

August 26, 2022

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

RE: Nitsch Project #9419  
35 Saratoga  
Site Plan and Stormwater Review  
Devens, MA

Dear Mr. Angus:

Nitsch Engineering received and reviewed the following updated documents:

1. Site Plans (the Plans) entitled, "Proposed Building, 35 Saratoga Boulevard, Devens, Massachusetts," dated April 20, 2022, prepared by Eugene T. Sullivan, Inc.;
2. Sight Distance Assessment, 35 Saratoga Boulevard, Devens, MA, dated March 31, 2022;
3. Sight Distance Report Response to Comments, dated May 31, 2022;
4. Figure 1 – Stopping Sight Distance Approaching from The East, 35 Saratoga Boulevard, Devens, MA, prepared by Bayside Engineering, dated July 25, 2022;
5. Figure 2 – Intersection Sight Distance Driveway Looking, 35 Saratoga Boulevard, Devens, MA, prepared by Bayside Engineering, dated July 25, 2022; and
6. Additional Responses to Comments No 23 and No 26, dated August 22, 2022.

Nitsch Engineering is providing comments with respect to traffic and sight distance in this letter. Please note that site plan, stormwater management, and landscape review are being provided in separate letters.

This letter represents a comprehensive summary of letter and email correspondence between May and August 2022. For clarity, we have provided our initial comments from May 5, 2022, in normal font, the responses from the Applicant are in **bold** font, and Nitsch Engineering's responses are provided in **red** font.

## PROJECT UNDERSTANDING

The property owner is seeking approval to clear the 35 Saratoga Boulevard site and construct a +/-154,000-square-foot new industrial building. The project will include associated grading, landscaping, retaining walls, parking, stormwater, and utility improvements. The proposed tenant is Avantor (Bio-Tech) who currently owns and occupies the adjacent facility at 29 Saratoga Boulevard. This new development would be accessed via Barnum Road and Saratoga Boulevard. The principal entry to the site is proposed off of Saratoga Boulevard via a shared driveway with Ryerson (45 Saratoga Boulevard). The Barnum Road entry is being proposed for truck traffic and restricted to right turns only, as sight distance is a concern.

## SIGHT DISTANCE REPORT

18. Please provide the date(s) of the traffic counts used. Since they are from a 2020 report, if the counts themselves were taken that year, clarify whether the volume measurements were taken prior to or during the pandemic. If during the pandemic, please explain if any adjustments were made to establish base traffic conditions.

**Applicant Response (05/31/2022): The counts were obtained from the 2020 Traffic Monitoring Program report prepared by VHB. The date of the report was December 16, 2021. The Barnum road counts were conducted on April 27 and April 28, 2021. The Saratoga Boulevard counts**

were conducted on May 4 and May 5, 2021. As indicated in the report, *'In Spring 2020, traffic conditions were influenced significantly by the outbreak of the COVID-19 virus and resulting pandemic. MassDevelopment, working with other state agencies, agreed to postpone the traffic counting efforts associated with the 2020 monitoring efforts until 2021 when traffic volumes would hopefully return to more traditional levels. The data collected and presented in this report reflect actual traffic counts conducted in late April and early May 2021 and a one-time 10-percent growth factor to reflect the reduced volumes around and within the Devens area. The 10-percent growth number was developed through review of 2019, 2020, and 2021 permanent count station data and an interim study prepared for MassDevelopment in September 2020 which indicated that traffic volumes were not fully back to 'normal' following the pandemic.'* Hence, the recorded volumes were increased by 10% to account for COVID.

Supplemental daily automatic traffic recorder counts were done on May 18, 2022 and May 19, 2022, automatic traffic recorder counts were performed to determine the speed of vehicles on Barnum Road and Saratoga Boulevard. The Barnum Road ATR was placed west of Saratoga Boulevard (which is east of the proposed Barnum Road site driveway). The data shows that the two-day average daily traffic volume on Barnum Road was 3,019 vehicles per day (vpd).

The Saratoga Boulevard ATR was placed west of the driveway to 35 Saratoga Boulevard (which is west of the 35 Saratoga Boulevard site driveway). The data shows that the two-day average daily traffic volume on Saratoga Boulevard was 2,963 vpd.

