



Mr. Theo Kindermans, Chair
Town of Concord – Zoning Board of Appeals
141 Keyes Road, 1st Floor
Concord, Massachusetts 01742

March 26, 2026

Ref. T1935

Re. Proposed Country Store & Fuel Station – #166 Commonwealth Avenue | Concord, MA
Peer Review of Transportation and Stormwater

Dear Mr. Kindermans:

On behalf of the Town of Concord, TEC, Inc. (TEC) has reviewed documents submitted by Concord Country Store, LLC (the “Applicant”) as part of the transportation and stormwater engineering peer review for the proposed country store and fuel station to be located at #166 Commonwealth Avenue (the “Project”) in Concord, Massachusetts.

The project site, located on Map 9D, Block 2184 Lot 2, is located within the West Concord Business (WCB) zoning district. The parcel is currently occupied by a single ±2,280 square foot (SF) service station facility with four (4) fueling positions. Access to the site is provided via two (2) full access/egress driveways with one (1) driveway along the northerly side of Commonwealth Avenue east of Laws Brook Road [herein referred to as the Southerly Site Driveway] and one (1) driveway along the easterly side of Commonwealth Avenue west of Laws Brook Road [herein referred to as the Northerly Site Driveway]. Both driveways, specifically the Southerly Site Driveway, share traffic with the adjacent #152 Commonwealth Avenue property.

The Applicant proposes to demolish the existing service station building and remove the existing underground fuel storage tanks while replacing it with a two-story ±1,988 SF country store with four (4) fueling positions and replacing the underground fuel storage tanks. Access to the proposed site will be provided via two (2) full access/egress driveways with one (1) driveway along the northerly side of Commonwealth Avenue east of Laws Brook Road and one (1) driveway along the easterly side of Commonwealth Avenue west of Laws Brook Road. Connectivity to the #152 Commonwealth property will be discontinued and the Southerly Site Driveway shared curb-cut adjacent to the property line will act as two (2) separate driveways. The site will consist of eleven (11) off-street parking spaces including two (2) electric vehicle (EV) charging spaces.

The following documents were received, in addition to general application materials, as part of our peer review:

- *Traffic Impact Study – Proposed Country Store & Fuel Station – 166 Commonwealth Avenue - Concord, Massachusetts*; prepared by Bowman Consulting Group Ltd.; Boston, MA; dated December 2025
- *Drainage Report for Proposed Country Store and Auto Service Station – 166 Commonwealth Avenue - Concord, Massachusetts*; prepared by Bohler Engineering; Westborough, MA; dated December 18, 2025

- *Proposed Site Plan Documents – Country Store and Fuel Station – 166 Commonwealth Avenue - Concord, Massachusetts*; prepared by Bohler Engineering; Westborough, MA; dated January 15, 2026

TEC completed a review of these documents for the Town of Concord, and the following provides a summary of the comments we compiled during our review. For the purpose of this review, the Commonwealth Avenue roadway segment tangent through West Concord Center will be referred to as Commonwealth Avenue [East] and the roadway segment connecting to the Concord Roarty will be referred to as Commonwealth Avenue [North] for ease of reference. The connection roadway between Commonwealth Avenue [North] and Law Brooks Road on the westerly side of the triangle will be referred to as the Comm Ave Connector for ease of reference.

Transportation Impact Study

External Permitting

- 1.) Commonwealth Avenue is under the jurisdiction of the Town of Concord and therefore the project is not subject to the Massachusetts Department of Transportation (MassDOT) Permit to Access State Highway process.

Study Area & Existing Condition Descriptions

- 2.) The Traffic Impact Study (TIS) includes a study area of intersections including the three (3) triangle intersections of Commonwealth Avenue / Law Brooks Road and the intersection of Commonwealth Avenue [East] / Southerly Site Driveway. TEC generally concurs with the scope of the study area intersections based on the Massachusetts Department of Transportation (MassDOT) *Transportation Impact Assessment Guidelines*¹ (Section 3.I.C) to evaluate intersections in which the site-generated trips increase the peak hour traffic volume by more than 5 percent and/or by more than 100 new vehicles per hour.
- 3.) The following description items of existing conditions should be clarified:
 - a. The TIS does not identify the location of the Bruce Freeman Rail Trail, both north and east of the project.
 - b. The TIS also does not identify existing connectivity to the footbridge over the Nashoba Brook just east of the property line for which the site plan proposes to include a 5-foot walkway from Commonwealth Road crossing within the subject property.
 - c. The TIS denotes a posted speed along Law Brooks Road in the vicinity of the study area as 20 miles per hour (mph) is signed along the eastbound approach directly west of the Comm Ave Connector roadway. There is no posted speed limit sign along Law Brooks Road westbound in the vicinity of the study area and would otherwise

