4 feet. According to the geotechnical report, the design groundwater elevation for building one is 336, which is above the bottom of all five (5) of the underground infiltration systems. The design groundwater elevation does not appear to align with the groundwater information shown on the Test Pit Plan dated November 5, 2020 in the appendices of the stormwater report. The Applicant should review and address these inconsistencies.

Highpoint Response (12/14/2020): The Engineer has reviewed in more detail the geotechnical report with respect to the soil testing performed. Based upon the geotechnical data, the peak groundwater elevation measured at the Bldg. 2 site of 335.9. Groundwater measurement at the Bldg. 1 site is 334.5. Based upon the testing results, the groundwater is elevated at the east area of the site, likely attributed to shallow bedrock and presence of fill soils that may result in perched water conditions. The groundwater elevations drop across the site east to west, which is coincident with the drop in topography. Groundwater was encountered at lower depths with respect to existing grade at the west area of the site, which is demonstrated in the soil test logs prepared by the Engineer. The subsurface infiltration facility designs were verified to maintain a minimum 4' groundwater separation based upon the test pits and boring data.

Regarding proposed recharge facility SWM-01, this will be converted to a subsurface detention facility with impervious liner due to elevation groundwater. The discharge from this facility will be controlled under the hydrologic model and routed to the west side of the building for recharge.

Nitsch Response (01/04/2021): As noted in our updated response to Comment #20, the plan set does not provide the locations of the soil testing with respect to the footprints of the subsurface infiltration systems. However, it appears that the estimated seasonal high groundwater used in the design of the subsurface infiltration systems was based on the groundwater elevation measured in TP-136. TP-115, which is also in the vicinity of the systems and closer to SWM-02 and SWM-03 than TP-136, has an estimated seasonal high groundwater elevation of 323 ft which would mean a separation of less than 4 ft between the bottom of the systems and groundwater.

Given the differences between the test pits in proximity of the systems, the Applicant should perform test pits within the footprint of each infiltration system (SWM-02, SWM-03,

SWM-04, SWM-05, and SWM-06) prior to construction to ensure that the proper assumptions were made for soil texture, groundwater, and infiltration rate, and a mounding analysis is not required.

38. **Standard 4** requires that at least 44% of the TSS must be removed prior to discharge to the infiltration structure if the discharge is within an area with a rapid infiltration rate (greater than 2.4 inches per hour). The narrative indicates that the soils on site are A soils and have a rapid infiltration rate. Please provide calculations showing that the bioretention/rain garden provides this level of treatment.

Highpoint Response (12/14/2020): The bioretention/rain garden areas will be analyzed to verify they provide the required 44% TSS removal of the 1-inch water quality volume for infiltration within soils with rapid infiltration. The analysis results will be included in the revised Stormwater Management Report.

Nitsch Response (01/04/2021): Supporting calculations showing that the rain gardens can filter the 1-inch storm were provided after the call on December 31, 2020. Based on this analysis, the rain gardens appear to be designed with the capacity to filter the 1-inch storm. Comment closed.

39. **Standard 4** also requires that stormwater management systems be designed to remove 80% of the average annual post-construction load of total suspended solids. The treatment trains utilized on-site for TSS removal are not described in the narrative or related specifically to the watershed areas making it difficult to understand if the TSS removal requirement is met for the entire site. There appears to be a portion of impervious area in watershed PR WS-10 that drains directly offsite without pretreatment. Runoff from this area should be treated before discharging offsite.

Highpoint Response (12/14/2020): The treatment trains upstream of the recharge facilities are either a hybrid catchbasin/water quality unit; a combined deep sump catchbasin connected to water quality unit, or bio-retention/rain garden connected to subsurface infiltration facility. TSS removal calculation worksheets are included in Appendix B of the Stormwater Report. The portion of impervious area in watershed PR WS-10 has been modified to be directed to a catch basin connected to a water quality unit prior to discharge. The revision will be depicted on the Plans.

Nitsch Response (01/04/2021): A water quality structure has been added to PR WS-10 and additional TSS removal calculations covering the treatment trains were added. We note that an additional water quality structure is needed downstream of the trench drain in the loading dock per Comment #14. Comment closed.

40. **Standard 4** also requires a Long-Term Pollution Prevention Plan, which was not provided with this submission.

Highpoint Response (12/14/2020): A Post-Construction Operation and Maintenance Plan is included in Appendix C of the Stormwater Report. This is intended to meet the Standard 4 Long Term Pollution Prevention Plan requirement.

Nitsch Response (01/04/2021): The Post-Construction Operation and Maintenance Plan does not provide procedures for storing materials and waste products inside or under cover, vehicle washing, spill prevention and response, maintenance of lawns gardens or other landscaped areas, or storage and use of fertilizers, herbicides, and pesticides. This information should be included in the Long-Term Pollution Prevention Plan as outlined in the MassDEP Stormwater Management Standards. We also note that the post-indicator

valve near the loading dock should be included in the Plan (both for preventative maintenance of the valve itself and its intended operation during spills). The Applicant should update the Long-Term Pollution Prevention and Operation and Maintenance Plans to include this information.

41. **Standard 8** is covered by a National Pollutant Discharge Elimination System (NPDES) Construction General Permit, but no Stormwater Pollution Prevention Plan (SWPPP) has been submitted. A SWPPP should be submitted to the DEC before land disturbance begins.

Highpoint Response (12/14/2020): An EPA NPDES Construction General Permit will be applied for 14 days prior to construction, and a Stormwater Pollution Prevention Plan will be prepared for the Project. A copy will be submitted to the DEC upon request.

Nitsch Response (01/04/2021): Comment closed pending submission of the SWPPP to DEC.

42. **Standard 10** prohibits illicit discharges to the stormwater management systems. The Illicit Discharge Statement should be provided and signed by the engineer of record before construction.

Highpoint Response (12/14/2020): The Applicant will prepare an Illicit Discharge Statement and submit to the DEC for record prior to construction.

Nitsch Response (01/04/2021): Comment closed pending submission of the Illicit Discharge Statement to DEC.