The ATR data is attached.

Nitsch Response (06/07/2022): Comment resolved

19. Did the traffic counts include speed data? If so, please provide 50<sup>th</sup> and 85<sup>th</sup> percentile speeds on both study roadways.

**Applicant Response (05/31/2022): The 2020 Traffic Monitoring Program report did not collect speed data.**

Nitsch Response (06/07/2022): Comment resolved

20. The report states the sight distance calculations are attached, but they appear to be missing. Please provide any relevant sight distance calculations.

**Applicant Response (05/31/2022): The sight distance worksheets are attached.**

Nitsch Response (06/07/2022): Are Figures 1-4 the "sight distance worksheets"? Still no calculations found.

**Applicant Response (08/22/2022): <None provided>**

Nitsch Response (08/25/2022): Please respond to this comment.

21. For the required minimum sight distances in Table 1, please use the Design values from the AASHTO Green Book (2018) Tables 3-1 and 9-7 (rounded-up values, as are standard), or as adjusted for grade. Please ensure the value for SSD for Saratoga Boulevard approaching from the south at 30 MPH is corrected, as well.

**Applicant Response (05/31/2022): Summarized in Table 1 are the sight distances using the Design values from the AASHTO A Policy on Geometric Design of Highways and Streets<sup>1</sup>.**

**TABLE 1  
 SIGHT DISTANCE SUMMARY**

	Required Minimum 30 MPH (Feet) <sup>a</sup>	Required Minimum 35 MPH (Feet) <sup>b</sup>	Required Minimum 40 MPH (Feet) <sup>c</sup>	Measured (Feet)
<b>Saratoga Boulevard and Site Driveway</b>				
Stopping Sight Distance:				
Saratoga Boulevard approaching from the north	200	250	305	500+
Saratoga Boulevard approaching from the south	200	250	305	500+
Intersection Sight Distance:				
Driveway looking to the north	287 <sup>d</sup> 331 <sup>e</sup>	334 <sup>d</sup> 386 <sup>e</sup>	382 <sup>d</sup> 441 <sup>e</sup>	500+
Driveway looking to the south	287 <sup>d</sup> 331 <sup>e</sup>	334 <sup>d</sup> 386 <sup>e</sup>	382 <sup>d</sup> 441 <sup>e</sup>	500+
<b>Barnum Road and Site Driveway</b>				
Stopping Sight Distance:				
Barnum Road approaching from the east <sup>f</sup>	--	234	285	400
Barnum Road approaching from the west <sup>f</sup>	--	234	285	500+
Intersection Sight Distance:				
Driveway looking to the east	--	334 <sup>d</sup> 386 <sup>e</sup>	382 <sup>d</sup> 441 <sup>e</sup>	400+
Driveway looking to the west	--	334 <sup>d</sup> 386 <sup>e</sup>	382 <sup>d</sup> 441 <sup>e</sup>	500+

<sup>a</sup>Recommended minimum values obtained from A Policy on Geometric Design of Highways and Streets; American Association of State Highway and Transportation Officials (AASHTO); 2010, and based on a 30 mph speed (Posted Speed Limit) on Saratoga Boulevard.

<sup>b</sup>Recommended minimum values obtained from A Policy on Geometric Design of Highways and Streets; American Association of State Highway and Transportation Officials (AASHTO); 2010, and based on a 35 mph speed on Saratoga Boulevard.

<sup>c</sup>Recommended minimum values obtained from A Policy on Geometric Design of Highways and Streets; American Association of State Highway and Transportation Officials (AASHTO); 2010, and based on a 40 mph speed on Saratoga Boulevard.

<sup>d</sup>Recommended minimum value for vehicles turning right exiting a roadway under STOP-sign control.

<sup>e</sup>Recommended minimum value for vehicles turning left exiting a roadway under STOP-sign control.

<sup>f</sup>Recommended minimum values obtained from A Policy on Geometric Design of Highways and Streets; American Association of State Highway and Transportation Officials (AASHTO); 2010, and based on a 35 or 40 mph speed on Barnum Road, adjusted for 4% grade.

