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Ref: 9677

July 31, 2024

Ms. Jacki Byerley, AICP, Town Planner
Town of Andover
Planning & Economic Development
36 Bartlett Street
Andover, MA 01810

Re: Proposed P&G Andover Manufacturing Center Enhancement Project
Andover, Massachusetts

Dear Ms. Byerley:

Vanasse & Associates, Inc. (VAI) is pleased to provide responses to comments that were identified in the June 25, 2024 *Traffic Peer Review Letter No. 1* prepared by Greenman-Pedersen, Inc. (GPI) concerning their review of the April 2024 *Transportation Impact Assessment (TIA)* that was been prepared by VAI in support of the proposed P&G Andover Manufacturing Center Enhancement Project to be located in Andover, Massachusetts (hereafter referred to as the "Project"). Listed below are the comments identified by GPI in the subject letter followed by responses prepared on behalf of the Project applicant.

The GPI comments include a section on the TIA and a section on the Initial Site Plan. Responses to the TIA comments were prepared by VAI and responses to the site plan comments were prepared by Nitsch Engineering, the Project site engineer.

General

Comment No. 1: *There are discrepancies between the site plans, the Special Permit Application and the Traffic Impact Assessment (TIA) on the size of the proposed expansion. The plans and application state that the expansion will be 201,684 square feet (SF) in size, while the Proposed Project section of the TIA describes the expansion as only 136,460 SF of manufacturing space and the Project-Generated Traffic section of the TIAS describes a 201,684 SF expansion. The Applicant should clarify this discrepancy and update the TIA as needed to reflect the correct size of the proposed the expansion.*

Response: The building area expansion is 201,684 sf; however, Project-generated traffic was based on employee shift information provided by the applicant.

Study Area

Comment No. 2: *The Traffic Impact Assessment (TIA) estimates that 77 percent of site-generated passenger vehicle trips and 100 percent of site-generated truck trips will travel to/from the south on River Street; however, the Applicant has not include any intersections to the south within the study area for the TIA. GPI recommends that the Applicant extend the study area to include the intersection of Ballardvale Street (Route 125) / Andover Bypass Street (Route 125) as the proposed development is anticipated to result in*

increases of 89 to 145 vehicle trips through this intersection during the weekday AM and PM peak hours, respectively.

Response: The intersection of Ballardvale Street and Route 125 was added to the study area.

Comment No. 3: *Should the volume of site-generated vehicle trips exceed 25 trips in a turning lane or 35 trips in a through lane at either of the intersections of Route 125 with the I-93 NB and SB Ramps, GPI recommends the Applicant further extend the study area to also include the interchange intersections.*

Response: The increase in site-generated trips at the two intersections noted exceeds 100 vehicles per hour (vph) so the I-93 ramp intersections were also added to the study area. The revised study area is shown in Figure 1R. All three intersections were counted and analyzed in July 2024. This data is provided in the Technical Appendix to this letter. A summary of the results is provided later in this document. Traffic-volume networks were developed for the revised study area from Existing through Build conditions and these are also provided in the Technical Appendix.

Comment No. 4: *GPI has raised concerns in Comments #16 and #17 on the distribution of site-generated vehicle trips through the study area intersections. Once these comments have been addressed, GPI will assess whether additional intersections should be included in the study area, particularly the intersection of Andover Street / Tewksbury Street as a high percentage of the site-generated trips are anticipated to travel through this intersection.*

Response: As noted below in responses to Comment Nos. 17 and 18, the distribution of site-generation vehicle trips through the study area intersections was revised to reflect an expected blend of employees' residences during the transition to the Andover campus.

Traffic Volumes

Comment No. 5: *GPI concurs with VAI's assessment that traffic volumes in the month of June represent above-average conditions and therefore, do not require seasonal adjustment. However, the Applicant has based the assumption that February volumes represent average-month conditions on only the MassDOT Weekday Seasonal Factors for only the year 2019. It is typical to use the average of three years of data when determining an appropriate seasonal adjustment factor. Based on an average of the Weekday Seasonal Factors from 2017 – 2019, traffic volumes in the month of February are approximately 2.3 percent lower than average-month conditions.*

Response: According to MassDOT TIA guidelines, only one year's worth of data for seasonal adjustment purposes is required and the most recent non-COVID year of 2019 was used in the TIA which indicates February represents average-month conditions.

Comment No. 6: *The Applicant has grown traffic volumes to a seven-year design horizon using an annual growth rate of 1.5 percent per year based on permanent count station data available within the Town of Andover. Two of these count stations are located on Interstate 93 and may not be representative of traffic growth on more arterial roadways like River Street. There is an additional permanent count station located on Route 125 in Wilmington (Station #5127), which may provide a better representation of traffic growth in this area. GPI reviewed the count data from Count Station #5127*

and noted that this location experienced a significant increase in traffic from 2015 to 2016, but traffic volumes have otherwise remained relatively constant from 2010 – 2019. The increase in volumes from 2015 to 2016 may have been the result of construction in the surrounding area, including the reconstruction of the I-93 interchange at Route 125. Therefore, GPI believes that the 1.5 percent growth rate utilized by VAI will result in a conservative (worse than expected) estimated of 2031 No-Build traffic volume conditions. Further, the over-estimation of annual growth will far offset the under-estimation of seasonal variation.

Response: So noted. To provide a conservative assessment, the 1.5 percent growth rate was retained in subsequent analyses.

Comment No. 7: *The Applicant previously contacted the Town of Andover to obtain information on other planned or approved development projects that may impact traffic volumes within the study area. However, the site is located nearly immediately adjacent to the Wilmington town line. Therefore, GPI recommends the Applicant also contact the Town of Wilmington to include traffic from any planned or approved developments within the Town of Wilmington that may impact traffic volumes within the study area, including the additional study area intersections requested in Comments #2 and #3. GPI is aware of multiple developments in close proximity to Route 125, including two on Upton Drive, that will increase traffic through the study area intersections.*

Response: The Town of Wilmington was contacted in order to determine if there are any planned or approved development projects that are expected to influence future traffic volumes within the study area. The Wilmington Town Planner indicated that the following projects should be included in this assessment:

- ***Proposed Warehouse/Office – 30 Upton Drive.*** This project entails the redevelopment of an 80,000 sf warehouse/office building and the construction of a new 41,990 sf warehouse/office building to be located at 30 Upton Drive in Wilmington, Massachusetts. Traffic volumes from the *Traffic Impact and Access Study*[1] submitted by Greenman-Pedersen, Inc. (GPI) dated December 2021 were added to the future condition networks.

- ***Proposed Mixed Commercial Development – 38 Upton Drive.*** This project entails the construction of a 263,900 sf building composed of research and development space, light industrial space, manufacture spaces, and warehousing space to be located at 38 Upton Drive in Wilmington, Massachusetts. Traffic volumes from the *Technical Memorandum*[2] submitted by GPI dated September 2022 were added to the future condition networks.

- ***Proposed Life Science/Biomanufacturing Facility – 181-187 Ballardvale Street.*** This project entails the life science/biomanufacturing 71,300 sf expansion of the existing building located at 181-187 Ballardvale Street in Wilmington, Massachusetts. Traffic volumes from the *Memorandum*[3] submitted by MDM dated

[1] *Traffic Impact and Access Study*, 30 Upton Drive, Wilmington, Massachusetts; GPI; December 2021.
[2] *Technical Memorandum*, 38 Upton Drive, Wilmington, Massachusetts; GPI; September 2022.
[3] *Memorandum*, 181-187 Ballardvale Street, Wilmington, Massachusetts; MDM; November 2023.

November 2023, were added to the future condition networks.

- ***Proposed Self-Storage Facility – 225 Andover Street.*** This project entails the construction of an 81,960 sf building to be located at 225 Andover Street in Wilmington, Massachusetts. Traffic volumes from the *Memorandum*[4] submitted by VHB dated July 2021 were added to the future condition networks.

- ***Proposed Self-Storage Facility – 181-187 Ballardvale Street.*** This project entails the light industrial 6,060 sf expansion of the existing building to be located at 250 Andover Street in Wilmington, Massachusetts. Traffic volumes from the *Application for Site Plan Review*[5] submitted by Beals Associates Inc. dated August 2023 were added to the future condition networks.

Traffic volumes from the projects identified above were added to the expanded study area network for No Build and Build conditions.

Collision History

Comment No. 8: *All of the study area intersections experienced an average of fewer than one collision per year and a crash rate well below the state and District-wide averages, indicating no significant collision patterns exist within the study. GPI recommends the Applicant update the collision history evaluation to include the additional study area intersections as described in Comments #2 and #3.*

Response: As requested, crash data was compiled for the three Wilmington intersections and is summarized in Table 3R below. According to the MassDOT crash data portal, Route 125 at Ballardvale Street experienced 24 collisions between 2017 and 2021. Route 125 at the I-93 northbound ramps experienced 10 collisions and Route 125 at the I-93 southbound ramps experienced 12 collisions. The crash rates for the intersections were observed to be lower than the MassDOT District 4 crash rates for signalized intersections.

[4]*Memorandum*, 225 Andover Street, Wilmington, Massachusetts; VHB; July 2021.
[5]*Application for Site Plan Review*, 250 Andover Street, Wilmington, Massachusetts; Beals Associates Inc; August 2023.

Table 3R
MOTOR VEHICLE CRASH DATA SUMMARY[a]

	Route 125 at Ballardvale Street	Route 125 at I-93 NB Ramps	Route 125 at I-93 SB Ramps
Year:			
2017	5	1	0
2018	9	2	1
2019	4	3	6
2020	2	1	1
2021	4	3	4
Total	24	10	12
Average[a]	4.80	2.00	2.40
Crash Rate[b]	0.35	0.15	0.35
Significant[c]	No	No	No
Type:			
Angle	7	3	5
Rear-End	7	6	5
Head-On	0	0	0
Sideswipe	8	1	1
Fixed Object	1	0	0
Pedestrian/Bicycle	0	0	0
Unknown/Other	1	0	1
Total	24	10	12
Conditions:			
Clear	17	7	8
Cloudy	5	1	1
Rain	1	2	1
Fog/Smog/Smoke	0	0	0
Snow/Ice	0	0	0
Unknown/Not Reported	1	0	2
Total	24	10	12
Lighting:			
Daylight	18	6	10
Dawn/Dusk	1	2	1
Dark (Road Lit)	3	1	1
Dark (Road Unlit)	2	1	0
Total	24	10	12
Pavement Conditions :			
Dry	20	7	11
Wet	3	3	1
Snow/Ice	0	0	0
Unknown/Other	1	0	0
Total	24	10	12
Severity:			
Property Damage Only	20	8	6
Personal Injury	4	1	6
Fatality	0	0	0
Unknown	0	0	0
Total	24	10	12

[a]Average number of crashes over a five-year period.
[b]Crash rate per million entering vehicles (mev).
[c]Significant if crash rate > 0.57 for unsignalized intersections; or > 0.73 for unsignalized intersections (MassDOT District 4 rates).
Source: MassDOT Crash Data, 2017 through 2021.

Vehicle Speeds

Comment No. 9: *GPI concurs with the Applicants assessment of vehicle speeds along Lowell Junction Road. GPI notes that Lowell Junction Road and Connector Road meet River Street on both horizontal and vertical curves, which impede sight lines for vehicles exiting Lowell Junction Road and Connector Road, as well as for vehicles approaching the intersections on River Street. GPI recommends the Applicant also collect speed data along River Street to assess the minimum required sight distances at the River Street intersections with Lowell Junction Road and Connector Road.*

Response: As requested, VAI collected speed measurements in July 2024 over a 48-hour period through the use of an automatic traffic recorder (ATR) device. Table 4R below summarizes the observed speed data. The data is provided in the Technical Appendix to this letter.

Table 4R
OBSERVED VEHICLE SPEEDS (In Miles Per Hour)

Location/Direction	Average Speed	85th Percentile Speed[a]
River Street between Connector Road and Lowell Junction Road:		
Northbound	35	38
Southbound	32	34

[a]The 85th percentile speed is the speed at which 85 percent of the traffic is traveling at or below. It is commonly used for setting speed limits on roadways.

As can be seen from Table 4R, the average speed recorded northbound on River Street was 35 mph and the 85th percentile speed recorded was 38 mph. The average speed recorded southbound was 32 mph and the 85th percentile speed was 34 mph. The posted speed limit in the northbound direction is 30 mph and 25 mph in the southbound direction.

Sight Distances

Comment No. 10: *The Applicant has not provided an assessment of available sight distances at the proposed site driveways or study area intersections within the TIA, although the Conclusions stated that landscaping and signage adjacent to the site driveways should kept low enough or sufficiently set back from the roadway so as not to impeded sight lines. GPI recommends the Applicant provide an assessment of the available sight lines at the proposed site driveways, as well as at the River Street intersections with Lowell Junction Road and Connector Road. The assessment should evaluate the adequacy of sight lines for both passenger vehicles and trucks due to the high number of truck trips that could be generated by the proposed use.*

Response: As requested, VAI collected sight distance measurements in July 2024 at the locations noted both for passenger vehicles and trucks. Table A-1 summarizes the results of the measurements for passenger vehicles and Table A-2 summarizes the results for trucks.

Table A-1
PASSENGER CAR SIGHT DISTANCE MEASUREMENTS[a]

Intersection/Sight Distance Measurement	Recommended Minimum Distance (Feet) Measured 85th Percentile or Posted Speed	Desirable Distance (Feet) Measured 85th Percentile or Posted Speed	Measured Distances
River Street at Connector Road			
Stopping Sight Distance:			
River Street approaching from the north	240	--	365[b]
River Street approaching from the south	280	--	365[c]
Intersection Sight Distance:[d]			
Looking to the north from Connector Road	240	375	246[e]
Looking to the south from Connector Road	280	420	409[g]
River Street at Lowell Junction Road			
Stopping Sight Distance:			
River Street approaching from the north	240	--	500+
River Street approaching from the south	280	--	438[f]
Intersection Sight Distance:			
Looking to the north from Lowell Junction Road	240	375	455[g]
Looking to the south from Lowell Junction Road	280	420	338[h]
Burtt Road at the Pfizer driveway			
Stopping Sight Distance:			
Burtt Road approaching from the north	200	--	500+
Burtt Road approaching from the south	200	--	500+
Intersection Sight Distance:			
Looking to the north from Pfizer driveway	200	335	500+
Looking to the south from Pfizer driveway	200	335	500+
Burtt Road at the site south driveway			
Stopping Sight Distance:			
Burtt Road approaching from the north	200	--	500+
Burtt Road approaching from the south	200	--	500+
Intersection Sight Distance:			
Looking to the north from site south driveway	200	335	500+[h]
Looking to the south from site south driveway	200	335	500+[h]
Pfizer driveway at the site north driveway			
Stopping Sight Distance:			
Pfizer driveway approaching from the east	200	--	130[i]
Pfizer driveway approaching from the west	200	--	192[i]
Intersection Sight Distance:			
Looking to the east from site north driveway	200	335	130[i]
Looking to the west from site south driveway	200	335	192[i]

[a]Recommended values obtained from *A Policy on Geometric Design of Highways and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018.
[b]Sight distance is limited by the roadway curve and "STANDARD" sign.
[c]Sight distance is limited by the grade of the roadway.
[d]Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.
[e]Sight distance is limited by the nearby utility poles and trees.
[f]Sight distance is limited by the curvature of the roadway.
[g]Sight distance is limited by the roadway curve and nearby trees.
[h]Sight distance if nearby trees are cut back.
[i]Distances are limited by the length of the Pfizer driveway from Burtt Road and the Pfizer building gate.

As can be seen in Table A-1, the sight distance at the intersection of River Street at Connector Road was found to exceed the minimum recommended distance for SSD in both directions. The desirable distance for ISD was not met in either direction. However, the minimum recommended distance for ISD is provided as the measured distance for ISD exceeds the minimum recommended distance for SSD. The intersection of River Street at Lowell Junction Road was found to exceed the minimum recommended distance for SSD in both directions, and only met the desirable distance for ISD looking north of the driveway. The minimum recommended distance for ISD is provided as the measured distance for ISD exceeds the minimum recommended distance for SSD. All the recommended minimum distances are based on the 85th percentile vehicle travel speed of 38 mph northbound and 34 mph southbound.

In addition, the above tables indicate the sight distance at the intersections of Burtt Road at the Pfizer driveway and Burtt Road at the site south driveway were found to exceed the minimum recommended distance for SSD and the desirable distance for ISD in both directions. The minimum recommended distance for SSD and ISD were not met for the intersection of the Pfizer driveway at the site north driveway. This is due to the length of the Pfizer driveway which only has 192 feet until it intersects Burtt Road to the west and 130 feet until it the Pfizer building gate. All the recommended minimum distances are based on the 85th percentile vehicle travel speed of 30 mph.

Table A-2
TRUCK SIGHT DISTANCE MEASUREMENTS

Intersection/Sight Distance Measurement	Recommended Minimum Distance (Feet) Measured 85th Percentile or Posted Speed	Desirable Distance (Feet) Measured 85th Percentile or Posted Speed	Measured Distances
River Street at Connector Road			
Stopping Sight Distance:			
River Street approaching from the north	240	--	365[b]
River Street approaching from the south	280	--	365[c]
Intersection Sight Distance:[d]			
Looking to the north from Connector Road	240	475	246[e]
Looking to the south from Connector Road	280	535	600+
River Street at Lowell Junction Road			
Stopping Sight Distance:			
River Street approaching from the north	240	--	500+
River Street approaching from the south	280	--	438[f]
Intersection Sight Distance:			
Looking to the north from Lowell Junction Road	240	475	398[g]
Looking to the south from Lowell Junction Road	280	535	338[h]
Lowell Junction Road at Gillette Way			
Stopping Sight Distance:			
Lowell Junction Road approaching from the east	200	--	500+
Lowell Junction Road approaching from the west	200	--	500+
Intersection Sight Distance:			
Looking to the east from Gillette Way	200	335	500+
Looking to the west from Gillette Way	200	335	500+

[a]Recommended values obtained from *A Policy on Geometric Design of Highways and Streets,* 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018.
[b]Sight distance is limited by the roadway curve and "STANDARD" sign.
[c]Sight distance is limited by the grade of the roadway.
[d]Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.
[e]Sight distance is limited by the nearby utility poles and trees.
[f]Sight distance is limited by the curvature of the roadway.
[g]Sight distance is limited by the branches of nearby trees.
[h]Sight distance is limited by nearby trees.

As can be seen in Table A-2, the sight distance at the intersection of River Street at Connector Road was found to exceed the minimum recommended distance for SSD in both directions. The desirable distance for ISD was not met looking north from Connector Road; however, to the south the measured ISD was met. The minimum recommended distance for ISD is provided as the measured distance for ISD exceeds the minimum recommended distance for SSD.

The sight distance at the intersection of River Street at Lowell Junction Road was found to exceed the minimum recommended distance for SSD in both directions. The desirable distance for ISD was not met in either direction. However, the minimum recommended distance for ISD is provided as the measured distance for ISD exceeds the minimum recommended distance for SSD. The intersection of Lowell Junction Road at Gillette Way was found to exceed the minimum recommended distance for SSD and the desirable distance for ISD in both directions. The recommended minimum

distances are based on the 85th percentile vehicle travel speed of 38/34 mph or a posted speed of 30 mph. Due to site features, it is not possible to provide a STOP sign on all approaches at the intersection of Gillette Way and the circulating roadway. STOP-sign control has been placed at the westbound approach and the southbound approach to the intersection. It should be noted that entrance from Gillette Way requires vehicles to come to a stop to check in at a guardhouse and again at the entrance to the circulating roadway around the building. This with the STOP control on two of the three approaches to the intersection should address any potential for conflicts.

Trip Generation

Comment No. 11: *The trip generation estimate for the proposed development has been based on information provided by the Applicant on the anticipated number of employees and shift times. However, VAI has not included a narrative explanation of the data that was provided in the Appendix. Based on the data provided in the Appendix, it appears that the proposed use will operate with 107 employees working from 8:00 AM – 5:00 PM, 226 employees working from 6:00 AM – 6:00 PM, and 73 employees working from 6:00 PM – 6:00 AM. The Applicant has estimated in Table 5 that the development will generate 678 passenger trips on a daily basis; however, this volume is inconsistent with the total of 406 employees traveling to and from the site daily, which could generate 812 passenger vehicle trips. The Applicant should provide an explanation of how the weekday daily vehicle trips were calculated.*

Response: Upon further review, there were typos outlining the proposed shift times and numbers of employees that were in the table provided in the Appendix. The expansion is proposed to contain the components noted in Table A-3:

Table A-3
EMPLOYEE SHIFT OPERATIONS AND TIMES

Type	Name	Shift Time	Days	Number of Employees
Office	Day Shift	8:00 AM to 5:00 PM	Monday to Friday	107
Office	Split Shift	6:00 AM to 2:30 PM	Monday to Friday	150
Manufacturing	A	6:00 AM to 6:00 PM	Mon, Tues, Wed & every other Sun	38
Manufacturing	B	6:00 PM to 6:00 AM	Sun, Mon, Tues & every other Sat	37
Manufacturing	C	6:00 AM to 6:00 PM	Thu, Fri, Sat & every other Sun	38
Manufacturing	D	6:00 PM to 6:00 AM	Wed, Thu, Fri & every other Sat	36

The manufacturing shifts (A, B, C, and D) complement each other and are only scheduled three days per week with alternating weekend days. For instance, Shift A and Shift B employees both work Mondays but there are only 38 manufacturing employees throughout the day except during shift overlaps. The 150-employee shift listed in Shift A under Group J is an Office "Split Shift" and is on a different schedule than either the Office Day Shift employees or the Shift A employees.

Accordingly, the average daily trip generation is the summation of the Day Shift Office, Split Shift Office, a day Manufacturing shift (A or C), and a night Manufacturing shift (B or D). Additional trips would be made assuming 5 percent of Day Shift Office employees get dropped off. The resulting daily trip generation is shown below in Table 5R:

Table 5R
REVISED DAILY TRIP GENERATION

Shift/Use	Employee Count
Day Shift Office	107
Split Shift Office	150
Day Manufacturing	38
Night Manufacturing	37
SubTotal	407
Multiply by 2 for entering and exiting trips	814
Dropoffs and Pickups of 5% Day Shift Office employees	12 = 6 * 2 (Exiting in AM and Entering in PM)
TOTAL	826 daily trips

Comment No. 12: *GPI also found some discrepancies in the addition of cells within the trip generation calculation table included in the Appendix, particularly for the calculation of employees in Group E and the total employees in the "COUNT" column. In addition, employees from Group J appear to have been excluded from the calculation of total employees in Column "A/C". The Applicant should review the discrepancies in trip generation calculations contained in the Appendix and provide updated trip generation calculations with explanations of how the volumes in each cell were calculated and what the volumes in each cell are intended to represent.*

Response: The Groups on the left of the Appendix table represent specific employee functions for P&G while the Count column represents the employee populations for those functions. As noted previously, the value of 150 for Group J was mistakenly inserted in Shift A.

Comment No. 13: *VAI has included trip generation calculations for the proposed 136,460 SF of manufacturing space based on Institute of Transportation Engineers (ITE) trip rates for Land Use Code (LUC) 140 – Manufacturing within the TIA Appendix. However, no reference to the ITE data was made in the narrative portion of the TIA and it does not appear that the Applicant has utilized the ITE trip rates in estimating site-*

generated vehicle trips. In addition, the proposed development will include a 201,864 SF expansion. Therefore, the size of the development utilized in the trip generation estimate based on ITE trip rates does not reflect the size of the proposed expansion. The Applicant should explain the inclusion of the ITE data in the Appendix, and provide a comparison of the trip generation estimates based on ITE trip rates for the corrected development size and the Applicant-provided data of employee shift changes.

Response: Inclusion of this ITE data in the Appendix was an error. The shift data was used to estimate vehicle trips.

Comment No. 14: *VAI's trip generation estimate for the weekday AM peak hour appears to have been based on the number of Day Shift employees that would enter during the morning peak hour (107 employees) with an assumption that 5 percent will be dropped off, also creating an exiting trips. VAI's trip generation estimate for the weekday PM peak hour appears to assume that all Day Shift employees (107) will exit during the weekday PM peak hour, with 5 percent of these employees being picked up and also creating an entering trip. In addition, all Factory employees (73) are assumed to enter during the weekday PM peak hour to start their 6 PM – 6 AM shift. Based on the shift times noted in the Appendix, this methodology appears reasonable for the weekday AM and PM peak hours; however the Applicant should provide additional detail as described in Comment #11.*

Response: Following up on response to Comment No. 11, the weekday morning and weekday evening peak hours were generally observed in the 7:00 to 8:00 AM time period and the 4:00 to 5:00 PM time period. The only shift that would impact the morning peak hour is the Office Day Shift which would enter the site to start work at 8:00 AM. There are no shifts that would impact the evening peak hour; however, to provide a conservative assessment, it was assumed that the Office Day Shift exiting employees and the Night Manufacturing Shift entering employees would impact the evening peak hour due to the possibility of the evening peak hour occurring in the 5:00 to 6:00 PM hour once the Project is completed. The resulting peak-hour distribution, adjusted for clarification on the Manufacturing shifts, is shown in Table 5RR. These are the passenger vehicle peak-hour trips that were used for analyses in this response letter.

Table 5RR
ADJUSTED PEAK-HOUR TRIP GENERATION

Time Period	Office Day Shift Trips	Drop Off/ Pick Up Trips (5%)	Manufacturing Night Shift Trips	Employee Passenger Vehicle Total Trips
Weekday Morning Peak Hour:				
Entering	107	--[a]	0	107
Exiting	0	6	0	6
Total	107	6	0	113
Weekday Evening Peak Hour:				
Entering	0	6	37	43
Exiting	107	--[a]	0	107
Total	107	6	37	150

[a]Entering trips in morning and exiting trips in evening for pickup/drop-offs are assumed to be in the 107 trip total.

Comment No. 15: *Based on ITE trips rates for LUC 140 – Manufacturing for a 201,460 SF expansion, the proposed development would be anticipated to generate 957 vehicle trips (478 entering and 479 exiting) on a weekday, 137 vehicle trips (104 entering and 33 exiting) during the weekday AM peak hour, and 149 vehicle trips (46 entering and 103 exiting) during the weekday PM peak hour.*

Response: It was determined early in the process that trip generation based on the number of employees and shift times would better reflect the effect that the Project would have on study area roadways. VAI concurs with the results calculated by GPI for the ITE-based trip generation.

Comment No. 16: *Table 5 in the TIAS provides an estimate of the weekday daily and peak hour truck trips to be generated by the proposed manufacturing use. However, VAI has not provided any narrative explanation or trip generation calculations to demonstrate how the truck trips were developed. VAI estimates the development will generate 26 truck trips on a daily basis and 2 truck trips during each of the weekday AM and PM peak hours. GPI has reviewed ITE trip rates for LUC 140 – Manufacturing for truck trips and found that a 201,460 SF manufacturing use is estimated to generate 90 truck trips (45 entering and 45 exiting) on a weekday with approximately 6 truck trips occurring in each of the weekday AM and PM peak hours. Therefore, the truck trip estimate contained in Table 5 of the TIAS appears to significantly underestimate truck trips to be generated by the proposed development. The Applicant should provide additional information on how truck trips were estimated and update the calculations, as necessary, to reflect the correct size of the expansion.*

Response: The estimated trips for the proposed development were based on the existing truck trips entering and exiting Gillette Way as shown in the intersection of Lowell Junction Road at Gillette Way turning movement counts. The truck trip rates for the weekday morning and evening peak hours were calculated by dividing these truck trips by the existing building size (596,430 sf).

The weekday daily truck trips were calculated by comparing the existing weekday morning peak hour trip rate (0.10 trips/KSF) with the weekday daily truck trip rate for LUC 140 (*Manufacturing)* (0.45 trips/KSF) and weekday morning peak hour trip rate (0.03 trips/KSF). The existing weekday morning peak hour had 5 total truck trips and the existing weekday evening peak hour had 9 total truck trips. The calculated existing truck trip rates for the weekday daily and weekday morning and evening peak hours were multiplied by the proposed square footage (201,684 sf) of the expansion to develop the initial truck trips. Table A-4 shows the existing and ITE truck trip rates.

Table A-4
EMPIRICAL TRUCK TRIP-RATES COMPARISON

Time Period/ Directional Distribution	Observed Trip Rate[a]	ITE Trip Rate[b]
Weekday Daily	**0.150**	0.450
Weekday Morning Peak Hour	0.010	0.030
Weekday Evening Peak Hour	0.015	0.030

[a]Based on TMC data rates (existing trips/1,000sf); *596,430 sf June 2023*.
[b]Based on truck trip rates from LUC 140.

The weekday daily and weekday morning and evening peak-hour truck trips were based on the previously proposed square footage expansion. The proposed expansion of 201,684 sf changes the truck trips to 32 trips (approximately 16 trucks entering and exiting) on an average weekday (two-way, 24-hour volume), with 2 truck trips (1 entering and 1 exiting) expected during the weekday morning peak hour and 3 truck trips (1 entering and 2 exiting) expected during the weekday evening peak hour.

Trip Distribution

Comment No. 17: *The TIA states that the distribution of site-generated trips to and from the site was estimated based on a combination of existing travel patterns at the study area intersections and employee residence zip code information for employees expected to transfer from existing facilities to the proposed site. A list of employee zip codes was provided in the TIA Appendix; however, the Applicant has not provided any information on how trips were assigned to/from the site for each of these employee zip codes. The Applicant should provide additional trip distribution calculations to demonstrate the anticipated route to/from the site employees from each municipality will utilize.*

Response: The employee zip code data were summarized into the list that was in the Appendix of the TIA. This list was then summarized by town and the proposed paths taken by the employees to work and back to their respective towns were developed. This approach was modified based on Comment No. 18 below.

Comment No. 18: *The Applicant estimates that approximately 77 percent of employee trips will travel to/from the south on River Street, while the remaining 23 percent will travel to/from the north on River Street based on the journey-to-work data, which was not supplied in the TIA Appendix. However, the existing traffic volumes at the River Street*

intersections with Lowell Junction Road and Connector Road appear to indicate that approximately 45 percent of existing trips in the area travel to/from the south on River Street, while 55 percent travel to/from the north on River Street. The Applicant's current distribution may under-estimate the impact of the proposed development on intersections to the north of the site.

Response: Based on discussions with the Applicant, there is a likelihood that not all of the employees would continue to commute from their present home location to the Andover site, particularly if they reside south of Boston. In order to account for this expected transition, it was assumed that if the employee residence in question was from a town or city further south than I-90, it was assumed that they would move to be closer to their place of work (Andover). This included employees from the City of Boston. The distribution for these relocated employees was based on existing traffic patterns throughout the study area. The paths were divided into Andover Street, heading east or west, Route 125, heading east or west, or I-93, heading north or south. After all the paths were recorded for each town, a revised trip distribution was created. The initial and revised trip distributions are shown in Table 6R. Trucks were assumed to travel to and from the south on River Street/Ballardvale Street. This is retained in the updated distribution; however, all trucks are assumed to travel to and from the south on I-93.

Table 6R
TRIP-DISTRIBUTION SUMMARY[a]

Roadway	Direction (To/From)	Initial Distribution Percent (Passenger Cars)	Updated Distribution Percent (Passenger Cars)
Andover Street	East	4	7
Andover Street	West	19	37
River Street	South	77	--
Route 125	East	--	7
Route 125	West	--	5
I-93	South	--	44
TOTAL		100	100

[a]Based on employee residence zip code data provided by the Applicant and a review of existing traffic patterns in the study area.

The trip distribution discussed in response to Comment No. 17 shows a change in the distribution from 19 percent to 37 percent on Andover Street to/from the west and from 77 percent to 56 percent south on River Street, of which 44 percent would be expected to travel to/from I-93 southbound.

