

REF.: NEX-2200133.00

May 27, 2022

Ms. Lee Newman
Director of Planning and Community Development
Needham Department of Public Works
500 Dedham Avenue
Needham, MA 02492

**SUBJECT: Highland Science Center, Gould Street, Needham, MA
Traffic Peer Review**

Dear Ms. Newman:

On behalf of the Town of Needham, **Greenman-Pedersen Inc.** (GPI) performed a review of the *Transportation Impact and Access Study*¹ (TIAS) prepared by Vanasse Hangen Brustlin, Inc. (VHB) for review by the Town of Needham for the proposed Highland Science Center in Needham, Massachusetts. The site is located on the northeast corner of the intersection of Highland Avenue and Gould Street, and currently contains a Muzi Ford car dealership, Charles River Media Group and WCVB Channel 5. The site was recently part of a rezoning effort by the Town to allow for the development of up to ±880,000 square feet (SF) of office, research and development, and ancillary retail and service space. GPI has reviewed the TIAS and supporting traffic analysis for consistency with the goals and studies prepared as part of the Town's rezoning, as well as for compliance with the Massachusetts Department of Transportation (MassDOT) guidelines for traffic impact analysis and general engineering practice. The following summarizes GPI's comments related to the TIAS.

General Comments

1. As the project directly abuts the state highway layout (SHLO) on Interstate 95 / Route 128 and is anticipated to generate more than 3,000 vehicle trips per day (vpd), the project will require review by the Massachusetts Environmental Policy Act (MEPA) office in the form of a Environmental Notification Form (ENF) and a mandatory Environmental Impact Report (EIR). An ENF was prepared by the Applicant and noticed in the Environmental Monitor on April 8, 2022. The TIAS was included as a chapter within the ENF. A Certificate on the ENF was issued by MEPA on May 9, 2022. GPI previously provided comments to the MEPA office on behalf of the Town of Needham regarding the ENF, and a copy of these comments is included as an Attachment for reference. Many of GPI's comments were incorporated into the recommendations of the ENF Certificate, which include:
 - a) Table 2-9 of the ENF indicates that the traffic operations at the intersections of Highland Avenue / West Street will drop from LOS C to D and the operations of Highland Avenue / Gould Street / Hunting Road will degrade from LOS E to F as a result of the additional traffic generated by the project. The Applicant is requested to explore the feasibility of implementing additional measures to improve operations at these locations, including an additional northbound lane on Hunting Road.
 - b) Collision diagrams should be prepared for any study area intersections experiencing an average of more than 3.0 collisions per year and a crash rate higher than the statewide or district-wide average. The Applicant should investigate measures to improve safety and mitigate collision occurrence at any locations where five or more collisions of a similar type have occurred over the analysis period.

¹ *Transportation Impact and Access Study, Highland Science Center, Needham, Massachusetts*; prepared by Vanasse Hangen Brustlin, Inc. (VHB); March 2022.

- c) The Applicant should perform an estimate of the potential bicycle parking demand generated by the project to ensure adequate bicycle parking is provided for an effective Transportation Demand Management (TDM) program.
2. The project will also require a Vehicular Access Permit from MassDOT for the proposed change-in-use of the property, as well as for the construction of off-site roadway improvements within the SHLO. As such, the ENF was reviewed by the MassDOT District 6 office, as well as the Public-Private Development Unit (PPDU). The following comments from MassDOT were incorporated into the ENF Certificate issued by MEPA:
 - a) The Applicant should evaluate queuing at the study area intersections to ensure that lengthier queues do not impact the operation of roadways and railways within the study area.
 - b) The Applicant should perform an analysis of the existing and proposed weave conditions on Highland Avenue to ensure that the increased traffic volumes will not lead to degraded safety conditions in the area of the I-95 / Highland Avenue interchange.
 - c) The Applicant should coordinate with the Massachusetts Bay Transit Authority (MBTA) to determine the feasibility of additional MBTA Bus Route 59 service closer to the project site and include feasible options in the Draft EIR.
 - d) MassDOT requests that the Applicant consider installing bicycle and pedestrian improvements on Highland Avenue at the I-95 Interchange to connect with the proposed Complete Streets improvements being installed as part of MassDOT Project #606635 along Highland Avenue.
 - e) The Applicant should provide a description of the methodology to be used to estimate the effectiveness of the proposed Transportation Demand Management (TDM) measures and discuss what remedial measures will be taken if the monitoring program indicates that the TDM program is less effective than anticipated in reducing single-occupant vehicle (SOV) trips and encouraging alternative means of travel to/from the site.
 - f) The proposed Transportation Monitoring Program should include a travel survey of employees and patrons of the site. Although MassDOT did not provide any further details on this request, it is assumed that the travel survey will be designed to verify the distribution of site-generated trips and mode share in order to assess the efficacy of the proposed TDM program.