**On May 18, 2022 and May 19, 2022, automatic traffic recorder counts were performed to determine the speed of vehicles on Barnum Road and Saratoga Boulevard. The Barnum Road ATR was placed west of Saratoga Boulevard (which is east of the proposed Barnum Road site driveway). The 85th percentile speed was found to be 38 mph on May 18, 2022 and 39 mph on May 19, 2022 in the westbound direction. This indicates using a 40 mph speed for assessing the sight distances at the Barnum Road driveway would be appropriate.**

**The Saratoga Boulevard ATR was placed west of the driveway to 35 Saratoga Boulevard (which is west of the 35 Saratoga Boulevard site driveway). The 85th percentile speed was found to be 36 mph on May 18, 2022 and 35 mph on May 19, 2022 in the eastbound direction. This indicates using a 35 mph speed for assessing the sight distances at the Saratoga Boulevard driveway would be appropriate.**

**The ATR data is attached.**

<sup>1</sup> A Policy on Geometric Design of Highways and Streets; American Association of State Highway and Transportation Officials; Washington, D.C.; 2018.

**In the comments from Mass Development, they recommended using the design speed of 45 mph as the posted speed limit on Barnum Road is 35 mph. However, as there is now actual speed data, collected over a two-day period, for Barnum Road, the sight distances were evaluated based on a 40 mph speed, adjusting for grade as appropriate.**

**Nitsch Response (06/07/2022): Please update *all* required minimum sight distances in Table 1 to their rounded-up values, including the Saratoga Boulevard and Site Driveway ISD and the Barnum Road and Site Driveway SSD and ISD. Change the year of the AASHTO publication in the table footnotes to 2018 for consistency.**

22. If either of these roadways has a grade affecting the sight distance (3% or greater), please describe it in the Sight Distance Assessment section and ensure that any calculations provided reflect those grades.

**Applicant Response (05/31/2022): Based on available grading data from the site plans, Barnum Road rises a four (4) percent grade approaching the proposed Barnum Road site driveway from both directions. These four (4) percent grades are reflected in the calculations shown above in Table 1.**

**Nitsch Response (06/07/2022): In footnote "f" of Table 1, specify that it is a 4% *upgrade* in both directions. Were the required minimum ISDs for Barnum Road and Site Driveway also adjusted for grade? If so, please provide a footnote to explain. If not, please make those adjustments.**

**Applicant Response (08/22/2022): <None provided>**

**Nitsch Response (08/25/2022): Please respond to this comment.**

23. In Figures 1 and 2, what is the visual obstruction between driver and object used to determine the sight line?

**Applicant Response (05/31/2022): The stopping sight distance (SSD) was measured from the height of the truck driver's eye (7.75 feet average) to a two (2) foot tall object at the edge of the travelled way (Barnum Road). Additional sight lines were prepared using automobiles exiting the proposed Barnum Road site driveway. These are shown on Figures 3 and 4, attached.**

**As noted on Figure 3, with a lower profile and lower eye height, automobiles will have less stopping sight distance. It is recommended that an Intersection Ahead (W2-2) sign be installed on Barnum Road westbound. This sign can be supplemented with a W10-11 (Truck) sign.**

**Nitsch Response (06/07/2022): See Comment No. 26. If actual measurements were taken from the CAD drawings in Figures 1-4, is the crest curve of the roadway itself the visual obstruction between driver and object that was used to determine the sight line? Separately, on the grade charts in Figures 1-4, are the grades along the roadway centerline or along the sight lines shown?**

**Applicant Response (08/22/2022): The stopping sight distance (SSD) was measured from the height of the truck driver's eye (7.75 feet average) to a two (2) foot tall object at the edge of the travelled way (Barnum Road). Additional sight lines were prepared using automobiles exiting the proposed Barnum Road site driveway. These are shown on Figures 3 and 4, attached.**

**The visual obstructions would have been the existing topography. Photos showing the sight lines are included in the response to Comment No. 26 below.**

**As noted on Figure 3, with a lower profile and lower eye height, automobiles will have less stopping sight distance. It is recommended that an Intersection Ahead (W2-2) sign be installed on Barnum Road westbound. This sign can be supplemented with a W10-11 (Truck) sign.**