If the Commission has any questions, please call.

Very truly yours,

Nitsch Engineering, Inc.



Anna Murphy, PE
Project Engineer

Approved By:



Jennifer Johnson, PE, CFM®, CPSWQ, LEED AP
Project Manager

December 3, 2020

12-14-2020 Applicant Responses provide in **RED** text
12/28/2020 Peer Reviewer follow-up comments in **BLUE** text

Devens Enterprise Commission
c/o Mr. Neil Angus, AICP CEP, LEED AP
Environmental Planner
33 Andrews Parkway
Devens, MA 01434

RE: Nitsch Project #9419
King Street Properties
Bio-Manufacturing Campus
45 Jackson Road
Traffic Review Comments
Devens, MA

Dear Mr. Angus:

Nitsch Engineering has received copies of the Application For Level 2 – Unified Permit and associated Site Plans for the proposed Bio-Manufacturing Building at 45 Jackson Road in Devens, Massachusetts, dated November 5, 2020, prepared by Highpoint Engineering, Inc. This letter summarizes our review of the traffic elements of those documents, particularly the Access and Circulation section of the application; the Traffic Impact and Access Study, dated November 2020, prepared by VHB; and the traffic elements of the Site Plans.

Based on Nitsch Engineering's review of the submitted documents, we have determined that the traffic study and method of analysis comply with industry practices and current transportation engineering standards in addressing the following key elements:

- Traffic Counts;
- Crash Analysis;
- 7-Year Build Horizon;
- Annual Background Growth Rate;
- Traffic Generated by Other Developments;
- Site-Generated Trips;
- HCM Capacity Analysis with delay, Level of Service (LOS), v/c ratios, and 50th and 95th percentile queues;
- Sight Distance Evaluation; and
- Transportation Demand Management.

However, based on Nitsch Engineering's review of the documents, we offer the following comments for consideration:

1. In describing the existing roadways, please include the functional classification. Also, per the MassDOT Road Inventory, none of the roadways in the study area are under local jurisdiction ("Unaccepted by city or town"). Please correct this information in the Roadways section.
 - **Applicant Response:** Noted. The report will be updated to include a reference to their functional classification.
 - **Peer Reviewer Follow-Up:** Comment resolved.
2. The descriptions of the intersections of Jackson Road at St. Barbara Street / American Superconductor Driveway and Jackson Road at Lake George Street (North) both state that Jackson Road runs in a northeast-southwest direction, which is inconsistent with the Jackson Road at Patton Road / Lake George Street intersection description and the directionalities used for those intersections in the Capacity Analysis (north-south direction). Please correct this information.
 - **Applicant Response:** Noted. This will be updated in the report and will match the capacity analysis.

- [Peer Reviewer Follow-Up: Comment resolved.](#)
- 3. Please remove the third sentence in the description of the intersection of Jackson Road at Lake George Street (North).
 - [Applicant Response: Noted. The report will be updated.](#)
 - [Peer Reviewer Follow-Up: Comment resolved.](#)
- 4. Were the adjustments to the 2020 count data for the COVID-19 pandemic (+23.7% in the AM, +9.4% in the PM, and +17.4% for ADT) calculated based on the 2015 count data *after* adjustment from 2015 to 2019 per the MassDOT Yearly Growth Rates table and adjustment for seasonal factor? Also, which Group was used for the yearly growth rates? Based on the MassDOT Road Inventory, these roadways fit the U4-U7 group since they are considered within an urbanized area (Boston), resulting in a cumulative adjustment of +7.9% from 2015 to 2019. For the same reason, the seasonal factors should use the U4-U7 group, which would indicate that April 2015 counts were above average, not below. Please clarify whether adjustments were made to the 2015 data prior to comparison with the 2020 data, and please use the U4-U7 group for seasonal factors and yearly growth.
 - [Applicant Response: The original volumes were calculated using R4-R7 factors, as the study area has the characteristics of a rural area. Additionally, there are neighboring communities/roadways \(such as Harvard, Ayer, and Shirley\) that have roads categorized as rural by the MassDOT Road Inventory.](#)

VHB also grew the roadways to 2020 by applying the 2018 to 2019 growth factor twice (resulting in a 4% overall increase from yearly growth rates instead of 2.7%) to be conservative and more consistent with the 1% yearly growth rate used for future volumes. As a result of this and applying the seasonal factor on the April 2015 counts for R4-R7 roadways, the cumulative annual adjustment between 2015 and 2020 was +8.1% for counts grown from April 2015. The 2020 counts were grown based on 2015 count data before adjustment with MassDOT yearly growth rates. However, this resulted in negligible differences due to rounding and volume balancing, as the higher volumes from the adjusted 2015 intersections were carried throughout the study area.

For comparison purposes, VHB calculated the volumes using the peer reviewer's suggested method. The 2020 counts were grown by the MassDOT yearly growth rates for U4-U7 in addition to the COVID adjustments (+23.7% in the AM, +9.4% in the PM, and +17.4% for ADT). 2015 counts were grown by the MassDOT yearly growth rates for U4-U7 and no seasonal factors were applied as April 2015 counts for U4-U7 were above average. While there are minor differences after adjustments, these differences are negligible after balancing throughout the study area. The negligible differences are shown in attached figures. Accordingly, VHB feels that modifications to the traffic volumes and updated analyses are not necessary.
 - [Peer Reviewer Follow-Up: Please make note in the report that the rural classification was used in applying the adjustment factors from MassDOT's tables and provide the explanation why.](#)
- 5. In the crash analysis, please indicate the average statewide crash rates, and please provide comparisons with the calculated intersection crash rates.
 - [Applicant Response: These rates will be added to the report and will be compared to the calculated rates for each intersection.](#)
 - [Peer Reviewer Follow-Up: Comment resolved.](#)