Capacity and Queue Analysis

Comment No. 19: *The Synchro analysis worksheets contained in the Appendix did not provide heavy vehicle percentages used in the analysis. Therefore, GPI was not able to verify the heavy vehicles included in the analysis. The Applicant should provide updated Synchro analysis worksheets with this input information.*

Response: Worksheets with the heavy vehicle percentage visible are provided in the Technical Appendix to this letter.

Comment No. 20: *GPI has provided several comments above on the traffic volume projections, trip generation, and trip distribution methodology that need to be addressed and capacity and queue analyses updated before GPI can fully assess the impacts of the proposed development on the operations of the study area intersections. Therefore, the following comments represent only a preliminary review of the project's impacts on traffic operations. GPI will perform a more comprehensive review and provide additional comments once the comments above have been adequately addressed.*

a. *Traffic exiting River Street onto Andover Street experiences long delays and queues during the weekday PM peak hour under all analysis conditions. The additional traffic generated by the proposed development is anticipated to exacerbate these delays and queues. As mitigation for the proposed development, GPI recommends the Applicant evaluate options to improve the operations of this intersection, including consideration for additional turning lanes installation of a traffic-control signal, and/or implementation of all-way stop control at the intersection, or realignment of the intersection to allow the Andover Street northbound approach to operate free-flowing.*

Response: As requested, the intersections of Route 125 with Ballardvale Street, the I-93 northbound ramps, and the I-93 southbound ramps were added to the study area. A summary of the operations of these locations, incorporating the background developments noted previously and the revised trip distribution for the Project, is provided in Table A-5 for signalized intersections and Table 9R for the unsignalized intersections from the initial TIA.

Table A-5
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Movement	2024 Baseline				2031 No-Build				2031 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] Avg/95th	V/C	Delay	LOS	Queue Avg/95th	V/C	Delay	LOS	Queue Avg/95th
Route 125 at Ballardvale Street												
Weekday Morning:												
Route 125 EB LT	0.88	44.4	D	13/16	1.01	62.9	E	17/21	1.06	77.2	E	20/22
Route 125 EB TH	0.47	2.1	A	2/2	0.64	3.5	A	2/4	0.64	3.4	A	2/3
Route 125 WB TH/RT	0.83	36.3	D	17//24	1.06	79.8	E	25/30	1.07	82.1	F	25/31
Ballardvale Street SB LT	0.39	52.6	D	2/3	0.34	51.9	D	2/4	0.34	51.9	D	2/4
Ballardvale Street SB RT	0.24	22.9	C	2/3	0.28	20.6	C	3/4	0.28	20.6	C	3/4
Overall	--	**30.6**	**C**	--	--	**51.5**	**D**	--	--	**56.8**	**E**	--
Weekday Evening:												
Route 125 EB LT	0.49	35.0	C	4/5	0.57	35.1	D	4/6	0.61	35.8	D	5/6
Route 125 EB TH	0.94	23.9	C	21/27	1.09	63.6	E	30/34	1.09	63.4	E	30/34
Route 125 WB TH/RT	0.78	27.7	C	9/11	1.00	50.8	D	13/17	1.00	51.4	D	13/17
Ballardvale Street SB LT	0.95	69.3	E	7/12	1.10	109.7	F	9/14	1.13	119.7	F	9/15
Ballardvale Street SB RT	1.02	55.9	E	11/14	1.21	125.9	F	16/21	1.26	148.9	F	19/23
Overall	--	**39.3**	**D**	--	--	**80.2**	**F**	--	--	**88.6**	**F**	--
Route 125 at I-93 NB Off-Ramp and I-93 NB On-Ramp												
Weekday Morning:												
Route 125 EB TH/RT	0.41	12.8	B	6/7	0.54	15.0	B	8/9	0.55	15.1	B	8/9
Route 125 WB TH	0.41	11.8	B	8/11	0.47	14.1	B	11/10	0.47	14.2	B	11/10
Route 125 WB RT	0.13	0.1	A	0/0	0.16	0.1	A	0/0	0.16	0.1	A	0/0
I-93 NB Off-Ramp NB LT	0.04	39.0	D	1/1	0.04	38.7	D	1/1	0.04	38.7	D	1/1
I-93 NB Off-Ramp NB RT	0.78	40.4	D	10/13	0.99	62.5	E	16/23	1.04	77.0	E	19/25
Overall	--	**20.1**	**C**	--	--	**28.6**	**C**	--	--	**33.6**	**C**	--
Weekday Evening:												
Route 125 EB TH/RT	0.45	26.8	C	3/5	0.55	27.9	C	4/6	0.55	27.9	C	4/6
Route 125 WB TH	0.67	10.3	B	10/14	0.87	15.2	B	15/15	0.90	16.2	B	16/15
Route 125 WB RT	0.31	0.2	A	0/0	0.38	0.1	A	0/0	0.38	0.1	A	0/0
I-93 NB Off-Ramp NB LT	0.32	23.5	C	3/4	0.32	21.1	C	3/4	0.31	20.9	C	3/4
I-93 NB Off-Ramp NB RT	0.57	9.2	A	4/6	0.68	11.0	B	7/8	0.70	11.3	B	7/9
Overall	--	**10.7**	**B**	--	--	**13.2**	**B**	--	--	**13.6**	**B**	--

See notes at the end of table.

Table A-5 CONTINUED
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Signalized Intersection/ Peak Hour/Movement	2024 Baseline				2031 No-Build				2031 Build			
	V/C[a]	Delay[b]	LOS[c]	Queue[d] Avg/95th	V/C	Delay	LOS	Queue Avg/95th	V/C	Delay	LOS	Queue Avg/95th
Route 125 at I-93 SB Ramps												
Weekday Morning:												
Route 125 EB LT	0.06	19.4	B	1/2	0.07	19.6	B	1/2	0.07	19.6	B	1/1
Route 125 EB TH	0.38	23.8	C	6/9	0.47	25.4	C	8/12	0.47	25.6	C	8/12
Route 125 WB TH	0.27	25.9	C	3/6	0.31	24.4	C	4/6	0.31	24.5	C	4/6
Route 125 WB RT	0.57	2.6	A	6/8	0.65	3.3	A	8/9	0.65	3.3	A	8/9
I-93 SB Ramps SB LT	0.33	21.3	C	5/6	0.41	22.5	C	6/8	0.41	22.5	C	6/8
I-93 SB Ramps SB RT	0.04	1.1	A	0/0	0.05	1.1	A	0/0	0.05	1.1	A	0/0
Overall	--	**12.9**	**B**	--	--	**14.0**	**B**	--	--	**14.0**	**B**	--
Weekday Evening:												
Route 125 EB LT	0.06	7.6	A	1/1	0.09	9.4	A	1/1	0.09	9.5	A	1/1
Route 125 EB TH	0.18	6.9	A	2/3	0.22	7.8	A	2/3	0.22	7.9	A	2/3
Route 125 WB TH	0.58	14.7	B	7/11	0.71	18.7	B	8/15	0.72	19.1	B	9/15
Route 125 WB RT	0.69	5.3	A	0/0	0.83	9.1	A	0/0	0.87	10.9	B	0/0
I-93 SB Ramps SB LT	0.23	21.2	C	1/2	0.26	20.9	C	1/2	0.26	20.9	C	1/2
I-93 SB Ramps SB RT	0.08	2.0	A	0/0	0.08	2.0	A	0/0	0.08	2.0	A	0/0
Overall	--	**8.9**	**A**	--	--	**11.9**	**B**	--	--	**12.9**	**B**	--

[a]Volume-to-capacity ratio.
[b]Control (signal) delay per vehicle in seconds.
[c]Level of service.
[d]Queue length in vehicles.

Table 9R
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

Unsignalized Intersection/ Critical Movement/Peak Hour	2024 Baseline				2031 No-Build				2031 Build			
	Demand[a]	Delay[b]	LOS[c]	Maximum Queue[d]	Demand	Delay	LOS	Maximum Queue	Demand	Delay	LOS	Maximum Queue
River Street at Lowell Junction Road												
Weekday Morning:												
Lowell Junction Road LT/RT	35	13.2	B	1	46	14.6	B	1	49	15.0	C	1
Weekday Evening:												
Lowell Junction Road LT/RT	251	14.8	B	2	302	18.3	C	2	336	20.7	C	4
Connector Road at Lowell Junction Road												
Weekday Morning:												
Connector Road LT/RT	210	16.0	C	2	250	21.6	C	4	311	36.9	E	8
Weekday Evening:												
Connector Road LT/RT	41	10.3	B	1	50	10.9	B	1	75	12.0	B	1
River Street at Connector Road												
Weekday Morning:												
Connector Road LT/RT	50	12.0	B	1	60	12.7	B	1	64	13.0	B	1
Weekday Evening:												
Connector Road LT/RT	232	10.0	B	1	273	10.5	B	1	335	11.1	B	2
Gillette Way at Lowell Junction Road												
Weekday Morning:												
Gillette Way LT/RT	22	10.4	B	1	25	11.0	B	1	27	11.7	B	1
Weekday Evening:												
Gillette Way LT/RT	52	11.4	B	1	58	12.4	B	1	60	14.1	B	1
Andover Street at River Street and Private Driveway												
Weekday Morning:												
River Street LT/TH/RT	68	26.9	D	1	83	40.8	E	2	86	47.2	E	3
Private Driveway LT/TH/RT	2	10.1	B	0	2	10.3	B	0	2	10.3	B	0
Weekday Evening:												
River Street LT/TH/RT	514	>50.0	F	23	600	>50.0	F	38	647	>50.0	F	45
Private Driveway LT/TH/RT	33	10.9	B	1	33	11.4	B	1	33	11.5	B	1

[a]Demand in vehicles per hour.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]95th percentile queue length (veh).
LT = left-turning movements; RT = right-turning movements.

As shown in Table A-5, the Project has a minor effect on the I-93 ramp intersections but due to existing deficiencies causes a decrease in level-of-service on one approach and the overall intersection at the Ballardvale Street and Route 125 intersection during the weekday morning peak hour. The same intersection is projected to operate at LOS F with or without the Project during the weekday evening peak hour.

Table 9R depicts generally unchanged operations from the analysis in the TIA.

As requested, a review of potential improvements to the Andover Street and River Street intersection was conducted. It was determined that options exist to improve operations including the following:

- Option 1 – Installation of All-Way Stop Control (AWSC),
- Option 2 – Channelizing the approaches and shifting the alignment of the intersection so that the Andover Street east leg is under STOP-control and the Andover Street west leg and the River Street south leg are the free-flow movements, and
- Option 3 – Installing traffic signal control.

A preliminary review of traffic volumes for 2031 No-Build and 2031 Build conditions indicates that the intersection meets only peak hour signal warrants as identified in the Manual on Uniform Traffic Control Devices (MUTCD). Typically traffic volumes are required to be above threshold values for longer durations such as 4-hour and 8-hour time frames. The 4-hour signal warrant level was not reached for the hours of data collected for the TIA. Therefore, it is not likely that the intersection is a candidate for signalization so Option 3 was not selected for advancement.

Option 1 and Option 2 were analyzed for the 2031 No-Build and 2031 Build conditions with the results shown in Table A-6.

Table A-6
ANDOVER STREET AT RIVER STREET CAPACITY ANALYSIS SUMMARY WITH IMPROVEMENT OPTIONS

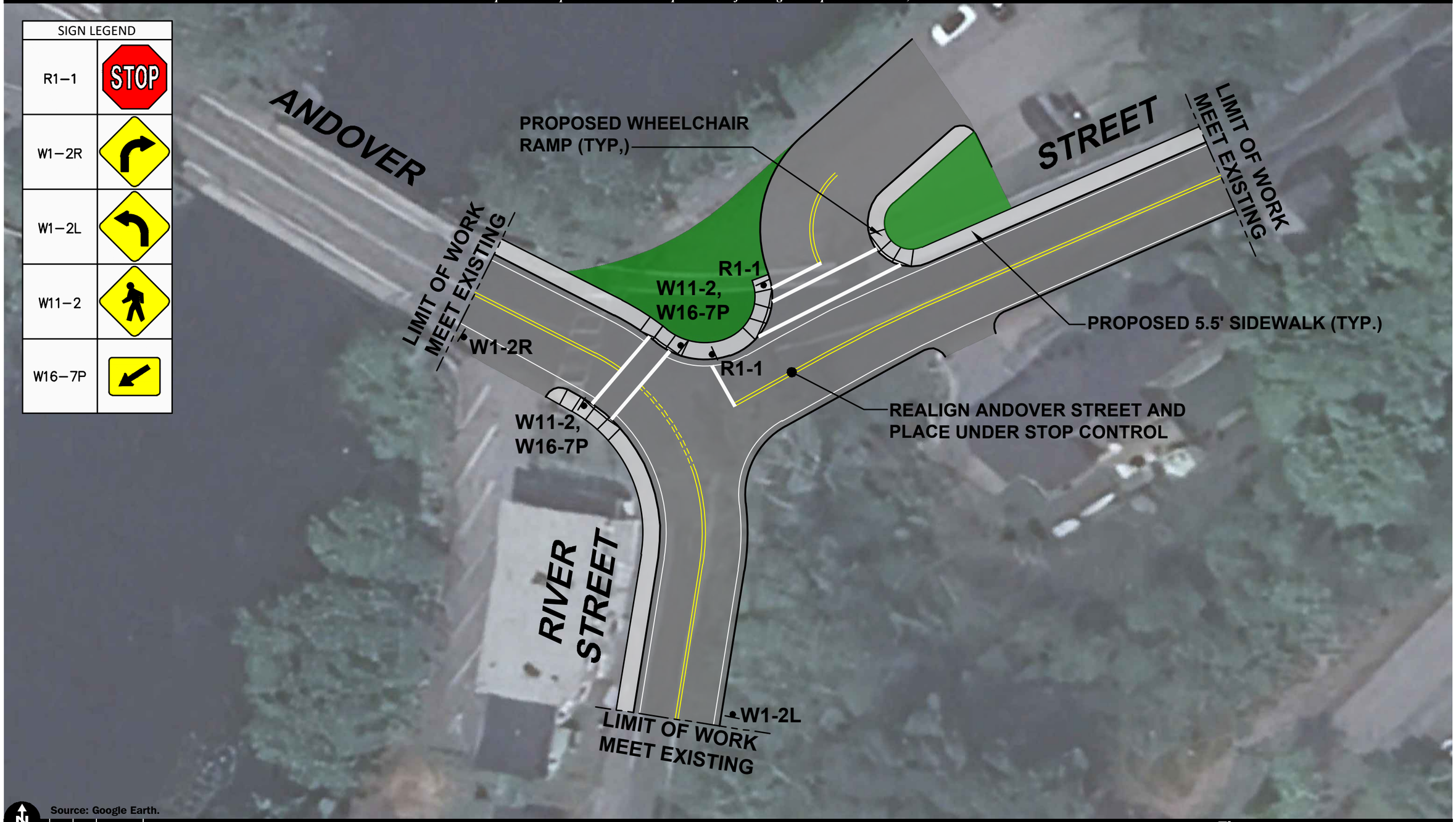
Unsignalized Intersection/	2031 No-Build – Unimproved				2031 No-Build AWSC – Option 1				2031 No-Build Andover WB Stop Sign – Option 2				2031 Build – Unimproved				2031 Build AWSC – Option 1				2031 Build Andover WB Stop Sign – Option 2			
Critical Movement/Peak Hour	Demand[a]	Delay[b]	LOS[c]	Maximum Queue[d]	Demand	Delay	LOS	Maximum Queue	Demand	Delay	LOS	Maximum Queue	Demand	Delay	LOS	Maximum Queue	Demand	Delay	LOS	Maximum Queue	Demand	Delay	LOS	Maximum Queue
Andover Street at River Street and Private Driveway																								
Weekday Morning:																								
Andover Street EB LT/TH/RT	766	0.1	A	0	766	86.5	F	24	--	--	--	--	806	0.1	A	0	806	109.4	F	29	--	--	--	--
Andover Street EB TH/RT	--	--	--	--	--	--	--	--	766	4.6	A	1	--	--	--	--	--	--	--	--	806	4.6	A	1
Andover Street WB LT/TH/RT	301	4.0	A	1	301	13.4	B	3	--	--	--	--	308	4.4	A	1	308	13.7	B	3	--	--	--	--
Andover Street WB LT/TH	--	--	--	--	--	--	--	--	299	76.9	F	11	--	--	--	--	--	--	--	--	306	114.7	F	14
River Street NB LT/TH/RT	83	40.8	E	2	83	11.0	B	1	--	--	--	--	86	47.2	E	3	86	11.1	B	1	--	--	--	--
River Street NB LT/RT	--	--	--	--	--	--	--	--	83	0.0	A	0	--	--	--	--	--	--	--	--	86	0.0	A	0
Private Driveway SB LT/TH/RT	2	10.3	B	0	2	10.0	B	0	--	--	--	--	2	10.3	B	0	2	10.1	B	0	--	--	--	--
Weekday Evening:																								
Andover Street EB LT/TH/RT	233	0.1	A	0	233	15.2	C	3	--	--	--	--	249	0.1	A	0	249	16.0	C	3	--	--	--	--
Andover Street EB TH/RT	--	---	--	--	--	--	--	--	233	7.7	A	1	--	--	--	--	--	--	--	--	248	7.6	A	1
Andover Street WB LT/TH/RT	198	0.9	A	1	198	15.0	C	2	--	--	--	--	201	1.0	A	1	201	15.3	C	2	--	--	--	--
Andover Street WB LT/TH	--	--	--	--	--	--	--	--	223	27.3	D	4	--	--	--	--	--	--	--	--	226	34.1	D	5
River Street NB LT/TH/RT	600	301.4	F	38	600	86.9	F	19	--	--	--	--	647	376.5	F	45	647	124.4	F	25	--	--	--	--
River Street NB LT/RT	--	--	--	--	--	--	--	--	600	0.0	A	0	--	--	--	--	--	--	--	--	647	0.0	A	0
Private Driveway SB LT/TH/RT	33	11.4	B	1	33	10.7	B	1	--	--	--	--	33	11.5	B	1	33	10.9	B	1	--	--	--	--

The maximum queues for the AWSC mitigation were calculated using the HCM 2010 AWSC method.
[a]Demand in vehicles per hour.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]95th percentile queue length (veh).
LT = left-turning movements; TH = through movements; RT = right-turning movements.

Installation of AWSC at the intersection under Option 1 is the easiest change to implement and distributes the delay among all approaches; however, if vehicle queues extend from the intersection across the bridge, this has the potential to impact the railroad crossing near the Ballardvale MBTA station. The best option to improve the intersection while minimizing the formation of vehicle queues that could affect the railroad crossing is Option 2, the reassignment of STOP control from the south River Street leg to the east Andover Street leg. A conceptual plan of this improvement is shown on Figure A-1. The Applicant is willing to contribute to the improvements depicted for this intersection.

In addition, the town has previously indicated concerns related to pedestrian crossings of River Street. Currently there are three midblock crosswalks along River Street that may be suitable locations for a RRFB installation. To address this concern, the Applicant is willing to contribute funds towards a Rectangular Rapid Flashing Beacon (RRFB) that the town may use to purchase and install an RRFB at a location of their choosing.

Another mitigation item involves operations at the intersection of Lowell Junction Road and Connector Road. Analysis indicates that the intersection which currently operates under Two-Way STOP Control (TWSC) is expected to experience a decrease in LOS from LOS C to LOS E during the weekday morning peak hour. No change is expected during the weekday evening peak hour. A change to AWSC at this intersection would address this condition as shown in Table A-7. The Applicant is willing to contribute towards the signage needed to make this change if the Town does not have similar signage available.



Source: Google Earth.

0 15 30 Scale in Feet

Figure -

Conceptual Improvement Plan
Andover Street at River Street

Vanasse & Associates inc

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Table A-7
CONNECTOR ROAD AT LOWELL JUNCTION ROAD CAPACITY ANALYSIS SUMMARY WITH IMPROVEMENT OPTIONS

Unsignalized Intersection/	2031 Build Original				2031 Build Original AWSC				2031 Build One Lane				2031 Build One Lane AWSC			
Critical Movement/Peak Hour	Demand[a]	Delay[b]	LOS[c]	Maximum Queue[d]	Demand	Delay	LOS	Maximum Queue	Demand	Delay	LOS	Maximum Queue	Demand	Delay	LOS	Maximum Queue
Connector Road at Lowell Junction Road																
Weekday Morning:																
Lowell Junction Road EB TH/RT	--	--	--	--	102	7.7	A	1	--	--	--	--	102	10.8	B	1
Lowell Junction Road WB LT/TH	--	--	--	--	421	18.9	C	8	--	--	--	--	421	21.1	C	7
Connector Road NB LT/RT	311	36.9	E	8	311	16.8	C	7	311	45.3	E	9	311	19.1	C	5
Weekday Evening:																
Lowell Junction Road EB TH/RT	--	--	--	--	632	8.9	A	3	--	--	--	--	632	19.2	C	8
Lowell Junction Road WB LT/TH	--	--	--	--	63	8.1	A	1	--	--	--	--	63	8.7	A	1
Connector Road NB LT/RT	75	12.0	B	1	75	8.2	A	1	75	15.0	C	1	75	9.8	A	1

The maximum queues for the AWSC mitigation were calculated using the HCM 2010 AWSC method.
[a]Demand in vehicles per hour.
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]95th percentile queue length (veh).
LT = left-turning movements; RT = right-turning movements.

Mitigation

Comment No. 21: *The majority of the vehicle trip generated by the proposed development will be employee trips. The Applicant has not proposed any Transportation Demand Management (TDM) measures to reduce single-occupant vehicle trips to the site. The Applicant should develop a comprehensive TDM program with consideration for the following measures:*

a. Assignment of a transportation coordinator (TC) to assist employees in finding alternative means of transportation, organizing and encouraging carpool and rideshare programs, implementing incentive programs for employees using alternative travel means;

b. Implementing a shuttle service to/from the MBTA commuter rail station;

c. Providing on-site showers and locker rooms for employees choosing to walk or bike to work;

d. Providing secure, weather-protected bicycle parking for employees biking to work;

e. Registering new employees with NuRide as part of employee orientation to assist with finding carpool and rideshare matched in the area, offer incentives for employees making green trips, and provide a guaranteed-ride-home to an employee who needs to leave in an emergency when making a green trip to work;

f. Providing designated carpool and rideshare parking spaces on the site located close to employee entrances;

g. Subsidizing transit passes for employees using public transportation to travel to work.

Response: The Applicant has reviewed potential TDM measures for the Project and has agreed to the following items:

- Provide a shower facility within the building.
- Encourage employees to register with Bay State Commute, the successor to NuRide, which enters employees into a ridematching database to improve access to others looking to carpool or vanpool.
- Provide a TDM/Transportation Coordinator to assist employees with transportation-related items such as alternative transportation and carpooling.

Subsidizing transit passes or providing shuttle bus service to the Ballardvale MBTA station are not likely to be an effective TDM strategy. The current schedules of the commuter rail into and out of Ballardvale Station are not conducive to employee travel from the Boston area to Andover. Most trains would get employees to the site hours before or sometime after shifts start and similarly to when shifts end.

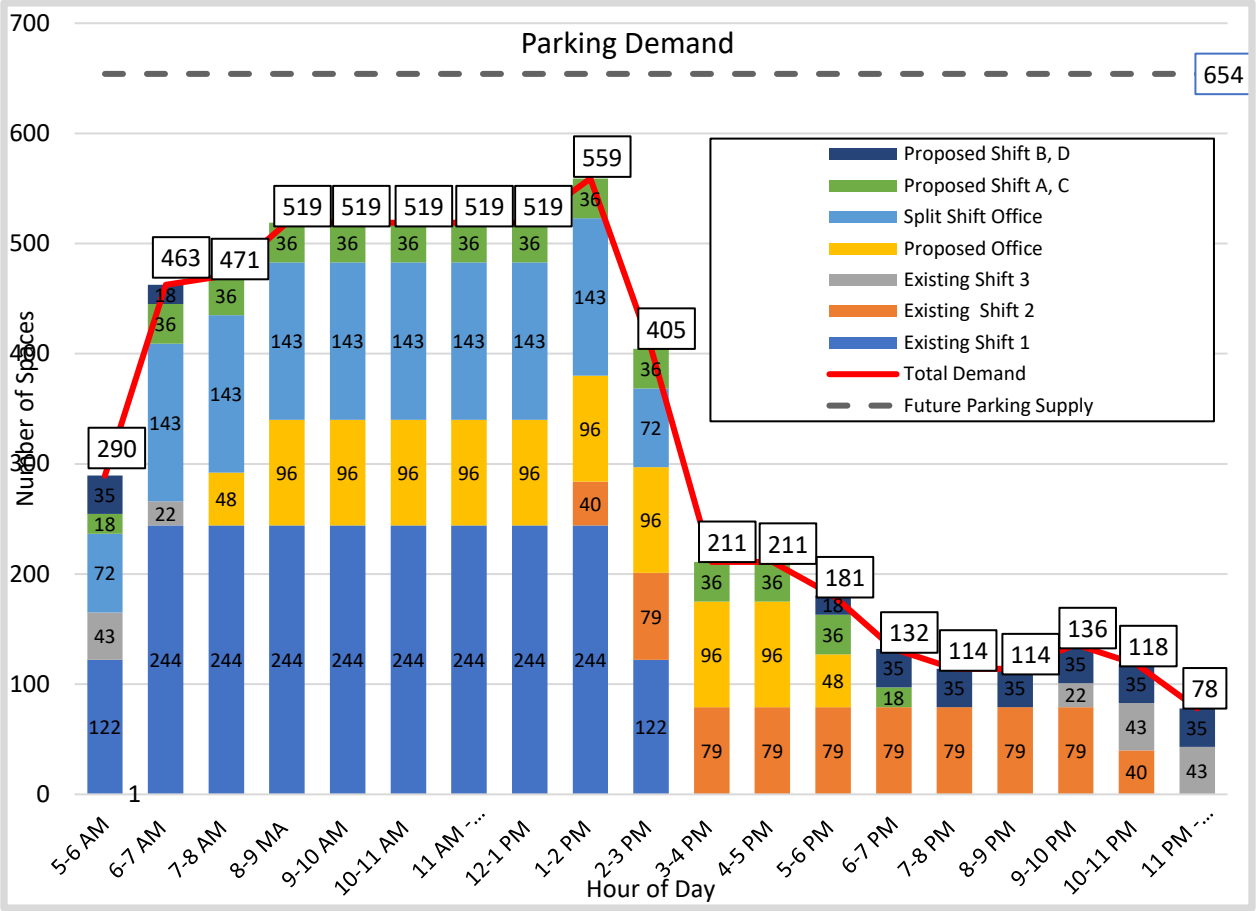
The Applicant has conducted surveys of their employees with regard to carpooling and/or shuttle bus service from the Boston area to the Andover site with the result that

between 10 and 13 percent of the employees express an interest in learning more about these two measures. The Applicant will continue to explore options related to these measures and is willing to implement the strategies that are determined to be effective in reducing vehicle trips to the site while promoting employee access to transportation options.

Parking

Comment No. 22: *The Applicant has not provided an assessment of the adequacy of the proposed parking supply within the TIA. GPI recommends the Applicant prepare an assessment of the potential parking demand to verify the adequacy of the proposed parking supply.*

Response: A parking assessment of the adequacy of the future parking supply was conducted as requested. This included estimates for current employees on site as well as the future employees. It is important to note that there are 3 existing shifts of employees at the Andover site with a maximum shift population of 257 employees during the day shift (based on badge swipe data provided by the Applicant). The Project involves the addition of 2 separate daytime shifts with a maximum shift population of 257 employees (107 Office Day Shift and 150 Office Split Shift) employees. In addition, the other existing shifts provide a maximum of 83 employees during the second shift and 45 employees during the third shift. To these are added the manufacturing shifts A, B, C, and D but these only operate 3 days per week plus alternating weekend days. A 5 percent absentee factor due to sick days, vacations, and other temporary absences, as well as a 5 percent adjustment factor for drop-off/pick-up activity associated with the Office Day Shift employees were also included. The results are shown in the following chart.



As shown, this analysis results in a maximum demand of 559 parking spaces for a one-hour period between the hours of 1:00 and 2:00 PM. It should be noted that half of the employees are expected to be present in the hour before the respective shift begins and in the hour after the respective shift ends.

Comment No. 23: *To satisfy the Town of Andover zoning requirements, a total of 1,936 parking spaces are required on the site. However, the Applicant is proposing only 654 parking spaces. The trip generation data provided in the Appendix of the TIA indicates that the proposed manufacturing use will operate with 406 employees, many of whom will be working overlapping shifts. Between the hours of 8:00 AM and 5:00 PM, a total of 333 employees will be on-site, which represents nearly half of the parking spaces being filled by the manufacturing use alone. As a result, only 321 parking spaces will remain for the remaining ±580,000 SF of warehouse, manufacturing, office, and laboratory space. The Applicant should consider conducting a parking inventory to assess the existing parking demand generated by the existing uses on the site.*

Response: As noted in the response to Comment No. 22, the Applicant has access to employee badge identification and has collected this data for existing employees. The following maximum employee populations were noted:

Shift	Days	Hours	Employees
First Shift	Mon - Fri	6:00 AM - 2:30 PM	257
Second Shift	Mon – Fri	2:00 - 10:30 PM	83
Third Shift	Sun – Fri	10:00 PM - 6:30 AM	45

Comment No. 24: *The Applicant has established a future reserve parking garage on the site to accommodate 1,619 parking spaces in the event additional parking is required on the site. As a condition of approval of the development, the Applicant should be required to conduct annual parking occupancy monitoring studies beginning 6 months following initial occupancy of the proposed expansion and should be required to construct the reserve parking garage once the available parking supply reaches 90 percent occupancy.*

Response: The Applicant will monitor the availability of parking supply and make adjustments to employee shift times if the parking demand is observed to approach the maximum supply. For instance, changing the start time for the existing second shift by 30 minutes brings the peak parking demand of 559 vehicles at 1-2PM down to 519 vehicles. The Applicant will employ active management of shifts and populations on site in order to maximize the efficiency of the parking facilities rather than commit additional resources to build a parking garage that may only be used sporadically or not at all.

Comment No. 25: *The Applicant should clarify whether the proposed reserve parking garage can be constructed in phases to allow one or more tiers to be constructed at a time, as needed.*

Response: Details on the reserve parking garage construction have not progressed to address constructability and whether the construction can be phased and/or constructed in a modular arrangement.

Site Circulation, Access, and Egress

Comment No. 26: *There is no traffic control currently proposed where the site driveway (Gillette Way) meets the site circulating roadway, which is likely to be the area of the highest conflict on site, particularly with the proposed truck bays near this intersection. GPI recommends the Applicant consider installation of an all-way stop condition at this location to minimize conflicts between entering and exiting vehicles. The Applicant may also want to consider striping a hatched area along the circulating roadway adjacent to the truck bays to alert driveways to entering and exiting truck traffic.*

Response: As noted previously, it is not possible to provide a STOP sign on all approaches at the intersection of Gillette Way and the circulating roadway. The site plan has been revised to incorporate a 2-way stop control at this intersection, on the westbound approach and the southbound approach. It should be noted that entrance from Gillette Way requires vehicles to come to a stop to check in at a guardhouse and again at the entrance to the circulating roadway around the building. Please see sheet C-300 of the updated site plans from Nitsch Engineering.

Comment No. 27: *The circulating roadway ends abruptly in the truck loading area in Drop Lot C at the southerly end of the site, with little direction to drivers on how to navigate this area.*

The Applicant should consider striping pavement markings to direct traffic through this truck parking area.

Response: The site plan has been updated to incorporate pavement markings. Please see sheets C-301 and C-303 of the updated site plans from Nitsch Engineering.