Study Area

3. The TIAS includes an evaluation of the impact to traffic operations associated with the project at a total of twenty (20) intersections, which include all nine of the study intersections included as part of the *Traffic Impact Study*² prepared for the original rezoning. GPI concurs that the study area is appropriate for the size and scale of the development and includes those intersections which are likely to experience a measurable impact from the proposed redevelopment.

Existing Conditions

4. The TIAS included an evaluation of the operations of the study area intersections during the weekday AM and PM peak periods, which are consistent with typical commuter peaks on the adjacent roadway networks. GPI concurs that these time periods represent the critical time periods for analysis as they represent the peak hours of both adjacent street traffic and site-generated vehicle trips.

² *Traffic Impact Study, Muzi Motors Rezoning, Gould Street & Highland Avenue – Needham, Massachusetts*; prepared by Greenman-Pedersen, Inc. (GPI); October 2020.
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5. The Existing Conditions Vehicle Volumes were derived from traffic counts obtained from a number of sources, many of which were collected prior to the COVID-19 pandemic. New traffic counts were collected in July 2021 at the following intersections:
 - Central Avenue at Cedar Street
 - Central Avenue at Webster Street
 - Highland Avenue at Hunnewell StreetAll other traffic counts contained within the traffic study were collected pre-pandemic and adjusted to existing conditions utilizing MassDOT's approved Yearly Growth Factors and balancing between intersections. Regardless of which traffic count was collected more recently, the traffic volumes between intersections were always balanced upward to the higher traffic count. GPI concurs that this methodology is acceptable and will result in the most conservative (highest) estimate of existing traffic conditions through the study area intersections.
6. Traffic counts at many of the study area intersections were obtained from previously seasonally-adjusted traffic volumes from other traffic studies. However, raw traffic counts collected in April 2017 were obtained from the *Highland Avenue Reconstruction Functional Design Report*³ for the Highland Avenue / Webster Street intersection. Similarly, raw traffic counts collected in January 2018 were obtained from the *Northland Newton Development DEIR*⁴ for the Highland Avenue intersections with the I-95 Northbound and Southbound ramps. MassDOT Weekday Seasonal Factors data was provided in the TIAS Appendix for the 2019 year only. Since the traffic counts were collected in 2017 and 2018, it would be expected that seasonal adjustment factors for those years would have been used to seasonally adjust the raw traffic volumes. MassDOT's Weekday Seasonal Factors data for 2017 and 2019 both indicate that traffic volumes in April represent above-average conditions for Group Factors U3-U7. Therefore, no seasonal adjustment would be required for the Highland Avenue / Webster Street intersection. It is unclear what, if any, seasonal adjustment factor was applied to the volumes at the Highland Avenue intersections with the I-95 ramps. However, the MassDOT Weekday Seasonal Factors data for 2018 indicates that January traffic volumes for Factor Group U3 represent above-average month conditions. Therefore, no seasonal adjustment factor would be required for the Highland Avenue intersections with the I-95 ramps.
7. No adjustment was applied to the traffic volumes collected in July 2021 to account for any variations due to COVID-19. However, these traffic counts were balanced upward with traffic counts collected at adjacent intersections under pre-COVID conditions. GPI concurs that this methodology for adjustment is acceptable.

Collision History

8. Per MassDOT guidelines, collision diagrams should be prepared for any locations that experience an average of more than 3 crashes per year or a crash rate higher than the state or district-wide average. The intersection of Highland Avenue / West Street experienced an average of 4.4 crashes per year and a crash rate higher than the state and district-wide averages. Similarly, the Highland Avenue / Second Avenue intersection experiences an average of 6.6 collisions per year and a crash rate above the state and district-wide averages. Therefore, the Applicant should obtain detailed collision reports for these intersections and prepare collision diagrams to identify any collision patterns occurring at these locations, as well as potential measures to reduce the occurrence of such collisions.
9. The following additional intersections also experienced an average of more than three (3) collisions per year, and collision diagrams should be prepared to identify any collision patterns or potential mitigating measures at these intersections:
 - Highland Avenue / First Avenue
 - Hunting Road / Kendrick Street

³ *Highland Avenue Reconstruction Functional Design Report*; Prepared by Stantec, Inc.; August 2017.

⁴ *The Northland Newton Draft Environmental Impact Report*; Prepared by Vanasse Hangen Brustlin, Inc. (VHB); August 2020.
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10. Although the intersection of Highland Avenue / Gould Street / Hunting Road also experienced more than three collisions per year, the crash rate was well below the state and district-wide averages. In addition, significant improvements were recently constructed by MassDOT that may reduce collisions at this location. Further, additional improvements are proposed at this intersection as mitigation for the proposed development, which may also impact collision occurrence. Therefore, preparation of a collision diagram for this location is not required. However, GPI recommends that the proposed Post-Occupancy Monitoring Program include a review of collisions occurring at this location following construction of the proposed mitigation measures to ensure that a new safety issue is not introduced.

