May 31, 2024

Attn. Ms. Kathleen Colwell
Planning Division Director
Dept. of Economic and Community Development
City of Methuen
41 Pleasant Street
Methuen, MA 01844

SUBJECT: Response to TEC Review Comments
Cafua Management
477-479 Broadway
Methuen, MA 01844
GPI Project No. NEX-2021347

Dear Kathleen:

Greenman-Pedersen, Inc. (GPI) has prepared this Response to Comments letter based on the Peer Review letter provided by The Engineering Corp TEC, dated April 8, 2024 regarding the above referenced project. The TEC Letter is attached for your reference. We have prepared the following information and the comments are summarized below followed by our responses to each.

Site Plan Review

1. It is noted that the applicant has not submitted any materials requesting a waiver.
RESPONSE: A note has been added to the site plan regarding the need for a waiver by the Community Development Board.

2. According to Methuen's Zoning Ordinance, Section 12.3.A(3)(e) with regards to the photometric plan '…light trespass onto any street or abutting lot will not occur.' Spot locations outside of the property lines of up to 0.9 lumens are shown to occur on the photometric plan.
RESPONSE: The lighting plan has been updated to eliminate light trespass along abutting property lines reducing levels to 0.0 to 0.3 footcandles. However, light levels provide along the driveway entrances exceed the 0.9 footcandles and are required to provide safe access and egress for patrons consistent with other commercial applications like this development.

3. It is noted that to reduce the required 60 foot vegetated buffer to the residential district east of the site, the Applicant is proposing a six (6) foot high solid stockade fence with a 30 foot vegetated buffer to the property line. The applicant should provide a detail of this fence for the board's approval.
RESPONSE: Comment acknowledged, a fence detail has been added to the plans.

4. TEC acknowledges that the Applicant has provided at least 18' of a drive aisle for the sixty-degree parking along the northeastern perimeter of the site in accordance with the bylaws. However, the vehicle queuing detail provided in Sheet 5 Site Plan encroaches upon this, and results in a drive aisle of less than 18'.
RESPONSE: The drive aisle has been adjusted to account for an 18' drive aisle without encroaching into the queue lane.

5. TEC recommends adding spot grades to the Grading & Utility Plan for each wheelchair ramp and along walkways to clarify the design satisfies ADA and MAAB regulations and matches the provided details.
RESPONSE: Additional spot grades have been added as suggested.

6. According to the Grading & Drainage Plan, the landscape area east of the proposed building, and the concrete sidewalk and landscape area west of the proposed building appears to have a 0% slope as the finished floor elevation is 117.5' and the top of curb is presumed to be 117.5' with a 6" reveal. TEC recommends revising the plans to ensure that potential runoff will be flowing away from the building.
RESPONSE: Grading and spot shots have been re-evaluated and adjusted as necessary.

7. It appears that the slope between the 116.15' spot grade and the 116 contour at the ADA crosswalk adjacent to the drive through entrance exceeds 5%. TEC recommends revising the grading in this area.
RESPONSE: The ADA accessible route has been adjusted and the grading and spot shots have been re-evaluated to ensure proper ADA requirements as necessary.

8. The Applicant should confirm that the current proposed location for the dumpster will not result in any traffic congestion issues with the current drive through layout.
RESPONSE: Comment acknowledged. The location of the fenced trash enclosure should not impact onsite traffic flow, however trash pickup will occur during off peak hours to reduce potential traffic congestion concerns.

9. The Applicant should revise the following in relation to the dumpster pad located at the northeast corner of the site:
   a) Spot grades within the area of dumpster pad to avoid a low point and potential ponding.
   b) The Site Plans and/or Detail Sheet so that the bollards shown on the Detail Sheets are consistent with what is proposed on the Site Plans.
RESPONSE: Additional spot shots have been provided along the trash enclosure area and bollards have been added to show consistency between the Site Plans and Detail Sheets.

10. The Applicant includes a flared accessible ramp detail which includes a 5' minimum clearance adjacent to the top of the ramp. According to the Site Plan, it appears there is only a 3' clearance between the top of ramp and proposed building. TEC recommends the Applicant revise the plans to be consistent.
RESPONSE: The Site Plans and Detail Sheet have been updated for consistency.

11. According to 'Massachusetts' Stormwater Best Management Practices', in respect to infiltration basins: "Distance from any building foundations including slab foundations without basements – Minimum of 10 ft. downslope and 100ft. upslope." The Applicant should adjust the location of the underground infiltration system as it appears to be less than 10 feet from the proposed building.
RESPONSE: The infiltration system has been adjusted to provide the minimum 10' of clearance as suggested.

12. Several utility crossings and conflicts are shown in the southern aisle on the Utility Plan. The applicant should show either proper utility separation, or provide elevations and details for proposed utility crossings.
RESPONSE: Additional utility crossing inverts were added to the plans to reduce potential crossing conflicts during construction.

13. The Applicant should include base elevations for the test pit logs to clarify the respective elevations of the subsurface materials.
RESPONSE: Elevations have been added to the test pit logs as requested.

14. TEC recommends the Applicant extend the proposed erosion control measures along the saw cut location within the northern drive aisle to avoid potential runoff into Broadway during construction.
RESPONSE: Erosion controls have been revised as suggested.

15. The Applicant is proposing a drive-thru bump bar that extends approximately 9.5' into the inner drive aisle. TEC recommends the Applicant revise so that an emergency vehicle can sufficiently maneuver around the clearance bar.
RESPONSE: Additional truck turn movement plans have been added to the plan set to verify clearance and access around the site and the clearance bar adjusted accordingly to accommodate movements.

Stormwater Management Review

16. According to the Grading & Drainage Plan, it appears the break in grade at both site entrances leads to additional proposed impervious area runoff towards Broadway. TEC recommends the Applicant revise these grade breaks to retain the site stormwater onsite to the maximum extent.
RESPONSE: The location of the grade break is required due to the changing elevation along Broadway. There is approximately a 2' elevation change between the northern and southern driveways, and the grade break location is provided to offset this change in elevation. The proposed drainage design still provides for no increases in peak rates of runoff and volume even with the location of this grade break. It should also be noted that an existing catch basin is located approximately 80' north of the northern curb cut and will capture any runoff not detained within the site driveway limits.

17. According to the Pre-Development Drainage Area Plan and HydroCAD Report, it appears the project area is modeled as one subcatchment area that directly flows to Design Point-1. However, a catch basin appears to be present within the existing conditions plans. TEC recommends the Applicant model the existing catch basin in the HydroCAD Report to accurately evaluate pre- development peak flows at Design Point 1, and stormwater entering the roadway.
RESPONSE: The Pre-Development has been revised to account for the existing catch basin.

18. Subcatchment 100S of the Post-Development shows flows from a large area from mostly offsite land, sheet flowing over the sidewalk/driveway entrance and flowing offsite before being captured in the roadway drainage system. The contours of the Existing Conditions appears to show the majority of this water being captured in a catch basin on site and not flowing offsite to the roadway. The Applicant should consider adding a structure to similarly capture this runoff to avoid sending additional surface water to the roadway in the Post condition.
RESPONSE: A yard drain has been added to capture the offsite runoff.

19. The Applicant should revise the following in relation to subcatchment area '6S' of the Post-Development HydroCAD:
    a) The routing method of the subcatchment as it is currently designed to flow directly to the underground detention system. Within the Grading & Drainage Plan, it appears stormwater runoff is conveyed overland from the patio to CB-2

RESPONSE: Subcatchment 6S has been removed and the resulting area has been divided accordingly to either CB-1 or CB-2.

b) The subcatchment area is currently modeled as entirely impervious area. Within the Post-Development Drainage Area Plan, it appears the subcatchment area includes the concrete patio area as well as the landscape area adjacent to the proposed building.
RESPONSE: The areas have been revised to reflect both the concrete patio and landscaping adjacent to the building.

20. The Applicant has provided the HydroCAD node summary pages for only for the 25-year storm. TEC requests the Applicant include summaries for all nodes for all storms
RESPONSE: Node summaries for all nodes have been added for all storms.

21. TEC recommends the Applicant include pipe sizing calculations to ensure adequate pipe capacity.
RESPONSE: Based on the small watershed areas contributing to each catch basin, pipe calculations were sized based on the HydroCAD storm modeling only.

Traffic Impact and Access Study Review

22. Broadway is under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). The Applicant will be required to file a Permit to Access State Highway with MassDOT District 4 as part of their approval. The City should consider including a condition to any approval of the site plan requiring completion of an approved MassDOT Permit to Access State Highway prior to the issuance of a Building Permit. The City should share all applicable traffic comments with MassDOT District 4 as they may be helpful in guiding their review.
RESPONSE: The Applicant has filed an Access Permit with MassDOT District 4.

23. The Traffic Impact and Access Study (TIAS) included the following intersections within the study area:

- Broadway (Route 28) / Rosewood Road / Village Mall Driveway
- Broadway (Route 28) / Rostrons Liquors exit-only Driveway (471 Broadway)
- Broadway (Route 28) / CREST Collaborative Driveway (464 Broadway)

Based on the scale of the planned redevelopment and the expected trip generation, TEC concurs with the Applicant's study area. No response required.

24. Traffic volume counts, including Turning Movement Counts (TMCs) and Automatic Traffic Recorder (ATR) data, were conducted at the study area roadway and intersections in January 2024 when schools were in session. The recorded volumes for this period were found to be lower than the average monthly conditions based on review of the historical traffic-volume data obtained from the New Hampshire Department of Transportation (NHDOT) and MassDOT continuous count station on Broadway and Interstate 93 (I-93). A conservative seasonal adjustment factor of 7.6 percent were applied based on MassDOT count station on I-93 in Methuen, Massachusetts, and the New Hampshire State Line. TEC concurs with this methodology. No response required.

25. The TIAS presents motor vehicle crash data for each study area intersection. The crash data indicates the number, type, and severity of crashes at the study area intersections between 2015 and 2019 obtained from MassDOT crash portal. With exception of the intersection of Broadway / Rosewood Road / Village Mall, the TIAS stated that that the intersection crash rates are lower than the MassDOT District 4 and Statewide averages with no notable safety trends that require further investigation. The Applicant should also evaluate crashes that occurred between 2021 and 2023 to assist in evaluating more recent crash history.

RESPONSE: As stated on the MassDOT crash database website, *"any crash records or data provided for the years after 2021 are subject to change at any time and are not to be considered up-to-date or complete. As such, open years of crash data are for informational purposes only and should not be used for analysis".* At the time the TIAS was prepared, the year of 2021 was also incomplete. For informational purposes and to address this comment, the crash records for the years 2021 through 2023 were reviewed. A summary of the data is provided in Table A-1 attached to this letter, along with the corresponding crash rate worksheets. The crash rates for all three study area locations are below the statewide and district-wide averages.

The intersection of Broadway / Rosewood Road / Village Mall experienced an average of 14 collisions per year over the five-year study period. The crash rate of 1.31 c/mev is well above the statewide (0.78 c/mev) and districtwide (0.73 c/mev) averages for a signalized intersection. It's noteworthy that this intersection was included in the Highway Safety Improvement Plan (HSIP) listing between 2017 and 2019. Previously, a Road Safety Audit (RSA) was conducted in 2014 for the Route 28 Resurfacing project, extending from Rosewood Road to NH State Line (MassDOT Project # 607709). This audit recommended various safety enhancements, including signal timing adjustments, the addition of left-turn pockets on Route 28, the introduction of a left-turn phase for Route 28 southbound, restrictions on left turns onto Rosewood Road from Route 28, and the implementation of protected-only left-turn phasing for Route 28. With the exception of the signal timing adjustments, none of these enhancements have been implemented at this private site location. The TIAS has incorporated the signal timing adjustments as part of their capacity analysis for the Future Conditions with Mitigation. Ultimately, the review of the safety-related aspects of the driveway configuration lie under MassDOT's exclusive jurisdiction.
RESPONSE: Comment Acknowledged.

26. The background growth rate of 1.0 percent per year was applied to the 2024 existing volumes to generate the 2031 future year volumes per MassDOT guidelines. The traffic associated with a 4,859 sf carwash, Tuscan Village, and Taco John's development was factored in using either the Institute of Transportation Engineers (ITE) statistics or studies prepared specifically for these developments these developments. TEC concurs with this methodology. No response required.

27. The trip generation of the proposed Project was assessed to determine if the proposed Project would meet or exceed any thresholds that would require formal environmental review with respect to traffic under Massachusetts Environmental Policy Act (MEPA). Based on this review, TEC concurs that the Project-related traffic does not exceed MEPA thresholds and therefore no Environmental Notification Form (ENF) appears to be required based on the traffic-related thresholds.
RESPONSE: Comment Acknowledged.

28. Site trip generation calculations for the proposed Project were generated based on the ITE Trip Generation Manual, 11th Edition, Land Use Code (LUC) 937 – Coffee/Donut Shop with Drive-Through Window. It is noteworthy that Dunkin's shop ("The Existing Dunkin's"), situated at 450 Broadway (approximately 300 feet south of the proposed Project and on the opposite side of Route 28), will be closed, and operations will transition to the proposed Project site. The existing Dunkin's site is anticipated to be replaced by a quick-service restaurant, consequently, no traffic "credits" were applied. Overall, the TIAS presents an above-average analysis condition and TEC generally concurs with this methodology. However, in conjunction with Comment #10, traffic volume counts for a 4-hour period (7:00 AM -9:00 AM; 4:00 PM – 6:00 PM) should be collected to validate ITE trip generation findings based on the apparent high volume of patron traffic.

REPONSE: Traffic counts were collected at the existing Dunkin' site located at 450 Broadway (approximately 300 feet south of the proposed Project). The count data is attached to this letter. The entering and exiting Dunkin' trips are summarized in Table 1 below and compared to what was used in the TIAS based on a trip rate per KSF. As shown in Table 1, although the existing Dunkin' site generated more traffic (25 more entering and 14 more exiting) than estimated for the future Dunkin' during the weekday AM peak hour, the existing Dunkin' is much larger at 4,839 SF. Based on a trip rate per KSF, the proposed 2,100 SF Dunkin' is expected to generate less traffic than what was assumed in the TIAS during all peak hours.

The TIAS used higher traffic volumes for the weekday PM and Saturday midday peak hours than that counted at the existing larger Dunkin' not taking into account the size of the buildings. To provide a conservative analysis, the additional 39 weekday AM peak hour trips were distributed along the roadway network and the marked-up site-generated/build networks, along with the analysis tables/worksheets are attached to this letter for reference. As a result, the increase in capacity and delay from what was previously provided in the TIAS is negligible.