Comment No. 28: *The Applicant should also provide traffic control, including STOP lines and STOP signs at the intersections of the circulating roadway with Burtt Road and cross-connection to the Pfizer Building.*

Response: STOP signs have been added to sheet C-302 of the updated site plans from Nitsch Engineering.

Comment No. 29: *The Applicant should stripe STOP lines at the end of each drive aisle in Lot B at the intersection with the circulating roadway.*

Response: Stop lines have been added to the end of the drive aisle in Lot B. Please see sheet C-302.

Comment No. 30: *The Applicant has proposed snow storage areas on the inside of the curves at each corner of the property, which are likely to block sight lines for vehicles navigating around these curves. GPI recommends elimination of the snow storage areas in these areas to improve visibility navigating these curves.*

Response: The snow storage plan has been updated to remove areas at the inside of curves. Please see Sheet C-003 of the updated site plans from Nitsch Engineering.

Comment No. 31: *The Applicant has provided emergency vehicle path diagrams as part of the site plan package, which depict the path of a fire truck navigating the site. GPI recommends the Applicant also provide vehicle path diagrams for trash removal vehicles accessing the dumpsters, as well as trucks accessing the bays near the main entrance into the site.*

Response: A vehicle path of a trash removal vehicle has been added. Please see Sheet C-003.

Comment No. 32: *Although there is a sidewalk proposed along the parking in proposed Lot C, the proposed walkways would require employees parked in these spaces to walk all the way to Lot B on this sidewalk in order to access a pedestrian walkway to the employee entrances. The Applicant should consider a constructing a direct pedestrian path from the door in the center of the rear of the proposed manufacturing building to the sidewalk along Lot C.*

Response: Due to grading concerns, a direct connection is not feasible from the doorway to the sidewalk along Lot C. However, the doorway is an emergency exit and is not likely to be used on a frequent basis.

We trust that this information is responsive to the comments that were identified in the June 25, 2024 comment letter prepared by GPI concerning their review of the April 2024 TIA. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

Scott W. Thornton

Scott W. Thornton, P.E.
Partner

Attachment: Technical Appendix

- Traffic Counts and Speed Measurements
- Trip Networks
- Crash Rate Worksheets
- Trip Distribution Data
- Trip Generation Data
- Capacity Analysis
- Parking Analysis

APPENDIX

TRAFFIC COUNT DATA
VEHICLE SPEED DATA
TRIP NETWORKS
MASSDOT CRASH RATE WORKSHEETS
TRIP DISTRIBUTION DATA
TRIP GENERATION DATA
CAPACITY ANALYSIS
PARKING ANALYSIS

TRAFFIC COUNT DATA

Location : River Street Between
Location : Connector Rd and Lowell Junctions Rd
City/State: Andover, MA

Accurate Counts
978-664-2565

Site Code: 96770001

7/8/2024	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Week Average	
Time	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,	SB,	NB,
12:00 AM	*	*	2	14	5	22	*	*	*	*	*	*	*	*	4	18
1:00	*	*	5	9	1	0	*	*	*	*	*	*	*	*	3	5
2:00	*	*	47	2	45	4	*	*	*	*	*	*	*	*	46	3
3:00	*	*	23	7	32	5	*	*	*	*	*	*	*	*	28	6
4:00	*	*	77	2	61	5	*	*	*	*	*	*	*	*	69	4
5:00	*	*	157	5	155	11	*	*	*	*	*	*	*	*	156	8
6:00	*	*	179	22	196	19	*	*	*	*	*	*	*	*	188	21
7:00	*	*	197	24	207	23	*	*	*	*	*	*	*	*	202	24
8:00	*	*	143	24	158	40	*	*	*	*	*	*	*	*	151	32
9:00	*	*	109	29	100	40	*	*	*	*	*	*	*	*	105	35
10:00	*	*	36	54	56	57	*	*	*	*	*	*	*	*	46	56
11:00	*	*	66	62	94	62	*	*	*	*	*	*	*	*	80	62
12:00 PM	*	*	83	121	94	96	*	*	*	*	*	*	*	*	89	109
1:00	*	*	75	68	70	94	*	*	*	*	*	*	*	*	73	81
2:00	*	*	72	155	64	159	*	*	*	*	*	*	*	*	68	157
3:00	*	*	56	178	73	232	*	*	*	*	*	*	*	*	65	205
4:00	*	*	48	171	90	179	*	*	*	*	*	*	*	*	69	175
5:00	*	*	47	189	56	167	*	*	*	*	*	*	*	*	52	178
6:00	*	*	36	62	23	59	*	*	*	*	*	*	*	*	30	61
7:00	*	*	23	46	29	39	*	*	*	*	*	*	*	*	26	43
8:00	*	*	22	42	25	37	*	*	*	*	*	*	*	*	24	40
9:00	*	*	14	17	16	27	*	*	*	*	*	*	*	*	15	22
10:00	*	*	22	29	19	19	*	*	*	*	*	*	*	*	21	24
11:00	*	*	4	21	8	30	*	*	*	*	*	*	*	*	6	26
Total	0	0	1543	1353	1677	1426	0	0	0	0	0	0	0	0	1610	1390
Day	0		2896		3103		0		0		0		0		3000	
AM Peak			7:00	11:00	7:00	11:00									7:00	11:00
Volume			197	62	207	62									202	62
PM Peak			12:00 PM	5:00	12:00 PM	3:00									12:00 PM	3:00
Volume			83	189	94	232									88	205
Comb Total	0		2896		3103		0		0		0		0		3000	

ADT ADT: 3,000 AADT: 3,000

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024
Page No : 1

Groups Printed- Cars - Trucks

	Ballardvale St From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	10	67	163	29	163	123	555
07:15 AM	15	78	182	35	176	145	631
07:30 AM	12	65	203	40	144	142	606
07:45 AM	11	72	223	65	217	175	763
Total	48	282	771	169	700	585	2555
08:00 AM	9	65	230	73	219	158	754
08:15 AM	21	52	221	62	226	157	739
08:30 AM	16	65	193	63	226	154	717
08:45 AM	18	70	206	68	243	125	730
Total	64	252	850	266	914	594	2940
Grand Total	112	534	1621	435	1614	1179	5495
Apprch %	17.3	82.7	78.8	21.2	57.8	42.2	
Total %	2	9.7	29.5	7.9	29.4	21.5	
Cars	100	397	1561	422	1510	1130	5120
% Cars	89.3	74.3	96.3	97	93.6	95.8	93.2
Trucks	12	137	60	13	104	49	375
% Trucks	10.7	25.7	3.7	3	6.4	4.2	6.8

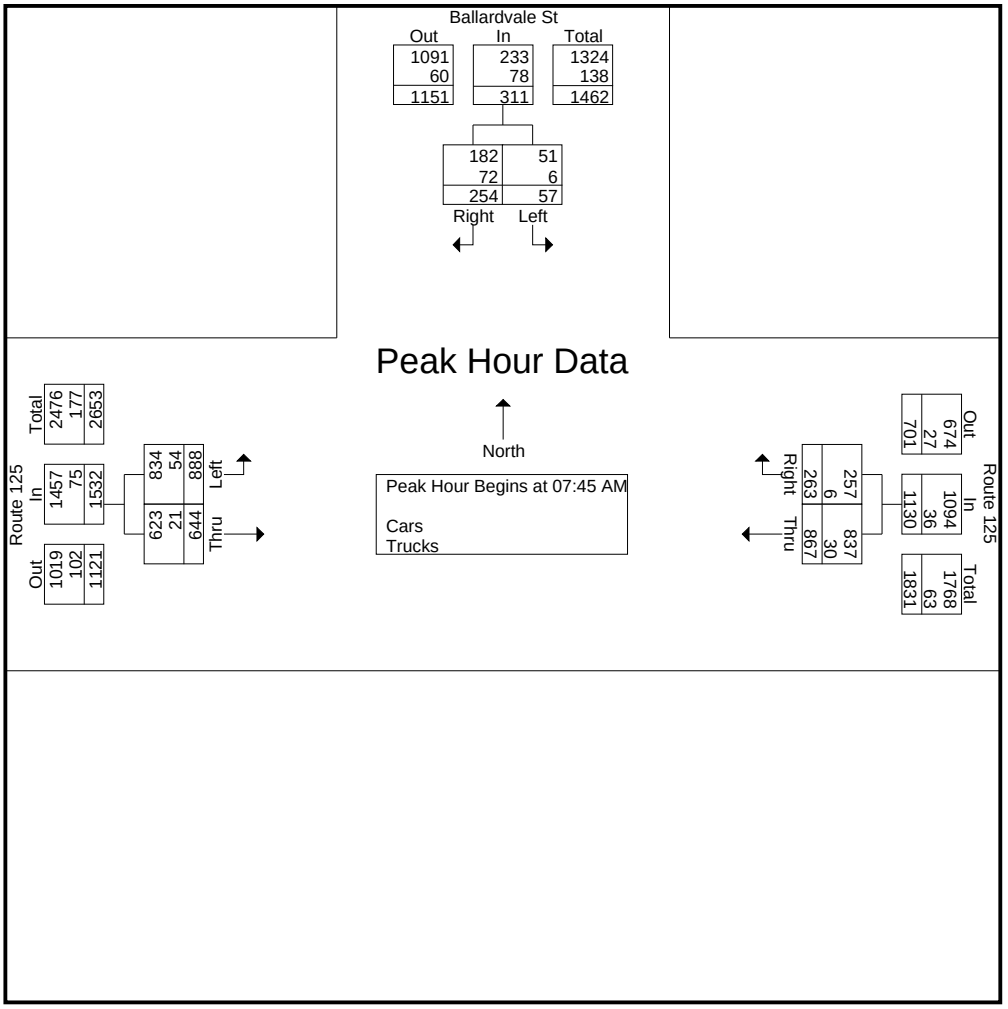
	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	11	**72**	**83**	223	65	288	217	**175**	**392**	**763**
08:00 AM	9	65	74	**230**	**73**	**303**	219	158	377	754
08:15 AM	**21**	52	73	221	62	283	**226**	157	383	739
08:30 AM	16	65	81	193	63	256	226	154	380	717
Total Volume	57	254	311	867	263	1130	888	644	1532	2973
% App. Total	18.3	81.7		76.7	23.3		58	42		
PHF	.679	.882	.937	.942	.901	.932	.982	.920	.977	.974
Cars	51	182	233	837	257	1094	834	623	1457	2784
% Cars	89.5	71.7	74.9	96.5	97.7	96.8	93.9	96.7	95.1	93.6
Trucks	6	72	78	30	6	36	54	21	75	189
% Trucks	10.5	28.3	25.1	3.5	2.3	3.2	6.1	3.3	4.9	6.4

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

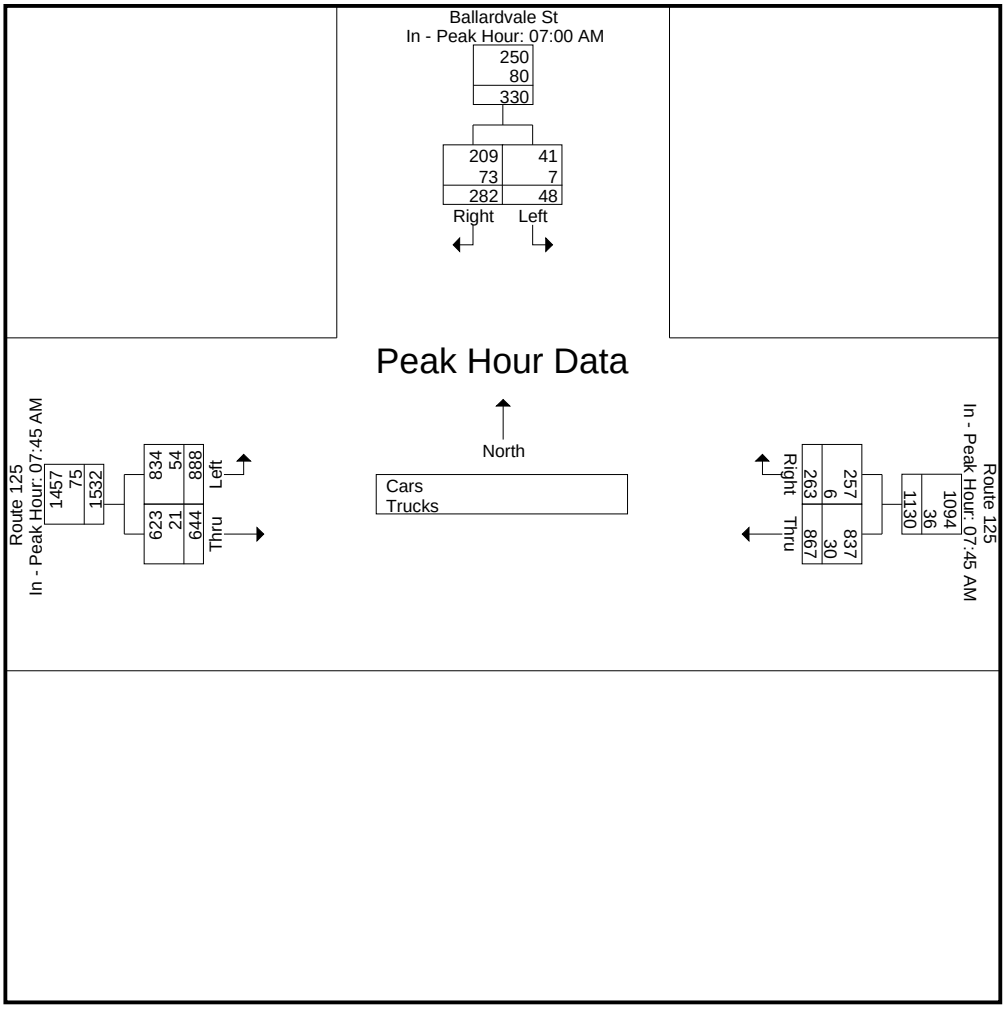
	07:00 AM			07:45 AM			07:45 AM		
+0 mins.	10	67	77	223	65	288	217	**175**	**392**
+15 mins.	**15**	**78**	**93**	**230**	**73**	**303**	219	158	377
+30 mins.	12	65	77	221	62	283	**226**	157	383
+45 mins.	11	72	83	193	63	256	226	154	380
Total Volume	48	282	330	867	263	1130	888	644	1532
% App. Total	14.5	85.5		76.7	23.3		58	42	
PHF	.800	.904	.887	.942	.901	.932	.982	.920	.977
Cars	41	209	250	837	257	1094	834	623	1457
% Cars	85.4	74.1	75.8	96.5	97.7	96.8	93.9	96.7	95.1
Trucks	7	73	80	30	6	36	54	21	75
% Trucks	14.6	25.9	24.2	3.5	2.3	3.2	6.1	3.3	4.9

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024
Page No : 4

Groups Printed- Cars

	Ballardvale St From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	7	50	155	28	147	116	503
07:15 AM	13	57	175	34	168	141	588
07:30 AM	11	52	194	38	130	134	559
07:45 AM	10	50	216	63	197	168	704
Total	41	209	740	163	642	559	2354
08:00 AM	8	46	222	71	206	153	706
08:15 AM	18	38	214	60	218	152	700
08:30 AM	15	48	185	63	213	150	674
08:45 AM	18	56	200	65	231	116	686
Total	59	188	821	259	868	571	2766
Grand Total	100	397	1561	422	1510	1130	5120
Apprch %	20.1	79.9	78.7	21.3	57.2	42.8	
Total %	2	7.8	30.5	8.2	29.5	22.1	

	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	10	**50**	60	216	63	279	197	**168**	365	704
08:00 AM	8	46	54	**222**	**71**	**293**	206	153	359	**706**
08:15 AM	**18**	38	56	214	60	274	**218**	152	**370**	700
08:30 AM	15	48	**63**	185	63	248	213	150	363	674
Total Volume	51	182	233	837	257	1094	834	623	1457	2784
% App. Total	21.9	78.1		76.5	23.5		57.2	42.8		
PHF	.708	.910	.925	.943	.905	.933	.956	.927	.984	.986

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024

Groups Printed- Trucks

	Ballardvale St From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	3	17	8	1	16	7	52
07:15 AM	2	21	7	1	8	4	43
07:30 AM	1	13	9	2	14	8	47
07:45 AM	1	22	7	2	20	7	59
Total	7	73	31	6	58	26	201
08:00 AM	1	19	8	2	13	5	48
08:15 AM	3	14	7	2	8	5	39
08:30 AM	1	17	8	0	13	4	43
08:45 AM	0	14	6	3	12	9	44
Total	5	64	29	7	46	23	174
Grand Total	12	137	60	13	104	49	375
Apprch %	8.1	91.9	82.2	17.8	68	32	
Total %	3.2	36.5	16	3.5	27.7	13.1	

	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	**3**	17	20	8	1	9	16	7	23	52
07:15 AM	2	21	**23**	7	1	8	8	4	12	43
07:30 AM	1	13	14	**9**	**2**	**11**	14	**8**	22	47
07:45 AM	1	**22**	23	7	2	9	**20**	7	**27**	**59**
Total Volume	7	73	80	31	6	37	58	26	84	201
% App. Total	8.8	91.2		83.8	16.2		69	31		
PHF	.583	.830	.870	.861	.750	.841	.725	.813	.778	.852

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024

Groups Printed- Bikes Peds

	Ballardvale St From North			Route 125 From East			Route 125 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0				
Total %										0	0	

	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024
Page No : 1

Groups Printed- Cars - Trucks

	Ballardvale St From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	54	292	159	29	76	181	791
04:15 PM	61	220	182	13	69	217	762
04:30 PM	64	296	205	18	73	176	832
04:45 PM	58	243	161	13	63	220	758
Total	237	1051	707	73	281	794	3143
05:00 PM	104	287	216	32	62	231	932
05:15 PM	57	233	167	18	77	279	831
05:30 PM	37	197	165	24	88	287	798
05:45 PM	36	140	151	21	75	188	611
Total	234	857	699	95	302	985	3172
Grand Total	471	1908	1406	168	583	1779	6315
Apprch %	19.8	80.2	89.3	10.7	24.7	75.3	
Total %	7.5	30.2	22.3	2.7	9.2	28.2	
Cars	466	1875	1378	154	542	1749	6164
% Cars	98.9	98.3	98	91.7	93	98.3	97.6
Trucks	5	33	28	14	41	30	151
% Trucks	1.1	1.7	2	8.3	7	1.7	2.4

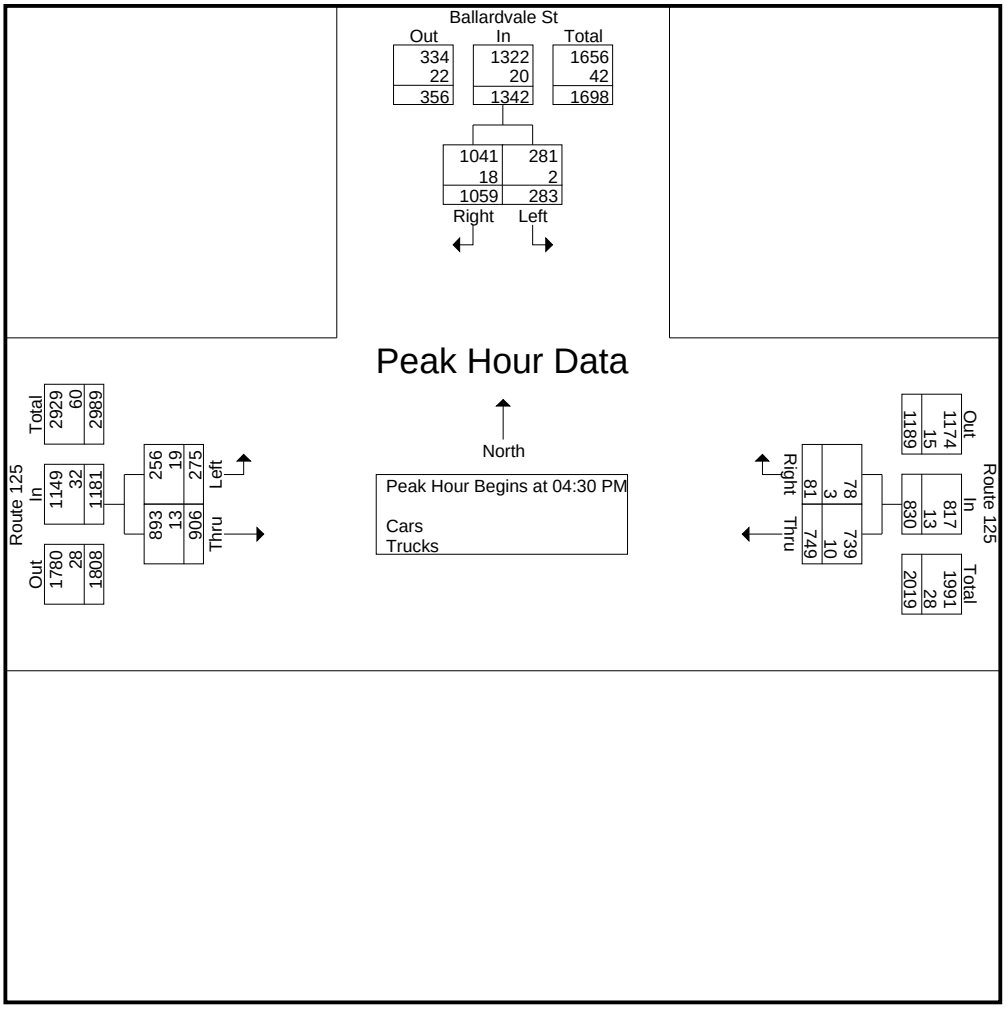
	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	64	**296**	360	205	18	223	73	176	249	832
04:45 PM	58	243	301	161	13	174	63	220	283	758
05:00 PM	**104**	287	**391**	**216**	**32**	**248**	62	231	293	**932**
05:15 PM	57	233	290	167	18	185	**77**	**279**	**356**	831
Total Volume	283	1059	1342	749	81	830	275	906	1181	3353
% App. Total	21.1	78.9		90.2	9.8		23.3	76.7		
PHF	.680	.894	.858	.867	.633	.837	.893	.812	.829	.899
Cars	281	1041	1322	739	78	817	256	893	1149	3288
% Cars	99.3	98.3	98.5	98.7	96.3	98.4	93.1	98.6	97.3	98.1
Trucks	2	18	20	10	3	13	19	13	32	65
% Trucks	0.7	1.7	1.5	1.3	3.7	1.6	6.9	1.4	2.7	1.9

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

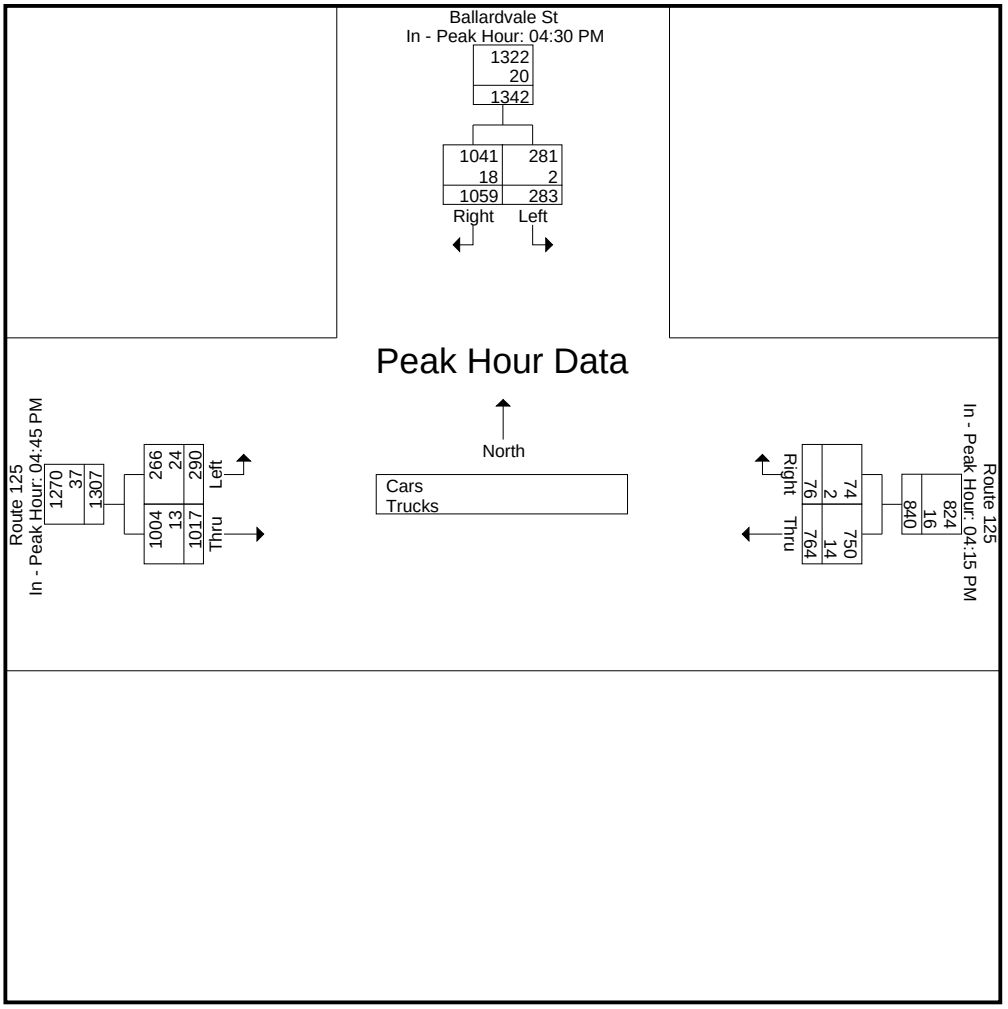
	04:30 PM			04:15 PM			04:45 PM		
+0 mins.	64	**296**	360	182	13	195	63	220	283
+15 mins.	58	243	301	205	18	223	62	231	293
+30 mins.	**104**	287	**391**	161	13	174	77	279	356
+45 mins.	57	233	290	**216**	**32**	**248**	**88**	**287**	**375**
Total Volume	283	1059	1342	764	76	840	290	1017	1307
% App. Total	21.1	78.9		91	9		22.2	77.8	
PHF	.680	.894	.858	.884	.594	.847	.824	.886	.871
Cars	281	1041	1322	750	74	824	266	1004	1270
% Cars	99.3	98.3	98.5	98.2	97.4	98.1	91.7	98.7	97.2
Trucks	2	18	20	14	2	16	24	13	37
% Trucks	0.7	1.7	1.5	1.8	2.6	1.9	8.3	1.3	2.8

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024

Groups Printed- Cars

	Ballardvale St From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	52	284	152	24	70	177	759
04:15 PM	60	217	176	12	65	208	738
04:30 PM	63	288	200	17	72	175	815
04:45 PM	57	238	159	13	54	217	738
Total	232	1027	687	66	261	777	3050
05:00 PM	104	283	215	32	59	228	921
05:15 PM	57	232	165	16	71	273	814
05:30 PM	37	195	165	22	82	286	787
05:45 PM	36	138	146	18	69	185	592
Total	234	848	691	88	281	972	3114
Grand Total	466	1875	1378	154	542	1749	6164
Apprch %	19.9	80.1	89.9	10.1	23.7	76.3	
Total %	7.6	30.4	22.4	2.5	8.8	28.4	

	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	63	**288**	351	200	17	217	**72**	175	247	815
04:45 PM	57	238	295	159	13	172	54	217	271	738
05:00 PM	**104**	283	**387**	**215**	**32**	**247**	59	228	287	**921**
05:15 PM	57	232	289	165	16	181	71	**273**	**344**	814
Total Volume	281	1041	1322	739	78	817	256	893	1149	3288
% App. Total	21.3	78.7		90.5	9.5		22.3	77.7		
PHF	.675	.904	.854	.859	.609	.827	.889	.818	.835	.893

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024

Groups Printed- Trucks

	Ballardvale St From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	2	8	7	5	6	4	32
04:15 PM	1	3	6	1	4	9	24
04:30 PM	1	8	5	1	1	1	17
04:45 PM	1	5	2	0	9	3	20
Total	5	24	20	7	20	17	93
05:00 PM	0	4	1	0	3	3	11
05:15 PM	0	1	2	2	6	6	17
05:30 PM	0	2	0	2	6	1	11
05:45 PM	0	2	5	3	6	3	19
Total	0	9	8	7	21	13	58
Grand Total	5	33	28	14	41	30	151
Apprch %	13.2	86.8	66.7	33.3	57.7	42.3	
Total %	3.3	21.9	18.5	9.3	27.2	19.9	

	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	**2**	**8**	**10**	**7**	**5**	**12**	6	4	10	**32**
04:15 PM	1	3	4	6	1	7	4	**9**	**13**	24
04:30 PM	1	8	9	5	1	6	1	1	2	17
04:45 PM	1	5	6	2	0	2	**9**	3	12	20
Total Volume	5	24	29	20	7	27	20	17	37	93
% App. Total	17.2	82.8		74.1	25.9		54.1	45.9		
PHF	.625	.750	.725	.714	.350	.563	.556	.472	.712	.727

Accurate Counts

978-664-2565

N/S Street : Ballardvale Street
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770001
Site Code : 96770001
Start Date : 7/9/2024

Groups Printed- Bikes Peds

	Ballardvale St From North			Route 125 From East			Route 125 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0				
Total %										0	0	

	Ballardvale St From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024
Page No : 1

Groups Printed- Cars - Trucks

	Route 93 NB Ramp From North			Route 125 From East			Route 93 NB Ramp From South			Route 125 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	182	40	3	0	146	0	145	6	522
07:15 AM	0	0	0	0	198	54	2	0	170	0	165	14	603
07:30 AM	0	0	0	0	213	43	5	0	149	0	147	9	566
07:45 AM	0	0	0	0	221	39	3	0	219	0	196	8	686
Total	0	0	0	0	814	176	13	0	684	0	653	37	2377
08:00 AM	0	0	0	0	225	49	5	0	203	0	177	10	669
08:15 AM	0	0	0	0	202	45	3	0	222	0	168	13	653
08:30 AM	0	0	0	0	212	36	2	0	213	0	166	7	636
08:45 AM	0	0	0	0	220	47	4	0	205	0	162	9	647
Total	0	0	0	0	859	177	14	0	843	0	673	39	2605
Grand Total	0	0	0	0	1673	353	27	0	1527	0	1326	76	4982
Apprch %	0	0	0	0	82.6	17.4	1.7	0	98.3	0	94.6	5.4	
Total %	0	0	0	0	33.6	7.1	0.5	0	30.7	0	26.6	1.5	
Cars	0	0	0	0	1572	263	26	0	1432	0	1256	75	4624
% Cars	0	0	0	0	94	74.5	96.3	0	93.8	0	94.7	98.7	92.8
Trucks	0	0	0	0	101	90	1	0	95	0	70	1	358
% Trucks	0	0	0	0	6	25.5	3.7	0	6.2	0	5.3	1.3	7.2