¹ *Transportation Impact Assessment (TIA) Guidelines*; Massachusetts Department of Transportation (MassDOT); Boston, MA; March 13, 2014.

be considered statutorily 25 mph for thickly settled / business district areas based on Massachusetts General Law (MGL) Chapter 90 Section 17C for which the Town of Concord has opted in. This would be the case unless specifically denoted in a MassDOT Special Speed Regulation. Note that Commonwealth Avenue westbound has a 20-mph speed limit sign just west of the Main Street (Route 62) intersection, 1,300-feet east of the Southerly Site Driveway.

- 4.) The Application should contact MassDOT and obtain a copy of any pertinent Special Speed Regulation on the study area roadways and confirm the posted and/or statutory speed zones noted in the TIS. The Applicant shall revised any and all TIS calculations that are based upon speed, where applicable, to denote the any posted speed from the MassDOT Special Speed Regulation. Note that some calculations will require the operating speeds as opposed to the posted speed. Also note that a Special Speed Regulation supersedes statutory speeds from MGL Chapter 90 Section 17 / 17C.

Traffic Data Collection

- 5.) Traffic volume counts at study area intersections were completed from Tuesday, April 8, 2025 while area schools were in general session and sufficiently before school vacation week to avoid holiday and vacation related impacts. The TIS were only collected for the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods. Limited TMC collection does not afford the opportunity to verify traffic signal warrants under Warrant #1 of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD). At a minimum, the Applicant should provide TMCs for a minimum of 8 hours (preferably 12 hours) of a typical midweek day to verify warrant conditions at various intersections where traffic signal warrant should be evaluated in the study area (intersection of Commonwealth Avenue [North] / Commonwealth Avenue [East] / Laws Brook Road). Note that for traffic signal warrant locations, Section 4C.01(12A) of the *Massachusetts Amendments to the 11th Edition of the Manual on Uniform Traffic Control Devices*² (the “Mass Amendments to the MUTCD”) denote that “a minimum of eight (8) hours of traffic count data should be collected as part of the engineering study of traffic conditions performed to justify the installation of a traffic control signal.” This is also highlighted in Section II.E of the MassDOT TIA Guidelines.
- 6.) The TIS does not include any Automatic Traffic Recorder (ATR) locations to assess volume, vehicle classification, of operating speed conditions for a typical day. Whereas there is a need to assess sight distances at the project driveways, to assess crash rates, and other such traffic parameters as part of the study, the Applicant should conduct an ATR in relation to the site driveway location(s). Note that the speed characteristics are different at each driveway given the stop control condition along the Commonwealth Avenue [North] southbound movements between the driveways.
- 7.) Traffic volumes were unadjusted as to seasonal variation as April typically represents an above-average monthly condition. The TIS denotes the use of MassDOT’s 2023 published

² The Massachusetts Amendments to the 11th Edition of the Manual on Uniform Traffic Control Devices for Streets and Highways; Massachusetts Department of Transportation (MassDOT); Boston, MA; January 2026

seasonal and axle adjustment; however, a) this is not the year of traffic volume count or the most recent year of seasonal adjustment factor, and b) the TIS does not specify the roadway classification from the data that was utilized in the study. TEC concurs that it is likely that no adjustment is necessary per the TIS; however, the information above should be clarified in the revised TIS.

Safety Analysis

- 8.) The segment of Commonwealth Avenue [North] between Law Brooks Road and the Comm Ave Connector is designed as a ‘Secondary Risk Site’ (2017-2021) as defined by the MassDOT Interactive Mapping Portal for Analysis and Crash Tracking (IMPACT) Crash Portal’s Network Screening – Risk Based tool ([Link to MassDOT Safety Analysis Tools](#)) for both ‘bicycle related’ and ‘pedestrian related’ crashes as ranked in both the statewide and the Metropolitan Area Planning Council’s (MAPC) Municipal Planning Organization (MPO) / Regional Planning Agency (RPA) boundaries. This was not identified in the TIA; although I recognize that the TIA does recognize that the intersections and segments within the study area are not designated as a Highway Safety Improvement Program (HSIP) crash cluster based on Equivalent Property Damage Only (EPDO) for the crash years 2019-2021 (current year of eligibility) within the MAPC boundaries. The Applicant should revise the TIA to denote this high crash risk location designation.
- 9.) The TIS references that crash data was compiled for the years 2018 through 2022; however, the table presented in the Appendix does not include 2022. In addition, a summary of crash data from the MassDOT IMPACT portal is not included to verify crash conditions and trends.