6. Please consider showing in the appendix the trip assignment at the study intersections for trips generated by other developments that was used in developing the No-Build condition traffic volumes.
 - Applicant Response: The trip assignment at the various study intersections will be provided in graphical format in the Appendix materials.
 - Peer Reviewer Follow-Up: Comment resolved.
7. Traffic Volume Data section states that “The weekday morning and evening peak periods are consistent with typical peak commuter traffic periods and coincide with the expected peak periods for traffic entering and exiting the proposed site.” However, for trip generation, the peak hour of adjacent street traffic was used for the morning and evening peak hours, rather than the peak hour of the generator. Using the peak hour of the generator would result in significantly higher numbers of trips and a more conservative analysis. Please explain why the peak hour of adjacent street traffic was used for the morning and evening peak hours, or update the trip generation using the peak hour of the generator.
 - Applicant Response: Standardized ITE practice notes that when looking at the peak hour traffic impacts of the development when overlaid on the peak hour of the adjacent street that the traffic generation for the “peak hour of the adjacent street” be utilized. While it is acknowledged that using the peak hour of the generator would result in a conservative assessment when overlaid on the peak hour of the adjacent street, this is not reflective of the true peak hour traffic conditions.

For comparative purposes, when looking at the hourly distribution of traffic along the local roadways and the ITE temporal distribution for the Manufacturing land use (note: R&D does not have a published hourly temporal distribution), the peak hours of the generator are 6:00-7:00 AM and 3:00-4:00 PM, whereas the peak hours of the adjacent street are 7:15-8:15 AM and 4:30-5:30 PM. As such, VHB feels that using the peak hour of generator volumes would create an artificial peak hour that could significantly overstate future traffic volumes.
 - Peer Reviewer Follow-Up: Comment resolved.
8. In Table 3 (Trip Generation), please update the Weekday Evening Peak Hour exiting vehicles to 63, which is the number indicated by the ITE Trip Generation web portal for this land use and size, and it also results in the correct total for entering and exiting during that peak hour.
 - Applicant Response: Noted. The report will be updated.
 - Peer Reviewer Follow-Up: Comment resolved.
9. Please consider discussing mode share for site-generated trips, even if only to state that all trips were assumed to be vehicular.
 - Applicant Response: As suggested in the comment, no credit was taken for mode-share reductions and all trips were assumed to be vehicular in nature. A brief mode share discussion will be added to the report stating this. Later in the report, the Applicant notes that they set a goal of achieving a 15% reduction as the Devens TMA suggests, but these credits were not used in the assessment of the Project’s impacts.
 - Peer Reviewer Follow-Up: Comment resolved.
10. Please consider including a figure showing the site-generated trip assignment at the study intersections.
 - Applicant Response: Noted. The report will be updated to include this figure.
 - Peer Reviewer Follow-Up: Figure not found in report, only in a separate attachment. Please include it in the report as requested.

11. Why was the HCM 2010 used for the capacity analyses instead of the HCM 6? Also, please ensure the footnote (2) matches the HCM edition used.
 - Applicant Response: Noted. The report will be updated to reflect HCM 6 results and the text and footnote will be updated to reflect that HCM 6 methodology was used. This update does not result in any change to the LOS for study area intersections.
 - Peer Reviewer Follow-Up: Comment resolved.
12. Please mention that Synchro was used for the capacity analyses and note which version.
 - Applicant Response: Noted. Text will be added to the report to note that Synchro 10 was used.
 - Peer Reviewer Follow-Up: Comment resolved.
13. Please consider including a table showing LOS designations for signalized and unsignalized intersections.
 - Applicant Response: Noted. This will be added to the report.
 - Peer Reviewer Follow-Up: Comment resolved.
14. Please explain in the capacity analysis narrative that all PHFs were set to 0.92 for future (No-Build and Build) conditions per MassDOT guidelines. Also, please fix the PHFs for northbound and southbound at the site driveway for the 2027 Build Morning Peak Hour.
 - Applicant Response: Noted. This will be added to the report. These adjustments do not alter the findings of the report.
 - Peer Reviewer Follow-Up: Comment resolved.
15. References to the primary driveway, the secondary driveway, and the alternative driveway are inconsistent throughout the document. For example, footnote 4 discusses a “potential secondary driveway,” though it is describing the location of the alternative driveway. Likewise, the paragraph after Table 7 refers to “the existing, secondary, and alternative driveway locations.” In the Site Access Improvements section, it says that the curb cuts were discussed in Chapter 3, but no such discussion is provided. It should be explicitly stated that the location of the secondary driveway is at the existing St. Barbara Street. If the potential alternative driveway is built, would Lake George Street (North) be closed? Please provide clear descriptions of the two proposed driveways and the third potential driveway early in the document, and please use consistent terminology throughout.
 - Applicant Response: Noted. The report will make it clear that the two driveways “main” and “secondary” will be permanent access locations to the development and the study will be updated to describe the potential “alternative” driveway location that will largely be based on the future phases of the master plan as well as negotiations with neighboring abutters.
 - Peer Reviewer Follow-Up: Comment resolved.
16. Please describe the proposed lane configuration of the site driveways. Also, please show on the plans the proposed pavement markings, including centerlines and stop bars, for the primary and secondary driveways.
 - Applicant Response: The lane descriptions will be added to the report as noted. The site plans will also be updated to illustrate pavement markings for both driveways.
 - Peer Reviewer Follow-Up: Comment resolved.
17. Please explain why only one site driveway was used in the capacity analyses even though at least two site driveways along Jackson Road are proposed. Furthermore, since the proposed secondary

driveway is the existing St. Barbara Street, please consider assigning some of the site-generated trips to that entry. Also, since the proposed parking area connects to the existing Lake George Street, please consider assigning some of the site-generated trips to Lake George Street at the intersection of Jackson Road at Patton Road / Lake George Street.

- Applicant Response: The primary driveway along Jackson Road will service the majority of the site-related traffic as it provides the most direct connection between the site's parking field and Jackson Road. The secondary driveway will serve as an access for some heavy vehicle traffic and potentially a small amount of employee-related traffic associated with the Building 1 development. While a small amount of traffic associated with Building 1 could (and likely will) use the secondary driveway during the peak periods, VHB assumed that all of the traffic would utilize the primary driveway location to present a conservative analysis of this driveway. While it has been demonstrated in the report that the Primary driveway will operate acceptably, any minor adjustment or shift of traffic from the primary driveway to the secondary driveway would only serve to benefit traffic operations at the primary driveway location.