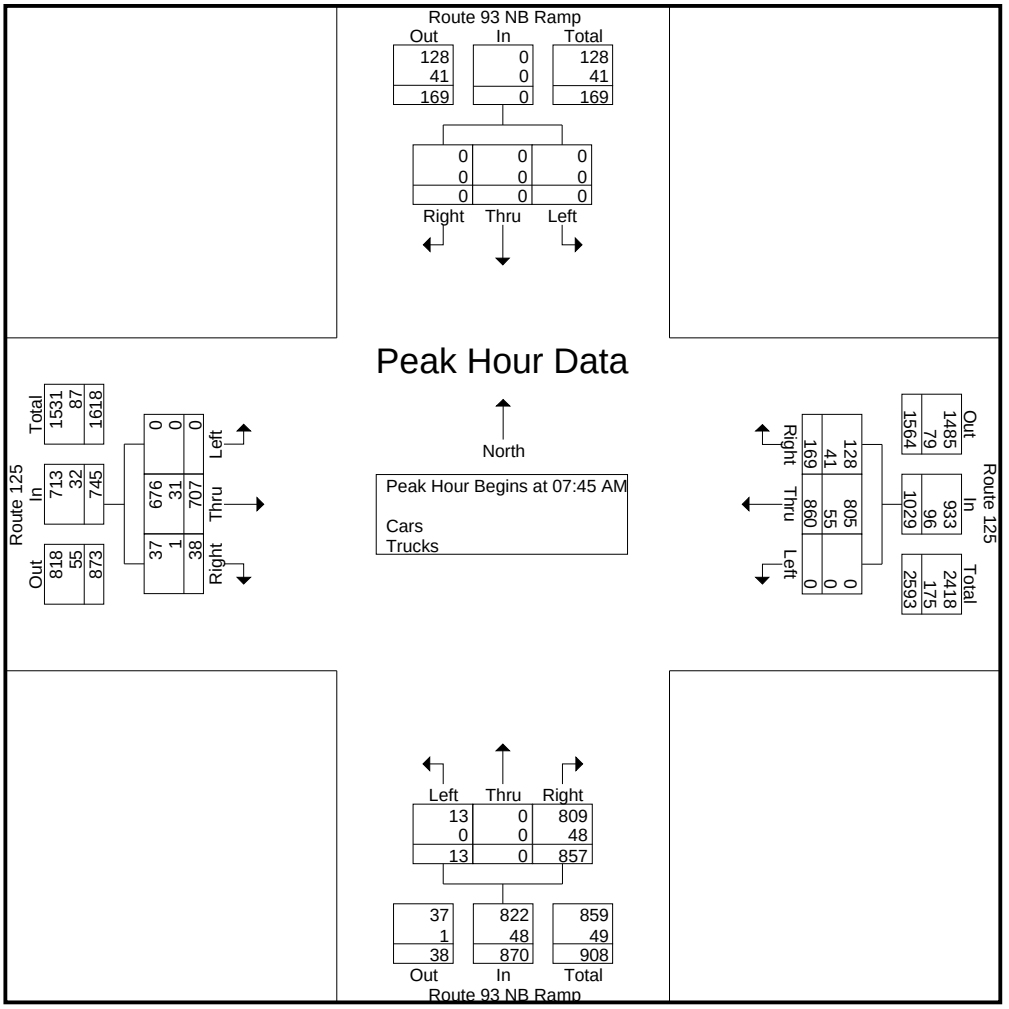
	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	221	39	260	3	0	219	222	0	**196**	8	**204**	**686**
08:00 AM	0	0	0	0	0	**225**	**49**	**274**	**5**	0	203	208	0	177	10	187	669
08:15 AM	0	0	0	0	0	202	45	247	3	0	**222**	**225**	0	168	**13**	181	653
08:30 AM	0	0	0	0	0	212	36	248	2	0	213	215	0	166	7	173	636
Total Volume	0	0	0	0	0	860	169	1029	13	0	857	870	0	707	38	745	2644
% App. Total	0	0	0		0	83.6	16.4		1.5	0	98.5		0	94.9	5.1		
PHF	.000	.000	.000	.000	.000	.956	.862	.939	.650	.000	.965	.967	.000	.902	.731	.913	.964
Cars	0	0	0	0	0	805	128	933	13	0	809	822	0	676	37	713	2468
% Cars	0	0	0	0	0	93.6	75.7	90.7	100	0	94.4	94.5	0	95.6	97.4	95.7	93.3
Trucks	0	0	0	0	0	55	41	96	0	0	48	48	0	31	1	32	176
% Trucks	0	0	0	0	0	6.4	24.3	9.3	0	0	5.6	5.5	0	4.4	2.6	4.3	6.7

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

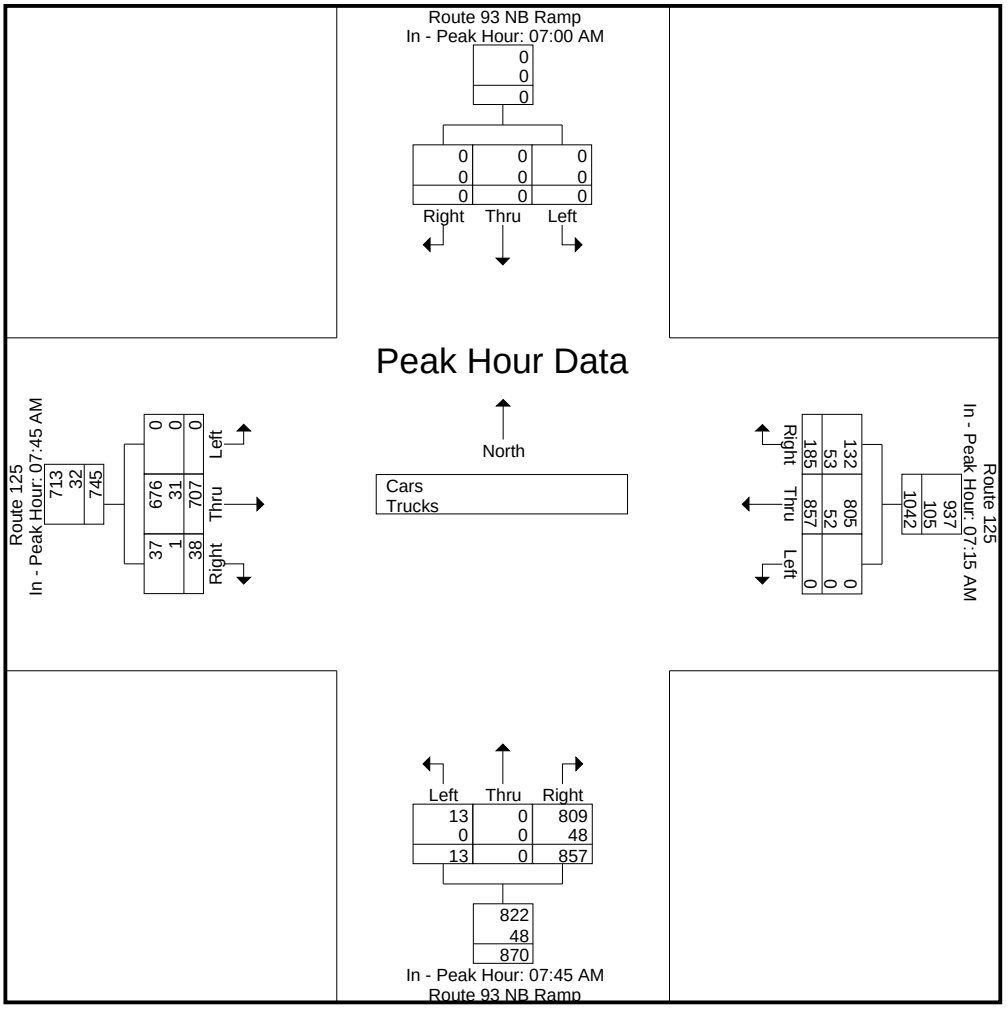
	07:00 AM				07:15 AM				07:45 AM				07:45 AM			
+0 mins.	0	0	0	0	0	198	**54**	252	3	0	219	222	0	**196**	8	**204**
+15 mins.	0	0	0	0	0	213	43	256	**5**	0	203	208	0	177	10	187
+30 mins.	0	0	0	0	0	221	39	260	3	0	**222**	**225**	0	168	**13**	181
+45 mins.	0	0	0	0	0	**225**	49	**274**	2	0	213	215	0	166	7	173
Total Volume	0	0	0	0	0	857	185	1042	13	0	857	870	0	707	38	745
% App. Total	0	0	0		0	82.2	17.8		1.5	0	98.5		0	94.9	5.1	
PHF	.000	.000	.000	.000	.000	.952	.856	.951	.650	.000	.965	.967	.000	.902	.731	.913
Cars	0	0	0	0	0	805	132	937	13	0	809	822	0	676	37	713
% Cars	0	0	0	0	0	93.9	71.4	89.9	100	0	94.4	94.5	0	95.6	97.4	95.7
Trucks	0	0	0	0	0	52	53	105	0	0	48	48	0	31	1	32
% Trucks	0	0	0	0	0	6.1	28.6	10.1	0	0	5.6	5.5	0	4.4	2.6	4.3

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024

Groups Printed- Cars

	Route 93 NB Ramp From North			Route 125 From East			Route 93 NB Ramp From South			Route 125 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	170	29	3	0	132	0	137	6	477
07:15 AM	0	0	0	0	183	40	2	0	162	0	158	14	559
07:30 AM	0	0	0	0	204	30	5	0	135	0	135	9	518
07:45 AM	0	0	0	0	209	25	3	0	202	0	184	8	631
Total	0	0	0	0	766	124	13	0	631	0	614	37	2185
08:00 AM	0	0	0	0	209	37	5	0	194	0	168	10	623
08:15 AM	0	0	0	0	190	37	3	0	215	0	162	13	620
08:30 AM	0	0	0	0	197	29	2	0	198	0	162	6	594
08:45 AM	0	0	0	0	210	36	3	0	194	0	150	9	602
Total	0	0	0	0	806	139	13	0	801	0	642	38	2439
Grand Total	0	0	0	0	1572	263	26	0	1432	0	1256	75	4624
Apprch %	0	0	0	0	85.7	14.3	1.8	0	98.2	0	94.4	5.6	
Total %	0	0	0	0	34	5.7	0.6	0	31	0	27.2	1.6	

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	0	**209**	25	234	3	0	202	205	0	**184**	8	**192**	**631**
08:00 AM	0	0	0	0	0	209	**37**	**246**	**5**	0	194	199	0	168	10	178	623
08:15 AM	0	0	0	0	0	190	37	227	3	0	**215**	**218**	0	162	**13**	175	620
08:30 AM	0	0	0	0	0	197	29	226	2	0	198	200	0	162	6	168	594
Total Volume	0	0	0	0	0	805	128	933	13	0	809	822	0	676	37	713	2468
% App. Total	0	0	0		0	86.3	13.7		1.6	0	98.4		0	94.8	5.2		
PHF	.000	.000	.000	.000	.000	.963	.865	.948	.650	.000	.941	.943	.000	.918	.712	.928	.978

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024

Groups Printed- Trucks

	Route 93 NB Ramp From North			Route 125 From East			Route 93 NB Ramp From South			Route 125 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	0	0	0	12	11	0	0	14	0	8	0	45
07:15 AM	0	0	0	0	15	14	0	0	8	0	7	0	44
07:30 AM	0	0	0	0	9	13	0	0	14	0	12	0	48
07:45 AM	0	0	0	0	12	14	0	0	17	0	12	0	55
Total	0	0	0	0	48	52	0	0	53	0	39	0	192
08:00 AM	0	0	0	0	16	12	0	0	9	0	9	0	46
08:15 AM	0	0	0	0	12	8	0	0	7	0	6	0	33
08:30 AM	0	0	0	0	15	7	0	0	15	0	4	1	42
08:45 AM	0	0	0	0	10	11	1	0	11	0	12	0	45
Total	0	0	0	0	53	38	1	0	42	0	31	1	166
Grand Total	0	0	0	0	101	90	1	0	95	0	70	1	358
Apprch %	0	0	0	0	52.9	47.1	1	0	99	0	98.6	1.4	
Total %	0	0	0	0	28.2	25.1	0.3	0	26.5	0	19.6	0.3	

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	15	**14**	**29**	0	0	8	8	0	7	0	7	44
07:30 AM	0	0	0	0	0	9	13	22	0	0	14	14	0	**12**	0	**12**	48
07:45 AM	0	0	0	0	0	12	14	26	0	0	**17**	**17**	0	12	0	12	**55**
08:00 AM	0	0	0	0	0	**16**	12	28	0	0	9	9	0	9	0	9	46
Total Volume	0	0	0	0	0	52	53	105	0	0	48	48	0	40	0	40	193
% App. Total	0	0	0		0	49.5	50.5		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.813	.946	.905	.000	.000	.706	.706	.000	.833	.000	.833	.877

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024

Groups Printed- Bikes Peds

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024
Page No : 1

Groups Printed- Cars - Trucks

	Route 93 NB Ramp From North			Route 125 From East			Route 93 NB Ramp From South			Route 125 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	288	137	28	0	236	0	74	9	772
04:15 PM	0	0	0	0	291	97	35	0	192	0	74	8	697
04:30 PM	0	0	0	0	313	176	31	0	185	0	71	13	789
04:45 PM	0	0	0	0	297	103	26	0	210	0	80	11	727
Total	0	0	0	0	1189	513	120	0	823	0	299	41	2985
05:00 PM	0	0	0	0	342	133	31	0	248	0	74	7	835
05:15 PM	0	0	0	0	336	85	46	0	267	0	77	7	818
05:30 PM	0	0	0	0	286	58	38	0	302	0	76	4	764
05:45 PM	0	0	0	0	206	73	18	0	187	0	62	9	555
Total	0	0	0	0	1170	349	133	0	1004	0	289	27	2972
Grand Total	0	0	0	0	2359	862	253	0	1827	0	588	68	5957
Apprch %	0	0	0	0	73.2	26.8	12.2	0	87.8	0	89.6	10.4	
Total %	0	0	0	0	39.6	14.5	4.2	0	30.7	0	9.9	1.1	
Cars	0	0	0	0	2321	841	253	0	1763	0	558	68	5804
% Cars	0	0	0	0	98.4	97.6	100	0	96.5	0	94.9	100	97.4
Trucks	0	0	0	0	38	21	0	0	64	0	30	0	153
% Trucks	0	0	0	0	1.6	2.4	0	0	3.5	0	5.1	0	2.6

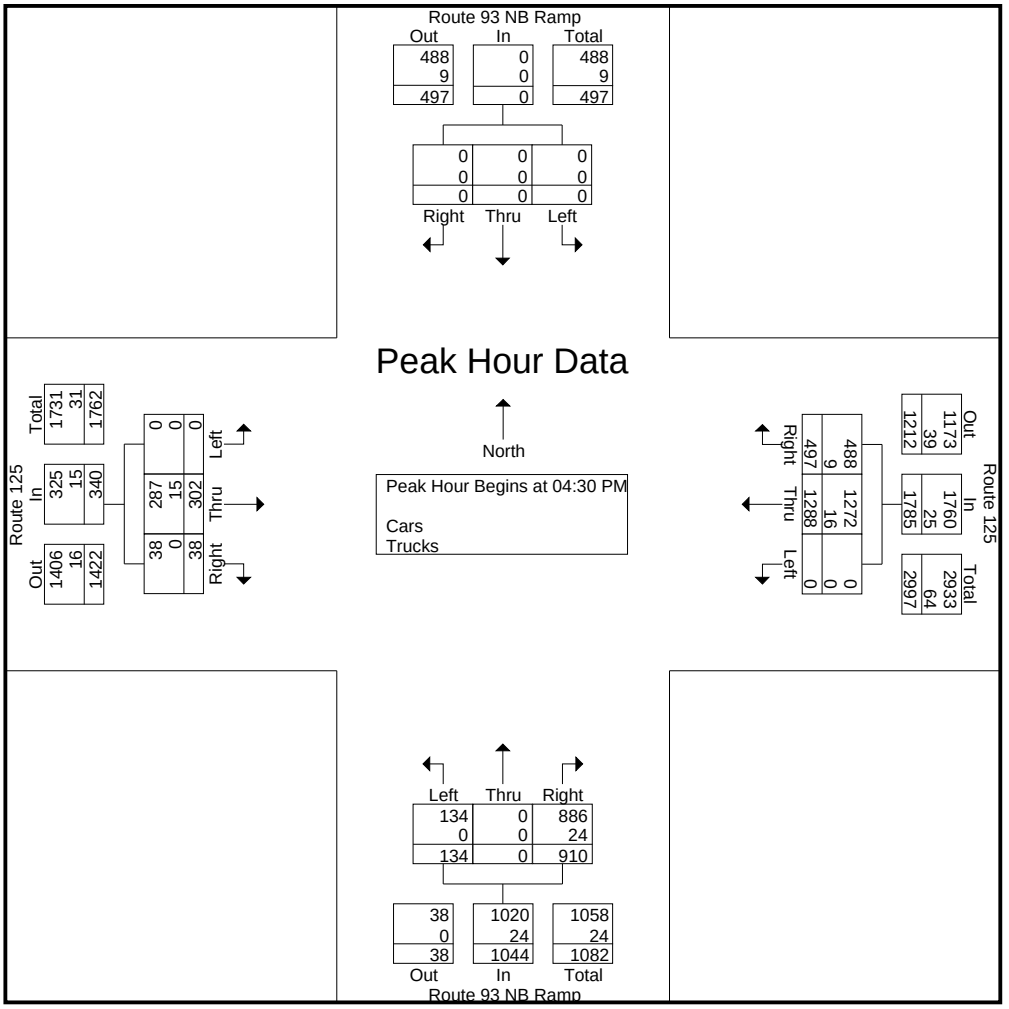
	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	313	**176**	**489**	31	0	185	216	0	71	**13**	84	789
04:45 PM	0	0	0	0	0	297	103	400	26	0	210	236	0	**80**	11	**91**	727
05:00 PM	0	0	0	0	0	**342**	133	475	31	0	248	279	0	74	7	81	**835**
05:15 PM	0	0	0	0	0	336	85	421	**46**	0	**267**	**313**	0	77	7	84	818
Total Volume	0	0	0	0	0	1288	497	1785	134	0	910	1044	0	302	38	340	3169
% App. Total	0	0	0		0	72.2	27.8		12.8	0	87.2		0	88.8	11.2		
PHF	.000	.000	.000	.000	.000	.942	.706	.913	.728	.000	.852	.834	.000	.944	.731	.934	.949
Cars	0	0	0	0	0	1272	488	1760	134	0	886	1020	0	287	38	325	3105
% Cars	0	0	0	0	0	98.8	98.2	98.6	100	0	97.4	97.7	0	95.0	100	95.6	98.0
Trucks	0	0	0	0	0	16	9	25	0	0	24	24	0	15	0	15	64
% Trucks	0	0	0	0	0	1.2	1.8	1.4	0	0	2.6	2.3	0	5.0	0	4.4	2.0

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

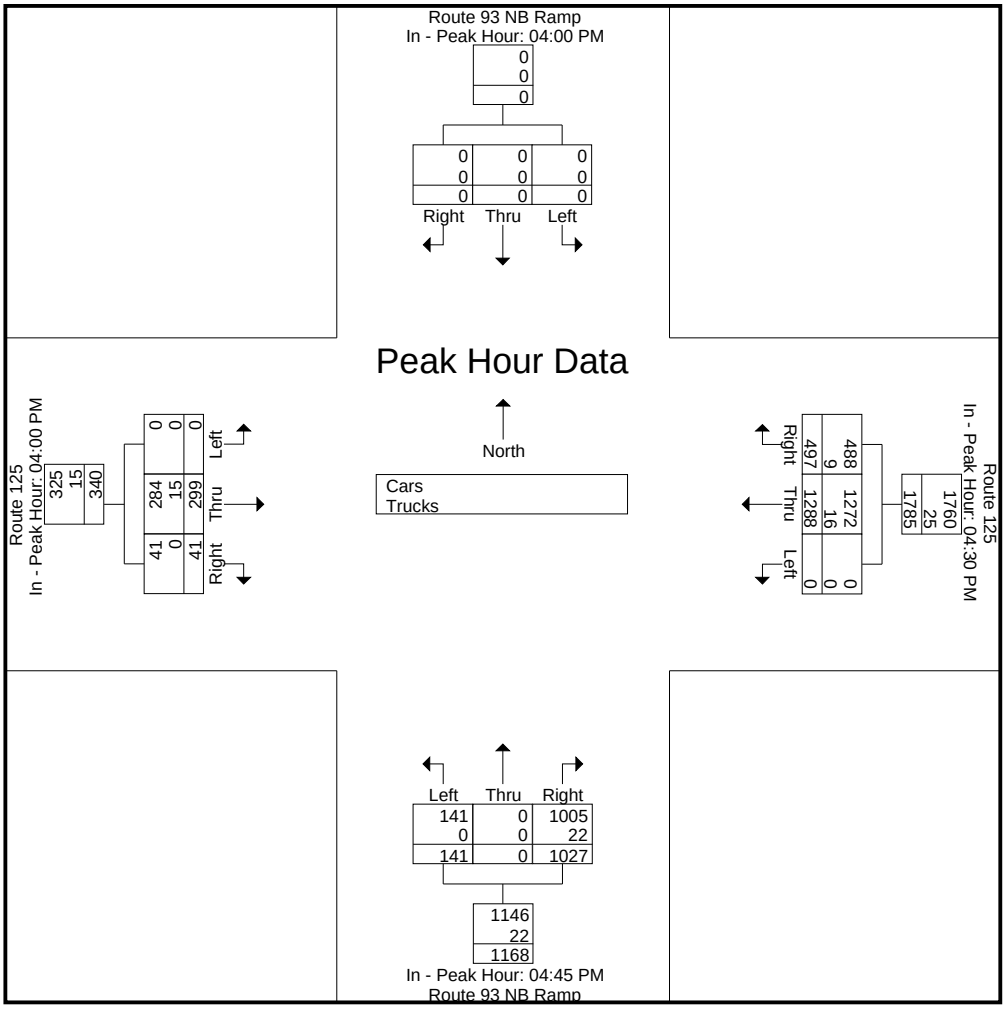
	04:00 PM				04:30 PM				04:45 PM				04:00 PM			
+0 mins.	0	0	0	0	0	313	**176**	**489**	26	0	210	236	0	74	9	83
+15 mins.	0	0	0	0	0	297	103	400	31	0	248	279	0	74	8	82
+30 mins.	0	0	0	0	0	**342**	133	475	**46**	0	267	313	0	71	**13**	84
+45 mins.	0	0	0	0	0	336	85	421	38	0	**302**	**340**	0	**80**	11	**91**
Total Volume	0	0	0	0	0	1288	497	1785	141	0	1027	1168	0	299	41	340
% App. Total	0	0	0		0	72.2	27.8		12.1	0	87.9		0	87.9	12.1	
PHF	.000	.000	.000	.000	.000	.942	.706	.913	.766	.000	.850	.859	.000	.934	.788	.934
Cars	0	0	0	0	0	1272	488	1760	141	0	1005	1146	0	284	41	325
% Cars	0	0	0	0	0	98.8	98.2	98.6	100	0	97.9	98.1	0	95	100	95.6
Trucks	0	0	0	0	0	16	9	25	0	0	22	22	0	15	0	15
% Trucks	0	0	0	0	0	1.2	1.8	1.4	0	0	2.1	1.9	0	5	0	4.4

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024

Groups Printed- Cars

	Route 93 NB Ramp From North			Route 125 From East			Route 93 NB Ramp From South			Route 125 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	280	130	28	0	224	0	70	9	741
04:15 PM	0	0	0	0	284	96	35	0	173	0	70	8	666
04:30 PM	0	0	0	0	306	174	31	0	179	0	68	13	771
04:45 PM	0	0	0	0	293	100	26	0	200	0	76	11	706
Total	0	0	0	0	1163	500	120	0	776	0	284	41	2884
05:00 PM	0	0	0	0	338	132	31	0	244	0	71	7	823
05:15 PM	0	0	0	0	335	82	46	0	263	0	72	7	805
05:30 PM	0	0	0	0	284	57	38	0	298	0	71	4	752
05:45 PM	0	0	0	0	201	70	18	0	182	0	60	9	540
Total	0	0	0	0	1158	341	133	0	987	0	274	27	2920
Grand Total	0	0	0	0	2321	841	253	0	1763	0	558	68	5804
Apprch %	0	0	0	0	73.4	26.6	12.5	0	87.5	0	89.1	10.9	
Total %	0	0	0	0	40	14.5	4.4	0	30.4	0	9.6	1.2	

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	306	**174**	**480**	31	0	179	210	0	68	**13**	81	771
04:45 PM	0	0	0	0	0	293	100	393	26	0	200	226	0	**76**	11	**87**	706
05:00 PM	0	0	0	0	0	**338**	132	470	31	0	244	275	0	71	7	78	**823**
05:15 PM	0	0	0	0	0	335	82	417	**46**	0	**263**	**309**	0	72	7	79	805
Total Volume	0	0	0	0	0	1272	488	1760	134	0	886	1020	0	287	38	325	3105
% App. Total	0	0	0		0	72.3	27.7		13.1	0	86.9		0	88.3	11.7		
PHF	.000	.000	.000	.000	.000	.941	.701	.917	.728	.000	.842	.825	.000	.944	.731	.934	.943

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024

Groups Printed- Trucks

	Route 93 NB Ramp From North			Route 125 From East			Route 93 NB Ramp From South			Route 125 From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	0	0	0	8	7	0	0	12	0	4	0	31
04:15 PM	0	0	0	0	7	1	0	0	19	0	4	0	31
04:30 PM	0	0	0	0	7	2	0	0	6	0	3	0	18
04:45 PM	0	0	0	0	4	3	0	0	10	0	4	0	21
Total	0	0	0	0	26	13	0	0	47	0	15	0	101
05:00 PM	0	0	0	0	4	1	0	0	4	0	3	0	12
05:15 PM	0	0	0	0	1	3	0	0	4	0	5	0	13
05:30 PM	0	0	0	0	2	1	0	0	4	0	5	0	12
05:45 PM	0	0	0	0	5	3	0	0	5	0	2	0	15
Total	0	0	0	0	12	8	0	0	17	0	15	0	52
Grand Total	0	0	0	0	38	21	0	0	64	0	30	0	153
Apprch %	0	0	0	0	64.4	35.6	0	0	100	0	100	0	
Total %	0	0	0	0	24.8	13.7	0	0	41.8	0	19.6	0	

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	**8**	**7**	**15**	0	0	12	12	0	**4**	0	**4**	**31**
04:15 PM	0	0	0	0	0	7	1	8	0	0	**19**	**19**	0	4	0	4	31
04:30 PM	0	0	0	0	0	7	2	9	0	0	6	6	0	3	0	3	18
04:45 PM	0	0	0	0	0	4	3	7	0	0	10	10	0	4	0	4	21
Total Volume	0	0	0	0	0	26	13	39	0	0	47	47	0	15	0	15	101
% App. Total	0	0	0		0	66.7	33.3		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.813	.464	.650	.000	.000	.618	.618	.000	.938	.000	.938	.815

Accurate Counts

978-664-2565

N/S Street : Route 93 NB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770002
Site Code : 96770002
Start Date : 7/9/2024

Groups Printed- Bikes Peds

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

	Route 93 NB Ramp From North				Route 125 From East				Route 93 NB Ramp From South				Route 125 From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Cars - Trucks

	Route 93 SB Ramp From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	95	15	30	161	2	54	357
07:15 AM	123	17	24	173	3	50	390
07:30 AM	107	14	30	185	6	59	401
07:45 AM	140	15	28	189	10	56	438
Total	465	61	112	708	21	219	1586
08:00 AM	110	18	44	207	8	76	463
08:15 AM	105	15	35	168	9	74	406
08:30 AM	125	15	35	182	6	52	415
08:45 AM	117	24	34	188	5	71	439
Total	457	72	148	745	28	273	1723
Grand Total	922	133	260	1453	49	492	3309
Apprch %	87.4	12.6	15.2	84.8	9.1	90.9	
Total %	27.9	4	7.9	43.9	1.5	14.9	
Cars	857	130	253	1354	49	485	3128
% Cars	93	97.7	97.3	93.2	100	98.6	94.5
Trucks	65	3	7	99	0	7	181
% Trucks	7	2.3	2.7	6.8	0	1.4	5.5

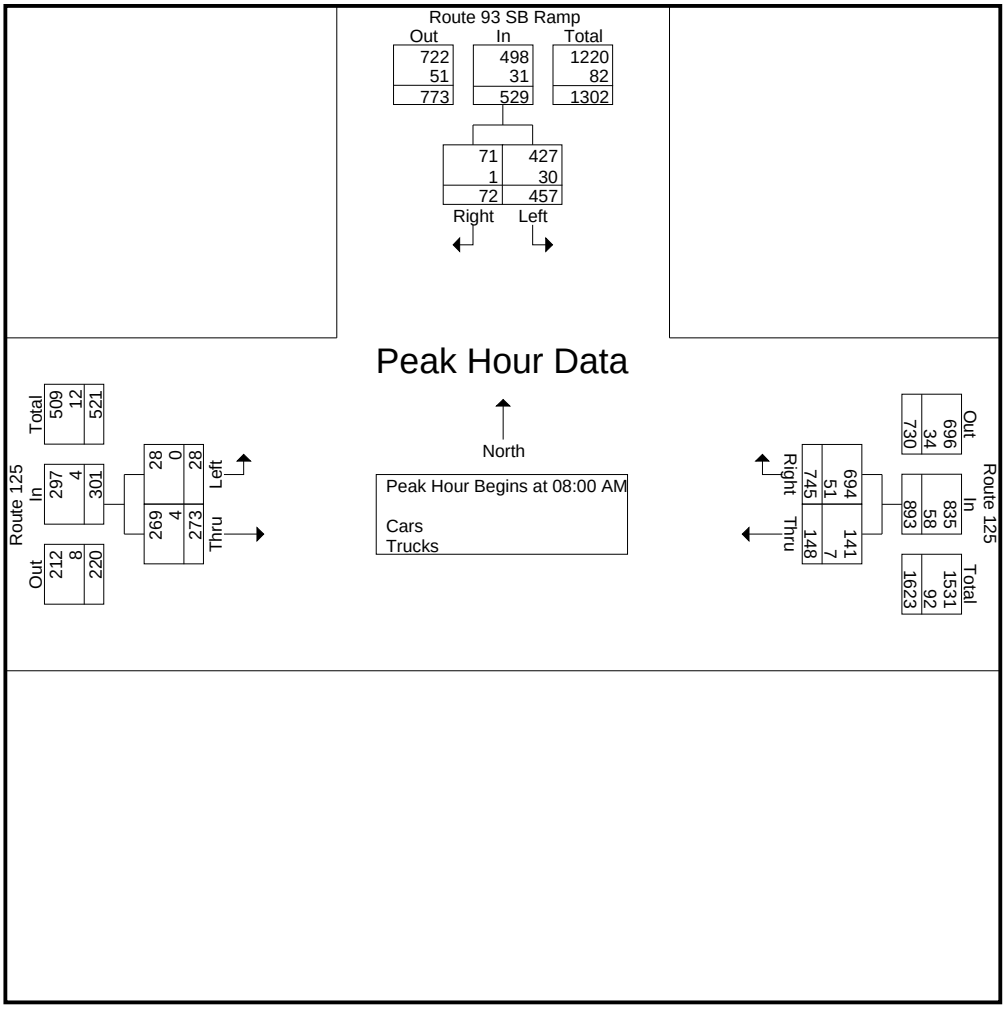
	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	110	18	128	**44**	**207**	**251**	8	**76**	**84**	**463**
08:15 AM	105	15	120	35	168	203	**9**	74	83	406
08:30 AM	**125**	15	140	35	182	217	6	52	58	415
08:45 AM	117	**24**	**141**	34	188	222	5	71	76	439
Total Volume	457	72	529	148	745	893	28	273	301	1723
% App. Total	86.4	13.6		16.6	83.4		9.3	90.7		
PHF	.914	.750	.938	.841	.900	.889	.778	.898	.896	.930
Cars	427	71	498	141	694	835	28	269	297	1630
% Cars	93.4	98.6	94.1	95.3	93.2	93.5	100	98.5	98.7	94.6
Trucks	30	1	31	7	51	58	0	4	4	93
% Trucks	6.6	1.4	5.9	4.7	6.8	6.5	0	1.5	1.3	5.4