Table 1. Trip Generation Comparison

	Based on May 2024 Counts			**Used in TIAS**
Time Period/Direction	Existing Dunkin' (4.839 KSF)	Rate per KSF	Proposed Dunkin' (2.100 KSF)	Proposed Dunkin' (2.100 KSF)
Weekday AM				
Enter	117	24.18	51	92
Exit	102	21.08	44	88
Total	219	45.26	95	180
Weekday PM				
Enter	39	8.06	17	41
Exit	37	7.65	16	41
Total	76	15.71	33	82
Saturday Midday				
Enter	83	17.15	36	93
Exit	82	16.95	36	92
Total	165	34.10	72	185

29. The TIAS accounts for pass-by trips consists of vehicles passing by the site on their way to another destination. A pass by trip rate of 50 percent during the weekday daily, Saturday daily, weekday AM, and Saturday midday peak hour and 55 percent during weekday evening peak hour was applied to trip generation numbers based on pass by trip rate information provided in ITE Trip Generation Manual. TEC concurs with this methodology. No response required.

The traffic generated by the proposed Project was distributed onto the adjacent roadway system based on the existing pattern, which is acceptable for coffee shop uses. That being said, to provide accurate depiction of traffic entering and exiting the Project site, the Applicant should perform a spot count at the existing Dunkin's. The Applicant should detail any analysis changes that may occur due to the change in traffic pattern along Broadway as the majority of the morning Project- related traffic is likely to enter from the north and exit toward south (right-in / right-out) based on major commuter trends. These discussions should be included as part of the Applicant's discussions with MassDOT District 4 because the relocation of the Dunkin' facility from the west side of Route 28 to the east side

may result in a higher volume and increased delays for southbound entering left turns and exiting left turns.

RESPONSE: It should be noted that the pass-by trips were distributed based on the directional traffic during each individual peak hour. Based on the existing networks, the volumes do not show that the major commuter trend is to enter from the north and exit toward the south during the weekday AM. As presented in Table 1 of the TIAS, the directional distribution during the weekday AM is 50% northbound / 50% southbound.

- **Based on the spot count at the existing Dunkin' located on the west side of Broadway, 55% of the entering traffic enters from the north and 69% of the exiting traffic exits to the south.**
- **In the TIAS, by using the existing travel patterns for distribution (cordon count for new/primary trips and directional distribution for pass-by trips), 47% enter from the north and 52% exit to the south during the weekday AM.**

During the weekday AM peak hour, the TIAS distribution percentages are fairly close to how the existing Dunkin' operates, and even further, it is likely that travel patterns slightly shift in the sense that more pass-by users will be pulled from the northbound direction than the existing site due to being located on the east side of Broadway. Accordingly, after reviewing the spot count at the existing Dunkin', GPI is confident with the trip distribution utilized in the TIAS.

30. The Build traffic volumes were grown to 2031 to cover 7-year planning horizon from time of data collection (2024). TEC concurs with this methodology as 7-year planning horizon aligns with MassDOT Transportation Impact Assessment (TIA) Guidelines. No response required.

31. TEC generally concurs with the results of the capacity and queue analysis provided as part of the TIAS which utilized the Highway Capacity Manual (HCM) 6th Edition for unsignalized and HCM 2000 for signalized intersections. However, TEC reserves the right to provide additional comments related to the revised capacity queue analysis for Route 28 southbound based upon the above comments.
RESPONSE: Comment acknowledged.

32. Operations at the signalized intersection of Broadway / Rosewood Road / the Village Mall Driveway were shown to operate overcapacity during the Saturday midday peak hour, independent of the Project. The Applicant has demonstrated that the impact of the Project can be mitigated with adjustments to signal timings. Therefore, it is recommended that the Applicant commits to adjusting signal timings as necessary. TEC concurs that the Project-related impact is minimal at the intersections of Broadway / Rostrins Liquors Driveway and Broadway / CREST Collaborative Driveway.
RESPONSE: At the signalized intersection of Broadway / Rosewood Road / Village Mall Driveway, it was demonstrated that the impact of the Project can be mitigated by adjusting the signal timings by one second during the Saturday midday peak period. As this location is under actuated signal control, an adjustment of one second is not deemed necessary, unless required by MassDOT.

33. The drive-through window lane is proposed to be 10-feet wide and provide storage for 14 vehicles without interrupting on-site circulation. The Applicant utilized three queue observations that were performed in 2014. Two observations were made in Londonderry, NH during weekday morning and one in Peabody, MA during weekday morning and Saturday midday. Based on these vehicle queue data, the vehicle queue for the drive-through window is anticipated to accommodate demand without interrupting traffic flow on site or along the adjacent roadways. TEC concurs with this statement. No response required.

34. To properly assess roadway operations and safety, including sight distance, the Applicant utilized the 85th percentile travel speeds along Broadway which is noted to be 40 MPH northbound and 39 MPH southbound in Table 3 of the TIAS. The measured speeds are higher than the posted speed limit of 35 and 30 MPH on Broadway northbound and southbound approaches, respectively. These travel speeds were measured by the ATR in January 2024. The sight distances reported in Table 4 of the TIAS are measured at the Site Driveway Exit-Only intersection with Broadway in accordance with the American Association of State Highway and Transportation Officials (AASHTO) requirements to operate in a safe manner. TEC concurs with the Applicant's sight line methodology. No response required.

35. The Applicant should provide additional information whether a parking supply of 20 stalls will be adequate to meet the demands of the Project, especially considering that the existing Dunkin facility offers approximately 32 stalls. TEC recommends that the Applicant perform a parking demand observations at the existing Dunkin Facility in order to demonstrate that the parking supply will be sufficient to accommodate the parking demands of the Project.
RESPONSE: Based on data provided in the Institute of Transportation Engineers *Parking Generation Manual, 5th Edition*, the average peak parking demand anticipated to be generated by the proposed 2,100 SF Dunkin' is 11 vehicles during a weekday and 19 vehicles during a Saturday. Accordingly, the parking supply of 20 stalls is expected to be adequate to meet the demands of the proposed Dunkin' site. In comparison, the average peak parking demand for the existing 4,839 SF Dunkin' is 26 vehicles during a weekday and 42 vehicles during a Saturday.

In addition to the ITE parking data, GPI went out on Thursday, May 23, 2024, and collected parking count data between 8:45 AM and 9:15 AM at the existing Dunkin' facility. This time period was chosen based on the Time of Day Distribution for Parking Demand for LUC 937 which indicates the peak weekday parking demand occurs at 9:00 AM. It was found that a maximum of 11 spaces were occupied during this morning time period. Accordingly, this data also justifies the 20 parking stalls. No observations were made on Saturday, as there is no Time of Day Distribution for Parking Demand data available. Based on the result of the data collected and the ITE data, the maximum Saturday parking demand is expected to be approximately 19 vehicles.

Traffic Engineering Site Plan Review

36. A marked stop line should be provided for vehicles exiting the Site Exit-Only Driveway approach to Broadway. The stop sign and 'Do not enter' signs should be mounted on different posts due to the shape/visibility requirements of the Manual on Uniform Traffic Control Devices (or MUTCD).
RESPONSE: A stop line has been added to the plans as suggested. The signs are routinely installed back to back & no changes are proposed regarding this item.

37. The Applicant should consider restricting the flow of traffic within the front parking area to one-way northbound only and slightly narrowing the parking aisle width. This flow restriction could reduce pedestrian and vehicular conflicts within the parking lot.
RESPONSE: Pedestrian access has been adjusted to minimize potential conflicts/concerns however no changes to the front parking flow have been made.

38. The proposed crosswalk location depicted on the Site Plan appears to cross directly behind parking spaces or directly within the reverse path of a vehicle. Depending on the response to Comment #37,

the Applicant could consider relocating the crosswalk to the northerly end of the parking aisle to allow the pedestrians to be in front of the motorist.
RESPONSE: See response above regarding the adjusted pedestrian access changes.

39. TEC recommends that the proposed parking spaces located in the easterly portion of the site be assigned as employee-only parking with accompanying signage to reduce patron traffic and pedestrian conflicts through the drive-through and bypass lanes.
RESPONSE: Employee parking signs have been added as suggested.

40. Based on the Truck Turn Plan a WB-50 truck can narrowly access and circulate through the bypass lane or drive-through lane, as necessary. The Applicant's engineer should provide a truck turning analysis using a City of Methuen fire apparatus to ensure that emergency vehicles are able to navigate in and out of the site.
RESPONSE: Additional truck turn movements based on the City of Methuen fire apparatus have been added to the plan set.

41. Since there is no formal loading zone identified on the site, a narrative should be provided indicating how loading/deliveries and trash/recycling will be managed off-hours.
RESPONSE: A note has been added to the plan indicating loading/deliveries, trash/recycling to be managed off-hours.

42. The sight triangle areas for the site driveway intersection with Driveway should be shown on the Site Plans along with a note to indicate: "Signs, landscaping and other features located within sight triangle areas shall be designed, installed, and maintained so as not to exceed 2.5- feet in height. Snow windrows located within sight triangle areas that exceed 3.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed."
RESPONSE: A Sight Line Plan has been prepared and is included in the site plan set. This plan shows the sight line triangles and also includes the note requested.

43. A note should be added stating: "All Signs and pavement markings to be installed within the Project site shall conform to the applicable specifications of the Manual on Uniform Traffic Control Devices (MUTCD).
RESPONSE: A note has been added to the plans as suggested.

If you have any questions or need additional information, feel free to contact me by phone at (603) 632-3509 or by email to ctymula@gpinet.com.

Sincerely,
Greenman Pedersen, Inc.

Chris Tymula, P.E.
Site Engineering Dept. Head

Attachments:
1. TEC Review Letter 4/8/2024

2. Crash Summary (2021 – 2023)
3. Existing Dunkin' Counts – May 2024
4. Updated Weekday AM – Trip Generation, Networks, and Capacity and Queue Analysis
5. ITE Parking Data
6. Existing Dunkin' Parking Count Data – May 2024

Cc: Greg Nolan, Cafua Management
Arthur Broadhurst, Esq, Merrimack Valley Law

Response to TEC Review Comments 5-31-24.docx

TABLE A-1
Collision Summary

Location	Number of Collisions			Severity [a]				Collision Type [b]						Percent During	
	Total	Average per Year	Crash Rate [c]	PD	PI	F	NR	SS	RE	CM	SV	HO	NR	Commuter Peak [d]	Wet/Icy Conditions [e]
Broadway at Rosewood Road and Village Mall Driveway	15	5.0	0.47	10	5	--	--	3	7	2	1	2	--	7%	7%
Broadway at Rostrons Liquors Exit-Only Driveway	1	0.3	0.03	--	1	--	--	--	--	--	1*	--	--	0%	0%
Broadway at CREST Collaborative Driveway	5	1.7	0.17	5	--	--	--	--	2	3	--	--	--	0%	40%

Source: MassDOT (2021-2023).

[a] PD = property damage only; PI = personal injury; F = fatality, NR = not reported.

[b] SS = sideswipe; RE = rear end; CM = cross movement/angle; SV = single vehicle; HO = head on; NR = not reported.

[c] Measured in crashes per million entering vehicles for intersections and in crashes per million vehicle miles traveled for roadway segments.

[d] Percent of vehicle incidents that occurred during the weekday AM (7:00 AM-9:00 AM) and weekday PM (4:00 PM -6:00 PM) commuter peak periods.

[e] Represents the percentage of only "known" collisions occurring during inclement weather conditions.

*Collision with Pedestrian

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Methuen | COUNT DATE : Jan-24

DISTRICT : 4 | UNSIGNALIZED : | SIGNALIZED : X

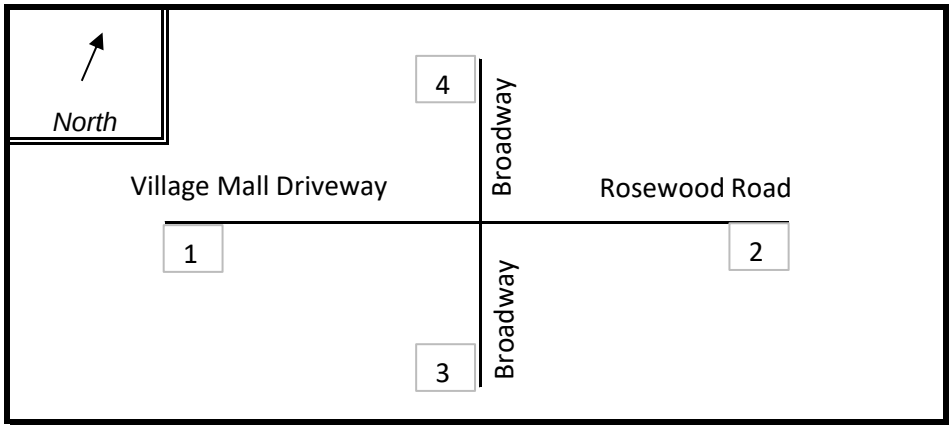
~ INTERSECTION DATA ~

MAJOR STREET : Broadway (Route 28)

MINOR STREET(S) : Rosewood Road

Village Mall Driveway

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM/PM) :	128	111	1,174	981		**2,394**

" K " FACTOR : **0.082**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **29,195**

TOTAL # OF CRASHES : 15 | # OF YEARS : 3 | AVERAGE # OF CRASHES PER YEAR (**A**) : **5.00**

CRASH RATE CALCULATION : 0.47

RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Weekday PM volumes used

Project Title & Date: NEX-2021347 Methuen, MA - Mixed-Use Development

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Methuen COUNT DATE : Jan-24

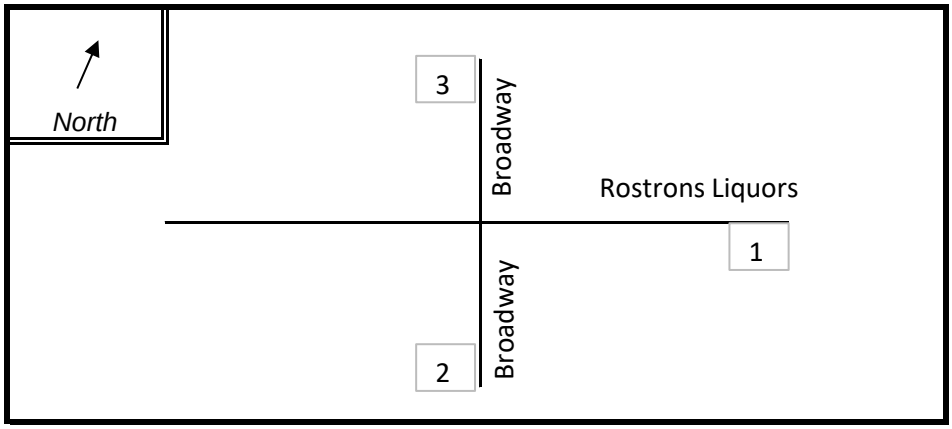
DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Broadway (Route 28)