Additionally, for the Building 1 project, the only site-related traffic using the Lake George Street route (via the Patton Road/Lake George Street/Jackson Road intersection) to access the site will be truck deliveries to and from the site which is estimated to be less than 5 trips during the peak commuter hours. As the development is built out, and as noted in the Master Plan section of the Traffic Study, evaluations of the value of a more formalized connection to the overall campus should be evaluated and any impacts at the Jackson Road/Lake George Street/Patton Road intersection should be assessed.

- Peer Reviewer Follow-Up: Please show that assigning to the secondary driveway some heavy vehicle traffic and a small amount of employee-related traffic associated with the Building 1 development will not substantially change the results for the intersection at St. Barbara Street.

18. In the first paragraph on page 30, the number of peak hour vehicles on the northwest-bound approach at the Jackson Road at Givry Street intersection should be 9 per Table 6, not 37. Please correct this information.
 - Applicant Response: Noted. This will be added to the report.
 - Peer Reviewer Follow-Up: Comment resolved.
19. In Table 7, please correct the desirable ISD South of Site Driveway to be 500 feet.
 - Applicant Response: Noted. This will be corrected in the report and in the supporting documentation.
 - Peer Reviewer Follow-Up: Comment resolved.
20. The second paragraph the Site Access Improvements section should refer to Figure 2, not Figure 1. Also, please ensure the referenced page numbers for discussion on sight distance measurements are correct.
 - Applicant Response: Noted. This will be corrected in the report.
 - Peer Reviewer Follow-Up: The referenced page numbers for the sight distance discussion still need to be corrected as requested.
21. In the Traffic Monitoring Program section, the last sentence of the first paragraph references "both driveways." Please revise this to say "all driveways" to include the potential third (alternative) driveway.
 - Applicant Response: Noted. This will be added to the report.
 - Peer Reviewer Follow-Up: Comment resolved.

22. The Master Planning section lists the size of Building 5 as 178,800 square feet, though Figure 3 shows it as 178,600 square feet. Furthermore, the total Phase 2 size is inconsistent between the Project Description section of the report (576 KSF) and the trip generation table in the appendix (574.80 KSF). Also, the first paragraph of the Conclusion indicates the size of potential future development to be 725,000 sf instead of 726,000 sf. Please correct these sizes and, if needed, update the trip generation.
- **Applicant Response: Noted.** VHB will work with the site engineer to correct the square footages. If needed, the traffic generation calculations will be adjusted to reflect those of the corrected values, although the resulting change is not expected to reflect any significant adjustment.
 - **Peer Reviewer Follow-Up:** The size of Building 5 is still inconsistent between Figure 3 and the Master Planning section, and the total Phase 2 size is still inconsistent between the Project Description section and the trip generation table in the appendix. Please reconcile these differences and, if needed, update the trip generation as requested.

We recommend that the Applicant review these comments and make appropriate revisions or additions prior to Devens Enterprise Commission approval of the traffic study.

We are available to discuss this review in person with the Applicant. If the Commission has any questions, please call.

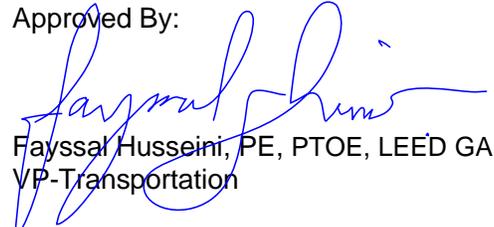
Very truly yours,

Nitsch Engineering, Inc.



Adina Alpert, PE, ENV SP, PTOE
Senior Project Engineer

Approved By:



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January 4, 2021

Mr. Neil Angus
 Devens Enterprise Commission
 33 Andrews Parkway
 Devens, MA 01434

Re: King Street Properties – 2nd Landscape Review
 Nitsch Project #9419 Task 36

Dear Neil,

IBI Placemaking has reviewed the landscape plans and site lighting for the King Street Properties Unified Permit revised submission. In general, the plans have addressed the comments from the initial review; however, some remaining items need to be addressed. The following comments are offered.

3.0: SITE PLAN

3.02: REQUIREMENTS

3.02 (3) (b) 6 (a) states that “All existing landscape features, especially existing trees and woodland to remain, shall be shown on ALL site plan sheets. (See attached plan)

- The limit of tree clearing is now indicated on the west edge of the site on the Erosion Control Plan, but is not indicated on the grading, layout or planting plans. The cropping of the layout and planting plans puts the limit of tree clearing off the page. Include the line on the grading plan and clearly annotate the location of this line on the layout and planting plans.
- As previously noted, the straw wattle and orange caution fence noted on the Erosion Control Plan can be considered tree protection fence on the west edge of the property; however, the orange caution fence would need to remain in place and be maintained for the duration of construction activity, not removed following tree clearing as noted on the plan. Modify the note and include on all drawings.
- Protection of the existing stand of trees straddling the project site and the Community College property is suggested by a dashed line, but it is not identified. Provide this line and annotate on all plans.
- Individual trees for protection are not coordinated across the plans and are not noted on all the plans. Provide clear identification of all trees to be retained and protected.
- Identify the 8” ash south of the new site entrance for tree protection on all plans.

3.04: DESIGN STANDARDS

1. 3.04 (8) (c) 2 calls for native plants.

- The replacement of some non-native species is noted; however, the reliance on non-native perennials and ornamental grasses remains. Given what is known about the important role of native plants in promoting diversity and addressing species and

ecosystem collapse, we feel that the plant list could be improved upon by including more native perennials, especially the straight form of those species where possible.