2029 No-Build Conditions

11. The Applicant has projected traffic volumes to a seven-year design horizon consistent with MassDOT guidelines utilizing a background growth rate of 1.0 percent per year and adding traffic to be generated by other proposed or approved developments in the surrounding area. GPI concurs with this methodology.

Trip Generation

12. Table 3 of the TIAS notes that the existing site-generated trips were estimated based on empirical traffic counts collected at the site driveways, which show only 887 daily trips are currently generated by the site. It is important to note that these empirical counts were collected in the fall of 2021, during COVID, and as a result, may under-estimate the trips generated by the site pre-COVID when it was fully operational. The use of the lower existing site-generated trips will result in a more conservative (higher) estimate of the net increase in trips generated by the proposed redevelopment.
13. The Applicant has estimated the site-generated vehicle trips based on Institute of Transportation Engineers (ITE) trip generation rates for Land Use Codes (LUC) 710 (General Office Building), 760 (Research and Development Center) and 822 (Strip Retail Plaza (<40,000 sf)) and applied a modest credit for internal capture of trips shared between uses on the site. In addition, the Applicant has assumed that 25 to 40 percent of the retail trips will be from pass-by trips (vehicles already on the adjacent roadway network passing by the site while traveling to another destination). GPI concurs with this methodology.
14. Although the Applicant has proposed a significant Transportation Demand Management (TDM) program, the Applicant has not applied any reduction in vehicle trips generated by the project for the implementation of the TDM program. While GPI agrees that this methodology will result in the most conservative (worst case) estimate of project's impacts on traffic operations through the study area, it should not excuse the Applicant from developing an effective TDM program or identify target mode share goals for the proposed TDM program. The Applicant should estimate the potential mode share and vehicle trip reduction anticipated from implementing the proposed TDM program and identify mode share goals to be monitored and evaluated as part of the Post-Occupancy Monitoring Program.

Transportation Demand Management (TDM) Measures

15. The Applicant has proposed the following transit-related measures as part of the TDM program:
 - Explore the feasibility of providing shuttle service connectivity to nearby public transportation nodes (commuter rail and Green Line);
 - Require tenants to provide a 50 percent transit pass subsidy for their employees;
 - Carpool assistance and incentives;
 - Emergency ride home;
 - Display in the Main Lobby transportation-related information for tenants' employees and visitors; and

- Promotional efforts.

The Applicant should provide additional information on how carpool assistance and emergency ride home services will be provided, as well as what incentive program may be implemented. In addition to providing shuttle service to nearby commuter rail and Green Line services, the Applicant should explore the possibility of extending bus service to the site.

Bicycle Accommodations

16. Section 2.3.4.1 of the ENF notes that a total of 89 bicycle parking spaces will be provided indoors and outdoors, while the TIAS describes a total of only 70 bicycle parking spaces proposed on the site. The Applicant should clarify this discrepancy.
17. No description has been provided within the ENF or TIAS on how many bicycle parking spaces will be indoors and how many will be outdoors. The studies also do not contain any assessment of the potential bicycle parking demand that could be generated and the adequacy of the number of bicycle parking spaces provided to accommodate this demand. The Applicant should provide an evaluation of the potential bicycle parking demand to ensure that adequate bicycle parking is provided to encourage use of bicycle as a means of traveling to/from the site.

Proposed Mitigation

18. The TIAS describes geometric improvements that are proposed at the intersection of Highland Avenue / Gould Street / Hunting Road as mitigation for the project, which are shown graphically in Figure 16. The widening of the roadway that will be required to accommodate the additional lanes at this location will also likely require reconstruction of the traffic signal at this intersection to accommodate new signal indications and mast arms, as well as vehicle detection and pedestrian signal equipment. No mention of the signal upgrades was provided in the TIAS and no signal improvements are shown in Figure 16.
19. Figure 16 of the TIAS provides a graphic depiction of the roadway geometry proposed at the intersection of Highland Avenue / Gould Street / Hunting Road and along Gould Street fronting the site. The Figure does not include the Highland Avenue eastbound or Hunting Road northbound approaches to the intersection, so it is difficult to identify what, if any, improvements are proposed on those approaches. However, Figure 1.4 of the ENF also provides a similar graphic that includes all approaches to the intersection. While the geometry on the majority of the approaches appears consistent with the conceptual improvement sketches prepared as part of the former rezoning effort, the Hunting Road northbound approach to Highland Avenue and the receiving approach on Gould Street are inconsistent with the rezoning plans. The analysis and plans prepared as part of the rezone indicated that two through lanes would be required on Hunting Road with two receiving lanes on Gould Street to accommodate the traffic generated by the project. The capacity and queue analysis summarized in Table 15 of the TIAS indicates that even with the mitigation measures proposed by the Applicant, the Hunting Road northbound movement will operate over capacity at level-of-service (LOS) F during the weekday AM and PM peak hours under 2029 Build with Mitigation conditions. The Highland Avenue eastbound left-turn movement will also operate at LOS F during the weekday AM peak hour. Therefore, the Applicant should consider the feasibility of providing an additional northbound lane on Hunting Road to improve the capacity and operations of this intersection.
20. Figure 15 of the TIAS depicts improvements to be constructed at the Central Avenue / Gould Street intersection as mitigation for the project, which include restriping of Central Avenue to provide a westbound left-turn lane and installation of a fully-actuated traffic signal. The proposed signal equipment is not depicted on the plans. The Applicant should obtain survey information at this location to verify whether the proposed improvements can be constructed within the publicly-available right-of-way and whether any easements will