MINOR STREET(S) : Rostrons Liquors Driveway (471 Broadway)

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	WB	NB	SB			
PEAK HOURLY VOLUMES (AM/PM) :	29	1,143	993			**2,165**

" K " FACTOR : **0.082** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **26,402**

TOTAL # OF CRASHES : 1 # OF YEARS : 3 AVERAGE # OF CRASHES PER YEAR (**A**) : **0.33**

CRASH RATE CALCULATION : **0.03** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Weekday PM volumes used

Project Title & Date: NEX-2021347 Methuen, MA - Mixed-Use Development

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Methuen COUNT DATE : Jan-24

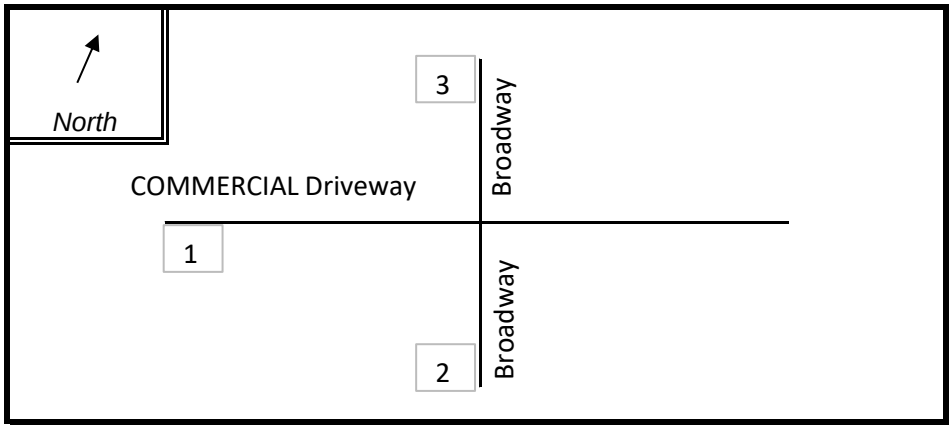
DISTRICT : 4 UNSIGNALIZED : X SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Broadway (Route 28)

MINOR STREET(S) : Commercial Driveway (464, 476, 480 Broadway)

INTERSECTION DIAGRAM (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	NB	SB			
PEAK HOURLY VOLUMES (AM/PM) :	3	1,168	993			**2,164**

" K " FACTOR : **0.082**

INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **26,390**

TOTAL # OF CRASHES : 5

OF YEARS : 3

AVERAGE # OF CRASHES PER YEAR (**A**) : **1.67**

CRASH RATE CALCULATION : **0.17**

$$\text{RATE} = \frac{(A * 1{,}000{,}000)}{(V * 365)}$$

Comments : Weekday PM volumes used

Project Title & Date: NEX-2021347 Methuen, MA - Mixed-Use Development

	Based on May 2024 Counts			Used in TIAS
	Existing Dunkin' 4.839 KSF	Rate per KSF	Proposed Dunkin' 2.100 KSF	Proposed Dunkin' 2.100 KSF
Weekday AM				
	117	24.18	51	92
	102	21.08	44	88
	219	45.26	95	180
Weekday PM				
	39	8.06	17	41
	37	7.65	16	41
	76	15.71	33	82
Saturday Midday				
	83	17.15	36	93
	82	16.95	36	92
	165	34.10	72	185

Unofficial Property Record Card - Methuen, MA

General Property Data

Parcel ID	610-123-48A	**Account Number**	4405
Prior Parcel ID	--		
Property Owner	DUBINSKY JASON W	**Property Location**	450 BROADWAY
	DUBINSKY VICKI S TRS	**Property Use**	Restaur/Bar
Mailing Address	5030 CHAMPION BLVD STE G6-211	**Most Recent Sale Date**	12/26/1995
		Legal Reference	4408/8
City	BOCA RATON	**Grantor**	
Mailing State	FL **Zip** 33496	**Sale Price**	1
ParcelZoning	BH	**Land Area**	0.808 acres

Current Property Assessment

Card 1 Value	Building Value	Xtra Features Value	Land Value	Total Value
	847,700	62,000	410,100	1,319,800

Building Description

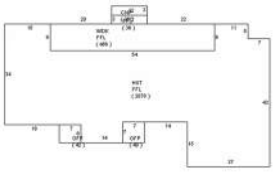
Building Style	Fast Food	**Foundation Type**	Slab	**Flooring Type**	Ceramic Tile
# of Living Units	1	**Frame Type**	Wood	**Basement Floor**	N/A
Year Built	2003	**Roof Structure**	Gable	**Heating Type**	Forced H/Air
Building Grade	Good	**Roof Cover**	Asphalt Shgl	**Heating Fuel**	Gas
Building Condition	Good	**Siding**	Vinyl	**Air Conditioning**	100%
Finished Area (SF)	4839	**Interior Walls**	Drywall	**# of Bsmt Garages**	0
Number Rooms	0	**# of Bedrooms**	0	**# of Full Baths**	0
# of 3/4 Baths	0	**# of 1/2 Baths**	2	**# of Other Fixtures**	0

Legal Description

Narrative Description of Property

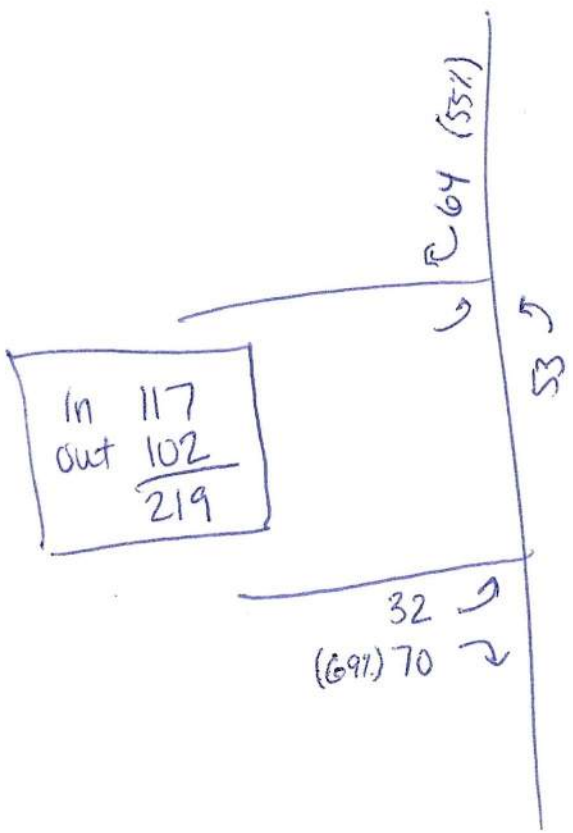
This property contains 0.808 acres of land mainly classified as Restaur/Bar with a(n) Fast Food style building, built about 2003 , having Vinyl exterior and Asphalt Shgl roof cover, with 1 unit(s), 0 room(s), 0 bedroom(s), 0 bath(s), 2 half bath(s).

Property Images

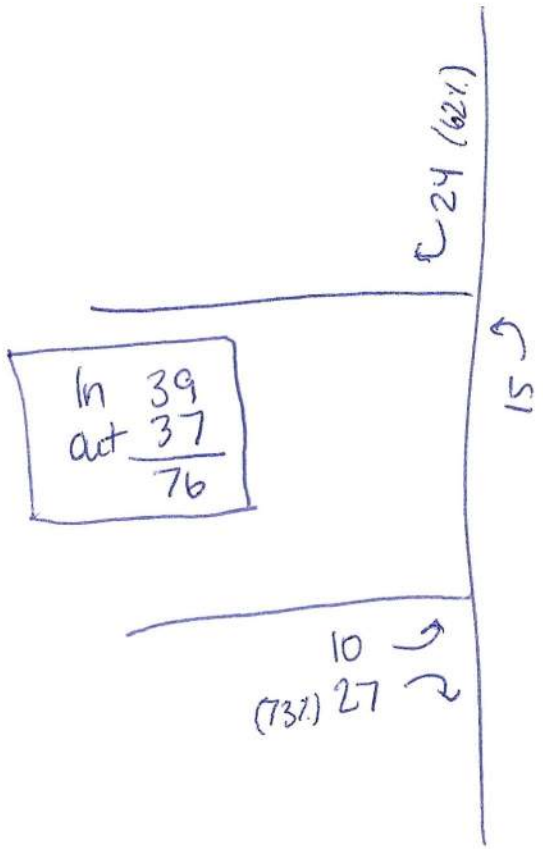


Disclaimer: This information is believed to be correct but is subject to change and is not warranteed.

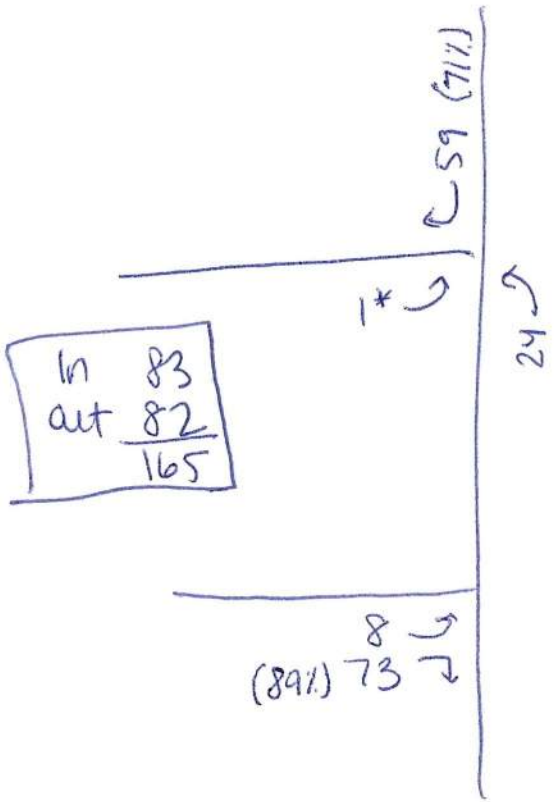
AM
8-9AM



PM
4-5PM
(Network Peak)



SAT
11AM-12PM



* Illegal Movement

Location Map: 249969 Methuen, MA

Precision Data Industries, LLC 157 Washington Street, Suite 2, Hudson, MA 01749 ph: 508-875-0100 email: datarequests@pdillc.com

(2) 7-9am/4-6pm
(2) Sat 11am-2pm

(2) VCUs

Client:	Engineer:	Site Code:	Date:	PDI Job #	City, State:
GPI	S. Theriault	NEX-2021347	5/9/24 and 5/11/24	249969	Methuen, MA

PDI File #: **249969 A**
Location: **N: Broadway S: Broadway**
Location: **W: Dunkin North Driveway**
City, State: **Methuen, MA**
Client: **GPI/ Theriault**
Site Code: **NEX-2021347**
Count Date: **Thursday, May 9, 2024**
Start Time: **7:00 AM**
End Time: **9:00 AM**

PRECISION DATA INDUSTRIES, LLC
157 Washington Street, Suite 2
Hudson, MA 01749
Office: 508-875-0100 Fax: 508-875-0118

Class: **Cars and Heavy Vehicles (Combined)**

	Broadway from North				Broadway from South				Dunkin North Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
7:00 AM	22	100	0	122	91	17	0	108	0	0	0	0	230
7:15 AM	18	141	0	159	118	13	0	131	0	0	0	0	290
7:30 AM	14	132	0	146	103	13	0	116	1	0	0	1	263
7:45 AM	6	139	0	145	179	17	0	196	0	0	0	0	341
Total	60	512	0	572	491	60	0	551	1	0	0	1	1124
8:00 AM	19	151	0	170	163	15	0	178	0	0	0	0	348
8:15 AM	13	151	0	164	176	11	0	187	0	0	0	0	351
8:30 AM	19	166	0	185	206	15	0	221	0	0	0	0	406
8:45 AM	13	168	0	181	218	12	0	230	0	0	0	0	411
Total	64	636	0	700	763	53	0	816	0	0	0	0	1516
Grand Total	124	1148	0	1272	1254	113	0	1367	1	0	0	1	2640
Approach %	9.7	90.3	0.0		91.7	8.3	0.0		100.0	0.0	0.0		
Total %	4.7	43.5	0.0	48.2	47.5	4.3	0.0	51.8	0.0	0.0	0.0	0.0	
Exiting Leg Total				1254				1149				237	2640
Cars	124	1088	0	1212	1181	113	0	1294	1	0	0	1	2507
% Cars	100.0	94.8	0.0	95.3	94.2	100.0	0.0	94.7	100.0	0.0	0.0	100.0	95.0
Exiting Leg Total				1181				1089				237	2507
Heavy Vehicles	0	60	0	60	73	0	0	73	0	0	0	0	133
% Heavy Vehicles	0.0	5.2	0.0	4.7	5.8	0.0	0.0	5.3	0.0	0.0	0.0	0.0	5.0
Exiting Leg Total				73				60				0	133

Peak Hour Analysis from 07:00 AM to 09:00 AM begins at:

8:00 AM	Broadway from North				Broadway from South				Dunkin North Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
8:00 AM	19	151	0	170	163	15	0	178	0	0	0	0	348
8:15 AM	13	151	0	164	176	11	0	187	0	0	0	0	351
8:30 AM	19	166	0	185	206	15	0	221	0	0	0	0	406
8:45 AM	13	168	0	181	218	12	0	230	0	0	0	0	411
Total Volume	64	636	0	700	763	53	0	816	0	0	0	0	1516
% Approach Total	9.1	90.9	0.0		93.5	6.5	0.0		0.0	0.0	0.0		
PHF	0.842	0.946	0.000	0.946	0.875	0.883	0.000	0.887	0.000	0.000	0.000	0.000	0.922
Cars	64	601	0	665	714	53	0	767	0	0	0	0	1432
Cars %	100.0	94.5	0.0	95.0	93.6	100.0	0.0	94.0	0.0	0.0	0.0	0.0	94.5
Heavy Vehicles	0	35	0	35	49	0	0	49	0	0	0	0	84
Heavy Vehicles %	0.0	5.5	0.0	5.0	6.4	0.0	0.0	6.0	0.0	0.0	0.0	0.0	5.5
Cars Enter Leg	64	601	0	665	714	53	0	767	0	0	0	0	1432
Heavy Enter Leg	0	35	0	35	49	0	0	49	0	0	0	0	84
Total Entering Leg	64	636	0	700	763	53	0	816	0	0	0	0	1516
Cars Exiting Leg				714				601				117	1432
Heavy Exiting Leg				49				35				0	84
Total Exiting Leg				763				636				117	1516