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

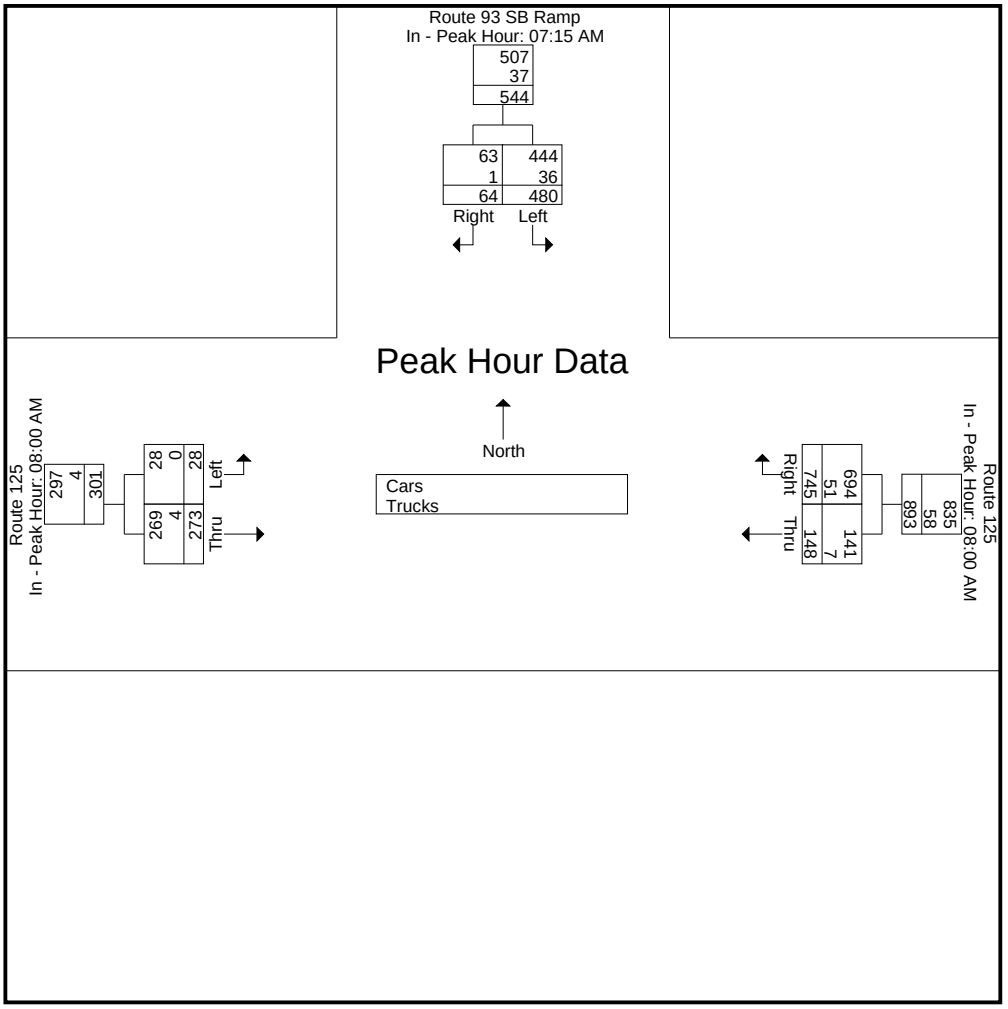
	07:15 AM			08:00 AM			08:00 AM		
+0 mins.	123	17	140	**44**	**207**	**251**	8	**76**	**84**
+15 mins.	107	14	121	35	168	203	**9**	74	83
+30 mins.	**140**	15	**155**	35	182	217	6	52	58
+45 mins.	110	**18**	128	34	188	222	5	71	76
Total Volume	480	64	544	148	745	893	28	273	301
% App. Total	88.2	11.8		16.6	83.4		9.3	90.7	
PHF	.857	.889	.877	.841	.900	.889	.778	.898	.896
Cars	444	63	507	141	694	835	28	269	297
% Cars	92.5	98.4	93.2	95.3	93.2	93.5	100	98.5	98.7
Trucks	36	1	37	7	51	58	0	4	4
% Trucks	7.5	1.6	6.8	4.7	6.8	6.5	0	1.5	1.3

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Cars

	Route 93 SB Ramp From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	87	14	30	148	2	52	333
07:15 AM	118	17	24	157	3	50	369
07:30 AM	96	13	30	176	6	59	380
07:45 AM	129	15	28	179	10	55	416
Total	430	59	112	660	21	216	1498
08:00 AM	101	18	42	190	8	75	434
08:15 AM	101	14	33	158	9	72	387
08:30 AM	121	15	34	168	6	51	395
08:45 AM	104	24	32	178	5	71	414
Total	427	71	141	694	28	269	1630
Grand Total	857	130	253	1354	49	485	3128
Apprch %	86.8	13.2	15.7	84.3	9.2	90.8	
Total %	27.4	4.2	8.1	43.3	1.6	15.5	

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	**129**	15	**144**	28	179	207	**10**	55	65	416
08:00 AM	101	**18**	119	**42**	**190**	**232**	8	**75**	**83**	**434**
08:15 AM	101	14	115	33	158	191	9	72	81	387
08:30 AM	121	15	136	34	168	202	6	51	57	395
Total Volume	452	62	514	137	695	832	33	253	286	1632
% App. Total	87.9	12.1		16.5	83.5		11.5	88.5		
PHF	.876	.861	.892	.815	.914	.897	.825	.843	.861	.940

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Trucks

	Route 93 SB Ramp From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	8	1	0	13	0	2	24
07:15 AM	5	0	0	16	0	0	21
07:30 AM	11	1	0	9	0	0	21
07:45 AM	11	0	0	10	0	1	22
Total	35	2	0	48	0	3	88
08:00 AM	9	0	2	17	0	1	29
08:15 AM	4	1	2	10	0	2	19
08:30 AM	4	0	1	14	0	1	20
08:45 AM	13	0	2	10	0	0	25
Total	30	1	7	51	0	4	93
Grand Total	65	3	7	99	0	7	181
Apprch %	95.6	4.4	6.6	93.4	0	100	
Total %	35.9	1.7	3.9	54.7	0	3.9	

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	5	0	5	0	16	16	0	0	0	21
07:30 AM	**11**	**1**	**12**	0	9	9	0	0	0	21
07:45 AM	11	0	11	0	10	10	0	**1**	**1**	22
08:00 AM	9	0	9	**2**	**17**	**19**	0	1	1	**29**
Total Volume	36	1	37	2	52	54	0	2	2	93
% App. Total	97.3	2.7		3.7	96.3		0	100		
PHF	.818	.250	.771	.250	.765	.711	.000	.500	.500	.802

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Bikes Peds

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0				
Total %										0	0	

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Cars - Trucks

	Route 93 SB Ramp From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	37	25	128	206	1	47	444
04:15 PM	40	20	119	194	5	45	423
04:30 PM	36	22	115	223	2	48	446
04:45 PM	43	32	82	239	4	46	446
Total	156	99	444	862	12	186	1759
05:00 PM	33	29	126	245	10	46	489
05:15 PM	40	30	133	251	7	45	506
05:30 PM	28	18	111	212	18	47	434
05:45 PM	30	22	71	165	2	42	332
Total	131	99	441	873	37	180	1761
Grand Total	287	198	885	1735	49	366	3520
Apprch %	59.2	40.8	33.8	66.2	11.8	88.2	
Total %	8.2	5.6	25.1	49.3	1.4	10.4	
Cars	259	198	881	1698	49	364	3449
% Cars	90.2	100	99.5	97.9	100	99.5	98
Trucks	28	0	4	37	0	2	71
% Trucks	9.8	0	0.5	2.1	0	0.5	2

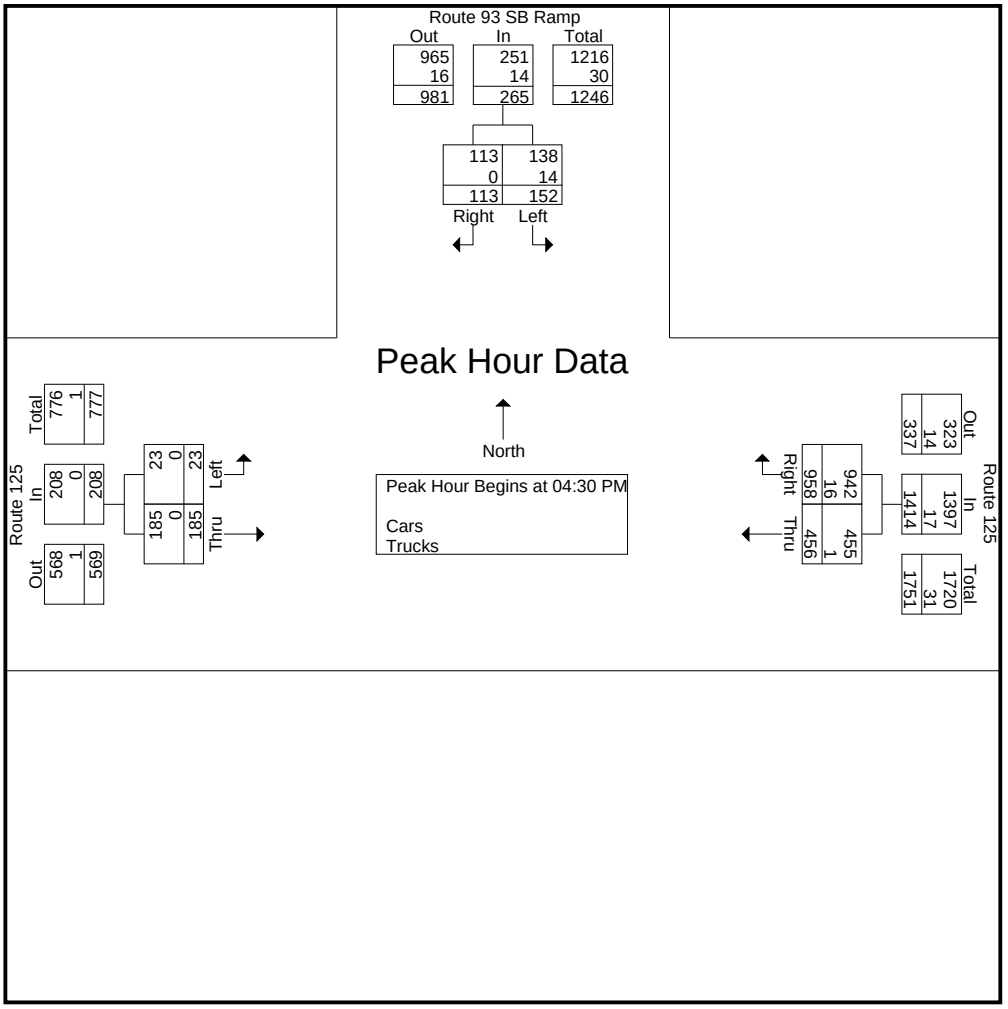
	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	36	22	58	115	223	338	2	**48**	50	446
04:45 PM	**43**	**32**	**75**	82	239	321	4	46	50	446
05:00 PM	33	29	62	126	245	371	**10**	46	**56**	489
05:15 PM	40	30	70	**133**	**251**	**384**	7	45	52	**506**
Total Volume	152	113	265	456	958	1414	23	185	208	1887
% App. Total	57.4	42.6		32.2	67.8		11.1	88.9		
PHF	.884	.883	.883	.857	.954	.921	.575	.964	.929	.932
Cars	138	113	251	455	942	1397	23	185	208	1856
% Cars	90.8	100	94.7	99.8	98.3	98.8	100	100	100	98.4
Trucks	14	0	14	1	16	17	0	0	0	31
% Trucks	9.2	0	5.3	0.2	1.7	1.2	0	0	0	1.6

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

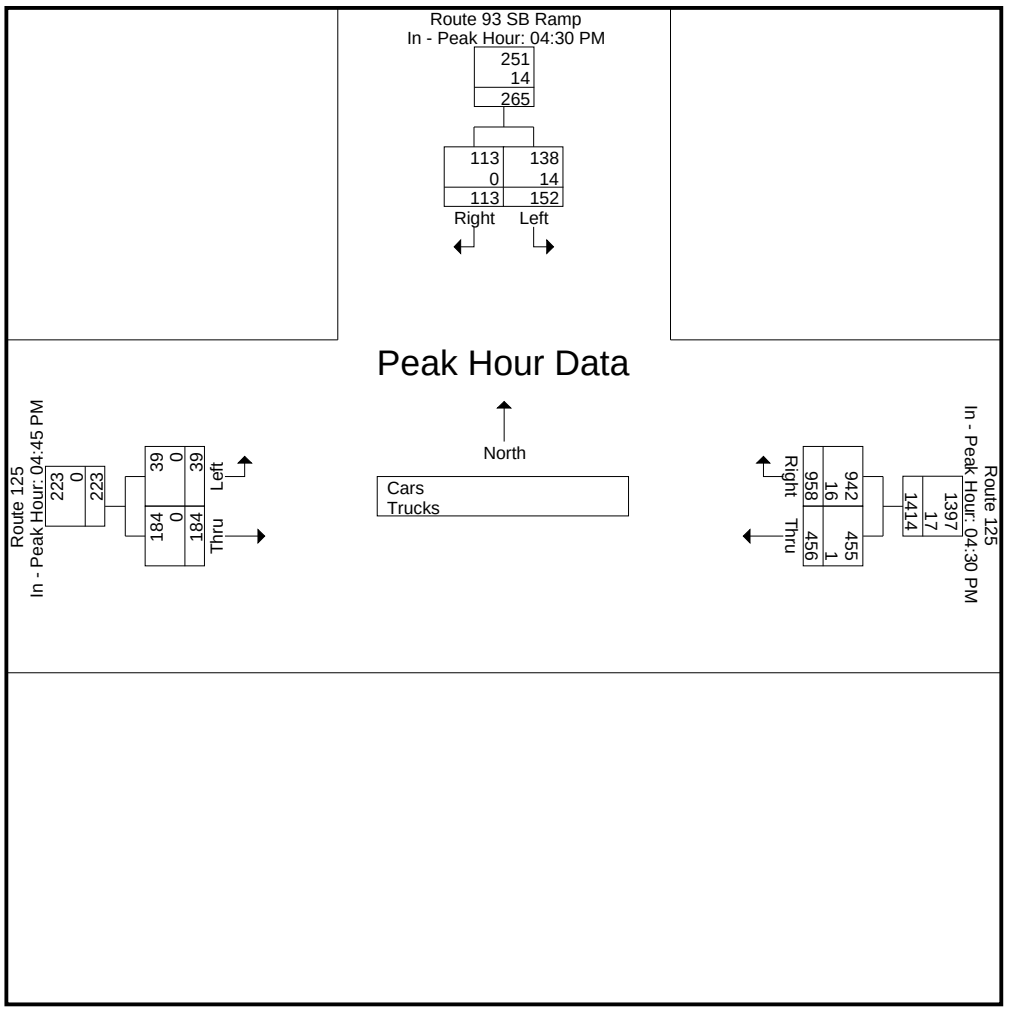
	04:30 PM			04:30 PM			04:45 PM		
+0 mins.	36	22	58	115	223	338	4	46	50
+15 mins.	**43**	**32**	**75**	82	239	321	10	46	56
+30 mins.	33	29	62	126	245	371	7	45	52
+45 mins.	40	30	70	**133**	**251**	**384**	**18**	**47**	**65**
Total Volume	152	113	265	456	958	1414	39	184	223
% App. Total	57.4	42.6		32.2	67.8		17.5	82.5	
PHF	.884	.883	.883	.857	.954	.921	.542	.979	.858
Cars	138	113	251	455	942	1397	39	184	223
% Cars	90.8	100	94.7	99.8	98.3	98.8	100	100	100
Trucks	14	0	14	1	16	17	0	0	0
% Trucks	9.2	0	5.3	0.2	1.7	1.2	0	0	0

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024
Page No : 3



Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Cars

	Route 93 SB Ramp From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	33	25	128	197	1	46	430
04:15 PM	37	20	118	188	5	44	412
04:30 PM	33	22	115	215	2	48	435
04:45 PM	39	32	82	235	4	46	438
Total	142	99	443	835	12	184	1715
05:00 PM	31	29	126	241	10	46	483
05:15 PM	35	30	132	251	7	45	500
05:30 PM	23	18	110	211	18	47	427
05:45 PM	28	22	70	160	2	42	324
Total	117	99	438	863	37	180	1734
Grand Total	259	198	881	1698	49	364	3449
Apprch %	56.7	43.3	34.2	65.8	11.9	88.1	
Total %	7.5	5.7	25.5	49.2	1.4	10.6	

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	33	22	55	115	215	330	2	**48**	50	435
04:45 PM	**39**	**32**	**71**	82	235	317	4	46	50	438
05:00 PM	31	29	60	126	241	367	**10**	46	**56**	483
05:15 PM	35	30	65	**132**	**251**	**383**	7	45	52	**500**
Total Volume	138	113	251	455	942	1397	23	185	208	1856
% App. Total	55	45		32.6	67.4		11.1	88.9		
PHF	.885	.883	.884	.862	.938	.912	.575	.964	.929	.928

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Trucks

	Route 93 SB Ramp From North		Route 125 From East		Route 125 From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	4	0	0	9	0	1	14
04:15 PM	3	0	1	6	0	1	11
04:30 PM	3	0	0	8	0	0	11
04:45 PM	4	0	0	4	0	0	8
Total	14	0	1	27	0	2	44
05:00 PM	2	0	0	4	0	0	6
05:15 PM	5	0	1	0	0	0	6
05:30 PM	5	0	1	1	0	0	7
05:45 PM	2	0	1	5	0	0	8
Total	14	0	3	10	0	0	27
Grand Total	28	0	4	37	0	2	71
Apprch %	100	0	9.8	90.2	0	100	
Total %	39.4	0	5.6	52.1	0	2.8	

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	**4**	0	**4**	0	**9**	**9**	0	**1**	**1**	**14**
04:15 PM	3	0	3	**1**	6	7	0	1	1	11
04:30 PM	3	0	3	0	8	8	0	0	0	11
04:45 PM	4	0	4	0	4	4	0	0	0	8
Total Volume	14	0	14	1	27	28	0	2	2	44
% App. Total	100	0		3.6	96.4		0	100		
PHF	.875	.000	.875	.250	.750	.778	.000	.500	.500	.786

Accurate Counts

978-664-2565

N/S Street : Route 93 SB Ramp
E/W Street : Route 125
City/State : Andover, MA
Weather : Clear

File Name : 96770003
Site Code : 96770003
Start Date : 7/9/2024

Groups Printed- Bikes Peds

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0		0	0		0	0				
Total %										0	0	

	Route 93 SB Ramp From North			Route 125 From East			Route 125 From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0		0	0		0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

VEHICLE SPEED DATA

Location : River Street Between
Location : Connector Rd and Lowell Junctions Rd
City/State: Andover, MA

Accurate Counts
978-664-2565

Site Code: 96770001

Direction: SB,

7/9/2024 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
1:00	0	0	1	1	0	0	0	0	0	0	0	0	0	2
2:00	0	1	0	2	1	1	0	0	0	0	0	0	0	5
3:00	0	0	0	18	17	9	3	0	0	0	0	0	0	47
4:00	0	0	2	6	9	6	0	0	0	0	0	0	0	23
5:00	0	0	1	21	39	14	1	1	0	0	0	0	0	77
6:00	0	0	5	29	68	44	9	1	1	0	0	0	0	157
7:00	0	0	4	50	68	47	10	0	0	0	0	0	0	179
8:00	0	0	11	61	93	28	3	1	0	0	0	0	0	197
9:00	0	0	9	45	69	17	3	0	0	0	0	0	0	143
10:00	0	1	11	39	47	9	1	1	0	0	0	0	0	109
11:00	0	1	3	12	15	5	0	0	0	0	0	0	0	36
12:00 PM	0	1	9	29	24	3	0	0	0	0	0	0	0	66
1:00	0	2	10	37	25	5	4	0	0	0	0	0	0	83
2:00	0	0	6	32	28	7	2	0	0	0	0	0	0	75
3:00	0	0	8	32	24	8	0	0	0	0	0	0	0	72
4:00	0	0	9	19	20	6	2	0	0	0	0	0	0	56
5:00	0	0	4	13	21	10	0	0	0	0	0	0	0	48
6:00	0	1	5	15	22	3	1	0	0	0	0	0	0	47
7:00	0	0	2	12	18	4	0	0	0	0	0	0	0	36
8:00	0	3	4	10	5	1	0	0	0	0	0	0	0	23
9:00	0	0	5	12	5	0	0	0	0	0	0	0	0	22
10:00	0	0	3	6	4	0	1	0	0	0	0	0	0	14
11:00	0	0	1	7	5	8	1	0	0	0	0	0	0	22
	0	0	1	2	1	0	0	0	0	0	0	0	0	4
Total	0	10	114	510	628	235	41	4	1	0	0	0	0	1543

Percentile	15th	50th	85th	95th
Speed	26	30	34	38

Mean Speed (Average)	31.5
10 MPH Pace Speed	26-35
Number in Pace	1138
Percent in Pace	74.0%
Number > 30 MPH	909
Percent > 30 MPH	58.9%

Location : River Street Between
Location : Connector Rd and Lowell Junctions Rd
City/State: Andover, MA

Accurate Counts
978-664-2565

Site Code: 96770001

Direction: SB,

7/10/2024 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
1:00	0	0	1	3	1	0	0	0	0	0	0	0	0	5
2:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3:00	0	0	4	17	17	4	3	0	0	0	0	0	0	45
4:00	0	0	2	10	12	7	1	0	0	0	0	0	0	32
5:00	0	0	3	15	29	9	5	0	0	0	0	0	0	61
6:00	0	1	7	34	74	30	9	0	0	0	0	0	0	155
7:00	0	0	3	48	93	39	10	3	0	0	0	0	0	196
8:00	3	7	20	73	77	25	2	0	0	0	0	0	0	207
9:00	0	0	13	53	58	27	6	1	0	0	0	0	0	158
10:00	0	0	14	27	45	11	3	0	0	0	0	0	0	100
11:00	0	1	9	25	17	3	0	1	0	0	0	0	0	56
12:00 PM	0	2	7	45	29	9	2	0	0	0	0	0	0	94
1:00	0	1	7	39	34	13	0	0	0	0	0	0	0	94
2:00	0	0	5	21	31	12	1	0	0	0	0	0	0	70
3:00	0	1	2	24	26	7	3	1	0	0	0	0	0	64
4:00	0	0	3	27	33	8	1	0	0	0	1	0	0	73
5:00	0	0	2	27	50	11	0	0	0	0	0	0	0	90
6:00	0	0	11	21	17	7	0	0	0	0	0	0	0	56
7:00	1	0	1	9	9	2	1	0	0	0	0	0	0	23
8:00	0	0	1	10	11	6	0	1	0	0	0	0	0	29
9:00	0	0	5	10	7	1	1	1	0	0	0	0	0	25
10:00	0	0	1	9	5	1	0	0	0	0	0	0	0	16
11:00	0	0	0	6	7	6	0	0	0	0	0	0	0	19
	0	0	1	3	4	0	0	0	0	0	0	0	0	8
Total	4	13	122	556	687	238	48	8	0	0	1	0	0	1677
Percentile				15th	50th	85th	95th							
Speed				26	30	34	38							
Mean Speed (Average)				31.5										
10 MPH Pace Speed				26-35										
Number in Pace				1223										
Percent in Pace				74.0%										
Number > 30 MPH				982										
Percent > 30 MPH				58.6%										
Grand Total	4	23	236	1066	1315	473	89	12	1	0	1	0	0	3220
Stats Percentile				15th	50th	85th	95th							
Speed				26	30	34	38							
Mean Speed (Average)				31.5										
10 MPH Pace Speed				26-35										
Number in Pace				2374										
Percent in Pace				74.0%										
Number > 30 MPH				1891										
Percent > 30 MPH				58.7%										

Location : River Street Between
Location : Connector Rd and Lowell Junctions Rd
City/State: Andover, MA

Accurate Counts
978-664-2565

Site Code: 96770001

Direction: NB,

7/9/2024 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
1:00	0	0	0	3	8	3	0	0	0	0	0	0	0	14
2:00	0	0	0	1	5	2	1	0	0	0	0	0	0	9
3:00	0	0	0	0	1	1	0	0	0	0	0	0	0	2
4:00	0	1	1	0	2	2	1	0	0	0	0	0	0	7
5:00	0	0	0	0	1	1	0	0	0	0	0	0	0	2
6:00	0	0	0	2	2	1	0	0	0	0	0	0	0	5
7:00	0	0	2	6	9	3	2	0	0	0	0	0	0	22
8:00	0	0	0	9	12	2	1	0	0	0	0	0	0	24
9:00	0	0	0	1	12	5	6	0	0	0	0	0	0	24
10:00	0	0	1	13	5	8	2	0	0	0	0	0	0	29
11:00	0	1	3	12	17	18	3	0	0	0	0	0	0	54
12:00 PM	0	0	2	10	25	20	5	0	0	0	0	0	0	62
1:00	0	1	1	21	54	32	9	3	0	0	0	0	0	121
2:00	0	0	0	16	32	18	2	0	0	0	0	0	0	68
3:00	1	0	4	16	68	52	12	2	0	0	0	0	0	155
4:00	0	0	1	18	61	76	21	1	0	0	0	0	0	178
5:00	0	0	2	32	65	55	17	0	0	0	0	0	0	171
6:00	0	0	1	21	79	71	15	1	1	0	0	0	0	189
7:00	0	0	2	9	19	27	5	0	0	0	0	0	0	62
8:00	0	0	0	3	16	21	4	1	1	0	0	0	0	46
9:00	0	0	0	7	16	15	3	1	0	0	0	0	0	42
10:00	0	0	0	3	5	6	1	1	1	0	0	0	0	17
11:00	0	0	2	6	13	4	3	0	1	0	0	0	0	29
	0	0	4	5	6	6	0	0	0	0	0	0	0	21
Total	1	3	26	214	533	449	113	10	4	0	0	0	0	1353

Percentile	15th	50th	85th	95th
Speed	29	33	38	41

Mean Speed (Average)	34.6
10 MPH Pace Speed	31-40
Number in Pace	982
Percent in Pace	73.0%
Number > 30 MPH	1109
Percent > 30 MPH	82.0%

Location : River Street Between
Location : Connector Rd and Lowell Junctions Rd
City/State: Andover, MA

Accurate Counts
978-664-2565

Site Code: 96770001

Direction: NB,

7/10/2024 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
1:00	0	0	3	5	9	3	2	0	0	0	0	0	0	22
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	2	2	0	0	0	0	0	0	0	4
4:00	0	0	0	0	2	2	1	0	0	0	0	0	0	5
5:00	0	0	0	0	1	3	1	0	0	0	0	0	0	5
6:00	0	2	2	3	3	1	0	0	0	0	0	0	0	11
7:00	0	0	1	5	6	4	3	0	0	0	0	0	0	19
8:00	0	0	1	5	14	3	0	0	0	0	0	0	0	23
9:00	0	0	0	5	19	11	4	1	0	0	0	0	0	40
10:00	0	0	1	13	15	7	4	0	0	0	0	0	0	40
11:00	0	0	3	8	27	11	5	3	0	0	0	0	0	57
12:00 PM	0	0	0	9	27	16	9	1	0	0	0	0	0	62
1:00	0	0	0	12	45	30	8	1	0	0	0	0	0	96
2:00	0	0	0	13	43	33	5	0	0	0	0	0	0	94
3:00	0	0	3	13	72	56	15	0	0	0	0	0	0	159
4:00	0	0	0	27	85	91	25	4	0	0	0	0	0	232
5:00	0	0	1	25	85	57	8	3	0	0	0	0	0	179
6:00	1	0	4	27	64	52	18	1	0	0	0	0	0	167
7:00	0	0	0	4	24	24	6	1	0	0	0	0	0	59
8:00	0	1	0	4	18	12	4	0	0	0	0	0	0	39
9:00	0	0	0	8	15	12	1	1	0	0	0	0	0	37
10:00	0	0	1	3	12	9	2	0	0	0	0	0	0	27
11:00	0	0	0	3	10	5	1	0	0	0	0	0	0	19
	0	0	1	4	16	4	5	0	0	0	0	0	0	30
Total	1	3	21	196	614	448	127	16	0	0	0	0	0	1426

Percentile	15th	50th	85th	95th
Speed	29	33	38	41

Mean Speed (Average)	34.7
10 MPH Pace Speed	31-40
Number in Pace	1027
Percent in Pace	75.0%
Number > 30 MPH	1205
Percent > 30 MPH	84.5%

Grand Total	2	6	47	410	1147	897	240	26	4	0	0	0	0	2779

Stats					
	Percentile	15th	50th	85th	95th
	Speed	29	33	38	41

Mean Speed (Average)	34.6
10 MPH Pace Speed	31-40
Number in Pace	2024
Percent in Pace	74.0%
Number > 30 MPH	2314
Percent > 30 MPH	83.3%

Location : River Street Between
Location : Connector Rd and Lowell Junctions Rd
City/State: Andover, MA

Accurate Counts
978-664-2565

Site Code: 96770001

Direction: Combined

7/9/2024 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
1:00	0	0	1	4	8	3	0	0	0	0	0	0	0	16
2:00	0	1	0	3	6	3	1	0	0	0	0	0	0	14
3:00	0	0	0	18	18	10	3	0	0	0	0	0	0	49
4:00	0	1	3	6	11	8	1	0	0	0	0	0	0	30
5:00	0	0	1	21	40	15	1	1	0	0	0	0	0	79
6:00	0	0	5	31	70	45	9	1	1	0	0	0	0	162
7:00	0	0	6	56	77	50	12	0	0	0	0	0	0	201
8:00	0	0	11	70	105	30	4	1	0	0	0	0	0	221
9:00	0	0	9	46	81	22	9	0	0	0	0	0	0	167
10:00	0	1	12	52	52	17	3	1	0	0	0	0	0	138
11:00	0	2	6	24	32	23	3	0	0	0	0	0	0	90
12:00 PM	0	1	11	39	49	23	5	0	0	0	0	0	0	128
1:00	0	3	11	58	79	37	13	3	0	0	0	0	0	204
2:00	0	0	6	48	60	25	4	0	0	0	0	0	0	143
3:00	1	0	12	48	92	60	12	2	0	0	0	0	0	227
4:00	0	0	10	37	81	82	23	1	0	0	0	0	0	234
5:00	0	0	6	45	86	65	17	0	0	0	0	0	0	219
6:00	0	1	6	36	101	74	16	1	1	0	0	0	0	236
7:00	0	0	4	21	37	31	5	0	0	0	0	0	0	98
8:00	0	3	4	13	21	22	4	1	1	0	0	0	0	69
9:00	0	0	5	19	21	15	3	1	0	0	0	0	0	64
10:00	0	0	3	9	9	6	2	1	1	0	0	0	0	31
11:00	0	0	3	13	18	12	4	0	1	0	0	0	0	51
	0	0	5	7	7	6	0	0	0	0	0	0	0	25
Total	1	13	140	724	1161	684	154	14	5	0	0	0	0	2896

Percentile	15th	50th	85th	95th
Speed	27	31	36	39

Mean Speed (Average)	33.0
10 MPH Pace Speed	28-37
Number in Pace	1902
Percent in Pace	66.0%
Number > 30 MPH	2018
Percent > 30 MPH	69.7%

Location : River Street Between
Location : Connector Rd and Lowell Junctions Rd
City/State: Andover, MA