be required for the proposed signal equipment. In addition, the Applicant should perform vehicle turning movement analysis to verify that the proposed curb radii and STOP line locations will allow emergency vehicles and trucks to safely navigate the intersection without encroaching on opposing traffic flows.

Transportation Operations Analysis

21. According to Table 9, the Highland Avenue southbound approach to West Street will operate over capacity with long delays during the weekday PM peak hour under 2029 Build conditions, with an increase in delay of 22 seconds per vehicle generated by the project. The Applicant has not proposed any measures to mitigate this impact. The Applicant should investigate measures to mitigate this significant impact to operations.
22. The Highland Avenue eastbound through/right-turn movement at the intersection with Webster Street will operate over capacity during the weekday AM peak hour under 2029 Build conditions, with an increase in delay of 26 seconds per vehicle generated by the project. The Applicant has not proposed any measures to mitigate this impact. The Applicant should investigate measures to mitigate this significant impact to operations.
23. Although not heavily impacted by project-generated traffic, the Highland Avenue westbound left/through movement at the intersection with 1st Avenue will be well over capacity during the weekday PM peak hour under both 2029 No-Build and Build conditions. GPI recommends the Applicant consider measures to reduce delay and improve operations at this location.
24. Similarly, the Hunting Road northbound approach to Kendrick Street will be well over capacity during the weekday AM peak hour under 2029 No-Build and Build conditions. GPI recommends the Applicant consider options for reducing delay and improving operations at this location.
25. The Webster Street and Cedar Street approaches to Central Avenue are expected to operate well over capacity with long delays and queues under 2029 No-Build and Build conditions, particularly during the weekday AM peak hour. The Applicant should investigate options for improving the operations of these intersections, including conducting a signal warrant analysis to assess whether a warrant for installation of traffic signal will be met at either of these locations.
26. As noted in Comment 19, even with the proposed mitigation at the Highland Avenue / Gould Street / Hunting Road intersection, some movements will continue operating at LOS F under 2029 Build with Mitigation conditions. Therefore, the Applicant should investigate the feasibility of providing additional capacity at this location to accommodate 2029 Build traffic volumes.

Traffic Monitoring Program

27. The TIAS describes a transportation monitoring program that will be conducted post-occupancy to monitor parking occupancy and traffic operations at four of the study area intersections, including the site driveway. The Applicant should also provide monitoring of the effectiveness of the proposed TDM program in encouraging walking/biking, carpooling, and public transportation travel to/from the site.
28. The proposed traffic monitoring program will include the collection of vehicle turning movement counts during the weekday AM and PM peak periods at the following study area intersections:
 - Central Avenue / Gould Street
 - Gould Street / TV Place
 - Gould Street / Project Site Driveway
 - Highland Avenue / Gould Street / Hunting Road

GPI agrees that these represent the critical locations that would experience the greatest increase in traffic due to the project. However, should the result of the monitoring study indicate that the actual traffic increase generated by the project exceeds the traffic projections contained within the ENF by ten percent or more, the study area for the monitoring program should be expanded to include additional locations to verify that the project's impacts does not create any operation deficiencies at nearby locations. In addition, the monitoring programs should include a capacity and queue analysis to verify the operations of each of the study area intersections under post-occupancy conditions. The monitoring program should also include the collection of daily traffic volumes on TV Place and the Project Site driveway to verify the daily traffic generated by the project.