Nitsch Response (08/25/2022): No new Figures 3 and 4 were provided, so we assume this is referring to the Figures 3 and 4 included in the applicant response from May 31, 2022. However, Figures 1 and 2 were updated in the interim and still have questions that are outstanding – see Comment 30. There have been inconsistencies between figures and changes that could affect sight distance measurements. Please provide updated Figures 1-4 with all relevant comments incorporated, and please label the visual obstruction along the sight line, be it a roadside slope, the roadway itself within the vertical curve, or otherwise. In other words, show how the sight line vector was constructed such that it was then measured in CAD. As shown currently, it looks like the vehicle on the roadway is placed at an arbitrary distance from the driveway and a line is drawn between the two vehicles. Show how that line was made. If the visual obstruction is the roadway itself, is that the purpose of the profile view, and if so, is the existing grade for the roadway centerline or does it follow the sight lines? This distinction is particularly important for the sight lines that cross over the roadside.

24. In the last paragraph on page 2, it is stated that the Barnum Road and site driveway intersection will be used for trucks only, but it looks like Barnum Road itself serves other properties and connections so that will have a mix of traffic, and only the site driveway is limited to trucks. Please clarify, and if the roadway will also have passenger cars, in Figure 1, use a driver eye height of 3.5 feet for a passenger car instead of the truck driver eye height.

**Applicant Response (05/31/2022): The Barnum Road driveway is intended to be used by trucks only. The proposed project is not proposing any restrictions on traffic on Barnum Road. Shown on Figure 3 is the sight line for an automobile approaching the Barnum Road site driveway from the east.**

Nitsch Response (06/07/2022): Comment resolved

25. In Figure 2, what distance back from the edge line is used? If using a distance other than the standard 14.5 feet, please explain.

**Applicant Response (05/31/2022): The drivers eye location, exiting the Barnum Road site driveway to Barnum Road is 14.5 feet from the edge of travelled way.**

Nitsch Response (06/07/2022): Comment resolved

26. Describe whether these measurements all done in CAD, or if there were any field measurements. Please provide figures showing all SSD and ISD measurements done in CAD. For any field measurements, provide the date(s) taken. Also, describe any considerations for change in foliage/vegetation levels for different times of year, especially if taken when there was little or no foliage/vegetation.

**Applicant Response (05/31/2022):** The measurements were done in CAD for Figures 1 and 2. Field observations were made for both the Saratoga Boulevard and Barnum Road driveways. The site visits were performed on March 3, 2022 and March 8, 2022. Looking to the east out of the proposed Barnum Road site driveway, the area is sloped and grassed only. There are no trees, shrubs, or signage that would impede sight lines (relative to foliage and vegetation) as seen in the photo to the right.



Looking to the west out of the proposed Barnum Road site driveway, the area is also sloped and grassed only. The tree line to the west is closer to Barnum Road. The photograph to the right shows the view measured 14.5 from the edge of travelled way. While it is the end of winter, the leaves from the previous Fall are still on the tree and do not block sight lines.



**Nitsch Response (06/07/2022):** Both pictures provided appear to be looking to the right from one or the other of the driveways, but the narrative describes only the Barnum Road site driveway looking east (left) and west (right). Please clarify. Also, please clarify whether the measured sight distances in Table 1 are all from field measurements or the ones looking east on Barnum Road are from the measurements done in CAD and shown in Figures 1-4. If they were all from field measurements, please clarify the purpose of Figures 1-4. Depending on that purpose, consider providing figures showing sight distances looking west on Barnum Road and looking both ways on Saratoga Road as well.

**Applicant Response (08/25/2022):** The measurements were done in CAD for Figures 1 and 2. Field observations were made for both the Saratoga Boulevard and Barnum Road driveways. The site visits were performed on March 3, 2022 and March 8, 2022. Looking to the east out of the proposed Barnum Road site driveway, the area is sloped and grassed only. There are no trees, shrubs, or signage that would impede sight lines (relative to foliage and vegetation) as seen in the photo to the right.