PDI File #: **249969 A**
Location: **N: Broadway S: Broadway**
Location: **W: Dunkin North Driveway**
City, State: **Methuen, MA**
Client: **GPI/ Theriault**
Site Code: **NEX-2021347**
Count Date: **Thursday, May 9, 2024**
Start Time: **4:00 PM**
End Time: **6:00 PM**

PRECISION DATA INDUSTRIES, LLC
157 Washington Street, Suite 2
Hudson, MA 01749
Office: 508-875-0100 Fax: 508-875-0118

Network Peak = 4-5 pm

Class: **Cars and Heavy Vehicles (Combined)**

	Broadway from North				Broadway from South				Dunkin North Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
4:00 PM	5	291	0	296	328	3	0	331	0	0	0	0	627
4:15 PM	3	267	0	270	301	2	0	303	0	0	0	0	573
4:30 PM	7	244	0	251	309	4	0	313	0	0	0	0	564
4:45 PM	9	298	0	307	302	6	0	308	0	0	0	0	615
Total	24	1100	0	1124	1240	15	0	1255	0	0	0	0	2379
5:00 PM	4	300	0	304	308	0	0	308	0	0	0	0	612
5:15 PM	6	277	0	283	296	3	0	299	0	0	0	0	582
5:30 PM	5	267	0	272	303	2	0	305	0	0	0	0	577
5:45 PM	2	261	0	263	291	2	0	293	0	1	0	1	557
Total	17	1105	0	1122	1198	7	0	1205	0	1	0	1	2328
Grand Total	41	2205	0	2246	2438	22	0	2460	0	1	0	1	4707
Approach %	1.8	98.2	0.0		99.1	0.9	0.0		0.0	100.0	0.0		
Total %	0.9	46.8	0.0	47.7	51.8	0.5	0.0	52.3	0.0	0.0	0.0	0.0	
Exiting Leg Total				2439				2205				63	4707
Cars	41	2184	0	2225	2390	22	0	2412	0	1	0	1	4638
% Cars	100.0	99.0	0.0	99.1	98.0	100.0	0.0	98.0	0.0	100.0	0.0	100.0	98.5
Exiting Leg Total				2391				2184				63	4638
Heavy Vehicles	0	21	0	21	48	0	0	48	0	0	0	0	69
% Heavy Vehicles	0.0	1.0	0.0	0.9	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	1.5
Exiting Leg Total				48				21				0	69

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

4:45 PM	Broadway from North				Broadway from South				Dunkin North Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
4:45 PM	9	298	0	307	302	6	0	308	0	0	0	0	615
5:00 PM	4	300	0	304	308	0	0	308	0	0	0	0	612
5:15 PM	6	277	0	283	296	3	0	299	0	0	0	0	582
5:30 PM	5	267	0	272	303	2	0	305	0	0	0	0	577
Total Volume	24	1142	0	1166	1209	11	0	1220	0	0	0	0	2386
% Approach Total	2.1	97.9	0.0		99.1	0.9	0.0		0.0	0.0	0.0		
PHF	0.667	0.952	0.000	0.950	0.981	0.458	0.000	0.990	0.000	0.000	0.000	0.000	0.970
Cars	24	1128	0	1152	1186	11	0	1197	0	0	0	0	2349
Cars %	100.0	98.8	0.0	98.8	98.1	100.0	0.0	98.1	0.0	0.0	0.0	0.0	98.4
Heavy Vehicles	0	14	0	14	23	0	0	23	0	0	0	0	37
Heavy Vehicles %	0.0	1.2	0.0	1.2	1.9	0.0	0.0	1.9	0.0	0.0	0.0	0.0	1.6
Cars Enter Leg	24	1128	0	1152	1186	11	0	1197	0	0	0	0	2349
Heavy Enter Leg	0	14	0	14	23	0	0	23	0	0	0	0	37
Total Entering Leg	24	1142	0	1166	1209	11	0	1220	0	0	0	0	2386
Cars Exiting Leg				1186				1128				35	2349
Heavy Exiting Leg				23				14				0	37
Total Exiting Leg				1209				1142				35	2386

PDI File #: **249969 A**
Location: **N: Broadway S: Broadway**
Location: **W: Dunkin North Driveway**
City, State: **Methuen, MA**
Client: **GPI/ Theriault**
Site Code: **NEX-2021347**
Count Date: **Saturday, May 11, 2024**
Start Time: **11:00 AM**
End Time: **2:00 PM**
Class:

PRECISION DATA INDUSTRIES, LLC
157 Washington Street, Suite 2
Hudson, MA 01749
Office: 508-875-0100 Fax: 508-875-0118

Cars and Heavy Vehicles (Combined)

	Broadway from North				Broadway from South				Dunkin North Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
11:00 AM	14	327	0	341	376	5	0	381	0	0	0	0	722
11:15 AM	17	335	0	352	336	11	0	347	0	1	0	1	700
11:30 AM	15	350	0	365	338	4	0	342	0	0	0	0	707
11:45 AM	13	332	0	345	342	4	0	346	0	0	0	0	691
Total	59	1344	0	1403	1392	24	0	1416	0	1	0	1	2820
12:00 PM	11	352	0	363	315	6	0	321	0	0	0	0	684
12:15 PM	11	356	0	367	306	1	0	307	0	0	0	0	674
12:30 PM	15	341	0	356	314	5	0	319	0	0	0	0	675
12:45 PM	11	356	0	367	326	4	0	330	0	0	0	0	697
Total	48	1405	0	1453	1261	16	0	1277	0	0	0	0	2730
1:00 PM	6	365	0	371	329	7	0	336	0	2	0	2	709
1:15 PM	8	333	0	341	363	4	0	367	0	1	0	1	709
1:30 PM	6	342	0	348	340	0	0	340	0	0	0	0	688
1:45 PM	11	330	0	341	341	1	0	342	0	0	0	0	683
Total	31	1370	0	1401	1373	12	0	1385	0	3	0	3	2789
Grand Total	138	4119	0	4257	4026	52	0	4078	0	4	0	4	8339
Approach %	3.2	96.8	0.0		98.7	1.3	0.0		0.0	100.0	0.0		
Total %	1.7	49.4	0.0	51.0	48.3	0.6	0.0	48.9	0.0	0.0	0.0	0.0	
Exiting Leg Total				4030				4119				190	8339
Cars	138	4102	0	4240	4007	52	0	4059	0	4	0	4	8303
% Cars	100.0	99.6	0.0	99.6	99.5	100.0	0.0	99.5	0.0	100.0	0.0	100.0	99.6
Exiting Leg Total				4011				4102				190	8303
Heavy Vehicles	0	17	0	17	19	0	0	19	0	0	0	0	36
% Heavy Vehicles	0.0	0.4	0.0	0.4	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.4
Exiting Leg Total				19				17				0	36

Peak Hour Analysis from 11:00 AM to 02:00 PM begins at:

11:00 AM	Broadway from North				Broadway from South				Dunkin North Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
11:00 AM	14	327	0	341	376	5	0	381	0	0	0	0	722
11:15 AM	17	335	0	352	336	11	0	347	0	1	0	1	700
11:30 AM	15	350	0	365	338	4	0	342	0	0	0	0	707
11:45 AM	13	332	0	345	342	4	0	346	0	0	0	0	691
Total Volume	59	1344	0	1403	1392	24	0	1416	0	1	0	1	2820
% Approach Total	4.2	95.8	0.0		98.3	1.7	0.0		0.0	100.0	0.0		
PHF	0.868	0.960	0.000	0.961	0.926	0.545	0.000	0.929	0.000	0.250	0.000	0.250	0.976
Cars	59	1339	0	1398	1386	24	0	1410	0	1	0	1	2809
Cars %	100.0	99.6	0.0	99.6	99.6	100.0	0.0	99.6	0.0	100.0	0.0	100.0	99.6
Heavy Vehicles	0	5	0	5	6	0	0	6	0	0	0	0	11
Heavy Vehicles %	0.0	0.4	0.0	0.4	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4
Cars Enter Leg	59	1339	0	1398	1386	24	0	1410	0	1	0	1	2809
Heavy Enter Leg	0	5	0	5	6	0	0	6	0	0	0	0	11
Total Entering Leg	59	1344	0	1403	1392	24	0	1416	0	1	0	1	2820
Cars Exiting Leg				1387				1339				83	2809
Heavy Exiting Leg				6				5				0	11
Total Exiting Leg				1393				1344				83	2820

PDI File #: **249969 B**
Location: **N: Broadway S: Broadway**
Location: **W: Dunkin South Driveway**
City, State: **Methuen, MA**
Client: **GPI/ Theriault**
Site Code: **NEX-2021347**
Count Date: **Thursday, May 9, 2024**
Start Time: **7:00 AM**
End Time: **9:00 AM**

PRECISION DATA INDUSTRIES, LLC
157 Washington Street, Suite 2
Hudson, MA 01749
Office: 508-875-0100 Fax: 508-875-0118

Class: **Cars and Heavy Vehicles (Combined)**

	Broadway from North				Broadway from South				Dunkin South Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
7:00 AM	0	101	0	101	93	0	0	93	23	9	0	32	226
7:15 AM	0	140	0	140	115	0	0	115	21	7	0	28	283
7:30 AM	0	132	0	132	110	0	0	110	21	6	0	27	269
7:45 AM	0	143	0	143	170	0	0	170	19	15	0	34	347
Total	0	516	0	516	488	0	0	488	84	37	0	121	1125
8:00 AM	0	149	0	149	176	0	0	176	15	5	0	20	345
8:15 AM	0	146	0	146	173	0	0	173	17	9	0	26	345
8:30 AM	0	169	0	169	206	0	0	206	22	8	0	30	405
8:45 AM	0	172	0	172	222	0	0	222	16	10	0	26	420
Total	0	636	0	636	777	0	0	777	70	32	0	102	1515
Grand Total	0	1152	0	1152	1265	0	0	1265	154	69	0	223	2640
Approach %	0.0	100.0	0.0		100.0	0.0	0.0		69.1	30.9	0.0		
Total %	0.0	43.6	0.0	43.6	47.9	0.0	0.0	47.9	5.8	2.6	0.0	8.4	
Exiting Leg Total				1334				1306				0	2640
Cars	0	1091	0	1091	1190	0	0	1190	154	68	0	222	2503
% Cars	0.0	94.7	0.0	94.7	94.1	0.0	0.0	94.1	100.0	98.6	0.0	99.6	94.8
Exiting Leg Total				1258				1245				0	2503
Heavy Vehicles	0	61	0	61	75	0	0	75	0	1	0	1	137
% Heavy Vehicles	0.0	5.3	0.0	5.3	5.9	0.0	0.0	5.9	0.0	1.4	0.0	0.4	5.2
Exiting Leg Total				76				61				0	137

Peak Hour Analysis from 07:00 AM to 09:00 AM begins at:

8:00 AM	Broadway from North				Broadway from South				Dunkin South Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
8:00 AM	0	149	0	149	176	0	0	176	15	5	0	20	345
8:15 AM	0	146	0	146	173	0	0	173	17	9	0	26	345
8:30 AM	0	169	0	169	206	0	0	206	22	8	0	30	405
8:45 AM	0	172	0	172	222	0	0	222	16	10	0	26	420
Total Volume	0	636	0	636	777	0	0	777	70	32	0	102	1515
% Approach Total	0.0	100.0	0.0		100.0	0.0	0.0		68.6	31.4	0.0		
PHF	0.000	0.924	0.000	0.924	0.875	0.000	0.000	0.875	0.795	0.800	0.000	0.850	0.902
Cars	0	601	0	601	726	0	0	726	70	32	0	102	1429
Cars %	0.0	94.5	0.0	94.5	93.4	0.0	0.0	93.4	100.0	100.0	0.0	100.0	94.3
Heavy Vehicles	0	35	0	35	51	0	0	51	0	0	0	0	86
Heavy Vehicles %	0.0	5.5	0.0	5.5	6.6	0.0	0.0	6.6	0.0	0.0	0.0	0.0	5.7
Cars Enter Leg	0	601	0	601	726	0	0	726	70	32	0	102	1429
Heavy Enter Leg	0	35	0	35	51	0	0	51	0	0	0	0	86
Total Entering Leg	0	636	0	636	777	0	0	777	70	32	0	102	1515
Cars Exiting Leg				758				671				0	1429
Heavy Exiting Leg				51				35				0	86
Total Exiting Leg				809				706				0	1515

PDI File #: **249969 B**
Location: **N: Broadway S: Broadway**
Location: **W: Dunkin South Driveway**
City, State: **Methuen, MA**
Client: **GPI/ Theriault**
Site Code: **NEX-2021347**
Count Date: **Thursday, May 9, 2024**
Start Time: **4:00 PM**
End Time: **6:00 PM**

PRECISION DATA INDUSTRIES, LLC
157 Washington Street, Suite 2
Hudson, MA 01749
Office: 508-875-0100 Fax: 508-875-0118

Class: **Cars and Heavy Vehicles (Combined)**

	Broadway from North				Broadway from South				Dunkin South Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
4:00 PM	0	285	0	285	326	0	0	326	8	4	0	12	623
4:15 PM	0	269	0	269	300	0	0	300	4	0	0	4	573
4:30 PM	0	243	0	243	310	0	0	310	7	3	0	10	563
4:45 PM	0	301	0	301	301	0	0	301	8	3	0	11	613
Total	0	1098	0	1098	1237	0	0	1237	27	10	0	37	2372
5:00 PM	0	294	0	294	299	0	0	299	9	4	0	13	606
5:15 PM	0	272	0	272	292	0	0	292	7	0	0	7	571
5:30 PM	0	257	0	257	292	0	0	292	4	1	0	5	554
5:45 PM	0	266	0	266	290	0	0	290	7	0	0	7	563
Total	0	1089	0	1089	1173	0	0	1173	27	5	0	32	2294
Grand Total	0	2187	0	2187	2410	0	0	2410	54	15	0	69	4666
Approach %	0.0	100.0	0.0		100.0	0.0	0.0		78.3	21.7	0.0		
Total %	0.0	46.9	0.0	46.9	51.7	0.0	0.0	51.7	1.2	0.3	0.0	1.5	
Exiting Leg Total				2425				2241				0	4666
Cars	0	2167	0	2167	2358	0	0	2358	54	15	0	69	4594
% Cars	0.0	99.1	0.0	99.1	97.8	0.0	0.0	97.8	100.0	100.0	0.0	100.0	98.5
Exiting Leg Total				2373				2221				0	4594
Heavy Vehicles	0	20	0	20	52	0	0	52	0	0	0	0	72
% Heavy Vehicles	0.0	0.9	0.0	0.9	2.2	0.0	0.0	2.2	0.0	0.0	0.0	0.0	1.5
Exiting Leg Total				52				20				0	72