Site Access and Circulation

29. Figure 2 of the TIAS provides a site plan depicting the proposed layout and traffic circulation on the site. The plan appears to indicate that a loading/unloading area will be provided at the front of the site between Buildings A and B. This loading area is located in close proximity of the signalized intersection of the main site driveway and Gould Street. Vehicles, particularly trucks, stopped in this area could cause a back up of traffic into Gould Street. The Applicant should consider modifications to the site plan that provide a clear separation of loading/unloading areas and through traffic access to the parking fields to ensure traffic does not back up onto Gould Street. In addition, the Applicant should consider limiting hours of deliveries to the site, as a condition of approval, to avoid deliveries occurring between 7:00 AM and 9:00 AM when a high volume of traffic may be entering the site from Gould Street to access the parking garage.
30. A large parking garage is proposed at the northerly end of the site, as well as a small surface parking lot near Gould Street. The Applicant should clearly define who will utilize the surface parking lot. In order to avoid congestion along the main drive aisle through the site, the surface parking lot should be restricted to use by accessible parking spaces, visitors, and brewery patrons (if a brewery is provided) only. All employees of both buildings, including brewery employees, should be directed to park in the parking garage.
31. The site plan included in Figure 2 does not depict any pedestrian connections between the proposed surface parking lot and the buildings. The Applicant should modify the site plan to provide fully accessible pedestrian routes between the surface parking lot and both buildings, as well as to the pedestrian loops around the site.
32. The entering travel lane on TV Place is aligned with the sidewalk as it passes by the proposed site driveway. In addition, the exiting lane west of the site driveway is aligned with the entering lane east of the driveway. This has the potential to create a head-on collision between drivers entering and exiting the site as they cross between lanes through the site driveway intersection with TV Place. It also has the potential for entering vehicles on TV Place to drive onto the sidewalk. The Applicant should modify the layout of TV Place to provide better alignment of entering and exiting travel lanes, which may involve additional widening of TV Place to the east of the site driveway and introduction of a raised or striped median island.
33. The Applicant should perform a vehicle turning movement analysis to verify that emergency vehicles and trucks can safely access and navigate the site. This includes delivery, postal, and trash removal vehicles. The Applicant should provide this turning analysis to the Needham Police and Fire Departments for verification that safe and adequate access is provided.
34. Table 15 of the TIAS indicates that queues of nearly 200 feet (eight vehicles) could occur in each lane exiting the site driveway during the weekday PM peak hour. Although the provided plan on Figure 2 is not scaled to be able to accurately measure the available stacking distance, it appears that only 60 feet of stacking distance is proposed in each lane on the site driveway approaching Gould Street before reaching the loading area. Therefore, the queues exiting the site will regularly back up into the loading area and around the corner beyond the driveway to the surface parking lot during the weekday PM peak hour. The Applicant should consider

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modifications to the site plan to provide additional vehicle stacking exiting the site without interference with the loading area, parking areas, or on-site circulation.

Should you have any questions regarding these comments, please contact me directly at 603-766-5223.

Sincerely,

GREENMAN-PEDERSEN, INC.

A handwritten signature in blue ink, appearing to read 'Rebecca L. Brown', is positioned above the printed name.

Rebecca L. Brown, P.E.
Senior Project Manager

Attachments:

- MEPA ENF – Traffic Peer Review Comment Letter
- MassDOT Weekly Seasonal Factors

REF.: NEX-2200133.00

April 25, 2022

Ms. Lee Newman
Director of Planning and Community Development
Needham Department of Public Works
500 Dedham Avenue
Needham, MA 02492

**SUBJECT: Highland Science Center, Gould Street, Needham, MA
MEPA ENF – Traffic Peer Review**

Dear Ms. Newman:

On behalf of the Town of Needham, **Greenman-Pedersen Inc.** (GPI) performed a review of the *Environmental Notification Form*¹ (ENF) prepared by Vanasse Hangen Brustlin, Inc. (VHB) for review by the Massachusetts Environmental Policy Act (MEPA) office for the proposed Highland Science Center in Needham, Massachusetts. The site is located on the northeast corner of the intersection of Highland Avenue and Gould Street, and currently contains a Muzi Ford car dealership, Charles River Media Group and WCVB Channel 5. The site was recently part of a rezoning effort by the Town to allow for the development of up to ±880,000 square feet (SF) of office, research and development, and ancillary retail and service space. GPI has reviewed the ENF and supporting traffic analysis for consistency with the goals and studies prepared as part of the Town's rezoning, as well as for compliance with the Massachusetts Department of Transportation (MassDOT) guidelines for traffic impact analysis and general engineering practice. The following summarizes GPI's comments related to the ENF.

Transportation Section (Traffic Generation)

1. In Section 1.B on page 18 of the ENF, the Applicant notes that a MassDOT Vehicular Access Permit will be required for the potential need to modify roadway geometry within the state highway layout (SHLO). It should be noted that MassDOT will require a minimum of two permits for this development. One permit will be for the change-in-use of the property as the property directly abuts land owned by the Commonwealth of Massachusetts (Interstate 95 / Route 128) and the project will generate more than 2,000 daily vehicle trips. A separate MassDOT access permit will be required for the construction of any off-site roadway improvements within the SHLO.
2. The table in Section 11.A on page 19 of the ENF Form notes that the existing site-generated trips were estimated based on empirical traffic counts collected at the site driveways, which show only 887 daily trips are currently generated by the site. It is important to note that these empirical counts were collected in the fall of 2021, during COVID, and as a result, may under estimate the trips generated by the site pre-COVID when it was fully operational. The use of the lower existing site-generated trips will result in a more conservative (higher) estimate of the net increase in trips generated by the proposed redevelopment.
3. In Section III on page 19 of the ENF Form, the Applicant is requested to describe any transportation demand management measures (TDM) to be implemented to reduce single-occupant vehicle trips to the site, including any transit-related measures. The Applicant has not described any TDM measures related to transit services in this section. However, these measures are described in Section 2.7.2 if the *Transportation* chapter, which notes that the Applicant will:

¹ *Environmental Notification Form, Highland Science Center, Needham Heights, Massachusetts*; prepared by Vanasse Hangen Brustlin, Inc. (VHB); March 2022.