- The substitution of the meadow mix is noted; provide maintenance notes to ensure the successful establishment and maintenance of the meadow. (See item #9 below)
2. **3.04 (8) (c) 8 calls for plant material within 20' of a road or paved area to be salt tolerant.**
 - The location of *Acer x freemanii* and *Acer rubrum* 'Bowhall' in the rear parking area and along the northern perimeter drive places these salt-intolerant species in a vulnerable position where salt-laden snow can be expected to be pushed onto the planting areas, despite the identification of snow storage areas elsewhere. Replace the trees with salt tolerant species.
 - *Cornus sericea* is not tolerant of road salt, its placement adjacent to vehicular pavement is not recommended. Select plantings—trees, shrubs, perennials, and grasses—for areas adjacent to vehicular pavement that are tolerant of road salt.
 3. **3.04 (8) (f) 2 requires the coverage of all unpaved areas.**

The proposed planting of several areas on the site, including the area bordering the new entry have not been noted. Provide the required coverage of all disturbed areas. (See attached plan)
 4. **3.04 (8) (f) 3 requires any unpaved areas steeper than 1:3 to be planted with shrubs or groundcovers with fibrous root systems.**
 - The planting of the 1:2 slope along the northern edge of the site with deciduous shrubs is noted; however, from the 335 contour westward, the shrub planting should continue to the back of the curb in lieu of the mown edge, as this area will also be steeper than the mowable slope of 1:3. Note: the reduction in pavement width noted in item #6 below may allow the edge to remain as mown lawn.
 - In addition, the planting of the 1:2 slope along the northern edge of the site with deciduous shrubs should continue around the northwestern corner of the site to encompass all the 1:2 slopes. This area is slated for snow storage, making the planting of shrubs here impractical. Adjust the grading to ensure that slopes within the snow storage area remain at 1:3 or greater and ensure that the planting in this area is tolerant of road salt.
 - In the planting area along Jackson Road, the planting of ornamental grasses on the 1:2 slope along the eastern side of the central landform and the western side of the southern landform is noted. Given the unmowable 1:2 slope, and the importance of soil stabilization, include in the maintenance notes that all ornamental grasses on 1:2 slopes should not be cut back or should be cut back by hand only in late spring to maintain coverage throughout the year. In addition, include direction in the maintenance notes to ensure the establishment of the grasses to provide the required slope stabilization. Given the proximity of the meadow mix area, education of the maintenance crews will be important for the adequate stabilization of the slope and for the safety of the workers.
 - Along Jackson Road, the planting of ornamental grasses on the western side of the southern landform is not all inclusive of the 1:2 slope. Adjust the edge of the ornamental grass area to incorporate the entire 1:2 slope.
 - The new raingarden near Jackson Road is planted with native shrubs and perennials; east of the rain garden where the slope steepens to 1:2 between contours 337 and 340, replace the perennials with shrubs to ensure the stabilization and protection of the steep slopes.
 - The planting of the 1:2 slope of the landform on the southern edge of the site with some deciduous shrubs is noted; however, the 1:2 slopes are incompletely covered. Provide the required coverage of all 1:2 slopes with shrubs, underplanting the proposed pines.

5. 3.04 (8) (f) 6 describes the limiting of construction activities to prevent soil compaction in future landscaped/natural areas.

The northern temporary sediment basin is located where future landscape is proposed at the terminus of the entry drive. Indicate methods to be undertaken to compensate for the compaction to ensure deep water penetration and soil oxygenation in the future landscape. Proposed planting/seeding for both basin areas is not indicated on the drawing. Indicate methods to be undertaken to ensure the success of proposed seeding and soil stabilization.

6. 3.04 (8) (g) 3 & 4 describe screening requirements.

- Enhance views along Nestal Drive by extending the shrub planting at the northern edge of the project westward to the edge of the project. Specify taller shrubs in this area to help screen the parking area rather than the low growing *Rhus aromatica* 'Gro Low'. Employ opportunities to expand this planting area through the reduction of the vehicular pavement along the perimeter drive and at the loading dock area.
- Additional year-round visually impermeable screening will be needed with the completion of Building #2 and the construction of the loading dock and parking on its south side, in order to provide the required three shade trees for every 50' of parking or loading dock area and provide adequate screening of the parking and loading areas for Wachusett Community College.

7. 3.04 (8) (g) 6 describes screening for parking areas to be visually impermeable year-round at a height of 6'.

From the 339 contour southward on Jackson Road, the ornamental and native grasses planted on the sides and atop the proposed landforms will not provide the additional year-round visual screening to supplement the 4 to 5' of screening provided by the landforms. Increase the height of the landforms slightly or call for evergreen plantings on the central and southern landforms to achieve the 6' height above the grades of Jackson Road.

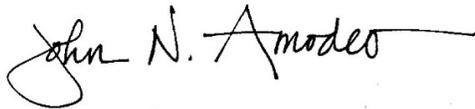
8. 3.04 (8) (h) 2 calls for shade trees at the perimeter of parking areas.

The southern portion of the front parking area is inadequately planting with shade trees; three are required for every 50' lineal feet of parking perimeter due to the visibility of the parking area from Jackson Road. Provide the additional trees.

9. 3.04 (8) (n) Maintenance

In order to ensure the success of the meadow and ornamental grass planting, provide additional maintenance notes for the establishment of the meadow mix and the ornamental grasses on steep slopes as described in items #1 and 4 above. Provide direction by month and year for the establishment and maintenance of the meadow and require the contractor's guarantee and maintenance responsibilities for weeding, watering, and mowing to extend for a 3-year period after final acceptance.

Sincerely,



John N. Amodeo, ASLA, LEED AP B+C

ORNAMENTAL GRASSES PLUGS

MIX	<i>Sporobolus heterolepis</i>	PRAIRIE DROPSPEED	4" PLUGS	18" O.C.
	<i>Deschampsia cespitosa</i>	TUFTED HAIR GRASS	4" PLUGS	18" O.C.
	<i>Schizachyrium scoparium</i>	LITTLE BLUESTEM	4" PLUGS	18" O.C.