Accurate Counts
978-664-2565

Site Code: 96770001

Direction: Combined

7/10/2024 Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 MPH	Total
1:00	0	0	4	8	10	3	2	0	0	0	0	0	0	27
2:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
3:00	0	0	4	17	19	6	3	0	0	0	0	0	0	49
4:00	0	0	2	10	14	9	2	0	0	0	0	0	0	37
5:00	0	0	3	15	30	12	6	0	0	0	0	0	0	66
6:00	0	3	9	37	77	31	9	0	0	0	0	0	0	166
7:00	0	0	4	53	99	43	13	3	0	0	0	0	0	215
8:00	3	7	21	78	91	28	2	0	0	0	0	0	0	230
9:00	0	0	13	58	77	38	10	2	0	0	0	0	0	198
10:00	0	0	15	40	60	18	7	0	0	0	0	0	0	140
11:00	0	1	12	33	44	14	5	4	0	0	0	0	0	113
12:00 PM	0	2	7	54	56	25	11	1	0	0	0	0	0	156
1:00	0	1	7	51	79	43	8	1	0	0	0	0	0	190
2:00	0	0	5	34	74	45	6	0	0	0	0	0	0	164
3:00	0	1	5	37	98	63	18	1	0	0	0	0	0	223
4:00	0	0	3	54	118	99	26	4	0	0	1	0	0	305
5:00	0	0	3	52	135	68	8	3	0	0	0	0	0	269
6:00	1	0	15	48	81	59	18	1	0	0	0	0	0	223
7:00	1	0	1	13	33	26	7	1	0	0	0	0	0	82
8:00	0	1	1	14	29	18	4	1	0	0	0	0	0	68
9:00	0	0	5	18	22	13	2	2	0	0	0	0	0	62
10:00	0	0	2	12	17	10	2	0	0	0	0	0	0	43
11:00	0	0	0	9	17	11	1	0	0	0	0	0	0	38
	0	0	2	7	20	4	5	0	0	0	0	0	0	38
Total	5	16	143	752	1301	686	175	24	0	0	1	0	0	3103

Percentile	15th	50th	85th	95th
Speed	27	31	36	40
Mean Speed (Average)	33.0			
10 MPH Pace Speed	28-37			
Number in Pace	2019			
Percent in Pace	67.0%			
Number > 30 MPH	2187			
Percent > 30 MPH	70.5%			

Grand Total	6	29	283	1476	2462	1370	329	38	5	0	1	0	0	5999

Stats	Percentile	15th	50th	85th	95th
	Speed	27	31	36	39
	Mean Speed (Average)	33.0			
	10 MPH Pace Speed	28-37			
	Number in Pace	3950			
	Percent in Pace	66.0%			
	Number > 30 MPH	4205			
	Percent > 30 MPH	70.1%			

TRIP NETWORKS

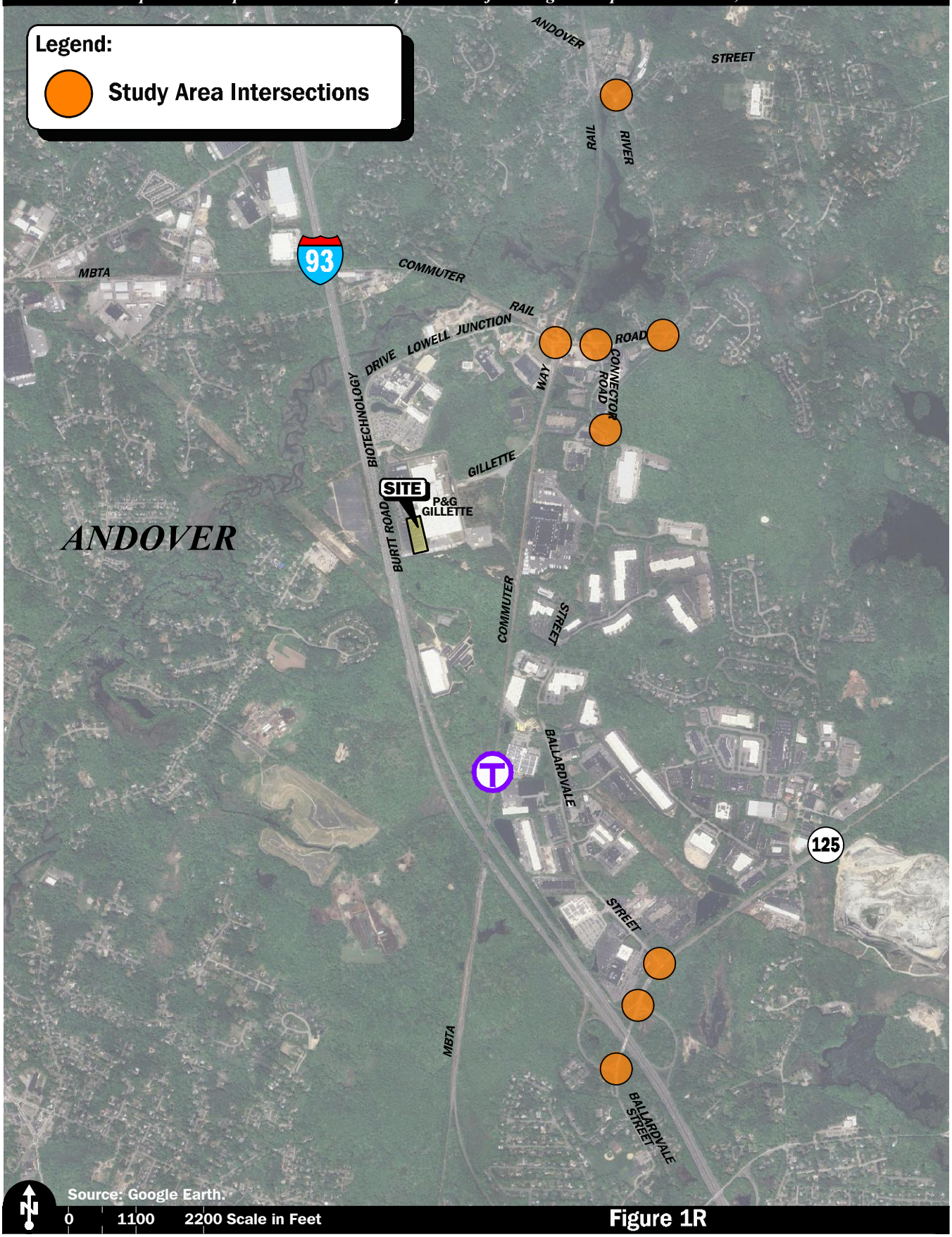
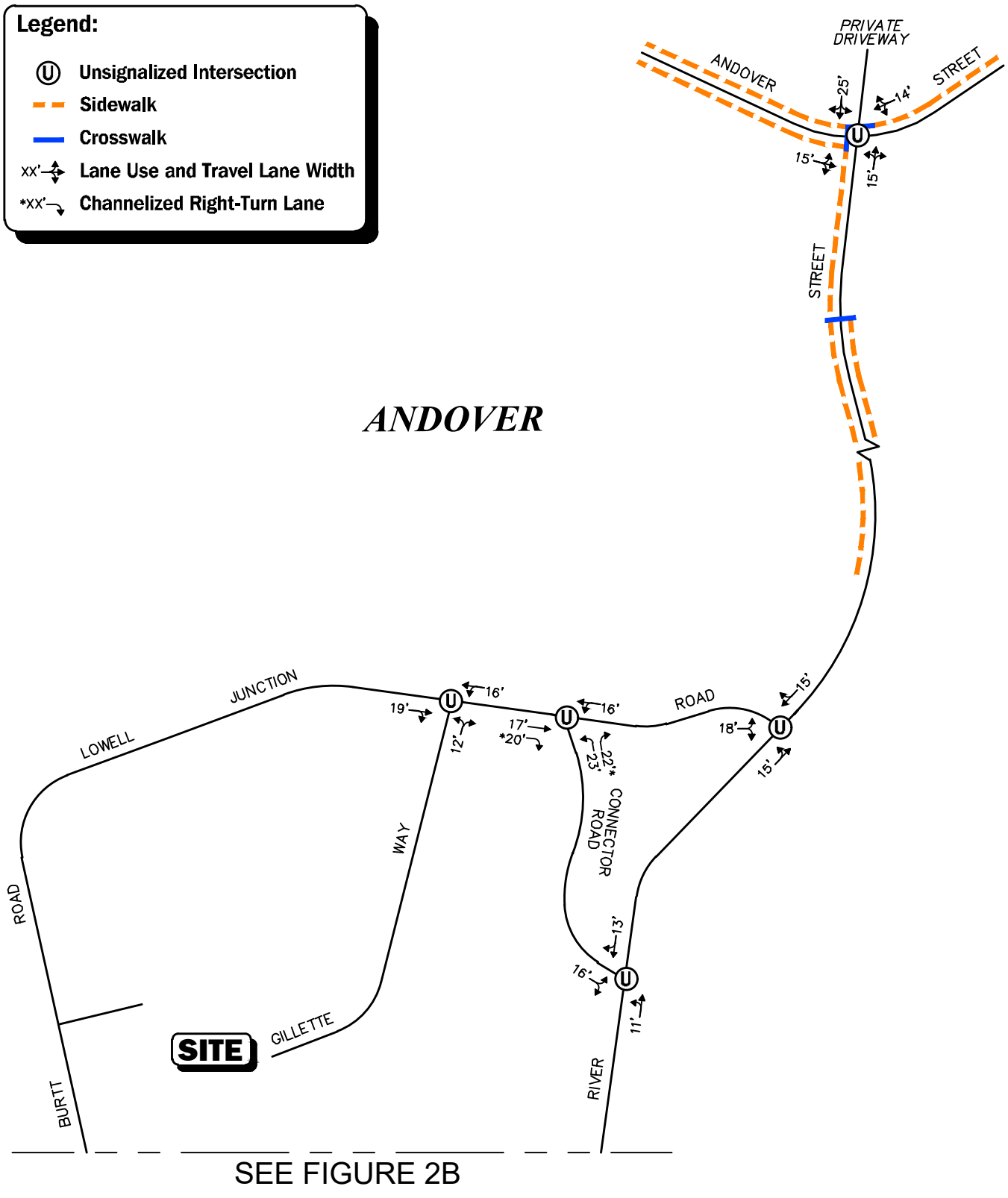


Figure 1R

Site Location and Study Area Map

Vanasse & Associates inc



Not To Scale

Figure 2A

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

Vanasse & Associates inc

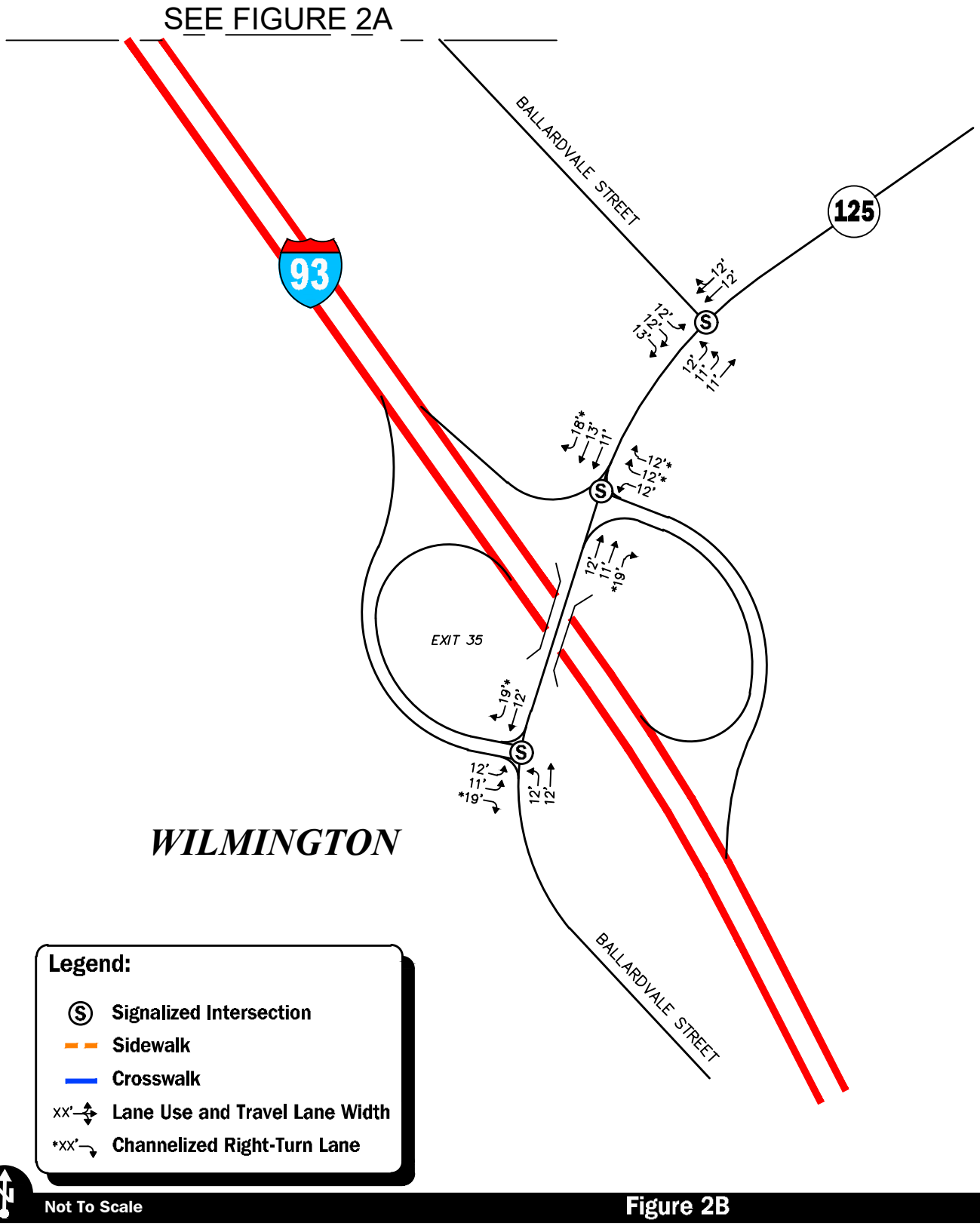
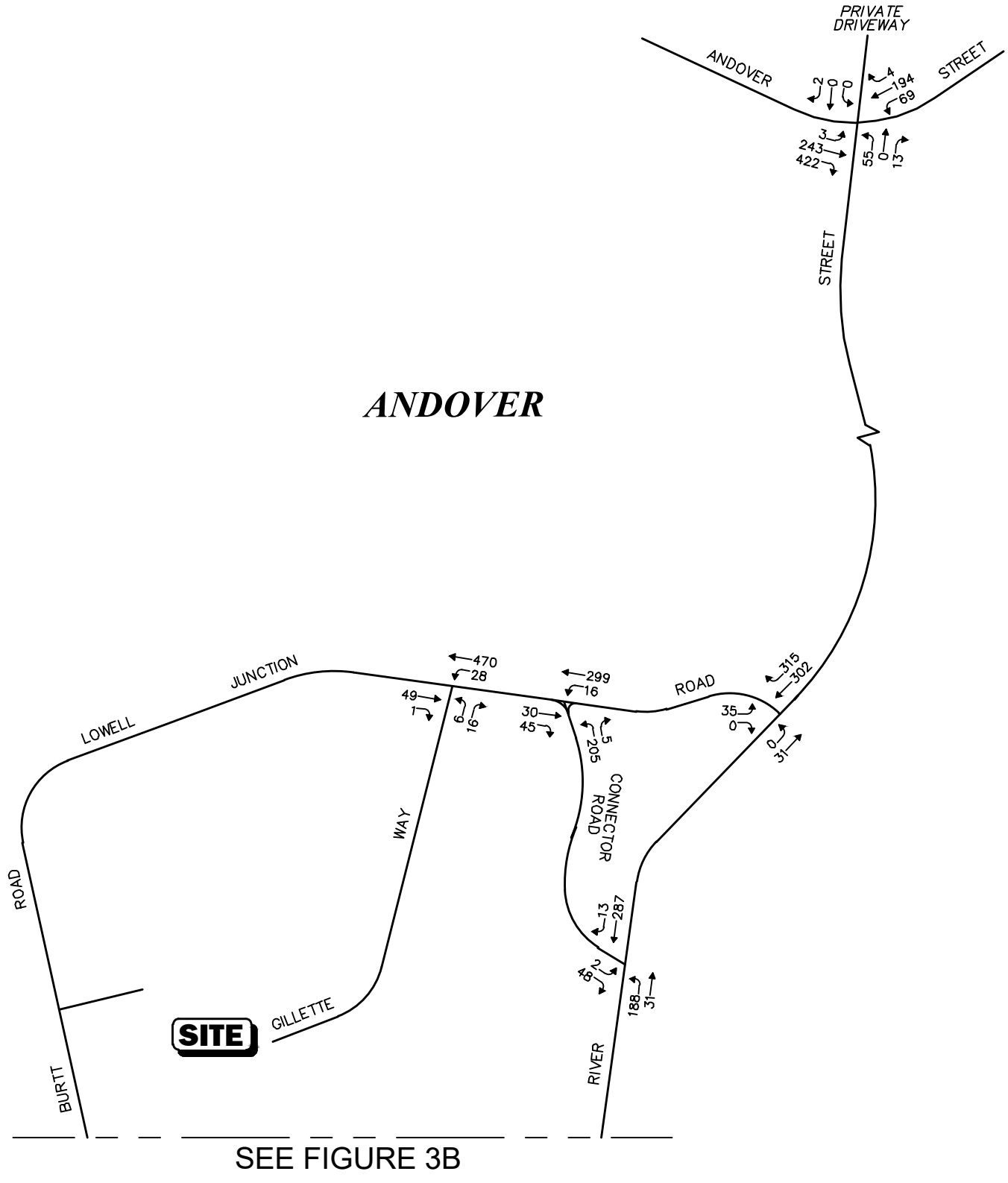


Figure 2B

Existing Intersection Lane Use, Travel Lane Width, and Pedestrian Facilities

Vanasse & Associates inc



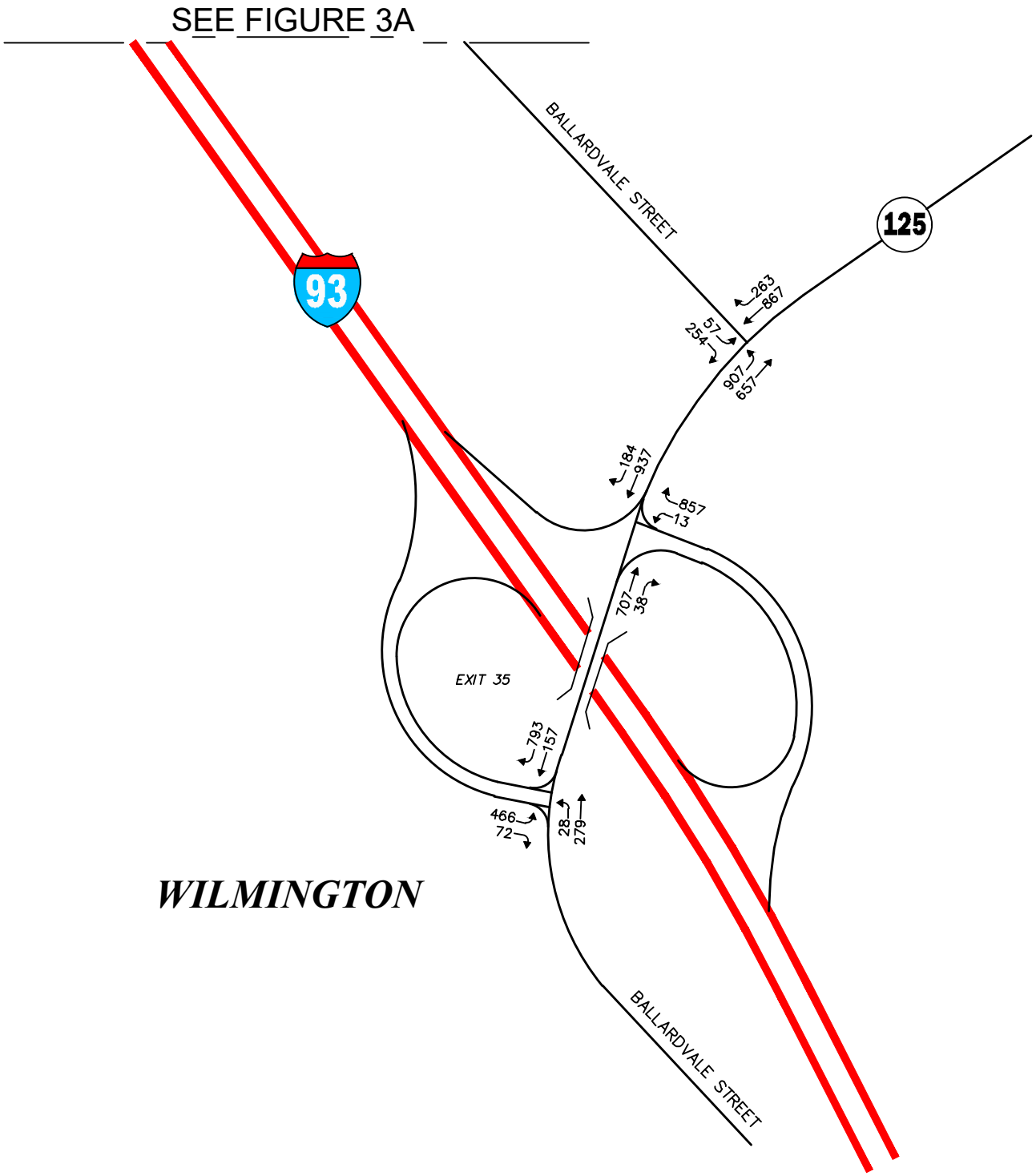
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3A

2024 Baseline
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

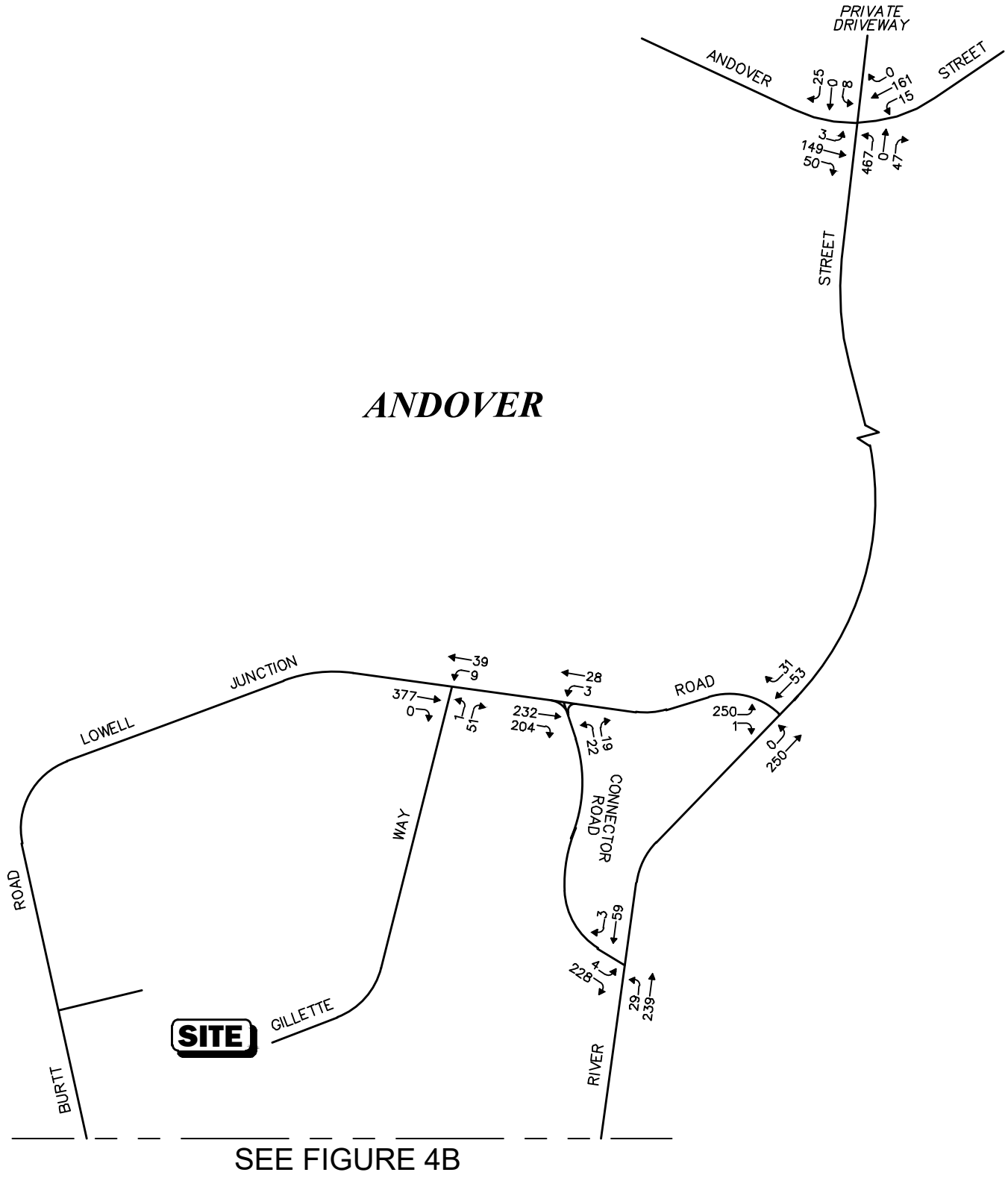


Not To Scale

Figure 3B

2024 Baseline
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



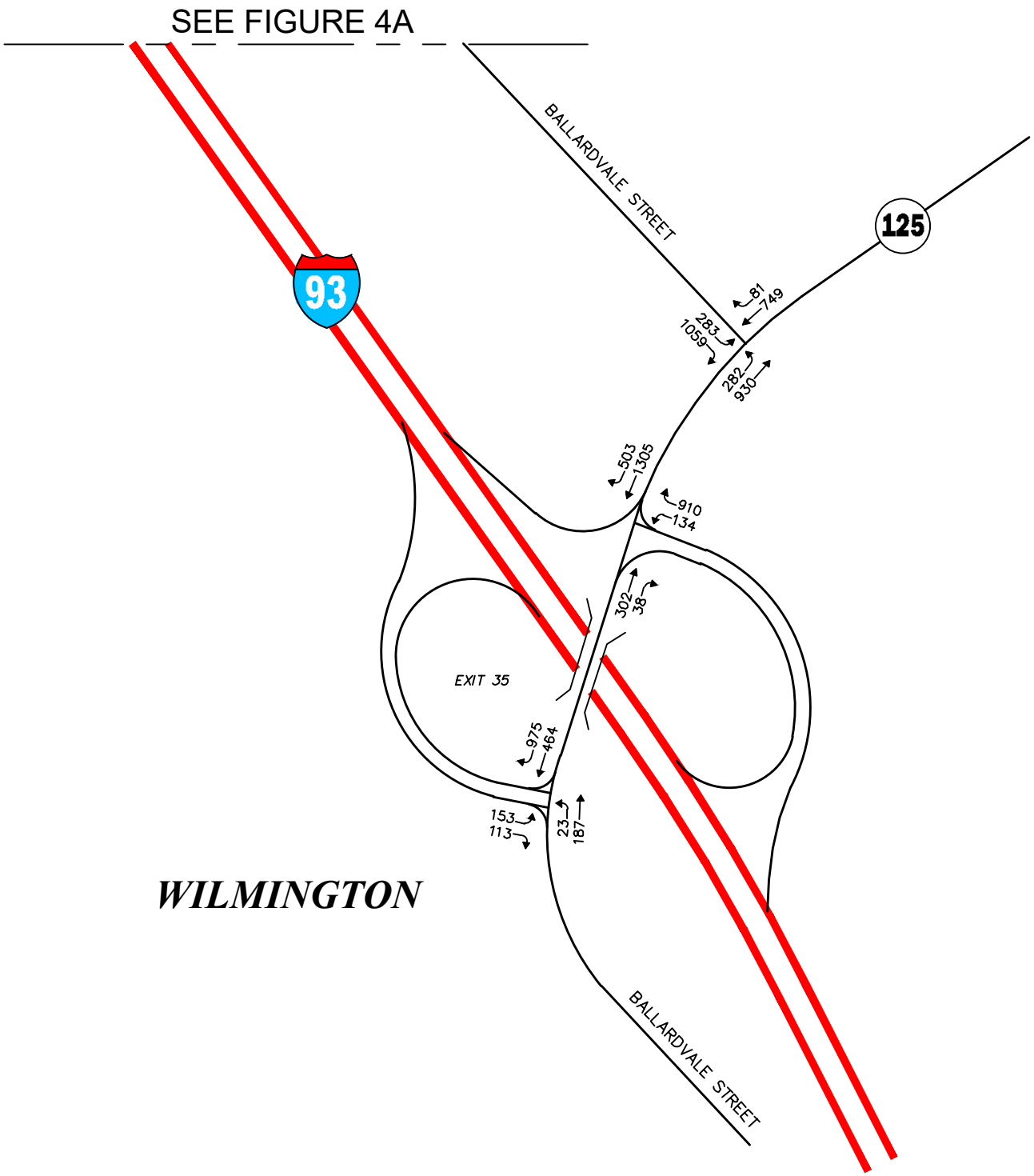
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 4A