- Explore the feasibility of providing shuttle service connectivity to nearby public transportation nodes (commuter rail and Green Line);
- Require tenants to provide a 50 percent transit pass subsidy for their employees;
- Carpool assistance and incentives;
- Emergency ride home;
- Display in the Main Lobby transportation-related information for tenants' employees and visitors; and
- Promotional efforts.

The Applicant should provide additional information on how carpool assistance and emergency ride home services will be provided, as well as what incentive program may be implemented. In addition to providing shuttle service to nearby commuter rail and Green Line services, the Applicant should explore the possibility of extending bus service to the site.

Transportation Section (Roadways and Other Transportation Facilities)

4. In Section 1.B on page 21 of the ENF Form, the Applicant has stated that no permits will be required related to roadways or other transportation facilities. However, a MassDOT access permit will be required for the construction of off-site roadway improvements within the SHLO. Therefore, the Applicant should complete the *Transportation Facility Impacts* section of the ENF Form.

Air Quality Section

5. In Section 1.A on page 23 of the ENF Form, the Applicant notes that the project does not exceed any of the thresholds related to air quality. However, MEPA requires that an *Air Quality and Greenhouse Gas Emissions* study be conducted for all projects that require a mandatory Environmental Impact Report (EIR). As the project is anticipated to generate more than 3,000 daily vehicle trips and provide more than 300 parking spaces, a mandatory EIR will be required. Therefore, the project will exceed the thresholds for an Air Quality analysis, which will include an evaluation of impacts from both stationary and mobile sources of emissions.

Project Description

6. Section 1.3 of the ENF notes that geometric improvements are proposed at the intersection of Highland Avenue / Gould Street / Hunting Road. The widening of the roadway that will be required to accommodate the additional lanes at this location will also likely require reconstruction of the traffic signal at this intersection to accommodate new signal indications and mast arms, as well as vehicle detection and pedestrian signal equipment. No mention of the signal upgrades were provided in this section.
7. Figure 1.4 provides a graphic depiction of the roadway geometry proposed at the intersection of Highland Avenue / Gould Street / Hunting Road and along Gould Street fronting the site. While the geometry on the majority of the approaches appears consistent with the conceptual improvement sketches prepared as part of the former rezoning effort, the Hunting Road northbound approach to Highland Avenue and the receiving approach on Gould Street are inconsistent with the rezoning plans. The analysis and plans prepared as part of the rezone indicated that two through lanes would be required on Hunting Road with two receiving lanes on Gould Street to accommodate the traffic generated by the project. The capacity and queue analysis summarized in Table 2-15 of the ENF indicates that even with the mitigation measures proposed by the Applicant, the Hunting Road northbound movement will operate over capacity at level-of-service (LOS) F during the weekday AM and PM peak hours under 2029 Build with Mitigation conditions. The Highland Avenue eastbound left-turn movement will also operate at LOS F during the weekday AM peak hour. Therefore, the Applicant should consider the feasibility of providing an additional northbound lane on Hunting Road to improve the capacity and operations of this intersection.

Bicycle Accommodations

8. Section 2.3.4.1 of the ENF notes that a total of 89 bicycle parking spaces will be provided indoors and outdoors, but no description is given on how many spaces will be indoors and how many will be outdoors. The study also does not contain any assessment of the potential bicycle parking demand that could be generated and the adequacy of the number of bicycle parking spaces provided to accommodate this demand.

Collision History

9. Table 2-2 of the ENF does not provide a calculation of the crash rates (in crashes per million entering vehicles) experienced at any of the study area intersections. The crash rate is utilized to assess the significance of the crash occurrence at a study intersection by comparing the crash rate experienced to the statewide and district-wide averages for similar intersections and/or roadway segments. In addition, per MassDOT guidelines, collision diagrams should be prepared for any locations that experience an average of more than 3 crashes per year or a crash rate higher than the state or district-wide average. The Applicant should calculate the crash rates for all study area intersections and prepare collision diagrams, as necessary, to identify collision patterns at the study area intersections. For any location where 5 or more crashes of a similar type occurred over the analysis period, the Applicant should investigate measures to improve safety and mitigate collision occurrence.