No-Build Conditions & Background Growth

- 10.) The TIS increases traffic volumes to a 2032 future year condition based on standard guidance of a 7-year design horizon for future year evaluation. TEC has no further objection to the use of a 2032 future year condition as the horizon year of evaluation. No response required.
- 11.) The TIS identifies planned roadway improvements at the Concord Rotary as part of MassDOT Project File No. 602091 and improvements to the signalized intersection of Main Street (Route 62) / Baker Avenue / Olde Bridge Road / Cottage Street. These locations are outside of the study area, and although they may affect traffic volume and flow conditions during their construction periods, are not expected to impact general traffic flows in the study area. No response required.
- 12.) Although TEC generally concurs with the use of a 1.0% year-over-year annual growth rate to account for new traffic along the study area roadways as this matches similar growth rates utilized in other area traffic studies approved by the Town and whereas the Central Transportation Planning Staff (CTPS) and MAPC denoted a lower regional rate. TEC would recommend that the Applicant confirm the area growth pattern with MAPC/CTPS, or the MassDOT Office of Transportation Planning (OTP) whether consideration of a growth rate utilized includes the various Massachusetts Bay Transportation Authority (MBTA) Communities multifamily residential zoning overlay districts approvals in the surrounding communities, which could further impact a typical 1.0% growth rate compounded annually

given most Towns in the area are subject to a significant increase in multifamily residential housings per the MBTA Communities approvals.

- 13.) TEC is in general concurrence with the use of the several external ‘Specific Developments by Others’ in future traffic volume projection beyond standard background growth. The Applicant should provide the trip generation projections and documentation from each referenced project in the TIA Appendix for verification.
- 14.) TEC understands that the project’s Traffic Impact and Access Study (TIAS), and subsequent documentation, from Bayside Engineering may not directly include the study area intersections; however, given the mixed-use nature of the site and the residential areas southwest of West Concord would suggest some site traffic for that development passes through the study area. TEC would ask that the Applicant confirm the trip projections for the 768 Elm Street project and its applicability to the study area. TEC would concur that this will likely not greatly affect the projections and analyses in the TIS.

Trip Generation

- 15.) The site trip generation calculations utilize published data from the industry standard Institute of Transportation Engineers (ITE) publication *Trip Generation, 11th Edition* for Land Use Code (LUC) 945 – Convenience Store / Gas Station with a land use subcategory of fueling positions (2 to 8 positions) and rate independent variable of convenience store gross floor area (GFA). TEC concurs with the use of this data; however, TEC denoted the following comments:
 - a. The TIS utilizes the ITE publication *Trip Generation, 11th Edition* as opposed to the more recent *Trip Generation, 12th Edition*. The Applicant should provide justification as to why this is the case. Please note that the use of the *12th Edition* will lower the projected trip generation on the site to 1,116 vehicle trips per day (unadjusted), 82 vehicle trips during the weekday morning peak hour (unadjusted), and 95 vehicle trips during the weekday evening peak hour (unadjusted). TEC concurs that the Applicant’s TIS provides a conservative evaluation of projected trips by publication. No response required.
 - b. TEC has verified that the alternative subcategory (GFA 2-4kSF) and independent variable (4 fueling positions), essentially using the fueling positions as the reason for traffic, is less trip generation projection for the site. Therefore, TEC concurs that the Applicant’s TIS provides a conservative evaluation of projected trip rates. No response required.
 - c. TEC can confirm that the pass-by rate documented by ITE for both the 11th and 12th Editions are denoted as 60% and 56% for the weekday morning and weekday evening peak hours, respectively, for locations with between two (2) and eight (8) fueling positions.
- 16.) A separate table should be added to the TIS which shows the weekday daily, weekday morning peak hour, weekday evening peak hour, Saturday daily, or Saturday midday peak hour for projected trip generation. Note that this does not affect the traffic operational

analysis in the TIS which is peak hour based. Note that the TIS Appendix does not provide trip generation calculations. This should be provided.

Trip Distribution

- 17.) The site trip distribution provided on existing traffic patterns whereas the convenience store and gas station uses are generally in line with the current traffic flows in the area. TEC concurs with this methodology. The Applicant should denote how the pass-by trips were assigned.
- 18.) The Applicant should revise Figures 7 and 8 of the TIS to depict the pass-by trips.