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

4:00 PM	Broadway from North				Broadway from South				Dunkin South Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
4:00 PM	0	285	0	285	326	0	0	326	8	4	0	12	623
4:15 PM	0	269	0	269	300	0	0	300	4	0	0	4	573
4:30 PM	0	243	0	243	310	0	0	310	7	3	0	10	563
4:45 PM	0	301	0	301	301	0	0	301	8	3	0	11	613
Total Volume	0	1098	0	1098	1237	0	0	1237	27	10	0	37	2372
% Approach Total	0.0	100.0	0.0		100.0	0.0	0.0		73.0	27.0	0.0		
PHF	0.000	0.912	0.000	0.912	0.949	0.000	0.000	0.949	0.844	0.625	0.000	0.771	0.952
Cars	0	1088	0	1088	1206	0	0	1206	27	10	0	37	2331
Cars %	0.0	99.1	0.0	99.1	97.5	0.0	0.0	97.5	100.0	100.0	0.0	100.0	98.3
Heavy Vehicles	0	10	0	10	31	0	0	31	0	0	0	0	41
Heavy Vehicles %	0.0	0.9	0.0	0.9	2.5	0.0	0.0	2.5	0.0	0.0	0.0	0.0	1.7
Cars Enter Leg	0	1088	0	1088	1206	0	0	1206	27	10	0	37	2331
Heavy Enter Leg	0	10	0	10	31	0	0	31	0	0	0	0	41
Total Entering Leg	0	1098	0	1098	1237	0	0	1237	27	10	0	37	2372
Cars Exiting Leg				1216				1115				0	2331
Heavy Exiting Leg				31				10				0	41
Total Exiting Leg				1247				1125				0	2372

PDI File #: **249969 B**
Location: **N: Broadway S: Broadway**
Location: **W: Dunkin South Driveway**
City, State: **Methuen, MA**
Client: **GPI/ Theriault**
Site Code: **NEX-2021347**
Count Date: **Saturday, May 11, 2024**
Start Time: **11:00 AM**
End Time: **2:00 PM**
Class:

PRECISION DATA INDUSTRIES, LLC
157 Washington Street, Suite 2
Hudson, MA 01749
Office: 508-875-0100 Fax: 508-875-0118

Cars and Heavy Vehicles (Combined)

	Broadway from North				Broadway from South				Dunkin South Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
11:00 AM	0	333	0	333	378	0	0	378	16	3	0	19	730
11:15 AM	0	334	0	334	340	0	0	340	19	2	0	21	695
11:30 AM	0	341	0	341	342	0	0	342	20	1	0	21	704
11:45 AM	0	332	0	332	343	0	0	343	18	2	0	20	695
Total	0	1340	0	1340	1403	0	0	1403	73	8	0	81	2824
12:00 PM	0	341	0	341	320	0	0	320	13	3	0	16	677
12:15 PM	0	354	0	354	308	0	0	308	11	2	0	13	675
12:30 PM	0	337	0	337	317	0	0	317	9	4	0	13	667
12:45 PM	0	353	0	353	329	0	0	329	16	1	0	17	699
Total	0	1385	0	1385	1274	0	0	1274	49	10	0	59	2718
1:00 PM	0	359	0	359	330	0	0	330	13	2	0	15	704
1:15 PM	0	339	0	339	353	0	0	353	6	2	0	8	700
1:30 PM	0	340	0	340	330	0	0	330	7	0	0	7	677
1:45 PM	0	323	0	323	333	1	0	334	11	3	0	14	671
Total	0	1361	0	1361	1346	1	0	1347	37	7	0	44	2752
Grand Total	0	4086	0	4086	4023	1	0	4024	159	25	0	184	8294
Approach %	0.0	100.0	0.0		100.0	0.0	0.0		86.4	13.6	0.0		
Total %	0.0	49.3	0.0	49.3	48.5	0.0	0.0	48.5	1.9	0.3	0.0	2.2	
Exiting Leg Total				4048				4245				1	8294
Cars	0	4068	0	4068	4001	1	0	4002	159	25	0	184	8254
% Cars	0.0	99.6	0.0	99.6	99.5	100.0	0.0	99.5	100.0	100.0	0.0	100.0	99.5
Exiting Leg Total				4026				4227				1	8254
Heavy Vehicles	0	18	0	18	22	0	0	22	0	0	0	0	40
% Heavy Vehicles	0.0	0.4	0.0	0.4	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.5
Exiting Leg Total				22				18				0	40

Peak Hour Analysis from 11:00 AM to 02:00 PM begins at:

11:00 AM	Broadway from North				Broadway from South				Dunkin South Driveway from West				
	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Total
11:00 AM	0	333	0	333	378	0	0	378	16	3	0	19	730
11:15 AM	0	334	0	334	340	0	0	340	19	2	0	21	695
11:30 AM	0	341	0	341	342	0	0	342	20	1	0	21	704
11:45 AM	0	332	0	332	343	0	0	343	18	2	0	20	695
Total Volume	0	1340	0	1340	1403	0	0	1403	73	8	0	81	2824
% Approach Total	0.0	100.0	0.0		100.0	0.0	0.0		90.1	9.9	0.0		
PHF	0.000	0.982	0.000	0.982	0.928	0.000	0.000	0.928	0.913	0.667	0.000	0.964	0.967
Cars	0	1335	0	1335	1397	0	0	1397	73	8	0	81	2813
Cars %	0.0	99.6	0.0	99.6	99.6	0.0	0.0	99.6	100.0	100.0	0.0	100.0	99.6
Heavy Vehicles	0	5	0	5	6	0	0	6	0	0	0	0	11
Heavy Vehicles %	0.0	0.4	0.0	0.4	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4
Cars Enter Leg	0	1335	0	1335	1397	0	0	1397	73	8	0	81	2813
Heavy Enter Leg	0	5	0	5	6	0	0	6	0	0	0	0	11
Total Entering Leg	0	1340	0	1340	1403	0	0	1403	73	8	0	81	2824
Cars Exiting Leg				1405				1408				0	2813
Heavy Exiting Leg				6				5				0	11
Total Exiting Leg				1411				1413				0	2824

Proposed:

2,100 SF Dunkin Donuts LUC 937 Coffee/Donut Shop with Drive-Through Window

		Total Trips	Pass-By Trips	New Trips
		Dunkin Donuts	Dunkin Donuts	Total
Weekday Daily				
	In	560	280	280
	Out	560	280	280
	Total	1,120	560	560
Weekday AM				
	In	92 ~~117~~	45 ~~55~~	47 ~~62~~
	Out	88 ~~102~~	45 ~~55~~	43 ~~47~~
	Total	180 ~~219~~	90 ~~110~~	90 ~~109~~
Weekday PM				
	In	41	23	18
	Out	41	23	18
	Total	82	46	36
Saturday Daily				
	In	738	369	369
	Out	738	369	369
	Total	1,476	738	738
Saturday Midday				
	In	93	46	47
	Out	92	46	46
	Total	185	92	93

AM	50%
PM	55%
SAT	50%

Pass-By

LUC 934 (Fast-Food Restaurant with Drive-Through Window)

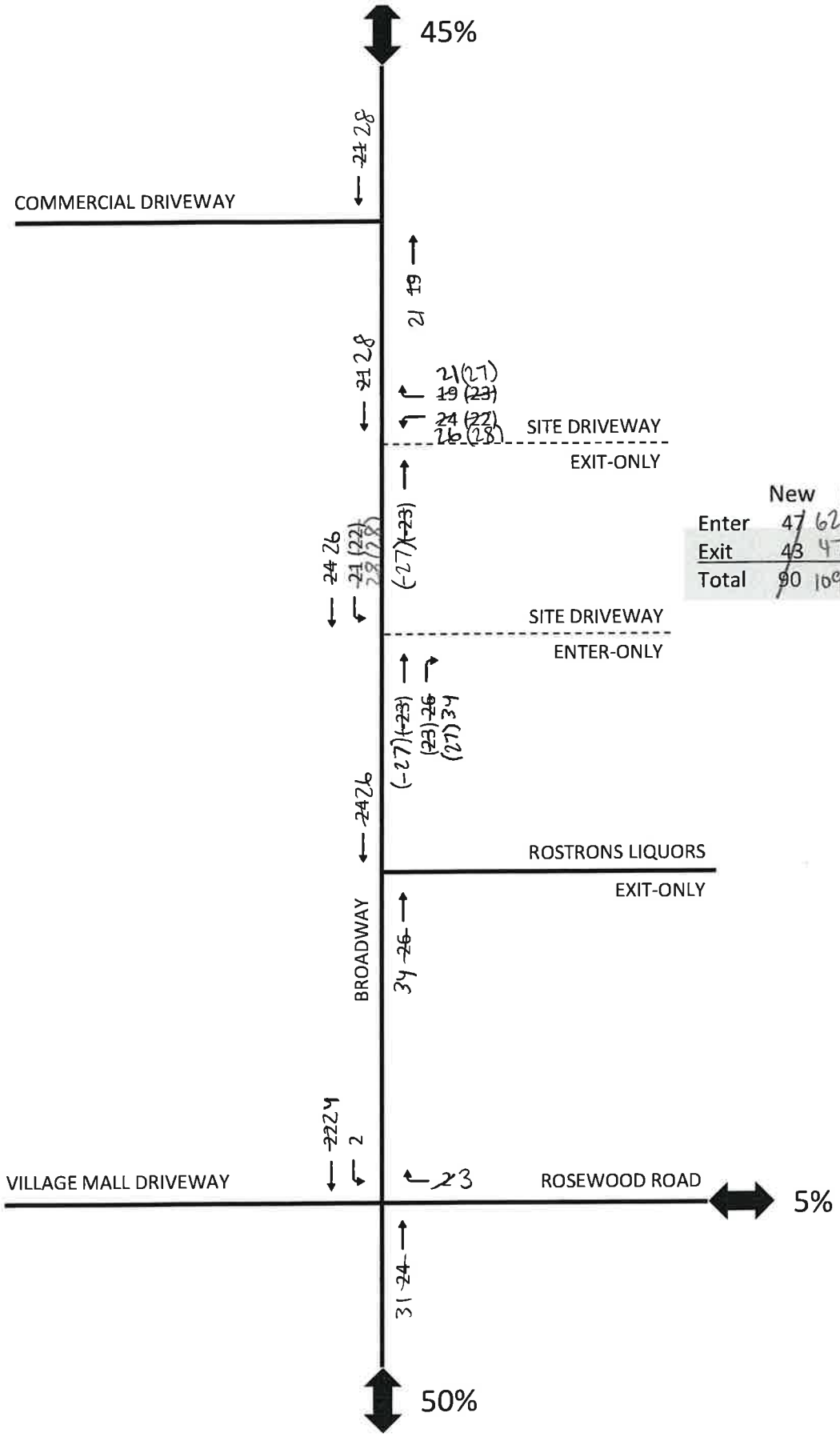
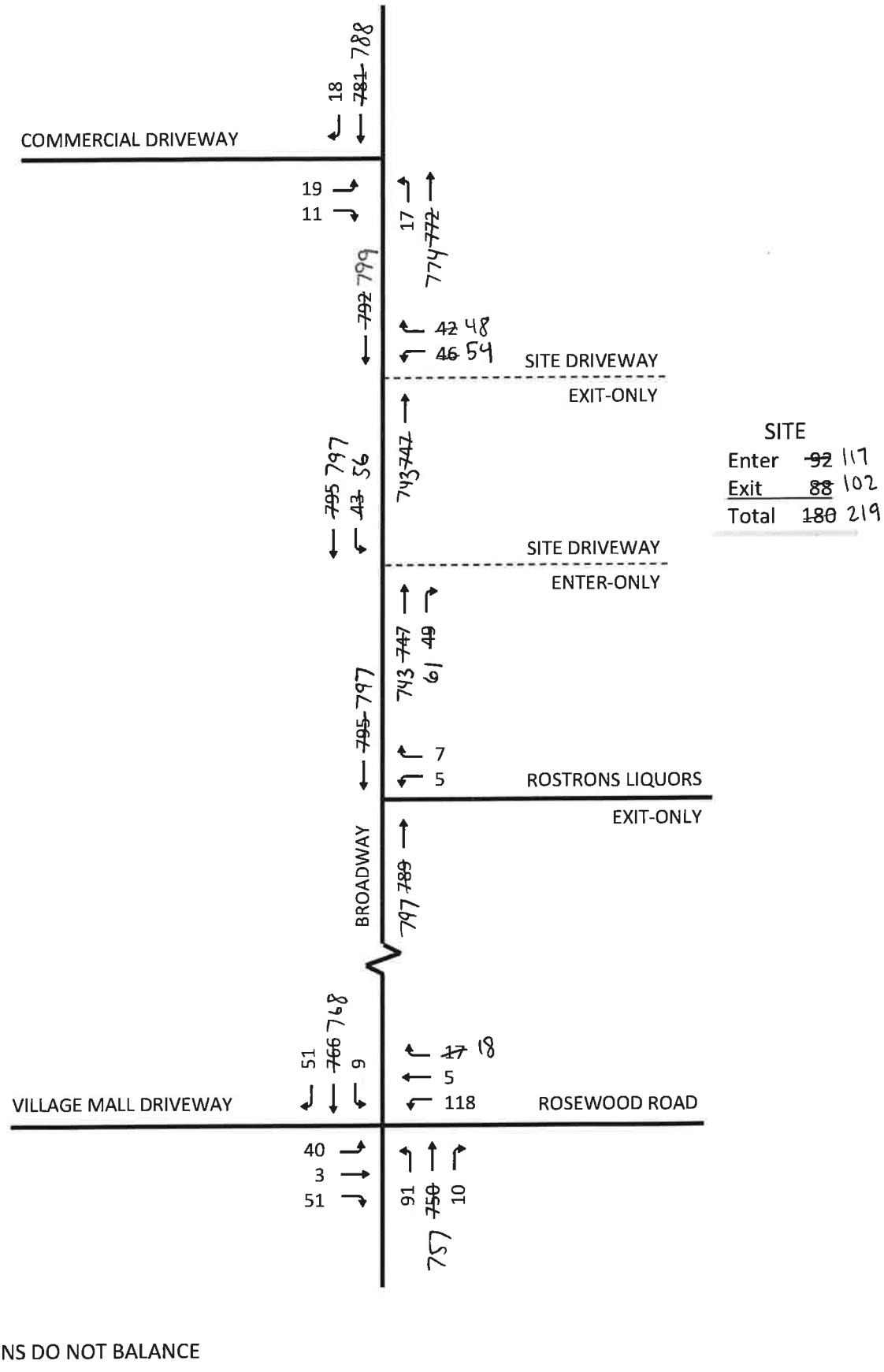