* Plugs planted at 18" O.C. in broad drifts along berm slopes

ADDITIONAL LANDSCAPE NOTES

- All trees with a minimum 12" caliper within the setback shall be preserved. Healthy existing wooded areas within setback areas where buildings cannot be constructed shall be preserved to the greatest extent feasible. No topographic alteration within the root zone of any existing tree or wooded area designated to be preserved.
- All work within the root zone of existing trees to be preserved shall be carried out under the direction and supervision of a Certified Arborist. Should there be no feasible alternative, excavation for walkways, curbs, structures, and utilities within the root zones of preserved trees shall be by hand excavation until roots are encountered, bending smaller main roots out of the excavation area, and severing all roots over 1" caliper. All exposed ends of sawed roots shall be kept moist by covering the exposed ends with wet peat moss and burlap until excavation is backfilled. Existing trees that have had excavation or grade changes within their root zone shall receive crown pruning and root fertilization per the arborist's recommendations.
- Building structures, roadways, and paved areas shall be set back at least 12" from the drip-line of wooded areas and trees slated for preservation. Construction activities and site alterations shall not disturb the root zone of the trees designated for preservation. During construction, the contractor shall install and maintain tree protection fencing, or other protective measures approved, located 12" beyond the drip-line of the trunk of a tree to be protected.
- The Contractor shall be responsible to replace any trees designated to remain, which have been damaged, killed, or removed as a result of construction activities. The Contractor shall be responsible for replacement of any trees, per caliper inch of deciduous trees and by height for evergreens. Two-inch caliper deciduous trees and 4" tall evergreens shall be the minimum size used for replacement.
- Vegetation shall be cleared from Right-of-Way or way only as needed to accommodate roadway, utilities, and sidewalks. Significant trees (minimum 12" caliper) or woodland vegetation within the Right-of-Way shall be preserved by adjusting the alignment of utilities and sidewalks to avoid the trees. The Contractor shall provide tree tags or any grade change of 6" above or below existing finish grade within 6" of the trunk of a tree to be preserved.
- Landscape Maintenance and Water Management: Landscape contractor shall submit a landscape maintenance and water management plan in accordance with 3.04 CMR Site Plan design standards. (b) (ii) Maintenance: Temporary and long-term operational snow storage plans shall be developed by Contractor with Owner's property manager.
- The existing soil shall be tested for both mechanical and chemical analyses by an independent testing laboratory, such as an agricultural college. The sieve analysis shall be based on the USDA Classification System. The chemical analysis shall be according to the standards of the Association of Official Analytical Chemists. Should additional soil be required to be used, such as topsoil or planting mix, the new soil shall be tested in the same manner. The testing results shall include recommendations from the testing agency on what amendments, if any, may be needed for the soil to support the proposed plant material in a healthy and vigorous condition and whether the soil can support lawn or woody plants.

SOIL PREPARATION NOTES

- Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analysis on existing, on-site soil and imported soil.
- Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Submit results of soil test for review by landscape architect. As approved by landscape architect, follow recommendations for each plant type as listed in plans.
- Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply fertilizer or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- Subgrade Preparation: Till subgrade to a minimum depth of 8 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- Mixing: Spread unamended soil to total depth as identified by plant type in Section 29300 "Plants", but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
- Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
- Compaction: Compact each lift of planting soil to 75 percent of maximum Standard Proctor density according to ASTM D698 except where a different compaction value is indicated on Drawings.
- Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniform fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

PLANT SCHEDULE

KEY	QTY	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING
DECIDUOUS TREES					
AFC	20	<i>Acer x freemanii 'Celebration'</i>	CELEBRATION MAPLE	3" CAL	AS SHOWN
ARO	5	<i>Acer rubrum 'October Glory'</i>	OCTOBER GLORY RED MAPLE	3" CAL	AS SHOWN
ARS	5	<i>Acer rubrum 'Scarlet Sentinel'</i>	SCARLET SENTINEL RED MAPLE	3" CAL	AS SHOWN
CFC	7	<i>Cornus florida 'Cherokee Princess'</i>	CHEROKEE PRINCESS DOGWOOD	2-1/2" CAL	AS SHOWN
FG	2	<i>Fagus grandifolia</i>	AMERICAN BEECH	3" CAL	AS SHOWN
GT	16	<i>Gleditsia triacanthos 'Streetkeeper'</i>	STREETKEEPER HONEYLOCUST	3" CAL	AS SHOWN
NS	15	<i>Nyssa sylvatica</i>	BLACK TUPELO	3" CAL	AS SHOWN
PAE	8	<i>Platanus x acerifolia 'Exclamation'</i>	EXCLAMATION PLANTTREE	3-4" CAL	AS SHOWN
QB	15	<i>Quercus bicolor</i>	SWAMP WHITE OAK	3-4" CAL	AS SHOWN
QP	5	<i>Quercus palustris</i>	PIN OAK	3-4" CAL	AS SHOWN
SR	3	<i>Syringa reticulata 'Ivory Silk'</i>	IVORY SILK TREE LILAC	3" CAL	AS SHOWN
EVERGREEN TREES & SHRUBS					
JCS	35	<i>Juniperus communis 'Blue Berry Delight'</i>	JUNIPER	3 GAL	4' O.C.
JVI	5	<i>Juniperus virginiana</i>	EASTERN RED CEDAR	6-8" ht	AS SHOWN
JV2	5	<i>Juniperus virginiana</i>	EASTERN RED CEDAR	8-10" ht	AS SHOWN
PRI	3	<i>Pinus rigida</i>	PITCH PINE	6-8" ht	AS SHOWN
PSI	2	<i>Pinus strobus</i>	EASTERN WHITE PINE	6-8" ht	AS SHOWN
PS2	3	<i>Pinus strobus</i>	EASTERN WHITE PINE	8-10" ht	AS SHOWN
PSY1	6	<i>Rhus sylvestris</i>	SCOTS PINE	6-8" ht	AS SHOWN
PSY2	6	<i>Rhus sylvestris</i>	SCOTS PINE	8-10" ht	AS SHOWN
DECIDUOUS SHRUBS					
AA	108	<i>Aronia arbutifolia 'Brilliantissima'</i>	CHOKEBERRY	3 GAL	4' O.C.
CS	169	<i>Cornus sericea 'Firedance'</i>	FIREDANCE REDTWIG DOGWOOD	3 GAL	4' O.C.
DL	193	<i>Diervilla lonicera</i>	NORTHERN BUSH HONEYSUCKLE	3 GAL	3' O.C.
PO	159	<i>Physocarpus opulifolius 'Little Devil'</i>	LITTLE DEVIL NINEBARK	3 GAL	3' O.C.
RA	170	<i>Rhus aromatica 'Gro Low'</i>	GRO LOW SUMAC	3 GAL	4' O.C.
VT	22	<i>Viburnum trilobum 'Bailey Compacta'</i>	BAILEY COMPACT VIBURNUM	3 GAL	6' O.C.