Driveway Locations & Sight Lines

- 19.) The TIS should revise the stopping sight distance (SSD) table based on the operating speed of the corridor, or the speed limit, whichever is higher. Previous ATR counts from the prior #166 Commonwealth Avenue site application near the Mobil Driveways was presented as 35 mph in both the northbound and southbound direction. The required SSD for 35 mph is 250-feet and the desired ISD is 390-feet.
- 20.) TEC generally agrees that the project will have little impact to the traffic network regarding traffic operations; however, the location of site driveways in close proximity to the intersection of Commonwealth Avenue / Law Brooks Road is concerning as sight lines may not be available from both the Northerly Site Driveway along Commonwealth Avenue [North] and the Southerly Site Driveway along Commonwealth Avenue [East]. TEC field measurements based on an approximation of site related infrastructure suggest:
 - a. The sight line for the SSD along Commonwealth Avenue northbound towards the Northerly Site Driveway appears to cross through the site and is limited by the three (3) off-street parking space against the site frontage. Note that calculations should assume vehicles are parked in these spaces and directly affect sight lines. The sight line appears to be restricted to approximately 215 feet, which may be below the AASHTO minimum distance required, pending updates to operating / posted speed. The Applicant should adjust Tables 3 and 4 accordingly and confirm the operating speed as necessary.
 - b. The sight line for the ISD along Commonwealth Avenue northbound towards the Northerly Site Driveway appears to similarly cross through the site and is limited by the three (3) off-street parking space against the site frontage. Note that calculations should assume vehicles are parked in these spaces and directly affect sight lines. The sight line appears to be restricted to less than 160 feet, which may be below the AASHTO minimum distance required, pending updates to operating / posted speed. The Applicant should adjust Tables 3 and 4 accordingly and confirm the operating speed as necessary.
 - c. The sight line for the ISD along Commonwealth Avenue northbound towards the Southerly Site Driveway is limited by the on-street parking spaces along Commonwealth Avenue. Note that calculations should assume vehicles are parked

in these spaces and directly affect sight lines. The sight line appears to be restricted to less than 110-feet (best case scenario assuming edge of parking lane is carried past driveway as edge of travel way), well below the AASHTO minimum distance required. The Applicant should adjust Tables 3 and 4 accordingly and confirm the operating speed as necessary.

The Applicant shall reevaluate sight distances measurements for both the Northerly Site Driveway and Southerly Site Driveway taking into account the location of on-site parking stalls, on-street parking stalls, other site frontage infrastructure such as signs and landscaping, as well as updates to operating a/or posted speeds from previous comments. The Applicant should seek opportunities to extend sight lines to/from the two (2) site driveways.

- 21.) Has any consideration been given to restricting traffic on the Southerly Site Driveway to entrance only due to the sight distance limitations, angle of driveway, and location in proximity and conflicts presented by the #152 Commonwealth Driveway. Has any consideration been given to remove on-street parking stalls along Commonwealth Avenue, in consultation with the Town.

The comments as noted above may result in modifications to the results of the capacity and queue analysis. TEC reserves the right to provide additional comments upon supplemental analysis from peer review comment responses.

Capacity and Queue Analysis

- 22.) For ease and consistency of review, the following formatting and input updates should be completed for the various capacity and queue analysis sheets:
 - a. Please provide the “Input” worksheet for each location with all related Synchro inputs.
- 23.) The TIS reports findings from the intersection capacity and queue analysis for unsignalized intersections using the *Highway Capacity Manual (HCM) 6th Edition* methodology which is not the most recent version of the analysis basis methodology. Although TEC does not necessarily disagree with use of the various older publications, the Applicant should provide justification for the use of the outdated publication and provide consistency between documentation of the TIS and Synchro as to what has been used.
- 24.) The level of service criteria described in Appendix E is not compatible with the *HCM 6th Edition* as locations with a volume-to-capacity ratio in excess of 1.00 would be reported as level of service (LOS) F. The Applicant should update the reference accordingly and provide a source footnote / reference on the table.
- 25.) TEC notes that the traffic operational analysis for the Commonwealth Avenue / Southerly Site Driveway may not be indicative of operational conditions either under both No-Build and Build conditions given the proximity of the driveways, and or semi-shared nature of the curb-cut (existing). The TIS estimates the existing trip generation to/from the existing service station based on the traffic volumes collected in April 2025 which indicates that the existing site generates 6 vehicle trips during the weekday morning peak hour and 0 vehicle trips during

the weekday evening peak hour. TEC questions the number of trips reported to/from the Southerly Site Driveway along Commonwealth Avenue [East] as the existing site is not active. The Applicant shall confirm that the Southerly Site Driveway traffic counts do or does not also include the driveway traffic to/from the abutting #152 Commonwealth Avenue which shared an open curb cut with the project site and whose traffic breakdown would not be necessarily discernable by traffic count without checking video back-up vehicle-by-vehicle. Note that traffic related to #152 Commonwealth Avenue would remain following construction of any new project at #166 Commonwealth Avenue. Should credit be given for the existing land use, the Applicant shall confirm the existing trip generation is accurate.