FIGURE 8
SITE GENERATED WEEKDAY AM
PEAK HOUR TRAFFIC VOLUMES



INTERSECTIONS DO NOT BALANCE

FIGURE 11
2031 BUILD WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES

TABLE 7
Intersection Capacity Analysis Summary

	2024 Existing				2031 No-Build				2031 Build			
Intersection/Peak Hour/Lane Group	**V/C [a]**	**Del. [b]**	**LOS [c]**	**Queue [d]**	**V/C**	**Del.**	**LOS**	**Queue**	**V/C**	**Del.**	**LOS**	**Queue**
Broadway (Route 28) at Rosewood Road and Village Mall Driveway												
Weekday AM:												
Village Mall EB left-turn/through	0.07	16.5	B	<25/<25	0.15	20.0	B	<25/45	0.15 ✓	~~20.8~~ 21.1	C ✓	<25/47 ✓
Village Mall EB right-turn	0.02	13.5	B	<25/<25	0.03	15.3	B	<25/<25	0.03 ✓	~~16.1~~ 16.3	B ✓	<25/<25 ✓
Rosewood Road WB approach	0.43	19.0	B	28/95	0.47	22.6	C	45/117	0.49 ✓	~~23.6~~ 23.9	C ✓	48/125 ~~49/125~~
Broadway NB approach	0.45	6.1	A	63/118	0.55	6.7	A	78/140	~~0.56~~ 057	6.8 ✓	A ✓	81/144 ~~83/145~~
Broadway SB approach	0.52	10.7	B	58/187	0.56	11.7	B	132/214	0.56 ✓	11.6 ✓	B ✓	138/221 ~~139/221~~
Overall Intersection	**0.54**	**9.4**	**A**	**--/--**	**0.61**	**10.6**	**B**	**--/--**	**0.62** ✓	**10.7** ✓	**B** ✓	**--/--**
Weekday PM:												
Village Mall EB left-turn/through	0.18	31.8	C	<25/53	0.28	32.3	C	33/96	0.28	32.1	C	33/96
Village Mall EB right-turn	0.06	25.5	C	<25/33	0.08	24.0	C	<25/45	0.08	23.9	C	<25/45
Rosewood Road WB approach	0.53	35.8	D	63/180	0.53	35.3	D	63/196	0.53	35.1	D	64/199
Broadway NB approach	0.76	12.9	B	148/387	0.99	37.8	D	189/665	1.01	41.8	D	193/674
Broadway SB approach	0.60	15.7	B	187/341	0.73	20.0	B	240/467	0.75	20.4	C	244/474
Overall Intersection	**0.72**	**16.1**	**B**	**--/--**	**0.90**	**29.7**	**C**	**--/--**	**0.90**	**31.8**	**C**	**--/--**
Saturday Midday:												
Village Mall EB left-turn/through	0.46	32.2	C	76/212	0.47	31.3	C	77/272	0.46	31.0	C	76/272
Village Mall EB right-turn	0.12	23.1	C	<25/35	0.13	22.4	C	<25/60	0.13	22.3	C	<25/60
Rosewood Road WB approach	0.41	31.6	C	62/219	0.44	31.0	C	66/246	0.44	30.8	C	66/247
Broadway NB approach	1.42	215.6	F	627/900	1.69	335.4	F	946/1095	1.73	352.7	F	972/1113
Broadway SB approach	1.02	55.0	D	488/700	1.42	219.1	F	847/988	1.52	262.9	F	891/1032
Overall Intersection	**1.13**	**122.6**	**F**	**--/--**	**1.30**	**248.4**	**F**	**--/--**	**1.32**	**275.5**	**F**	**--/--**

[a] Volume-to-capacity ratio.

[b] Average control delay in seconds per vehicle.

[c] Level of service.

[d] Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TABLE 7 (continued)
Intersection Capacity Analysis Summary

Intersection/Peak Hour/Lane Group	2024 Existing				2031 No-Build				2031 Build			
	V/C [a]	Del. [b]	LOS [c]	Queue [d]	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Broadway (Route 28) at Rostrons Liquors Exit-Only Driveway (471 Broadway)												
Weekday AM: Rostrons Liquors WB approach	0.03	10.4	B	--/<25	0.02	10.5	B	--/<25	0.02 ✓	10.6 ✓	B ✓	--/<25 ✓
Weekday PM: Rostrons Liquors WB approach	0.08	11.7	B	--/<25	0.06	12.7	B	--/<25	0.06	12.9	B	--/<25
Saturday Midday: Rostrons Liquors WB approach	0.07	15.6	C	--/<25	0.14	30.8	D	--/<25	0.16	34.1	D	--/<25
Broadway (Route 28) at Commercial Driveway (464, 476, 480 Broadway)												
Weekday AM:												
Commercial Driveway EB approach	0.02	21.8	C	--/<25	0.14	23.0	C	--/<25	~~0.15~~ 0.16	~~24.6~~ 25.0	D	--/<25 ✓
Broadway NB left-turn	0.00	0.0	A	--/<25	0.02	0.8	A	--/<25	0.02 ✓	0.8 ✓	A ✓	--/<25 ✓
Weekday PM:												
Commercial Driveway EB approach	0.02	19.9	C	--/<25	0.35	59.0	F	--/<25	0.36	60.9	F	--/35
Broadway NB left-turn	0.00	0.1	A	--/<25	0.04	1.0	A	--/<25	0.04	1.0	A	--/<25
Saturday Midday:												
Commercial Driveway EB approach	0.16	174.9	F	--/<25	>3.00	Err	F	--/<25	>3.00	Err	F	--/Err
Broadway NB left-turn	0.00	0.0	A	--/<25	0.12	4.4	A	--/<25	0.12	4.6	A	--/<25

[a] Volume-to-capacity ratio.

[b] Average control delay in seconds per vehicle.

[c] Level of service.

[d] Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TABLE 7 (continued)
Intersection Capacity Analysis Summary

	2024 Existing				2031 No-Build				2031 Build			
Intersection/Peak Hour/Lane Group	**V/C [a]**	**Del. [b]**	**LOS [c]**	**Queue [d]**	**V/C**	**Del.**	**LOS**	**Queue**	**V/C**	**Del.**	**LOS**	**Queue**
Broadway (Route 28) at Exit-Only Site Driveway												
Weekday AM: Site Driveway WB approach	--	--	--	--/--	--	--	--	--/--	~~0.15~~ 0.17	~~11.6~~ 11.8	B ✓	--/<25 ✓
Weekday PM: Site Driveway WB approach	--	--	--	--/--	--	--	--	--/--	0.20	24.9	C	--/<25
Saturday Midday: Site Driveway WB approach	--	--	--	--/--	--	--	--	--/--	>3.00	Err	F	--/Err

[a] Volume-to-capacity ratio.

[b] Average control delay in seconds per vehicle.

[c] Level of service.

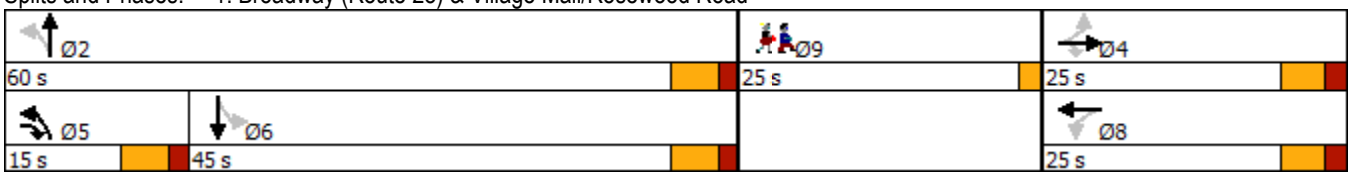
[d] Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	3	51	118	5	18	91	757	10	9	768	51
Future Volume (vph)	40	3	51	118	5	18	91	757	10	9	768	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	12	12	12	11	11	11	11	11	11
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		542			549			948			737	
Travel Time (s)		12.3			12.5			16.2			12.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	13%	3%	0%	0%	5%	6%	0%	0%	4%	5%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	5	8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	3.0	5.0	5.0		3.0	10.0		10.0	10.0	
Minimum Split (s)	10.5	10.5	8.5	10.5	10.5		8.5	15.5		15.5	15.5	
Total Split (s)	25.0	25.0	15.0	25.0	25.0		15.0	60.0		45.0	45.0	
Total Split (%)	22.7%	22.7%	13.6%	22.7%	22.7%		13.6%	54.5%		40.9%	40.9%	
Yellow Time (s)	3.5	3.5	4.0	3.5	3.5		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	1.5	2.0	2.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)		-1.5	-1.5		-1.5			-1.5			-1.5	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag			Lead				Lead			Lag	Lag	
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		Min	Min	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 65.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Broadway (Route 28) & Village Mall/Rosewood Road

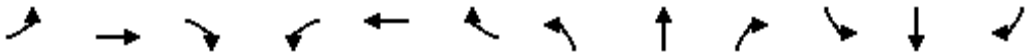


Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	23%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None

Intersection Summary

Lane Group	EBT	EBR	WBT	NBT	SBT
Lane Group Flow (vph)	46	55	153	933	900
v/c Ratio	0.15	0.09	0.48	0.58	0.54
Control Delay	23.6	5.1	28.3	8.1	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	5.1	28.3	8.1	13.4
Queue Length 50th (ft)	14	0	49	83	139
Queue Length 95th (ft)	47	22	125	145	221
Internal Link Dist (ft)	462		469	868	657
Turn Bay Length (ft)					
Base Capacity (vph)	439	660	447	2141	2059
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.08	0.34	0.44	0.44

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	3	51	118	5	18	91	757	10	9	768	51
Future Volume (vph)	40	3	51	118	5	18	91	757	10	9	768	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	11	11	11
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00			0.95			0.95	
Frt		1.00	0.85		0.98			1.00			0.99	
Flt Protected		0.96	1.00		0.96			0.99			1.00	
Satd. Flow (prot)		1694	1334		1748			3274			3322	
Flt Permitted		0.74	1.00		0.73			0.73			0.94	
Satd. Flow (perm)		1316	1334		1327			2413			3136	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	3	55	128	5	20	99	823	11	10	835	55
RTOR Reduction (vph)	0	0	38	0	5	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	46	17	0	148	0	0	932	0	0	897	0
Heavy Vehicles (%)	0%	0%	13%	3%	0%	0%	5%	6%	0%	0%	4%	5%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		13.8	17.8		13.8			42.6			33.1	
Effective Green, g (s)		15.3	20.8		15.3			44.1			34.6	
Actuated g/C Ratio		0.23	0.31		0.23			0.65			0.51	
Clearance Time (s)		5.5	5.5		5.5			5.5			5.5	
Vehicle Extension (s)		3.0	5.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		298	490		301			1649			1609	
v/s Ratio Prot			0.00					c0.05				
v/s Ratio Perm		0.03	0.01		c0.11			c0.32			0.29	
v/c Ratio		0.15	0.03		0.49			0.57			0.56	
Uniform Delay, d1		20.9	16.3		22.7			6.4			11.2	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.2	0.1		1.3			0.4			0.4	
Delay (s)		21.1	16.3		23.9			6.8			11.6	
Level of Service		C	B		C			A			B	
Approach Delay (s)		18.5			23.9			6.8			11.6	
Approach LOS		B			C			A			B	

Intersection Summary

HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	67.4	Sum of lost time (s)	15.5
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	7	797	0	0	797
Future Volume (vph)	5	7	797	0	0	797
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	11	11	11	11
Link Speed (mph)	30		40			40
Link Distance (ft)	667		737			127
Travel Time (s)	15.2		12.6			2.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	40%	7%	0%	0%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

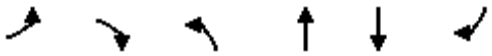
Area Type: Other
Control Type: Unsignalized

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	7	797	0	0	797
Future Volume (Veh/h)	5	7	797	0	0	797
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	8	866	0	0	866
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			737			
pX, platoon unblocked	0.91	0.91			0.91	
vC, conflicting volume	1299	433			866	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1128	175			651	
tC, single (s)	*3.5	*4.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.7			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	514	780			858	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	13	433	433	433	433
Volume Left	5	0	0	0	0
Volume Right	8	0	0	0	0
cSH	651	1700	1700	1700	1700
Volume to Capacity	0.02	0.25	0.25	0.25	0.25
Queue Length 95th (ft)	2	0	0	0	0
Control Delay (s)	10.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	19	11	17	774	788	18
Future Volume (vph)	19	11	17	774	788	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	11	11	11
Link Speed (mph)	30			40	40	
Link Distance (ft)	720			108	868	
Travel Time (s)	16.4			1.8	14.8	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	6%	3%	0%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	11	17	774	788	18
Future Volume (Veh/h)	19	11	17	774	788	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	12	18	841	857	20
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				972		
pX, platoon unblocked	0.96					
vC, conflicting volume	1324	440	878			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1252	440	878			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	98	98			
cM capacity (veh/h)	156	570	777			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	298	561	571	306
Volume Left	21	18	0	0	0
Volume Right	12	0	0	0	20
cSH	212	777	1700	1700	1700
Volume to Capacity	0.16	0.02	0.33	0.34	0.18
Queue Length 95th (ft)	13	2	0	0	0
Control Delay (s)	25.0	0.8	0.0	0.0	0.0
Lane LOS	D	A			
Approach Delay (s)	25.0	0.3		0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	48	743	0	0	799
Future Volume (vph)	54	48	743	0	0	799
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30		30			30
Link Distance (ft)	587		127			108
Travel Time (s)	13.3		2.9			2.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	7%	2%	2%	3%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
Control Type: Unsignalized

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	48	743	0	0	799
Future Volume (Veh/h)	54	48	743	0	0	799
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	52	808	0	0	868
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			864			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	1242	404			808	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1142	256			683	
tC, single (s)	*3.5	*4.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	94			100	
cM capacity (veh/h)	529	842			857	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	111	404	404	434	434
Volume Left	59	0	0	0	0
Volume Right	52	0	0	0	0
cSH	641	1700	1700	1700	1700
Volume to Capacity	0.17	0.24	0.24	0.26	0.26
Queue Length 95th (ft)	16	0	0	0	0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Institute of Transportation Engineers (ITE)
5th Edition Parking Generation
Land Use Code (LUC) 937 - Coffee/Donut Shop with Drive-Through Window
General Urban/Suburban (No nearby rail transit)

Independent Variable (X):		2.100	/ 1000 Sq. Feet Gross Floor Area (GFA)
Weekday Demand			
Average Peak Demand		5.22	vehicles per 1,000 Sq. Feet GFA
	=	11	vehicles
85th Percentile Peak Demand		12.52	vehicles per 1,000 Sq. Feet GFA
	=	26	vehicles
Saturday Demand			
Average Peak Demand		8.70	vehicles per 1,000 Sq. Feet GFA
	=	19	vehicles
85th Percentile Peak Demand		N/A	vehicles per 1,000 Sq. Feet GFA
	=	N/A	vehicles

	Weekday		Saturday	
Hours Beginning	Percent of Peak Period	Number of Vehicles	Percent of Peak Period	Number of Vehicles
12:00 - 4:00 AM		0		0
5:00 AM		0		0
6:00 AM		0		0
7:00 AM	73%	8		0
8:00 AM	92%	10		0
9:00 AM	100%	11		0
10:00 AM	88%	10		0
11:00 AM	73%	8		0
12:00 PM	73%	8		0
1:00 PM	77%	8		0
2:00 PM	58%	6		0
3:00 PM	62%	7		0
4:00 PM	62%	7		0
5:00 PM		0		0
6:00 PM		0		0
7:00 PM		0		0
8:00 PM		0		0
9:00 PM		0		0
10:00 PM		0		0
11:00 PM		0		0

Land Use: 937 Coffee/Donut Shop with Drive-Through Window

Description

This land use includes single-tenant coffee and donut restaurants with drive-through windows. Freshly brewed coffee and a variety of coffee-related accessories are the primary retail products sold at these sites. They may also sell other refreshment items, such as donuts, bagels, muffins, cakes, sandwiches, wraps, salads, and other hot and cold beverages. Some sites may also sell newspapers, music, CDs, and books. The coffee and donut shops contained in this land use typically hold long store hours (more than 15 hours) with an early morning opening. Also, limited indoor seating is generally provided for patrons; however, table service is not provided. Coffee/donut shop without drive-through window (Land Use 936), bread/donut/bagel shop without drive-through window (Land Use 939), and bread/donut/bagel shop with drive-through window (Land Use 940) are related uses.