PLANTING NOTES

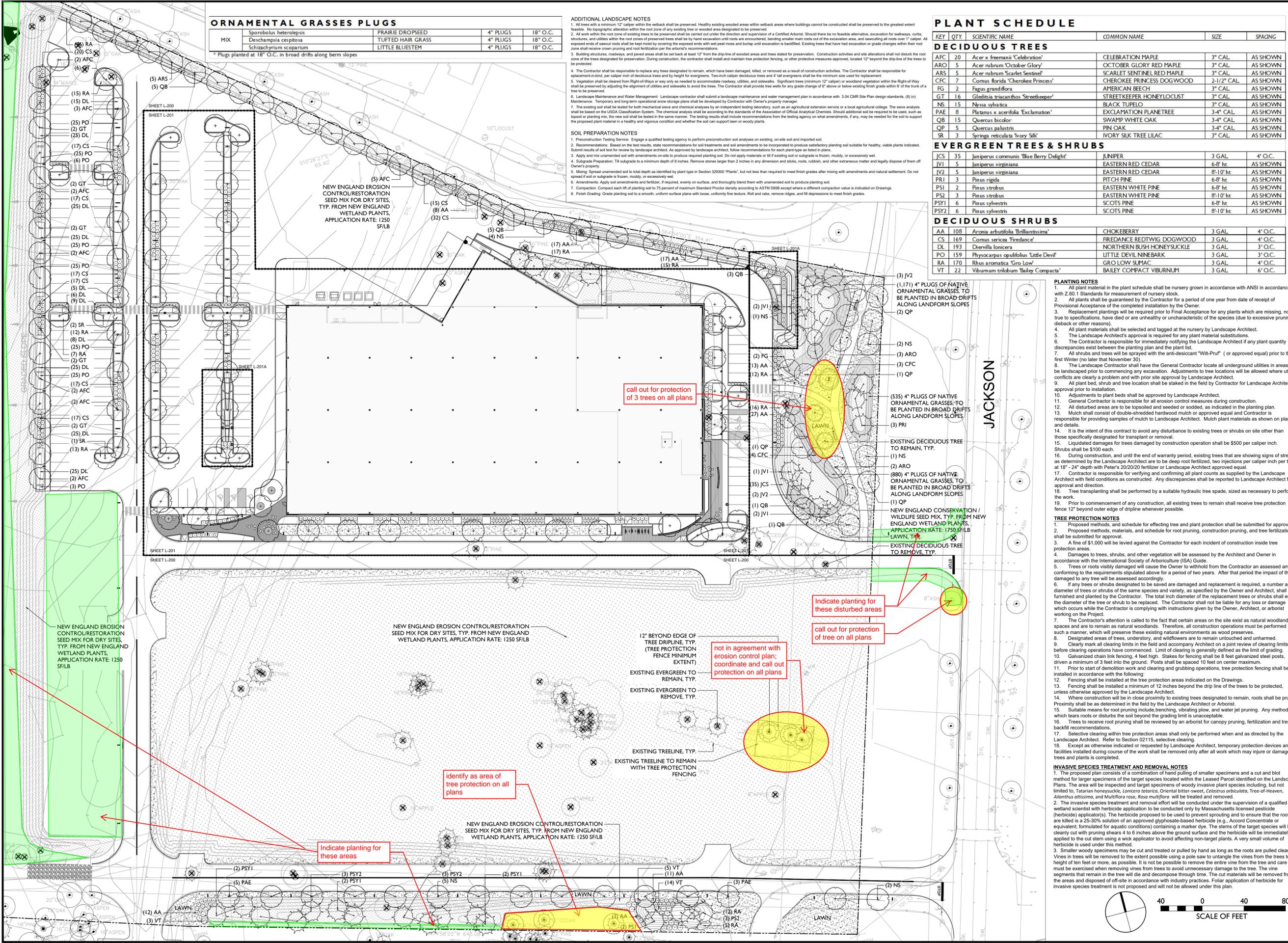
- All plant material in the plant schedule shall be nursery grown in accordance with ANSI in accordance with Z.60.1 Standards for measurement of nursery stock.
- General Contractor is responsible for the Contractor for a period of one year from date of receipt of Provisional Acceptance of the completed installation by the Owner.
- Replacement plantings will be required prior to Final Acceptance for any plants which are missing, not true to specifications, have died or are unhealthy or uncharacteristic of the species (due to excessive pruning, dieback or other reasons).
- All plant materials shall be selected and tagged at the nursery by Landscape Architect.
- The Landscape Architect's approval is required for any plant material substitutions.
- The Contractor is responsible for immediately notifying the Landscape Architect if any plant quantity discrepancies exist between the planting plan and the plant list.
- All shrubs and trees will be sprayed with the anti-desiccant "Wilt-Pruf" (or approved equal) prior to the first Winter (no later than November 30).
- The Landscape Contractor shall have the General Contractor locate all underground utilities in areas to be landscaped prior to commencing any excavation. Adjustments to tree locations will be allowed where utility conflicts are clearly a problem and with prior site approval by Landscape Architect.
- All plant bed, shrub and tree location shall be staked in the field by Contractor for Landscape Architects approval prior to installation.
- Adjustments to plant beds shall be approved by Landscape Architect.
- General Contractor is responsible for all erosion control measures during construction.
- All disturbed areas are to be topsoiled and seeded or sodded, as indicated in the planting plan.
- Mulch shall consist of double-shredded hardwood mulch or approved equal and Contractor is responsible for providing samples of mulch to Landscape Architect. Mulch plant materials as shown on plan and details.
- It is the intent of this contract to avoid any disturbance to existing trees or shrubs on site other than those specifically designated for transplant or removal.
- Liquidated damages for trees damaged by construction operation shall be \$500 per caliper inch. Shrubs shall be \$100 each.
- During construction, and until the end of warranty period, existing trees that are showing signs of stress as determined by the Landscape Architect are to be deep root fertilized, two injections per caliper inch per tree at 18" - 24" depth with Peter's 20/20/20 fertilizer or Landscape Architect approved equal.
- Contractor is responsible for verifying and confirming all plant counts as supplied by the Landscape Architect with field conditions as constructed. Any discrepancies shall be reported to Landscape Architect for approval and direction.
- Tree transplanting shall be performed by a suitable hydraulic tree spade, sized as necessary to perform the work.
- Prior to commencement of any construction, all existing trees to remain shall receive tree protection fence 12' beyond outer edge of drip-line whenever possible.