- 26.) Further evaluation of the Southerly Site Driveway should be provided showing the compounding effect of the Nashoba Brook Bakery driveway as immediately adjacent to the Southerly Site Driveway. These two (2) driveways, the existing and the proposed, will be directly adjacent and separated by say 25 feet. As the software program Synchro uses HCM model on a microscopic level, the effect of one driveway location is not projected onto another. Where the driveway operations are reported as ‘acceptable’ from the analysis software in Table 2, the real-life scenario could be vastly different if any vehicle(s) are queued along Commonwealth Avenue eastbound to turn left into the bakery driveway as they may potentially be blocking the ability for vehicles to turn left from the same direction into the proposed Southerly Site Driveway based on the minimal 25-foot separation. The Applicant should provide a sensitivity analysis that depicts the effects of the close proximity of these two driveways.

Off Site Improvements

- 27.) The Applicant has denoted the reconstruction of sidewalk along the Commonwealth Avenue site frontage, as well as a new crosswalk across Commonwealth Avenue [North]. Given the sight line challenges to/from the site driveways on each approach to the Commonwealth Avenue / Law Brooks intersection and the proximity of site driveways, has the Applicant given consideration to a) reconfiguration of the Commonwealth Avenue [North] approach to the intersection to provide a more 90-degree approach, and b) a change in traffic control at the intersection, such as an all-way stop-control (AWSC) and/or traffic signal. Similar considerations have been presented in past applications for the #166 Commonwealth Avenue site and have been discussed within the West Concord Advisory Committee. This comment is not a suggestion for the Applicant to fully fund any permitting, design, or construction of such intersection improvements; however, the Applicant should provide the Board with information as to the warranting aspects of traffic control at this intersection, updates on current discussions past/present as to intersection improvements, and any contributions to such improvements they may have been or are currently under discussion with the Town of Concord.
- 28.) Conditions of Approval related to a to design, permit, and construct the off-site roadway improvements may be forthcoming.

Site Plans – Transportation

- 29.) The Applicant should provide a swept path analysis exhibit showing the ability of Concord fire apparatus to access, circulate, and egress the site through the circulation pattern without leaving the paved surface while providing access to the necessary building fronts. The exhibit should include the dimension profile of the Concord fire apparatus on the swept path analysis exhibit.
- 30.) The Applicant should coordinate with the Town of Concord Fire Department and Engineering Department for preferred locations of fire lanes (if needed), confirmation of on-site hydrant locations as shown (if needed), confirmation of any mountable areas shown within the site plan for fire truck access, and sign requirements for fire lanes within the site.
- 31.) The site plan should depict the location of dumpster enclosures on-site and/or locations for loading access if provided internal to the buildings.
- 32.) The Applicant should provide a swept path analysis exhibit showing the ability of refuse trucks to access, circulate, and egress the site through the circulation pattern without leaving the paved surface while providing access to the dumpster enclosure locations on the site and/or the designated area(s) near the defined trash rooms. The exhibit should include the dimension profile of the refuse truck on the swept path analysis exhibit.
 - a. Note that the alignment of the dumpster location is shown such that a refuse vehicle may back directly into the first electric vehicle (EV) charging stall.
- 33.) The Applicant should provide a swept path analysis exhibit showing the ability of the standard delivery vehicle or service vehicle to be utilized on-site to access, circulate, and egress the site through the circulation pattern without leaving the paved surface and while providing access to the secured receiving area(s) at each building which does not block parking spaces and building access/egress. Being a gas station, this also includes the underground gas tanks. The exhibit should include the dimension profile of the delivery truck on the swept path analysis exhibit.
- 34.) The Applicant should describe the intent and circulation pattern for gas tanker delivery, the position of the gas tanker while discharging load, and whether this position would block off-street parking (i.e., specifically the parallel parking spaces), public sidewalk travel, and general access/egress from the site at each driveway.
- 35.) The site plans should provide a plan sheet depicting the sight triangles to and from the site driveway locations and identify areas to restrict vegetation, signage, on-street parking, and off-street parking to maintain AASHTO minimum recommendations. Although the project landscaping plans were not a focus of this peer review, some plantings proposed per these plans appear to be within of near the potential sight triangle locations for each driveway.
- 36.) The proposed site provides for eleven (11) off-street parking spaces, including two (2) EV charging spaces and one (1) accessible space. The land use is identified in Zoning Bylaw Section 7.7.2.1 Table IV of Minimum Parking. The site would require nine (9) parking spaces to satisfy the Zoning Bylaw and therefore does not require a variance or relief.