Looking to the west out of the proposed Barnum Road site driveway, the area is also sloped and grassed only. The tree line to the west is closer to Barnum Road. The photograph to the right shows the view measured 14.5 from the edge of travelled way. While it is the end of winter, the leaves from the previous Fall are still on the tree and do not block sight lines.



**Nitsch Response (08/25/2022):** The top picture has now been flipped (mirror image) relative to the one provided in the earlier response with no note about that change. Please confirm that this is now the correct orientation for this picture. Also, please clarify whether the measured sight distances in Table 1 are all from field measurements or the ones looking east on Barnum Road are from the measurements done in CAD and shown in Figures 1-4. If they were all from field measurements, please clarify the purpose of Figures 1-4. If the measurements are all from CAD, please provide figures showing sight distances looking west on Barnum Road and looking both ways on Saratoga Road as well.

27. It is unclear from Table 1 if the ISD for Barnum Road and Site Driveway looking east meets the criteria for 40 MPH for vehicles turning left (minimum 441 feet, measured 400+ feet). Please provide a more specific measurement, and if it is less than the minimum, please explain.

**Applicant Response (05/31/2022):** In accordance with the AASHTO manual, *“If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.”* Accordingly, the ISD should be at least equal to the SSD, which would allow a driver approaching the minor road to safely stop. In this case, the stopping sight distance is the controlling distance.

Nitsch Response (06/07/2022): Comment resolved

28. At the bottom of page 3, it is stated that "ISD should be at least equal to the SSD." Please clarify if that is the required minimum SSD or the measured SSD.

**Applicant Response (05/31/2022): It is the required minimum SSD.**

Nitsch Response (06/07/2022): Comment resolved

29. On page 6, it says the measured ISD at the proposed site driveway is 550+ feet. Please clarify whether this referring to one (1) of the driveways or both. Either way, the measured ISDs in Table 1 do not match. Please correct the table and/or the narrative.

**Applicant Response (05/31/2022): The statement was to refer to the SSD, not the ISD. The SSD for the proposed driveways exceeds the minimum AASHTO requirements.**

Nitsch Response (06/07/2022): We note that the measured SSDs for both proposed driveways exceed the minimum AASHTO requirements, as shown in Table 1, no matter whether the measured SSDs are 400/500+ feet as shown in the Table or 550+ feet as stated in the report paragraph. Nevertheless, the updated report should either drop the stated value from the paragraph or state values consistent with the table.

**Applicant Response (08/22/2022): <None provided>**

Nitsch Response (08/25/2022): Please respond to this comment.

30. New Nitsch Comment in response to new Figure 1 & Figure 2 received the day prior (07/26/2022): They have sent us a revised version of their Figures 1 and 2, which show a revised driveway configuration on Barnum Road having a raised triangular island, consistent with the accompanying plans. But also:

- Figure 1 has changed from a truck spotting a truck to a car spotting a car, which presents a more conservative sight distance analysis, which is good, but somehow the measured distance is the same. There is no explanation given.
- Figure 2 remains a truck spotting a car, but the height of the truck driver's eye has dropped from 7.75' (appropriate for a truck) to 4.00' (appropriate for a car), which doesn't make sense. Also, the height of the car being spotted has changed from 3.50' to 4.00' and no explanation is given.

I would like to know what the proponent is trying to show with these revised figures. The revised figures do not directly address any of the comments, though Comments No. 23 & 26 ask questions of these figures. They still need to respond to those comments as well as the others in the email sent to Peter Lowitt on June 7, 2022. And if they have revised the report itself, I would like to see it.

**Applicant Response (08/22/2022): <None provided>**

Nitsch Response (08/25/2022): Please respond to this comment.

31. New Nitsch Comment (08/25/2022): Please respond to all unresolved comments and submit revised Sight Distance Assessment report.

Devens Enterprise Commission: Nitsch Project #9419  
August 26, 2022  
Page 9 of 9

If the Commission has any questions, please call.

Very truly yours,

**Nitsch Engineering, Inc.**



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

AJA/JLJ/kam

Approved By:



Jennifer Johnson, PE, CFM, CPSWQ, LEED AP  
Deputy Director of Planning