Time of Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday at three study sites in a general urban/suburban setting.

Hour Beginning	Percent of Weekday Peak Parking Demand
12:00–4:00 a.m.	–
5:00 a.m.	–
6:00 a.m.	–
7:00 a.m.	73
8:00 a.m.	92
9:00 a.m.	100
10:00 a.m.	88
11:00 a.m.	73
12:00 p.m.	73
1:00 p.m.	77
2:00 p.m.	58
3:00 p.m.	62
4:00 p.m.	62
5:00 p.m.	–
6:00 p.m.	–
7:00 p.m.	–
8:00 p.m.	–
9:00 p.m.	–
10:00 p.m.	–
11:00 p.m.	–

Additional Data

The average parking supply ratio for the eight study sites with parking supply information is 8.8 spaces per 1,000 square feet GFA.

The sites were surveyed in the 2000s and the 2010s in Nevada, New Jersey, New York, Ontario (CAN), Tennessee, and Washington.

Source Numbers

405, 407, 412, 433, 442, 509, 523, 530, 540

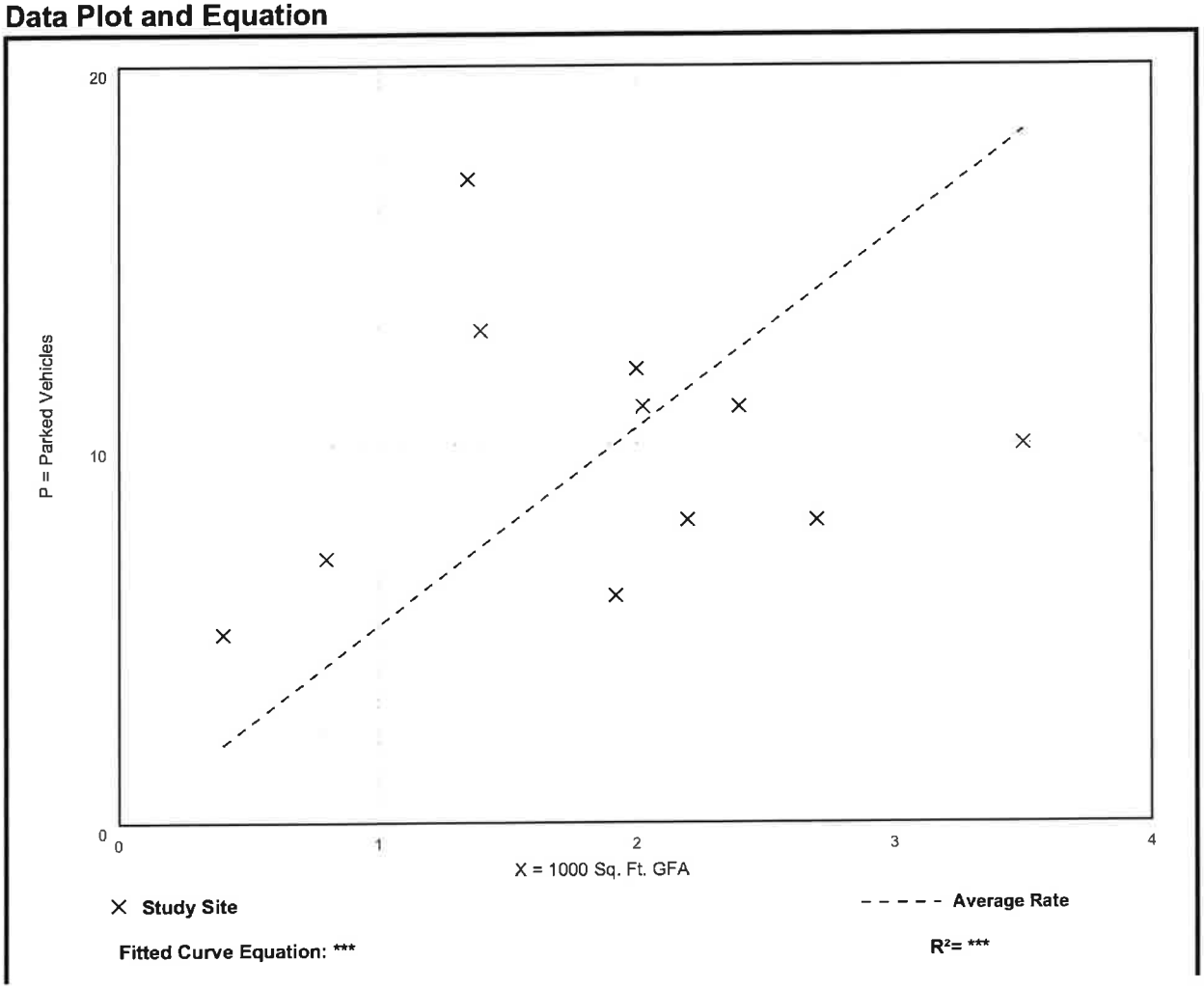
Coffee/Donut Shop with Drive-Through Window (937)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Weekday (Monday - Friday)
Setting/Location: General Urban/Suburban
Peak Period of Parking Demand: 8:00 - 10:00 a.m.
Number of Studies: 11
Avg. 1000 Sq. Ft. GFA: 1.9

Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
5.22	2.86 - 12.59	3.62 / 12.52	***	3.07 (59%)

Data Plot and Equation



Coffee/Donut Shop with Drive-Through Window (937)

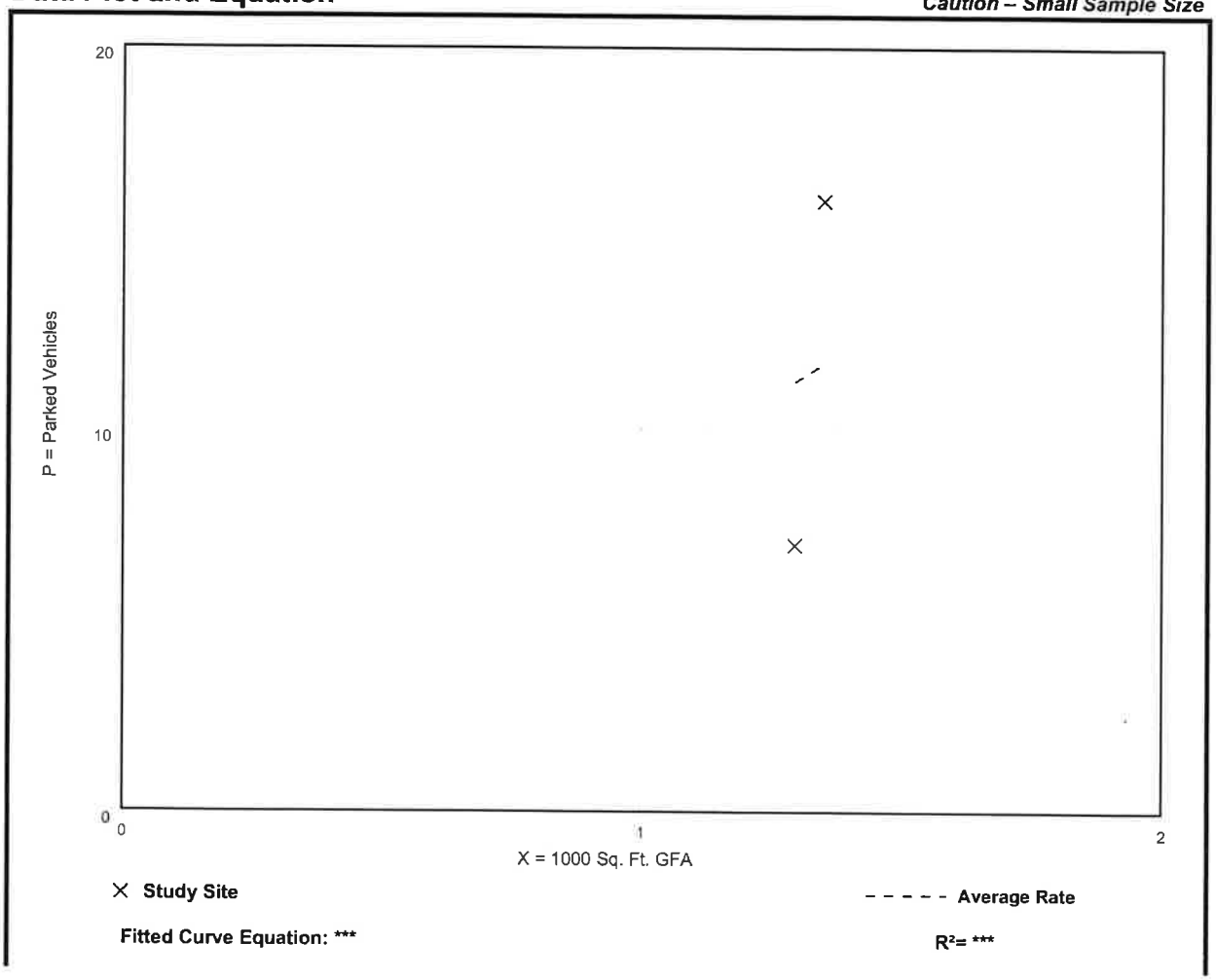
Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Saturday
Setting/Location: General Urban/Suburban
Peak Period of Parking Demand: 8:00 a.m.; 11:00 a.m.
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 1.3

Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
8.70	5.41 - 11.85	*** / ***	***	*** (***)

Data Plot and Equation

Caution – Small Sample Size



Methuen, MA
Parking Counts
8^{45} - 9^{16}
Weather - Sunny 75°

5/23/24
HLM

Spaces Available: 32 all marked
(includes 2 HC spaces)

Parked Vehicles →

8^{45} - 10
8^{49} - 11
8^{49} - 10
8^{51} - 11
8^{53} - 10
8^{53} - 11
8^{54} - 10
8^{55} - 11
8^{55} - 10
8^{56} - 9
8^{57} - 8
8^{58} - 9
9^{00} - 10
9^{00} - 11
9^{03} - 10
9^{04} - 9
9^{04} - 8
9^{06} - 9
9^{08} - 8
9^{11} - 7
9^{12} - 8
9^{15} - 9
9^{16} - 10

MAX = 11
AVG = 10

282 Merrimack Street, 2nd Floor
Lawrence, MA 01843
978.794.1792
TheEngineeringCorp.com
Create | Design | Innovate

Ms. Kathleen Bradley-Colwell
Planning Division Director
Department of Economic and Community Development
City of Methuen
41 Pleasant Street
Methuen, MA 01844

April 8, 2024

Ref. T0222.97

Re: Proposed Dunkin' Donuts – 477 & 479 Broadway
Civil & Traffic Engineering Peer Review #1

Dear Ms. Bradley-Colwell and Members of the Planning Board:

On behalf of the City of Methuen, TEC, Inc. (TEC) has reviewed documents as part of the traffic and civil engineering peer review for a proposed Dunkin' Donuts Development at 477 & 479 Broadway in Methuen, Massachusetts ("the Project"). The Project consists of removing the existing concrete walkways and overgrown vegetation and constructing a 2,100 square feet (sf) Dunkin' Donuts restaurant with a single drive through window and twenty-four (24) indoor seats. The proposed project provides access by two 20-foot wide one-way driveways on Broadway with the "Entrance" driveway to the south and "Exit" driveway to the north. The following documents were considered as part of our review:

- *Traffic Impact and Access Study – Proposed Donut Shop- 477 & 479 Broadway*, Methuen, Massachusetts; prepared by GPI, dated January 31, 2024;
- *"Application For Special Permit*" prepared by GPI, dated March 6, 2024;
- *"Proposed Site Plan"* prepared by GPI, dated March 6, 2024;
- *"Stormwater Management Report"*, prepared by GPI, dated March 6, 2024;
- *"Operation & Maintenance Plan"*, prepared by GPI, dated March 6, 2024
- *"Lighting Proposal", prepared by LSI, dated December 28, 2023*

In addition, TEC is in receipt of the letter titled "477 & 479 Broadway – Dunkin Donuts", prepared by Stephen J. Gagnon, CPWP-M of the Methuen DPW Engineering Division, dated March 18, 2024.

Upon review of the documents and plans, TEC has compiled the following comments for the Board's consideration:

Site Plan Review

1. It is noted that the applicant has not submitted any materials requesting a waiver.

2. According to Methuen's Zoning Ordinance, Section 12.3.A(3)(e) with regards to the photometric plan '…light trespass onto any street or abutting lot will not occur.' Spot locations outside of the property lines of up to 0.9 lumens are shown to occur on the photometric plan.

3. It is noted that to reduce the required 60 foot vegetated buffer to the residential district east of the site, the Applicant is proposing a six (6) foot high solid stockade fence with a 30 foot vegetated buffer to the property line. The applicant should provide a detail of this fence for the board's approval.