- 37.) The plan shows two (2) EV charging stations on-site. The Applicant should clarify if additional spaces on-site will be constructed as EV-ready. Note that although the TEC and the Town agree with the installation of EV charging station, the limited parking supply may render these spaces unused based on the patron mix. The Applicant should provide clarification as to the usage of these spaces if no employee or patron has an EV vehicle where the parking supply is limited, even if above the zoning bylaw minimum requirements.
- 38.) The site plans do provide a plan sheet depicting all site / driveway related traffic signs and pavement markings. This includes, but is not limited to, stop signage and pavement markings along driveways and drive aisles, and dedicated parking signage (e.g., accessible, EV, compact, etc.). The plans should also show any proposed pedestrian crossing signage for the proposed crosswalk location given a free flow condition along Commonwealth Avenue northbound. A sign summary with sign dimensions should be provided for all traffic signs.
- 39.) The four (4) parking spaces along the southerly side of the building are not a standard 90-degree angle. The Town of Concord Zoning Bylaw Section 7.7.3.1 outlines design dimensions of parking spaces. Please confirm the angle of parking and its compliance with the dimensional requirements. TEC believes this would qualify as the 75-degree dimensions where the length of space should be 19-feet.
- 40.) The Applicant should provide a dimension on the plan showing the EV charging station still allows for Public Right of Way Accessibility Guideline (PROWAG) compliance or 4-feet for the adjacent walkable surface.
- 41.) The Applicant should reexamine the position of several off-street parking spaces on-site as to the ability for a standard parked vehicle to enter and exit the space. For instance, the standard parking space and the two (2) EV parking spaces back directly into the exit lane of the driveway within the first queued vehicle.
- 42.) Are the 18-foot dimensions at the southwest corner of the fueling area continuous around the drive aisle radius? IN addition, the 20-foot width on the Southerly Site Driveway opening beyond within the curbed area. Please confirm the flow nature of this area and its compliance with drive aisle width from the Town of Concord Zoning Bylaw.
- 43.) There appears to be two (2) bollards in the central parallel parking spaces along the site frontage protecting the fire hydrant. These bollards appear to be within the parked vehicle area. Please clarify or adjust.
- 44.) Please show the full limits of proposed sidewalk work north of the Northerly Site Driveway which is denoted as “Replace in Kind” on the site plans.
- 45.) The Applicant should review the various construction details provided in the site plan and revised, if necessary, based on the Town of Concord Design & Construction Details ([Design & Construction Standards | Concord, MA](#)); such as sidewalk / crosswalks, driveway openings, pedestrian curb ramps, drainage structures, etc. This includes accessible ramps off of the site frontage that the Applicant has committed to in the plans at the direction of the Engineering Department. This includes the designation of EJ Cast Iron detectable warning panels consistent with West Concord Center.

- 46.) The Applicant should clarify any materials, barriers, pavement markings, shall be used for separation between the Southerly Site Driveway and the #152 Commonwealth Avenue property. The Applicant should also clarify whether any of these materials would be necessary on the #152 Commonwealth Avenue property, requiring rights-of-entry and/or easement.

Stormwater Management

Concord Public Works Stormwater Regulations

- 47.) Drainage Design and Construction Standards Section 2.3.1.1 – Elevations for all utility crossings should be provided.
- 48.) Drainage Design and Construction Standards Section 2.3.2.4.B.3 – The infiltration Best Management Practice (BMP) should include an emergency draw down device.
- 49.) Drainage Design and Construction Standards Section 2.3.2.5 – The proposed riprap along with the detail should conform to MassDOT Standard Specifications. The proposed rip rap apron/ scour hole detail does not provide any specific dimensions or sizing calculations.
- 50.) Erosion & Sedimentation Control Standards Section 5.3.4.B – Inspections shall be conducted after any rainfall event of ½” or more. The MA Erosion and Sedimentation Control Notes on sheet C-802 only indicates ‘significant rainfall’.
- 51.) The Applicant should ensure all details provided meet the requirements of the Concord Public Works (CPW) construction specifications and match the CPW Standard Construction Details both Drainage and Erosion & Sedimentation Control.
- 52.) Stormwater Regulations Article VI Section 3.5 and 4.4 – The Long-Term O&M (LTO&M) Plan shall be incorporated by reference into the chain of title of the property or properties on which the structures or controls are located, by recording of a notice at the Middlesex South District Registry of Deeds or the Land Court. Prior to the commencement of construction or land disturbance for the approved project, certification of recording shall be sent to the Board or Commission that approved the project and to CPW. A copy of the LTO&M Plan referenced in the recorded notice shall be sent to CPW with the certification. Any changes to the LTO&M Plan after recording of the notice must be approved by CPW.