2024 Baseline
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

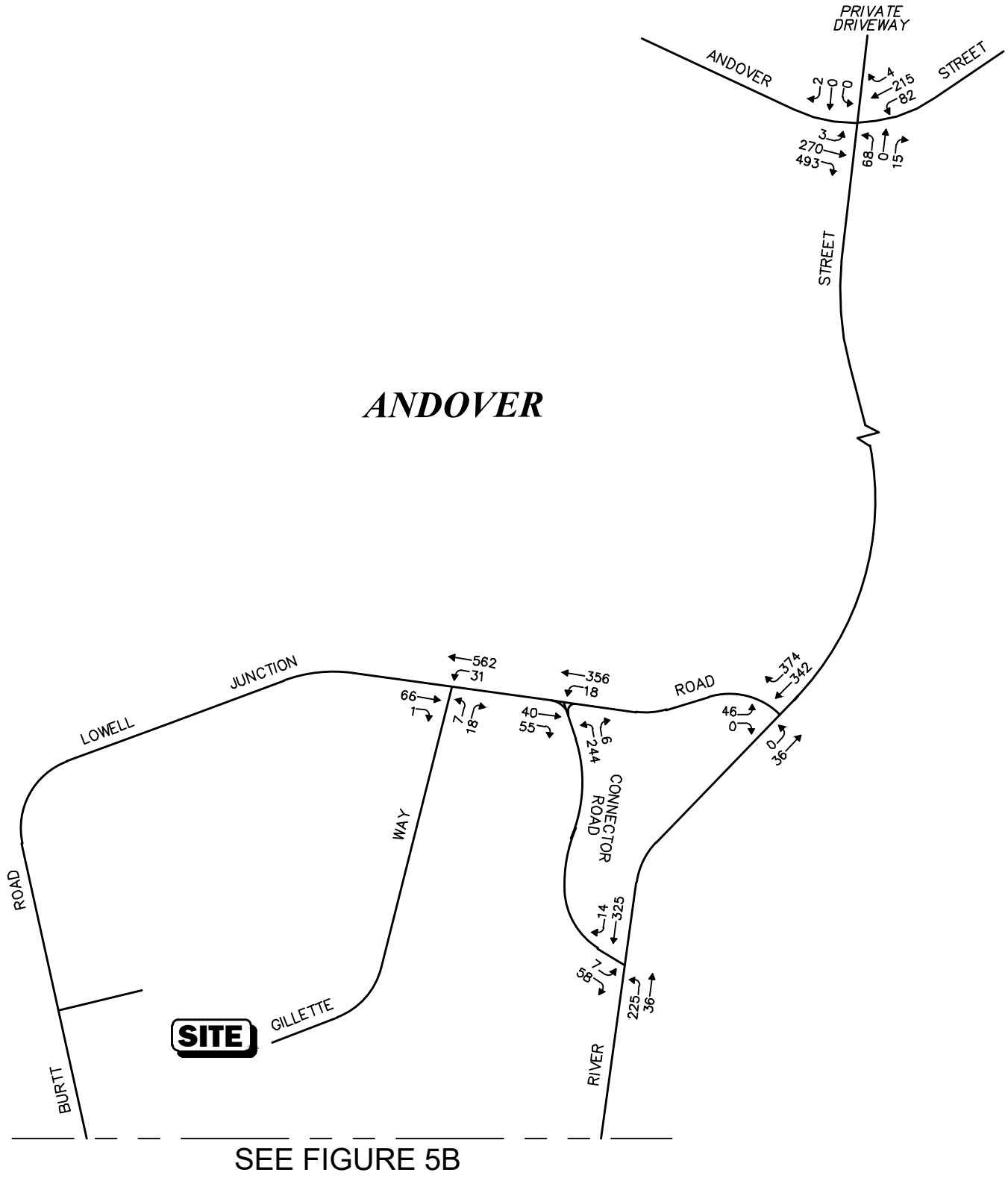


Not To Scale

Figure 4B

2024 Baseline
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



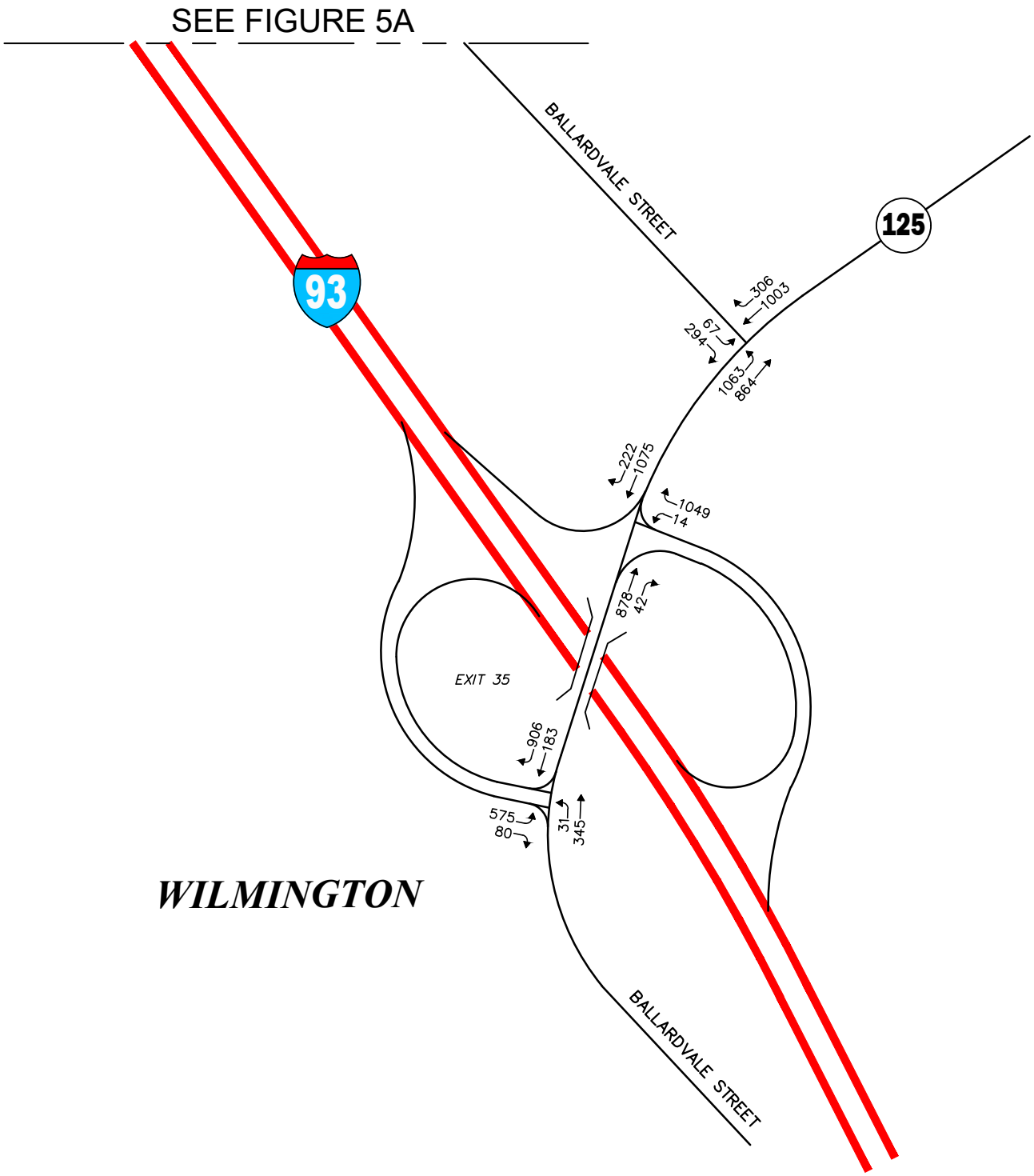
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 5A

Vanasse & Associates inc

2031 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

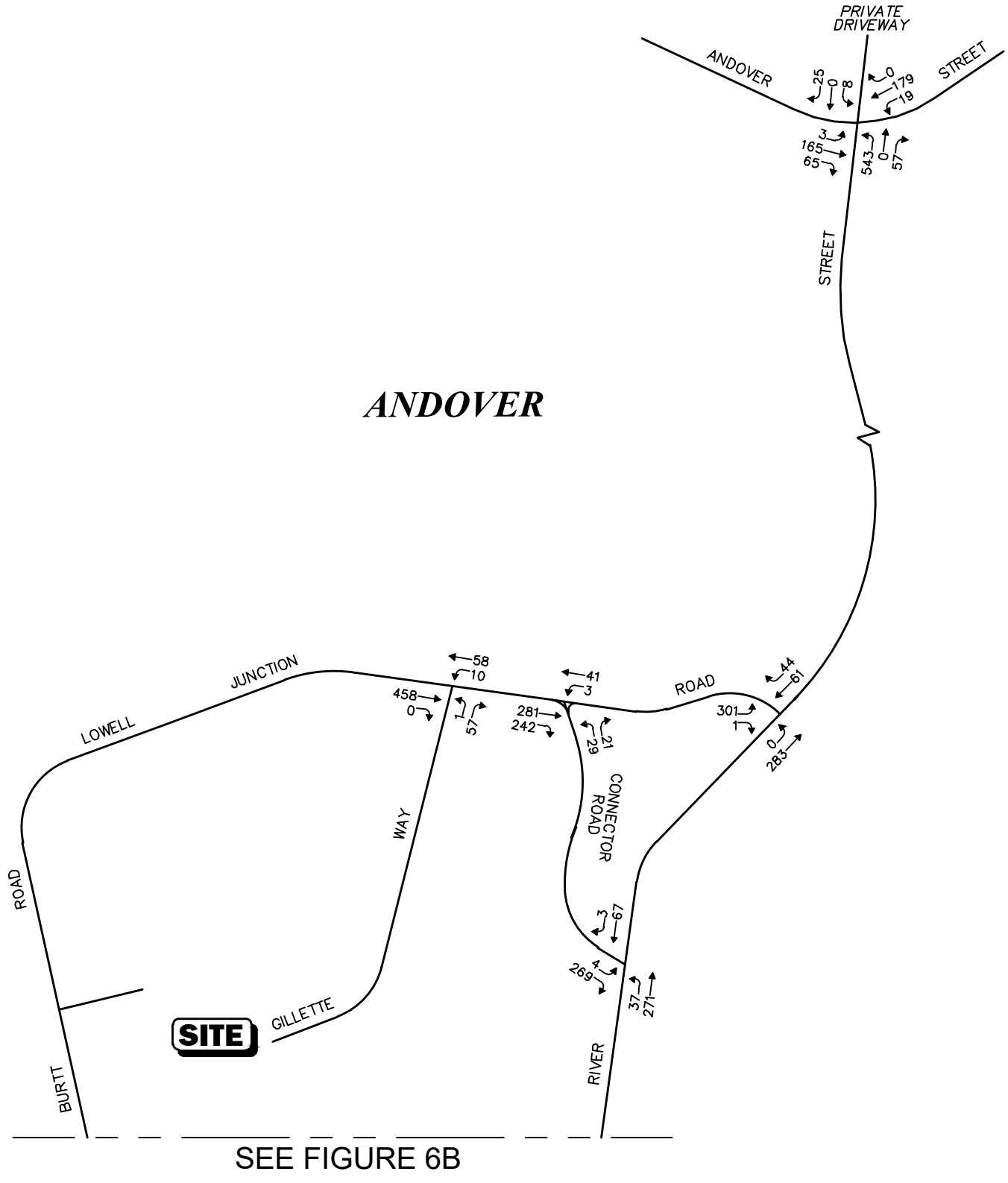


Not To Scale

Figure 5B

2031 No-Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



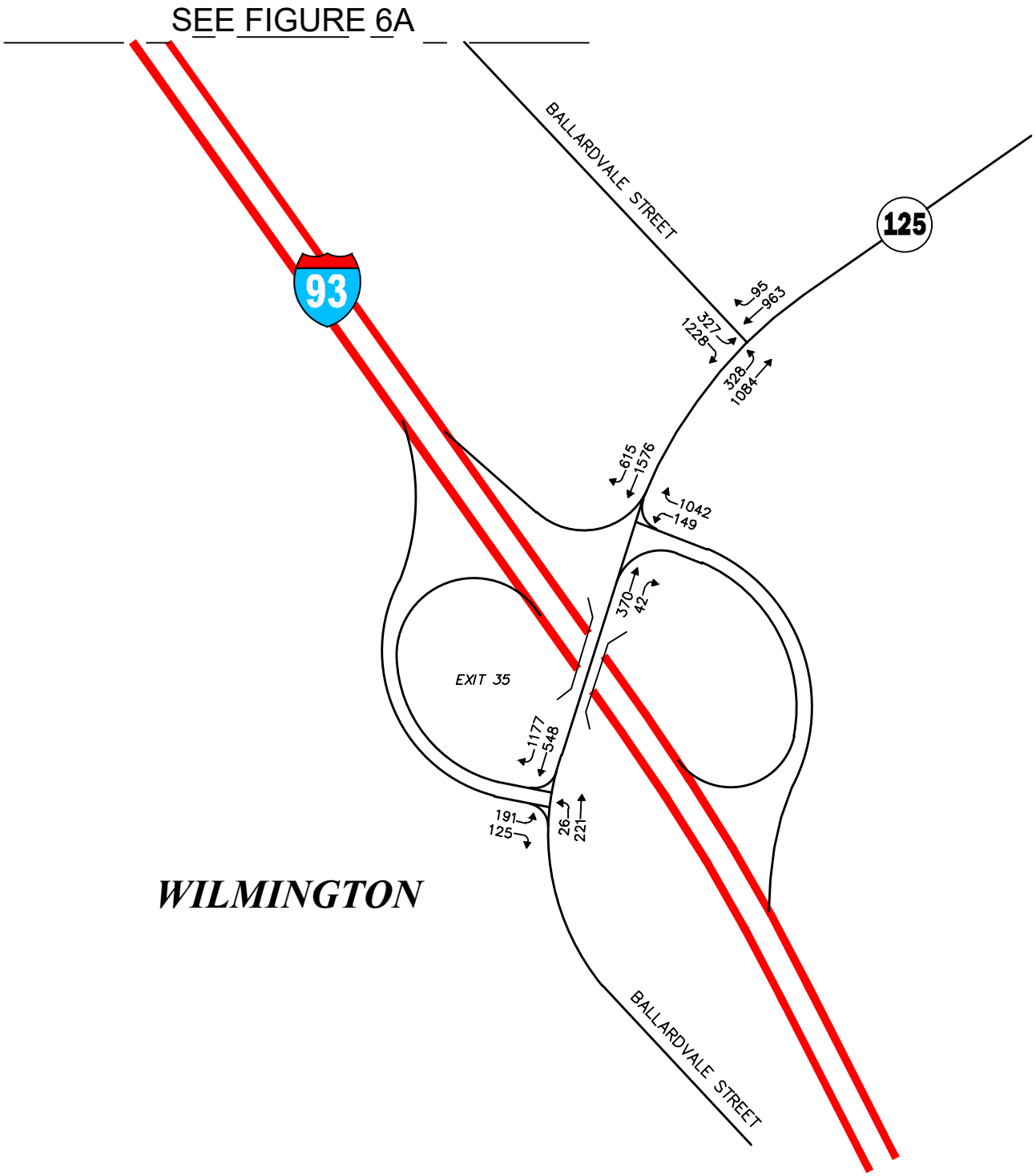
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 6A