Transportation Operations Analysis

10. According to Table 2-9, the Highland Avenue southbound approach to West Street will operate over capacity with long delays during the weekday PM peak hour under 2029 Build conditions, with an increase in delay of 22 seconds per vehicle generated by the project. The Applicant has not proposed any measures to mitigate this impact. The Applicant should investigate measures to mitigate this significant impact to operations.
11. The Highland Avenue eastbound through/right-turn movement at the intersection with Webster Street will operate over capacity during the weekday AM peak hour under 2029 Build conditions, with an increase in delay of 26 seconds per vehicle generated by the project. The Applicant has not proposed any measures to mitigate this impact. The Applicant should investigate measures to mitigate this significant impact to operations.
12. Although not heavily impacted by project-generated traffic, the Highland Avenue westbound left/through movement at the intersection with 1st Avenue will be well over capacity during the weekday PM peak hour under both 2029 No-Build and Build conditions. GPI recommends the Applicant consider measures to reduce delay and improve operations at this location.
13. Similarly, the Hunting Road northbound approach to Kendrick Street will be well over capacity during the weekday AM peak hour under 2029 No-Build and Build conditions. GPI recommends the Applicant consider options for reducing delay and improving operations at this location.
14. The Webster Street and Cedar Street approaches to Central Avenue are expected to operate well over capacity with long delays and queues under 2029 No-Build and Build conditions, particularly during the weekday AM peak hour. The Applicant should investigate options for improving the operations of these intersections, including conducting a signal warrant analysis to assess whether a warrant for installation of traffic signal will be met at either of these locations.
15. As noted in Comment 7, even with the proposed mitigation at the Highland Avenue / Gould Street / Hunting Road intersection, some movements will continue operating at LOS F under 2029 Build with Mitigation conditions. Therefore, the Applicant should investigate the feasibility of providing additional capacity at this location to accommodate 2029 Build traffic volumes.

Traffic Monitoring Program

16. Section 2.7.3 of the ENF describes a transportation monitoring program that will be conducted post-occupancy to monitor parking occupancy and traffic operations at four of the study area intersections, including the site driveway. The Applicant should also provide monitoring of the effectiveness of the proposed TDM program in encouraging walking/biking, carpooling, and public transportation travel to/from the site.
17. The proposed traffic monitoring program will include the collection of vehicle turning movement counts during the weekday AM and PM peak periods at the following study area intersections:
- Central Avenue / Gould Street
 - Gould Street / TV Place
 - Gould Street / Project Site Driveway
 - Highland Avenue / Gould Street / Hunting Road

GPI agrees that these represent the critical locations that would experience the greatest increase in traffic due to the project. However, should the result of the monitoring study indicate that the actual traffic increase generated by the project exceeds the traffic projections contained within the ENF by ten percent or more, the study area for the monitoring program should be expanded to include additional locations to verify that the project's impacts does not create any operation deficiencies at nearby locations. In addition, the monitoring programs should include a capacity and queue analysis to verify the operations of each of the study area intersections under post-occupancy conditions. The monitoring program should also include the collection of daily traffic volumes on TV Place and the Project Site driveway to verify the daily traffic generated by the project.

Should you have any questions regarding these comments, please contact me directly at 603-766-5223.

Sincerely,

GREENMAN-PEDERSEN, INC.



Rebecca L. Brown, P.E.
Senior Project Manager

Massachusetts Highway Department
 Statewide Traffic Data Collection
 2017 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.30	1.23	1.21	1.04	0.98	0.92	0.86	0.81	0.95	0.99	1.03	1.10	0.80
R2	0.95	0.96	0.98	0.97	0.97	0.93	0.97	0.94	0.96	0.90	0.92	0.93	0.96
R3	1.05	1.01	1.04	0.99	0.94	0.93	0.91	0.92	0.96	0.94	1.01	1.03	0.97
R4-R7	1.10	1.07	1.09	1.00	0.95	0.89	0.88	0.87	0.92	0.95	1.04	1.09	0.93
U1-Boston	1.01	1.04	0.99	0.94	0.93	0.92	0.96	0.93	0.94	0.93	0.95	0.98	0.95
U1-Essex	1.04	1.05	1.00	0.96	0.93	0.89	0.90	0.90	0.93	0.93	0.98	1.03	0.90
U1-Southeast	1.07	1.05	1.02	0.97	0.95	0.90	0.89	0.88	0.92	0.94	0.98	1.01	0.97
U1-West	1.00	0.96	0.94	0.92	0.93	0.92	0.95	0.93	0.92	0.92	0.97	0.97	0.89
U1-Worcester	1.10	1.10	1.04	0.97	0.95	0.94	0.93	0.91	0.95	0.96	0.98	1.04	0.89
U2	1.01	1.03	0.98	0.95	0.93	0.91	0.94	0.92	0.95	0.95	0.95	0.97	0.98
U3	1.03	1.05	1.01	0.95	0.92	0.90	0.94	0.93	0.93	0.92	0.96	0.99	0.96
U4-U7	1.06	1.05	1.02	0.96	0.92	0.89	0.95	0.95	0.92	0.92	0.98	1.03	0.98
Rec - East	1.18	1.17	1.08	1.03	0.95	0.87	0.83	0.83	0.97	0.98	1.19	1.19	0.98
Rec - West	1.30	1.23	1.32	1.18	0.95	0.82	0.70	0.69	0.97	0.96	1.16	1.15	0.95

Round off:

0-999 = 10

>1000 = 100

U = Urban

R = Rural

1 - Interstate

2 - Freeway and Expressway

3 - Other Principal Arterial

4 - Minor Arterial

5 - Major Collector

6 - Minor Collector

7 - Local Road and Street

Recreational - East Group - Cape Cod (all towns) including the town of Plymouth south of Route 3A (stations 7014,7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108 and 7178), Martha's Vineyard and Nantucket.