General Stormwater Management:

- 53.) TEC recommends the proposed elevated floodplain line based on the proposed cut and fill be super imposed on the proposed site plans to show the proposed change in location of the floodplain limits.
- 54.) TEC defers to the Board and the Building Commissioner/ Floodplain Administrator; however, it appears that the project may require an additional Special Permit under Zoning Bylaw Sections 7.2.5 and 7.2.6 due to work within the Floodplain Conservancy District not falling under Section 7.2.4.

- 55.) The 100-year floodplain as indicated on the site plans, and in the associated Floodplain Narrative provided by the engineer is also a Federal Emergency Management Agency (FEMA) Regulatory Floodway. Per Zoning Bylaw Section 7.2.3.4: “encroachments are prohibited in the regulatory floodway which would result in any increase in flood levels within the community during the occurrence of the base flood discharge unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels.” Compensatory storage at a ratio of 1:1 has been proposed; however, TEC defers to the Board whether an H&H or “no-rise” study of the floodway should be provided. At the very least, TEC recommends a “No-Rise” certification be provided as part of the application (refer to FEMA ‘Guidance for Flood Risk Analysis and Mapping’). TEC defers to the Board and the Building Commissioner/ Floodplain Administrator.
- 56.) TEC defers to the Board whether the proposed 1:1 compensatory storage is sufficient, and whether the request for 1:1 instead of 1.5:1 requires a formal variance from Zoning Bylaw Section 7.2.6.1.c. or if this requirement can be waived.
- 57.) The post-development HydroCAD model indicates the infiltration BMP as having a stone invert of 119.90, a surface area of 120 square feet, and a length of 15’. The grading and drainage plan and the construction details indicate a stone invert of 119.40, a surface area of 60 square feet, and a length of 20’. The model and/or plans should be revised to match.
- 58.) The post-development HydroCAD model indicates an Outlet Control Structure with a weir as part of the proposed subsurface infiltration trench BMP, however the plans do not indicate an Outlet Control Structure.
- 59.) Per the Rational Pipe Sizing Calculations provided in Appendix F, the 12” pipe provided for the subsurface infiltration trench (between structures A30 and A20) appears to be undersized.
- 60.) The infiltration BMP should include an inspection port, a monitoring well, and a drawdown device. TEC recommends the detail include specifications for location, size, and spacing of perforations for the perforated 12” high-density polyethylene (HDPE) pipe.
- 61.) TEC recommends a manhole or cleanout structure be provided at the connection of the 6” roof drain leader to the 12” drainage line from A40 to A30.

MassDEP Stormwater Regulation Standards

- 62.) Standard 1 – No New Untreated Discharges

Standard 1 appears to be met. Runoff from the stormwater management system is proposed to discharge to a stabilized pipe outfall for velocity reduction and to prevent erosion and scouring to the downgradient resource area, and the stormwater appears to meet water quality and peak flow requirements prior to discharge, although TEC recommends the engineer evaluate the feasibility of capturing stormwater from all impervious surfaces for proper oil separation/ treatment due to the Land Use with Higher Potential Pollutant Load (LUHPPL) – currently a small portion of the site is conveyed untreated to the municipal right-of-way.

As noted previously, the pipe outfall detail should be revised to include calculations and dimensions for the rip rap apron/ scour hole.

63.) Standard 2 – Peak Rate Attenuation

The post-development HydroCAD model should be revised to match the design plans, or vice versa to confirm compliance with Standard 2. It is expected due to the reduction in impervious area that the project will comply with Standard 2.

TEC also recommends the subcatchments be divided so that they are not combined to a single analysis point and that the watershed to the municipal right-of-way/ drainage network be analyzed individually from the watershed directly to Nashoba Brook. Regardless, it appears the project will comply with Standard 2 pending revisions to the model/plans as noted.