4. TEC acknowledges that the Applicant has provided at least 18' of a drive aisle for the sixty-degree parking along the northeastern perimeter of the site in accordance with the bylaws. However, the vehicle queuing detail provided in Sheet 5 Site Plan encroaches upon this, and results in a drive aisle of less than 18'.

5. TEC recommends adding spot grades to the Grading & Utility Plan for each wheelchair ramp and along walkways to clarify the design satisfies ADA and MAAB regulations and matches the provided details.

6. According to the Grading & Drainage Plan, the landscape area east of the proposed building, and the concrete sidewalk and landscape area west of the proposed building appears to have a 0% slope as the finished floor elevation is 117.5' and the top of curb is presumed to be 117.5' with a 6" reveal. TEC recommends revising the plans to ensure that potential runoff will be flowing away from the building.

7. It appears that the slope between the 116.15' spot grade and the 116 contour at the ADA crosswalk adjacent to the drive through entrance exceeds 5%. TEC recommends revising the grading in this area.

8. The Applicant should confirm that the current proposed location for the dumpster will not result in any traffic congestion issues with the current drive through layout.

9. The Applicant should revise the following in relation to the dumpster pad located at the northeast corner of the site:
   a) Spot grades within the area of dumpster pad to avoid a low point and potential ponding.
   b) The Site Plans and/or Detail Sheet so that the bollards shown on the Detail Sheets are consistent with what is proposed on the Site Plans.

10. The Applicant includes a flared accessible ramp detail which includes a 5' minimum clearance adjacent to the top of the ramp. According to the Site Plan, it appears there is only a 3' clearance between the top of ramp and proposed building. TEC recommends the Applicant revise the plans to be consistent.

11. According to 'Massachusetts' Stormwater Best Management Practices', in respect to infiltration basins: "*Distance from any building foundations including slab foundations without basements – Minimum of 10 ft. downslope and 100ft. upslope."* The Applicant should adjust the location of the underground infiltration system as it appears to be less than 10 feet from the proposed building.

12. Several utility crossings and conflicts are shown in the southern aisle on the Utility Plan. The applicant should show either proper utility separation, or provide elevations and details for proposed utility crossings.

13. The Applicant should include base elevations for the test pit logs to clarify the respective elevations of the subsurface materials.

14. TEC recommends the Applicant extend the proposed erosion control measures along the saw cut location within the northern drive aisle to avoid potential runoff into Broadway during construction.

15. The Applicant is proposing a drive-thru bump bar that extends approximately 9.5' into the inner drive aisle. TEC recommends the Applicant revise so that an emergency vehicle can sufficiently maneuver around the clearance bar.

Stormwater Management Review

16. According to the Grading & Drainage Plan, it appears the break in grade at both site entrances leads to additional proposed impervious area runoff towards Broadway. TEC recommends the Applicant revise these grade breaks to retain the site stormwater onsite to the maximum extent..

17. According to the Pre-Development Drainage Area Plan and HydroCAD Report, it appears the project area is modeled as one subcatchment area that directly flows to Design Point-1. However, a catch basin appears to be present within the existing conditions plans. TEC recommends the Applicant model the existing catch basin in the HydroCAD Report to accurately evaluate pre-development peak flows at Design Point 1, and stormwater entering the roadway.

18. Subcatchment 100S of the Post-Development shows flows from a large area from mostly offsite land, sheet flowing over the sidewalk/driveway entrance and flowing offsite before being captured in the roadway drainage system. The contours of the Existing Conditions appears to show the majority of this water being captured in a catch basin on site and not flowing offsite to the roadway. The Applicant should consider adding a structure to similarly capture this runoff to avoid sending additional surface water to the roadway in the Post condition.

19. The Applicant should revise the following in relation to subcatchment area '6S' of the Post-Development HydroCAD:

    a) The routing method of the subcatchment as it is currently designed to flow directly to the underground detention system. Within the Grading & Drainage Plan, it appears stormwater runoff is conveyed overland from the patio to CB-2.
    b) The subcatchment area is currently modeled as entirely impervious area. Within the Post-Development Drainage Area Plan, it appears the subcatchment area includes the concrete patio area as well as the landscape area adjacent to the proposed building.

20. The Applicant has provided the HydroCAD node summary pages for only for the 25-year storm. TEC requests the Applicant include summaries for all nodes for all storms

21. TEC recommends the Applicant include pipe sizing calculations to ensure adequate pipe capacity.

Traffic Impact and Access Study Review

22. Broadway is under the jurisdiction of the Massachusetts Department of Transportation (MassDOT). The Applicant will be required to file a Permit to Access State Highway with MassDOT District 4 as part of their approval. The City should consider including a condition to any approval of the site plan requiring completion of an approved MassDOT Permit to Access State Highway prior to the issuance of a Building Permit. The City should share all applicable traffic comments with MassDOT District 4 as they may be helpful in guiding their review.

23. The Traffic Impact and Access Study (TIAS) included the following intersections within the study area:

- Broadway (Route 28) / Rosewood Road / Village Mall Driveway
- Broadway (Route 28) / Rostrons Liquors exit-only Driveway (471 Broadway)
- Broadway (Route 28) / CREST Collaborative Driveway (464 Broadway)

Based on the scale of the planned redevelopment and the expected trip generation, TEC concurs with the Applicant's study area. *No response required.*

24. Traffic volume counts, including Turning Movement Counts (TMCs) and Automatic Traffic Recorder (ATR) data, were conducted at the study area roadway and intersections in January 2024 when schools were in session. The recorded volumes for this period were found to be lower than the average monthly conditions based on review of the historical traffic-volume data obtained from the New Hampshire Department of Transportation (NHDOT) and MassDOT continuous count station on Broadway and Interstate 93 (I-93). A conservative seasonal adjustment factor of 7.6 percent were applied based on MassDOT count station on I-93 in Methuen, Massachusetts, and the New Hampshire State Line. TEC concurs with this methodology. *No response required*.

25. The TIAS presents motor vehicle crash data for each study area intersection. The crash data indicates the number, type, and severity of crashes at the study area intersections between 2015 and 2019 obtained from MassDOT crash portal. With exception of the intersection of Broadway / Rosewood Road / Village Mall, the TIAS stated that that the intersection crash rates are lower than the MassDOT District 4 and Statewide averages with no notable safety trends that require further investigation. The Applicant should also evaluate crashes that occurred between 2021 and 2023 to assist in evaluating more recent crash history.

The intersection of Broadway / Rosewood Road / Village Mall experienced an average of 14 collisions per year over the five-year study period. The crash rate of 1.31 c/mev is well above the statewide (0.78 c/mev) and districtwide (0.73 c/mev) averages for a signalized intersection. It's noteworthy that this intersection was included in the Highway Safety Improvement Plan (HSIP) listing between 2017 and 2019. Previously, a Road Safety Audit (RSA) was conducted in 2014 for the Route 28 Resurfacing project, extending from Rosewood Road to NH State Line (MassDOT Project # 607709). This audit recommended various safety enhancements, including signal timing adjustments, the addition of left-turn pockets on Route 28, the introduction of a left-turn phase for Route 28 southbound, restrictions on left turns onto Rosewood Road from Route 28, and the implementation of protected-only left-turn phasing for Route 28. With the exception of the signal timing adjustments, none of these enhancements have been implemented at this private site location. The TIAS has incorporated the signal timing adjustments as part of their capacity analysis for the Future Conditions with Mitigation. Ultimately, the review of the safety-related aspects of the driveway configuration lie under MassDOT's exclusive jurisdiction.

26. The background growth rate of 1.0 percent per year was applied to the 2024 existing volumes to generate the 2031 future year volumes per MassDOT guidelines. The traffic associated with a 4,859 sf carwash, Tuscan Village, and Taco John's development was factored in using either the Institute of Transportation Engineers (ITE) statistics or studies prepared specifically for these developments these developments. TEC concurs with this methodology. *No response required.*

27. The trip generation of the proposed Project was assessed to determine if the proposed Project would meet or exceed any thresholds that would require formal environmental review with respect to traffic under Massachusetts Environmental Policy Act (MEPA). Based on this review, TEC concurs that the Project-related traffic does not exceed MEPA thresholds and therefore no Environmental Notification Form (ENF) appears to be required based on the traffic-related thresholds.

28. Site trip generation calculations for the proposed Project were generated based on the ITE *Trip Generation Manual, 11th Edition,* Land Use Code (LUC) 937 – Coffee/Donut Shop with Drive-Through Window. It is noteworthy that Dunkin's shop ("The Existing Dunkin's"), situated at 450 Broadway (approximately 300 feet south of the proposed Project and on the opposite side of Route 28), will be closed, and operations will transition to the proposed Project site. The existing Dunkin's site is anticipated to be replaced by a quick-service restaurant, consequently, no traffic "credits" were applied. Overall, the TIAS presents an above-average analysis condition and TEC generally concurs with this methodology. However, in conjunction with Comment #10, traffic volume counts for a 4-hour period (7:00 AM -9:00 AM; 4:00 PM – 6:00 PM) should be collected to validate ITE trip generation findings based on the apparent high volume of patron traffic.

29. The TIAS accounts for pass-by trips consists of vehicles passing by the site on their way to another destination. A pass by trip rate of 50 percent during the weekday daily, Saturday daily, weekday AM, and Saturday midday peak hour and 55 percent during weekday evening peak hour was applied to trip generation numbers based on pass by trip rate information provided in ITE Trip Generation Manual. TEC concurs with this methodology. *No response required.*

    The traffic generated by the proposed Project was distributed onto the adjacent roadway system based on the existing pattern, which is acceptable for coffee shop uses. That being said, to provide accurate depiction of traffic entering and exiting the Project site, the Applicant should perform a spot count at the existing Dunkin's. The Applicant should detail any analysis changes that may occur due to the change in traffic pattern along Broadway as the majority of the morning Project-related traffic is likely to enter from the north and exit toward south (right-in / right-out) based on major commuter trends. These discussions should be included as part of the Applicant's discussions with MassDOT District 4 because the relocation of the Dunkin' facility from the west side of Route 28 to the east side may result in a higher volume and increased delays for southbound entering left turns and exiting left turns.

30. The Build traffic volumes were grown to 2031 to cover 7-year planning horizon from time of data collection (2024). TEC concurs with this methodology as 7-year planning horizon aligns with MassDOT Transportation Impact Assessment (TIA) Guidelines. *No response required.*

31. TEC generally concurs with the results of the capacity and queue analysis provided as part of the TIAS which utilized the Highway Capacity Manual (HCM) 6th Edition for unsignalized and HCM 2000 for signalized intersections. However, TEC reserves the right to provide additional comments related to the revised capacity queue analysis for Route 28 southbound based upon the above comments.

32. Operations at the signalized intersection of Broadway / Rosewood Road / the Village Mall Driveway were shown to operate overcapacity during the Saturday midday peak hour, independent of the Project. The Applicant has demonstrated that the impact of the Project can be mitigated with adjustments to signal timings. Therefore, it is recommended that the Applicant commits to adjusting signal timings as necessary. TEC concurs that the Project-related impact is minimal at the intersections of Broadway / Rostrins Liquors Driveway and Broadway / CREST Collaborative Driveway.

33. The drive-through window lane is proposed to be 10-feet wide and provide storage for 14 vehicles without interrupting on-site circulation. The Applicant utilized three queue observations that were performed in 2014. Two observations were made in Londonderry, NH during weekday morning and one in Peabody, MA during weekday morning and Saturday midday. Based on these vehicle queue data, the vehicle queue for the drive-through window is anticipated to accommodate demand without interrupting traffic flow on site or along the adjacent roadways. TEC concurs with this statement. *No response required.*

34. To properly assess roadway operations and safety, including sight distance, the Applicant utilized the 85th percentile travel speeds along Broadway which is noted to be 40 MPH northbound and 39 MPH southbound in Table 3 of the TIAS. The measured speeds are higher than the posted speed limit of 35 and 30 MPH on Broadway northbound and southbound approaches, respectively. These travel speeds were measured by the ATR in January 2024. The sight distances reported in Table 4 of the TIAS are measured at the Site Driveway Exit-Only intersection with Broadway in accordance with the American Association of State Highway and Transportation Officials (AASHTO) requirements to operate in a safe manner. TEC concurs with the Applicant's sight line methodology. *No response required.*

35. The Applicant should provide additional information whether a parking supply of 20 stalls will be adequate to meet the demands of the Project, especially considering that the existing Dunkin facility offers approximately 32 stalls. TEC recommends that the Applicant perform a parking demand observations at the existing Dunkin Facility in order to demonstrate that the parking supply will be sufficient to accommodate the parking demands of the Project.

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36. A marked stop line should be provided for vehicles exiting the Site Exit-Only Driveway approach to Broadway. The stop sign and 'Do not enter' signs should be mounted on different posts due to the shape/visibility requirements of the Manual on Uniform Traffic Control Devices (or MUTCD).

37. The Applicant should consider restricting the flow of traffic within the front parking area to one-way northbound only and slightly narrowing the parking aisle width. This flow restriction could reduce pedestrian and vehicular conflicts within the parking lot.

38. The proposed crosswalk location depicted on the Site Plan appears to cross directly behind parking spaces or directly within the reverse path of a vehicle. Depending on the response to Comment #37, the Applicant could consider relocating the crosswalk to the northerly end of the parking aisle to allow the pedestrians to be in front of the motorist.

39. TEC recommends that the proposed parking spaces located in the easterly portion of the site be assigned as employee-only parking with accompanying signage to reduce patron traffic and pedestrian conflicts through the drive-through and bypass lanes.

40. Based on the Truck Turn Plan a WB-50 truck can narrowly access and circulate through the bypass lane or drive-through lane, as necessary. The Applicant's engineer should provide a truck turning analysis using a City of Methuen fire apparatus to ensure that emergency vehicles are able to navigate in and out of the site.

41. Since there is no formal loading zone identified on the site, a narrative should be provided indicating how loading/deliveries and trash/recycling will be managed off-hours.

42. The sight triangle areas for the site driveway intersection with Driveway should be shown on the Site Plans along with a note to indicate: "Signs, landscaping and other features located within sight triangle areas shall be designed, installed, and maintained so as not to exceed 2.5- feet in height. Snow windrows located within sight triangle areas that exceed 3.5-feet in height or that would otherwise inhibit sight lines shall be promptly removed."

43. A note should be added stating: "All Signs and pavement markings to be installed within the Project site shall conform to the applicable specifications of the Manual on Uniform Traffic Control Devices (MUTCD).

Please do not hesitate to contact us if you have any questions concerning this peer review at 978-794-1792. Thank you for your consideration.

Sincerely,
TEC, Inc.
*"**T**he **E**ngineering **C**orporation"*

David Nader, PE
Project Manager

Kevin Dandrade, PE, PTOE
Principal