Recreational - West Group - Continuous Stations 2 and 189 including stations 1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1113,1114,1116,2196,2197 and 2198.

Massachusetts Highway Department
 Statewide Traffic Data Collection
 2018 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.37	1.26	1.30	1.08	0.97	0.93	0.87	0.83	0.96	0.98	1.05	1.13	0.78
R2	0.95	0.96	0.98	0.97	0.97	0.93	0.97	0.94	0.96	0.90	0.92	0.93	0.96
R3	1.15	1.06	1.07	1.00	0.89	0.88	0.89	0.89	0.95	0.92	1.02	1.01	0.98
R4-R7	1.10	1.07	1.03	1.00	0.90	0.92	0.94	0.94	0.96	0.94	1.03	1.02	0.93
U1-Boston	1.05	0.98	1.01	0.93	0.92	0.91	0.95	0.93	0.94	0.92	0.96	0.99	0.96
U1-Essex	1.05	1.01	1.04	0.93	0.92	0.89	0.90	0.90	0.94	0.93	0.98	1.01	0.91
U1-Southeast	1.11	1.05	1.07	0.99	0.93	0.89	0.88	0.87	0.93	0.95	1.01	1.05	0.98
U1-West	1.15	1.08	1.07	0.98	0.94	0.92	0.92	0.88	0.92	0.91	1.00	1.06	0.83
U1-Worcester	1.18	1.11	1.09	0.99	0.95	0.94	0.95	0.91	0.97	0.97	1.01	1.05	0.87
U2	1.04	0.99	0.99	0.94	0.92	0.90	0.93	0.91	0.94	0.92	0.96	0.98	0.99
U3	0.99	1.00	1.02	0.96	0.91	0.89	0.92	0.90	0.95	0.92	1.01	0.97	0.97
U4-U7	1.03	1.02	0.97	0.95	0.88	0.89	0.96	0.93	0.94	0.93	1.00	1.00	0.99
Rec - East	1.22	1.15	1.09	1.12	0.90	0.89	0.82	0.83	0.92	0.98	1.06	1.08	0.99
Rec - West	1.30	1.23	1.32	1.18	0.95	0.82	0.70	0.69	0.97	0.96	1.16	1.15	0.97

Round off:

0-999 = 10

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Recreational - West Group - Continuous Stations 2 and 189 including stations 1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1113,1114,1116,2196,2197 and 2198.

Massachusetts Highway Department
Statewide Traffic Data Collection
2019 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.22	1.14	1.12	1.06	1.00	0.96	0.87	0.85	0.96	0.99	1.04	1.12	0.85
R2	0.95	0.96	0.98	0.97	0.97	0.93	0.97	0.94	0.96	0.90	0.92	0.93	0.96
R3	1.15	1.06	1.07	1.00	0.89	0.88	0.89	0.89	0.95	0.92	1.02	1.01	0.97
R4-R7	1.09	1.09	1.11	1.02	0.96	0.92	0.89	0.89	0.99	0.98	1.09	1.13	0.98
U1-Boston	1.03	1.01	0.98	0.94	0.94	0.92	0.95	0.93	0.94	0.94	0.97	1.04	0.96
U1-Essex	1.09	1.06	1.03	0.99	0.94	0.90	0.88	0.86	0.93	0.94	0.99	1.06	0.93
U1-Southeast	1.06	1.05	1.01	0.97	0.95	0.93	0.93	0.90	0.94	0.94	0.98	1.04	0.98
U1-West	1.19	1.14	1.09	0.95	0.92	0.89	0.89	0.86	0.91	0.95	0.97	1.07	0.84
U1-Worcester	1.02	1.04	0.97	0.94	0.93	0.91	0.95	0.91	0.93	0.92	0.95	1.10	0.88
U2	1.01	1.00	0.94	0.93	0.91	0.89	0.93	0.90	0.90	0.91	0.94	1.02	0.99
U3	1.06	1.03	0.98	0.94	0.93	0.91	0.95	0.91	0.92	0.93	0.97	1.00	0.98
U4-U7	1.01	1.00	0.95	0.92	0.88	0.86	0.92	0.91	0.92	0.94	0.99	1.04	0.99
Rec - East	1.04	1.16	1.12	0.98	0.92	0.88	0.77	0.81	0.94	1.02	1.08	1.12	0.99
Rec - West	1.30	1.23	1.32	1.18	0.95	0.82	0.70	0.69	0.97	0.96	1.16	1.15	0.98

Round off:

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