64.) Standard 3 – Groundwater Recharge

The project is a redevelopment, and it is proposed to result in a net decrease in the total impervious area, therefore groundwater recharge is not required. Although it is not required, groundwater recharge is proposed in the way of a subsurface pipe and stone infiltration trench therefore the required recharge volume per Standard 3 is met.

The stormwater report indicates a recharge volume of 87 cubic feet is proposed; however, the calculation (and Stage-Storage Table in Appendix F) seems incorrect. Per the plans, the trench is proposed at 3' wide with 12" of stone below the pipe invert, and 20' long, which at 40% voids in the stone would result in approximately 24 cubic feet of storage.

The drawdown calculations also appear to have a similar error and should be revised, or the plans revised.

It does not appear that on-site soil testing was performed for soil classification or estimated seasonal high groundwater determination. As the site is an existing gas station, soil testing should ensure groundwater recharge is not proposed within fill, unsuitable, or contaminated soils.

65.) Standard 4 – Water Quality & TSS Removal

The project is a redevelopment, and it is proposed to result in a net decrease in the total impervious area, therefore total suspended solids (TSS) removal and water quality treatment shall be provided to the maximum extent practicable. Deep-sump and hooded catch basins as well as a Contech CDS unit have been proposed to provide water quality treatment, therefore it appears Standard 4 is met.

The site is a LUHPPL therefore the stormwater system must include an oil/water separator and 44% TSS removal pretreatment prior to infiltration, which the CDS unit will provide therefore these requirements are met. The CDS unit detail should indicate the site-specific data requirements in the table located within the detail.

There is a portion of the site which does discharge to the public right-of-way without treatment therefore a TSS removal weighted average should be provided. TEC recommends the engineer evaluate the feasibility of capturing this stormwater for proper oil separation/ treatment due to the LUHPPL .

66.) Standard 5 – Land Uses with Higher Potential Pollutant Loads

The site is a LUHPPL therefore the stormwater system must include an oil/water separator and 44% TSS removal pretreatment prior to infiltration, which the CDS unit will provide therefore these requirements, and Standard 5 appear to be met. The CDS unit detail should indicate the site-specific data requirements in the table located within the detail.

TEC recommends the engineer evaluate the feasibility of capturing stormwater from all impervious surfaces for proper oil separation/ treatment due to the LUHPPL – currently a small portion of the site is conveyed untreated to the municipal right-of-way.

The narrative for Standard 5 indicates the use of the Stormceptor however the plans and Appendix F refer to a CDS unit.

Coverage under the NPDES multi-sector general permit will be required for the proposed land use therefore a Stormwater Pollution Prevention Plan (SWPPP) will be required. TEC recommends a condition that a copy of the SWPPP and the Multi-Sector General Permit (MSGP) Notice of Intent (NOI) be submitted to the Board when prepared and prior to discharge of post-construction stormwater.

67.) Standard 6 – Discharge to Critical Areas

Not Applicable.

68.) Standard 7 – Redevelopment Project

The project is a redevelopment and results in a reduction of impervious area. Assuming the comments provided are adequately addressed, Standard 7 appears to be met.

69.) Standard 8 – Construction Period Pollution Prevention and Erosion & Sediment Control

A Construction Period Erosion and Sediment Control Plan is provided within the submitted site plan set, therefore Standard 8 appears to be met. TEC defers to the Natural Resources Commission and CPW regarding the adequacy of proposed construction period pollution prevention controls.

The Stormwater Checklist should indicate whether the project falls under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) or not. The stormwater report Standard 8 narrative indicates a SWPPP and NOI under the CGP will be required.

70.) Standard 9 – Operation and Maintenance Plan (O&M Plan)

71.) An Operation and Maintenance Plan (O&M Plan) has been provided, therefore Standard 9 appears to be met.

The subsurface infiltration trench should be added to the O&M.

72.) Standard 10 – Prohibition of Illicit Discharge

A Long-Term Pollution Prevention Plan (LTPPP) has been provided and includes measures to prevent illicit discharge therefore Standard 10 appears to be met. An unsigned Illicit Discharge Compliance Statement is included in the LTPPP. TEC recommends a condition

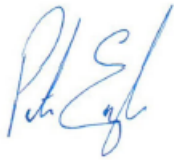
that a signed copy of the Illicit Discharge Compliance Statement be provided prior to construction.

Please do not hesitate to contact us directly if you have any questions concerning our peer review at 978-794-1792 (Sam G.) or 774-402-0229 (Peter E.). Thank you for your consideration.

Sincerely,
TEC, Inc.



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