TREE PROTECTION NOTES

- Proposed methods, and schedule for effecting tree and plant protection shall be submitted for approval.
- Proposed methods, materials, and schedule for root pruning, construction pruning, and tree fertilization shall be submitted for approval.
- A fee of \$1,000 will be levied against the Contractor for each incident of construction inside tree protection areas.
- Damages to trees, shrubs, and other vegetation will be assessed by the Architect and Owner in accordance with the International Society of Arboriculture (ISA) Guide.
- Trees or roots visibly damaged will cause the Owner to withhold from the Contractor an assessed amount conforming to the requirements stipulated above for a period of two years. After that period the impact of the damaged to any tree will be assessed accordingly.
- If any trees or shrubs designated to be saved are damaged and replacement is required, a number and diameter of trees or shrubs of the same species and variety, as specified by the Owner and Architect, shall be furnished and planted by the Contractor. The total inch diameter of the replacement trees or shrubs shall equal the diameter of the tree or shrub to be replaced. The Contractor shall not be liable for any loss or damage which occurs while the Contractor is complying with instructions given by the Owner, Architect, or arborist working on the Project.
- The Contractor's attention is called to the fact that certain areas on the site exist as natural woodland spaces and are to remain as natural woodlands. Therefore, all construction operations as wood preserves, in such a manner, which will preserve these existing natural environments as wood preserves.
- Designated areas of trees, understorey, and wildflowers are to remain untouched and unharmed.
- Clearly mark and identify the field and accompany Architect on a joint review of clearing limits before clearing operations have commenced. Limit of clearing is generally defined as the limit of grading.
- Galvanized chain link fencing, 4 feet high. Slakes for fencing shall be 8 feet galvanized steel posts, driven a minimum of 3 feet into the ground. Posts shall be spaced 10 feet on center maximum.
- Prior to start of demolition work and clearing and grubbing operations, tree protection fencing shall be installed in accordance with the following:
- Fencing shall be installed at the tree protection areas indicated on the Drawings.
- Fencing shall be installed a minimum of 12 inches beyond the drip line of the trees to be protected, unless otherwise approved by the Landscape Architect.
- Where construction will be in close proximity to existing trees designated to remain, roots shall be pruned. Proximity shall be as determined in the field by the Landscape Architect or Arborist.
- Suitable means for root pruning include trenching, vibrating plow, and water jet pruning. Any method which tears roots or disturbs the soil beyond the grading limit is unacceptable.
- Trees to receive root pruning shall be reviewed by an arborist for canopy pruning, fertilization and trench backfill recommendations.
- Selective clearing within tree protection areas shall only be performed when and as directed by the Landscape Architect. Refer to Section 02115, selective clearing.
- Except as otherwise indicated or requested by Landscape Architect, temporary protection devices and facilities installed during course of the work shall be removed only after all work which may injure or damage trees and plants is completed.

INVASIVE SPECIES TREATMENT AND REMOVAL NOTES

- The proposed plan consists of a combination of hand pulling of smaller specimens and a cut and blot method for larger specimens of the target species located within the Leased Parcel identified on the Landscape Plans. The area will be inspected and treated by a qualified wetland scientist or licensed pesticide (herbicide) applicator(s). The herbicide proposed to be used to prevent sprouting and to ensure that the roots are killed is a 25-30% solution of an approved glyphosate-based herbicide (e.g. Accord Concentrate or equivalent) formulated for aquatic conditions containing a marker dye. The stems of the target species will be clearly cut with pruning shears 4 to 6 inches above the ground surface and the herbicide will be immediately applied to the cut stem using a wick applicator to avoid affecting non-target plants. A very small volume of herbicide is used under this method.
- Smaller woody specimens may be cut and treated or pulled by hand as long as the roots are pulled cleanly. Vines in trees will be removed to the extent possible using a pole saw to untangle the vines from the trees to a height of ten feet or more, as possible. It is not possible to remove the entire vine from the tree and care must be exercised when removing vines from trees to avoid unnecessary damage to the tree. The vine segments that remain in the tree will die and decompose through time. The cut materials will be removed from the areas and disposed of off-site in accordance with industry practices. Foliar application of herbicide for invasive species treatment is not proposed and will not be allowed under this plan.



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 LANDSCAPE ARCHITECTURE
 No. 10713

LEVEL 2 - UNIFIED PERMIT
 45 JACKSON ROAD - LOT 1
 45 JACKSON ROAD
 DEWENS, MA
 OWNER/APPLICANT: KING DEVENS, LLC

REV	DATE	DESCRIPTION
1	12-24-2020	DEC & PEER REVIEW

ISSUE TYPE:
LEVEL 2 - PERMIT SET

ISSUE DATE:
 11-05-2020

PROJECT NUMBER:
 19019

DRAWN BY: HL
 CHECKED BY: JH
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SHEET TITLE:
OVERALL LANDSCAPE PLANTING PLAN

SHEET NUMBER:
L-200

ISSUED FOR: UNIFIED PERMIT