Vanasse & Associates inc

2031 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

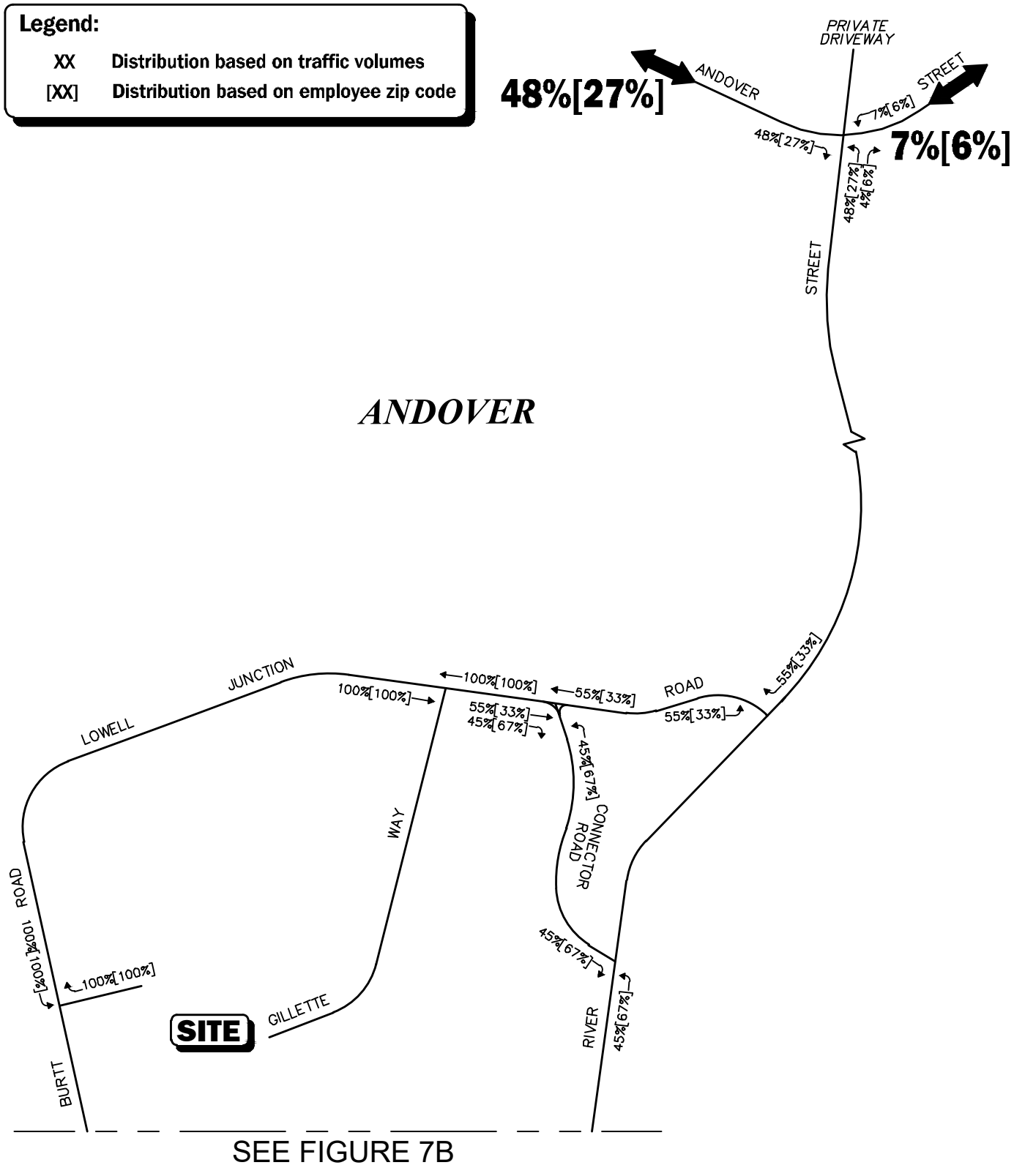


Not To Scale

Figure 6B

2031 No-Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

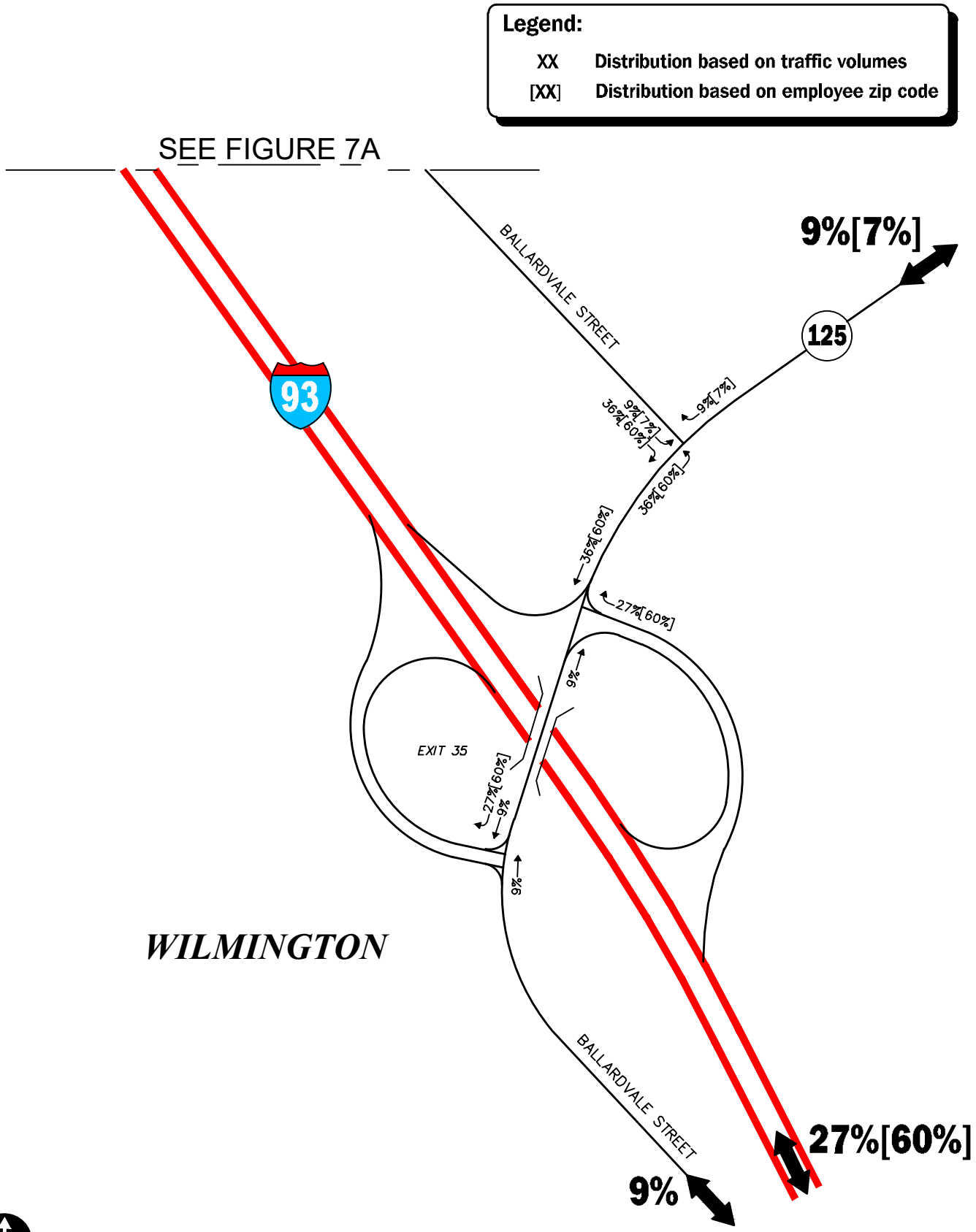


Not To Scale

Figure 7A

Trip Distribution Map
Passenger Car

Vanasse & Associates inc

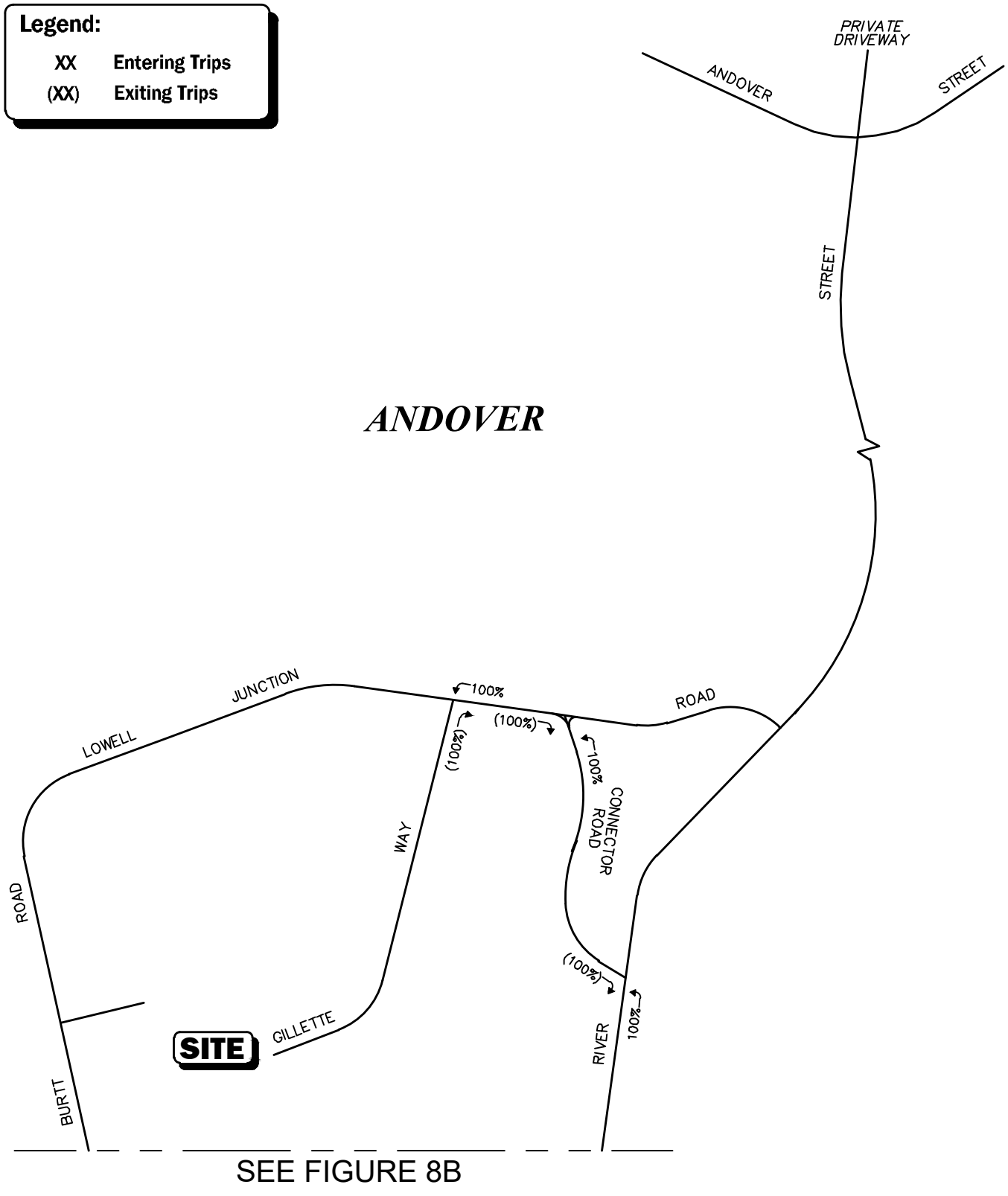


Not To Scale

Figure 7B

Trip Distribution Map
Passenger Car

Vanasse & Associates inc



Not To Scale

Figure 8A

Trip Distribution Map
Trucks

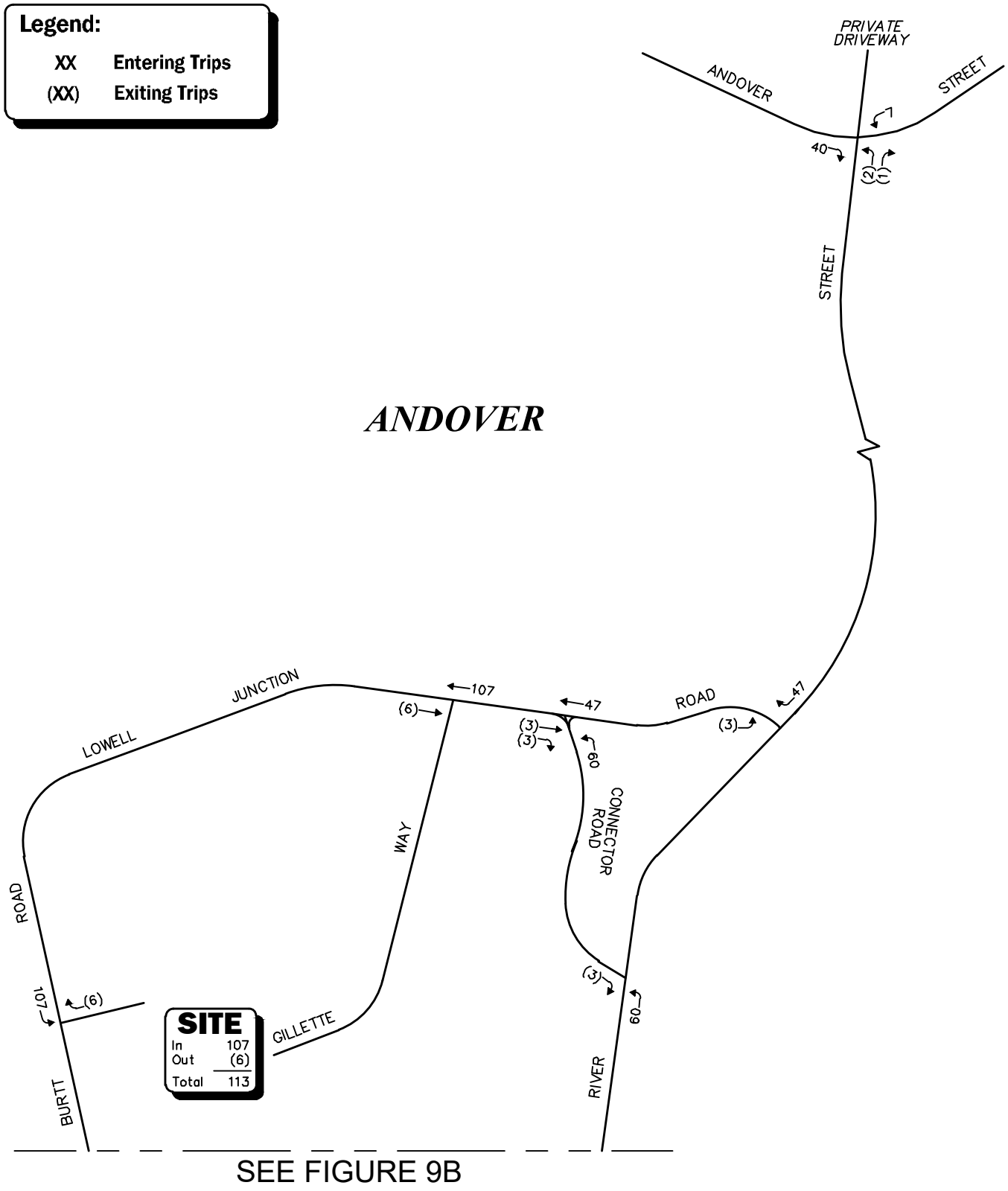
Vanasse & Associates inc

Not To Scale

Figure 8B

Trip Distribution Map
Trucks

Vanasse & Associates inc

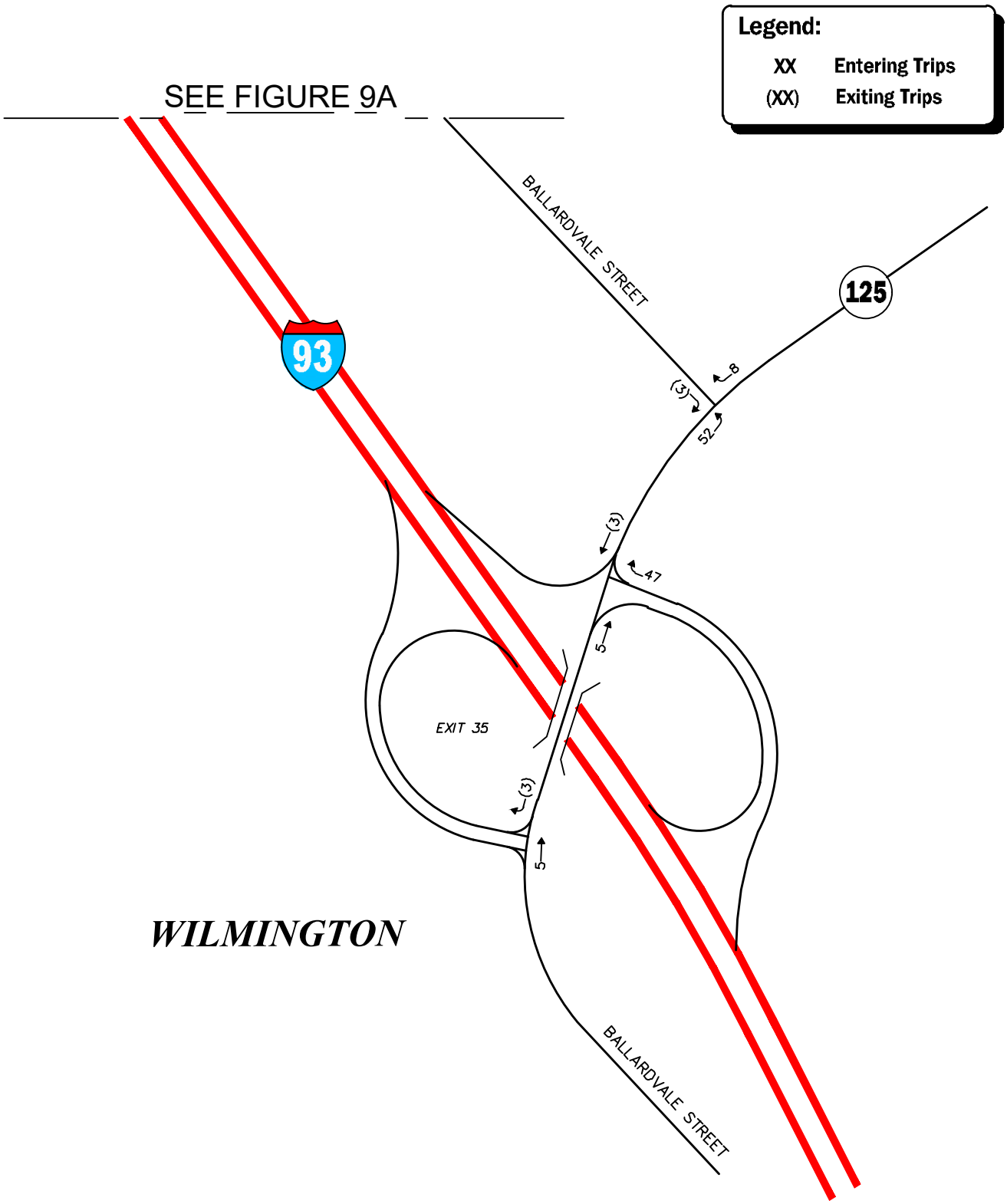


Not To Scale

Figure 9A

Site-Generated Weekday Morning Peak-Hour Traffic Volumes Passenger Car Trips

Vanasse & Associates inc

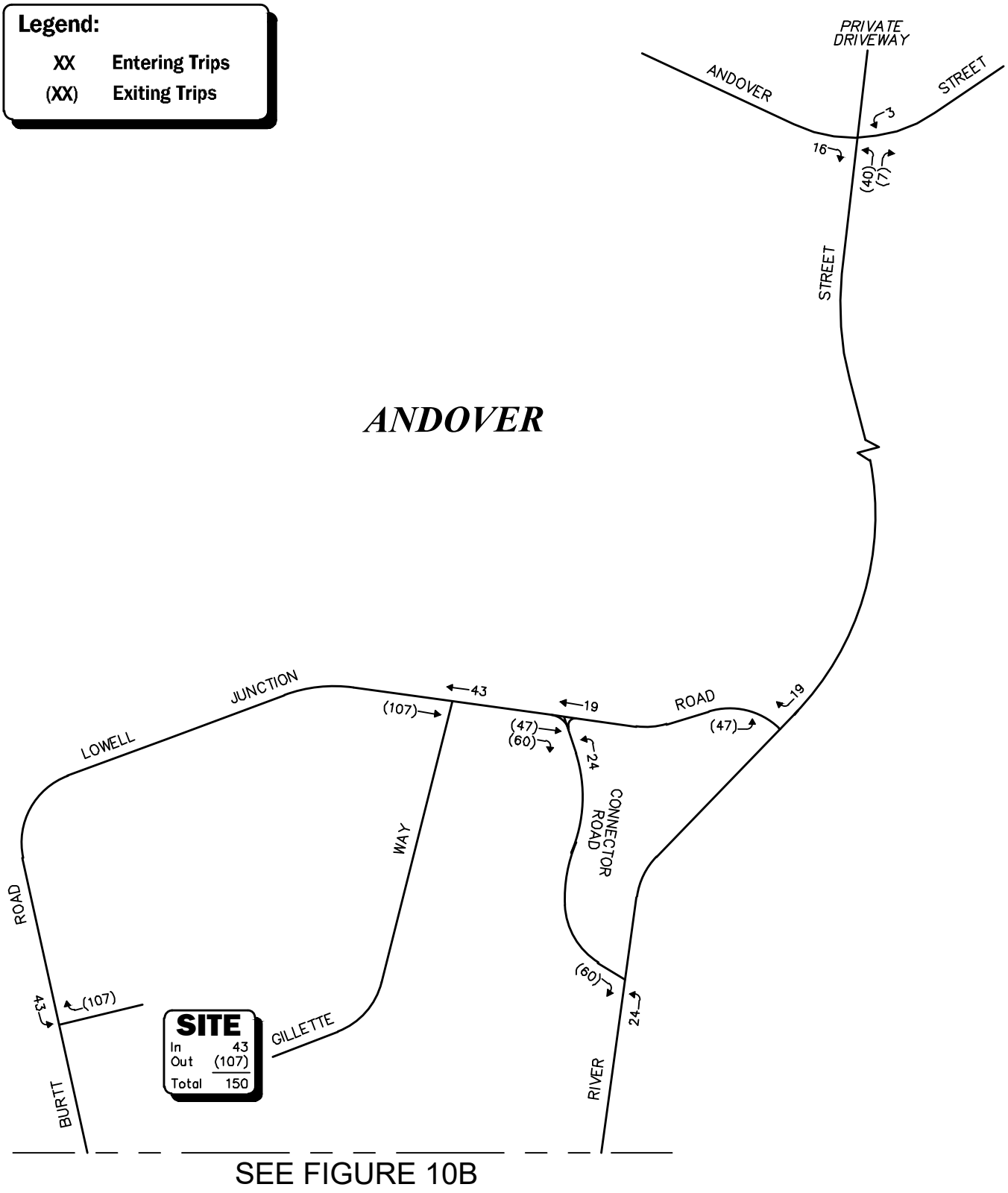


Not To Scale

Figure 9B

Site-Generated
Weekday Morning
Peak-Hour Traffic Volumes
Passenger Car Trips

Vanasse & Associates inc

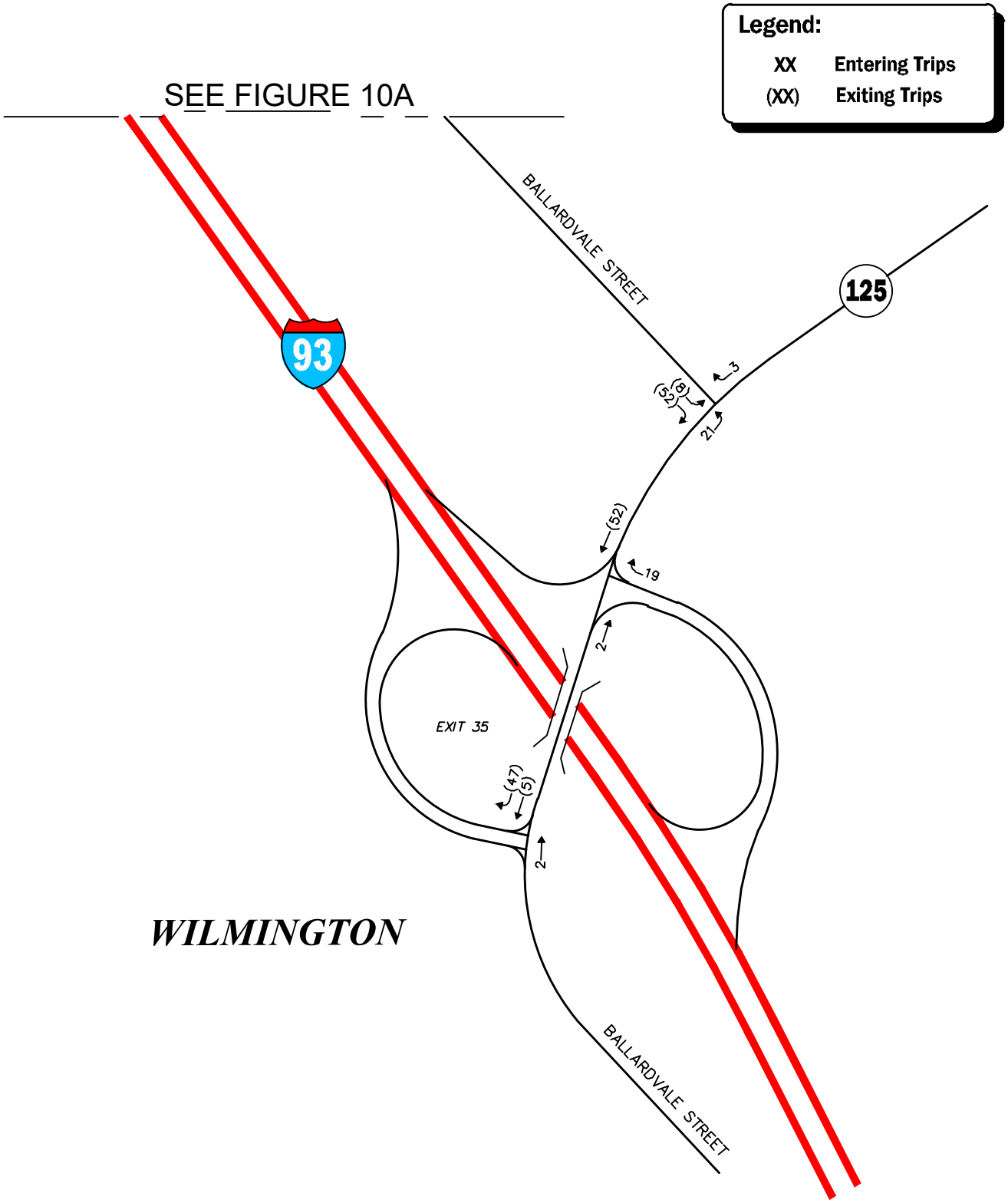


Not To Scale

Figure 10A

Site-Generated
Weekday Evening
Peak-Hour Traffic Volumes
Passenger Car Trips

Vanasse & Associates inc

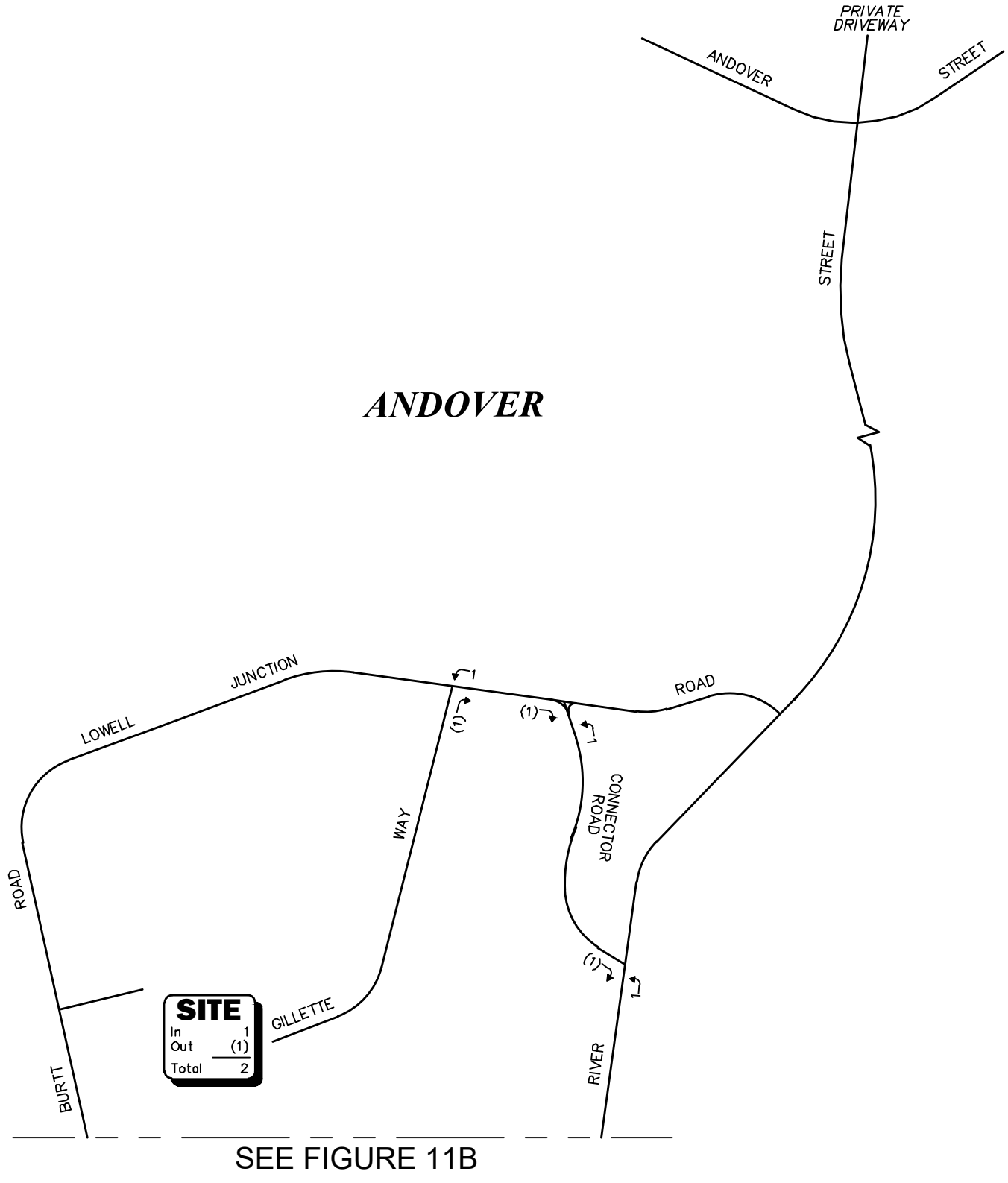


Not To Scale

Figure 10B

Site-Generated
Weekday Evening
Peak-Hour Traffic Volumes
Passenger Car Trips

Vanasse & Associates inc

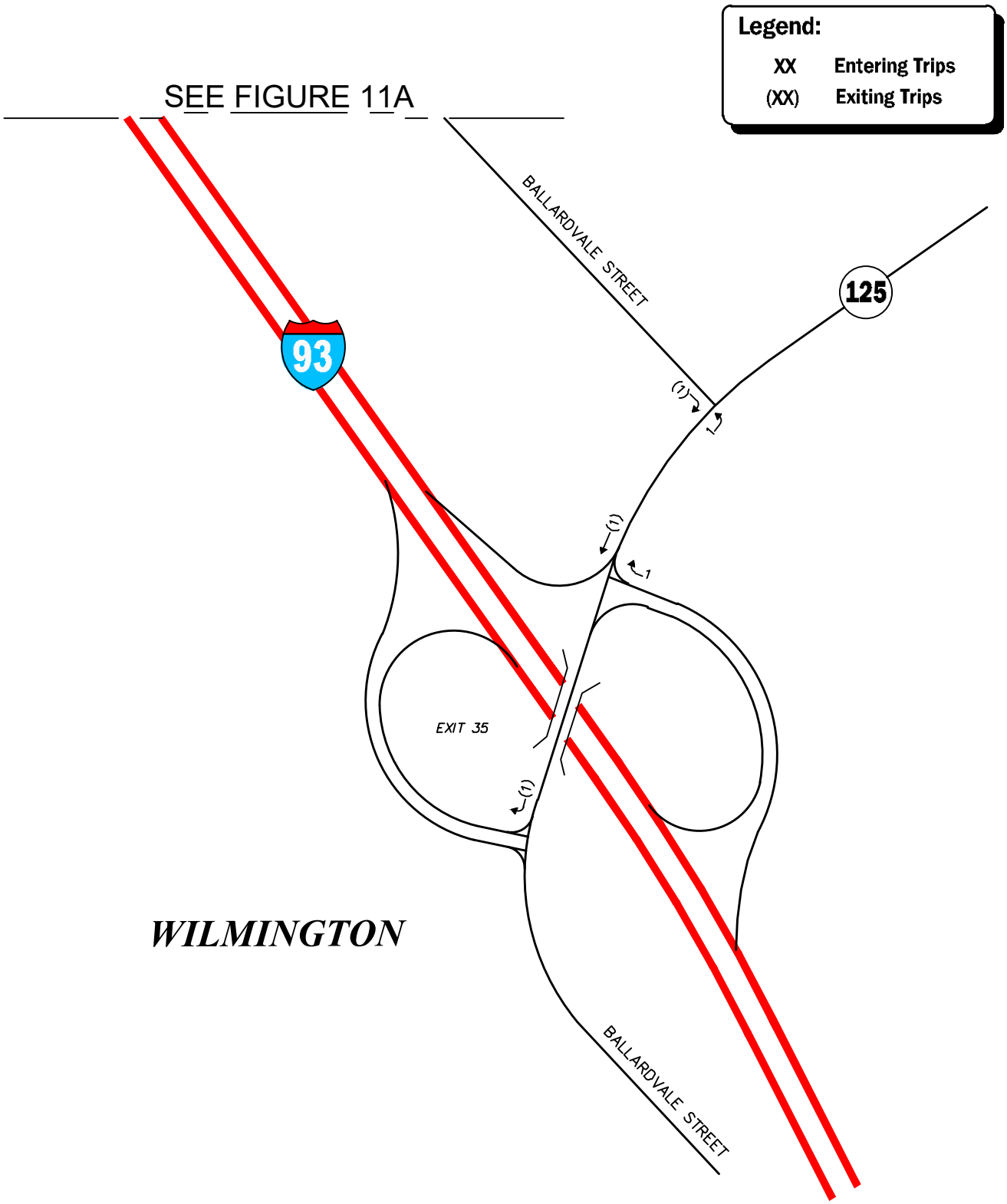


Not To Scale

Figure 11A

Site-Generated Weekday Morning Peak-Hour Traffic Volumes Truck Trips

Vanasse & Associates inc

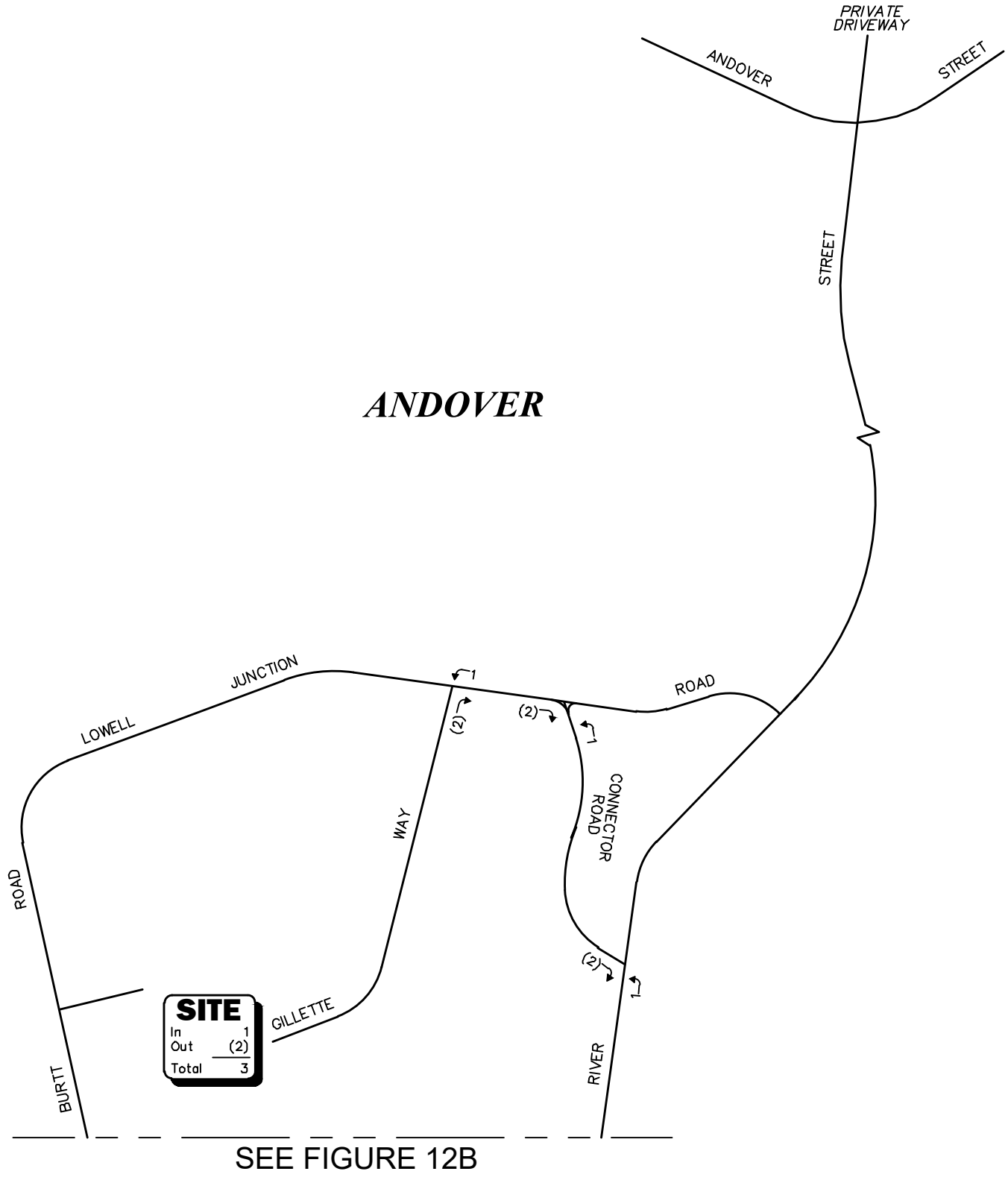


Not To Scale

Figure 11B

Site-Generated
Weekday Morning
Peak-Hour Traffic Volumes
Truck Trips

Vanasse & Associates inc

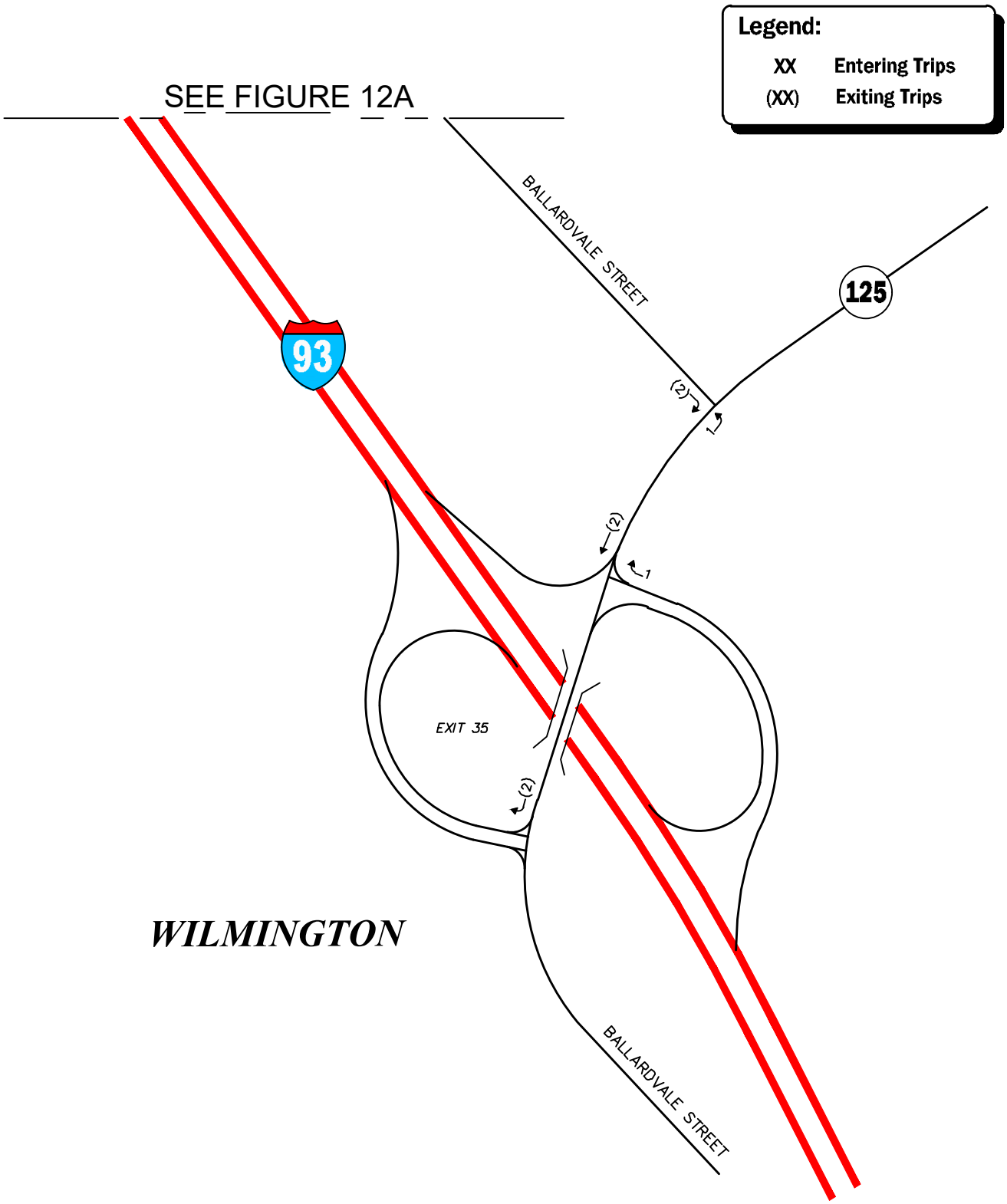


Not To Scale

Figure 12A

Site-Generated
Weekday Evening
Peak-Hour Traffic Volumes
Truck Trips

Vanasse & Associates inc

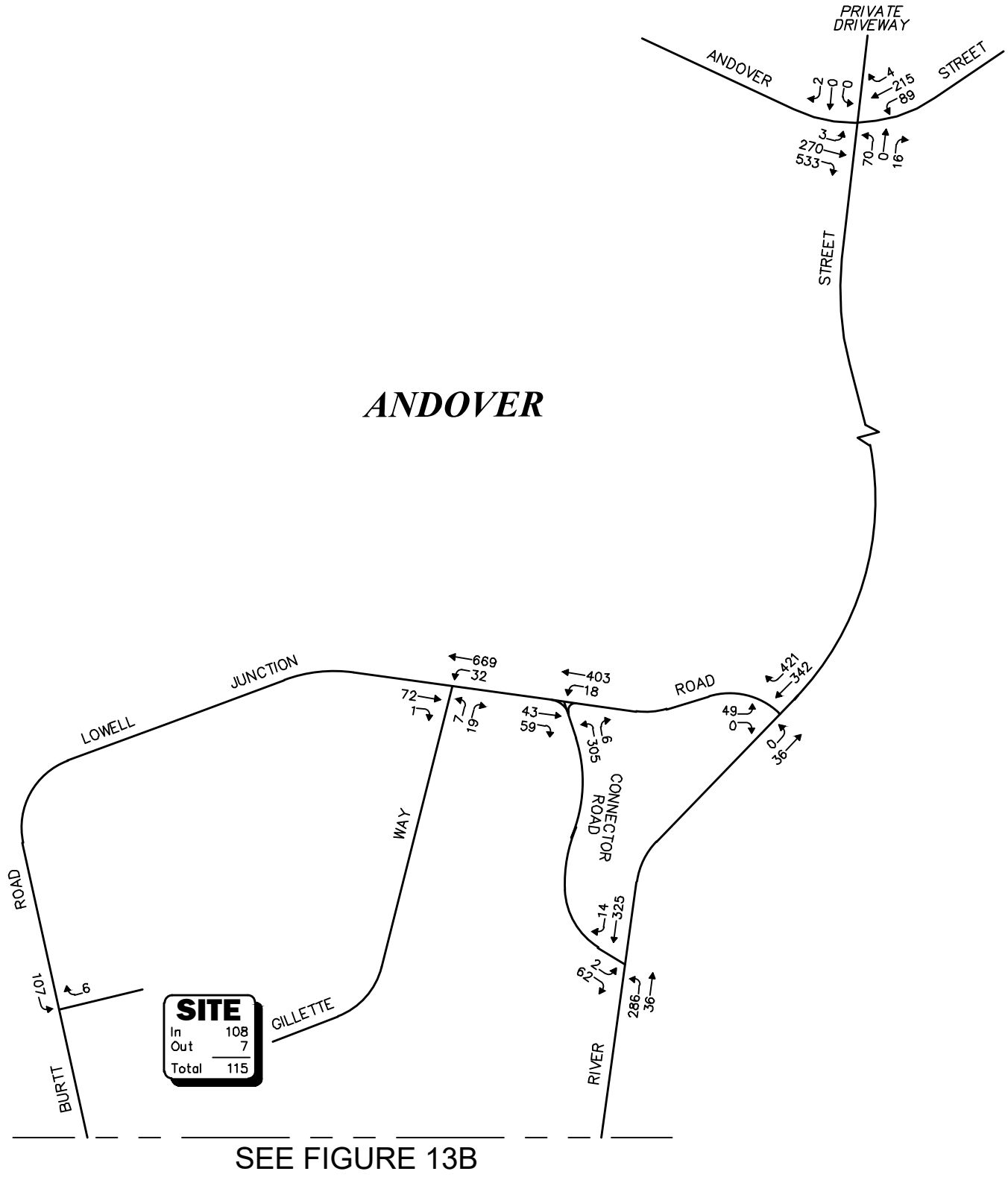


Not To Scale

Figure 12B

Site-Generated
Weekday Evening
Peak-Hour Traffic Volumes
Truck Trips

Vanasse & Associates inc



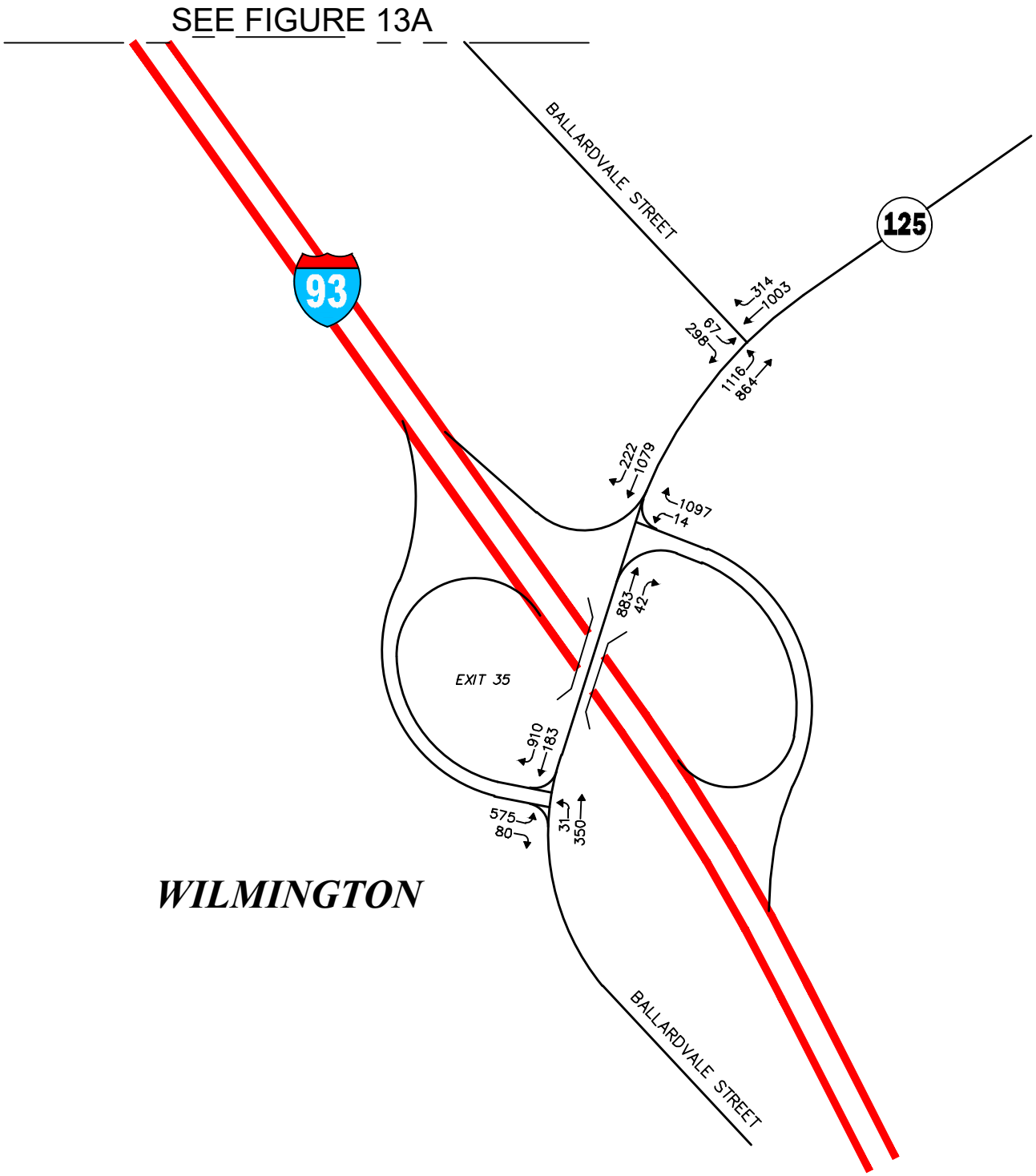
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 13A

2031 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc

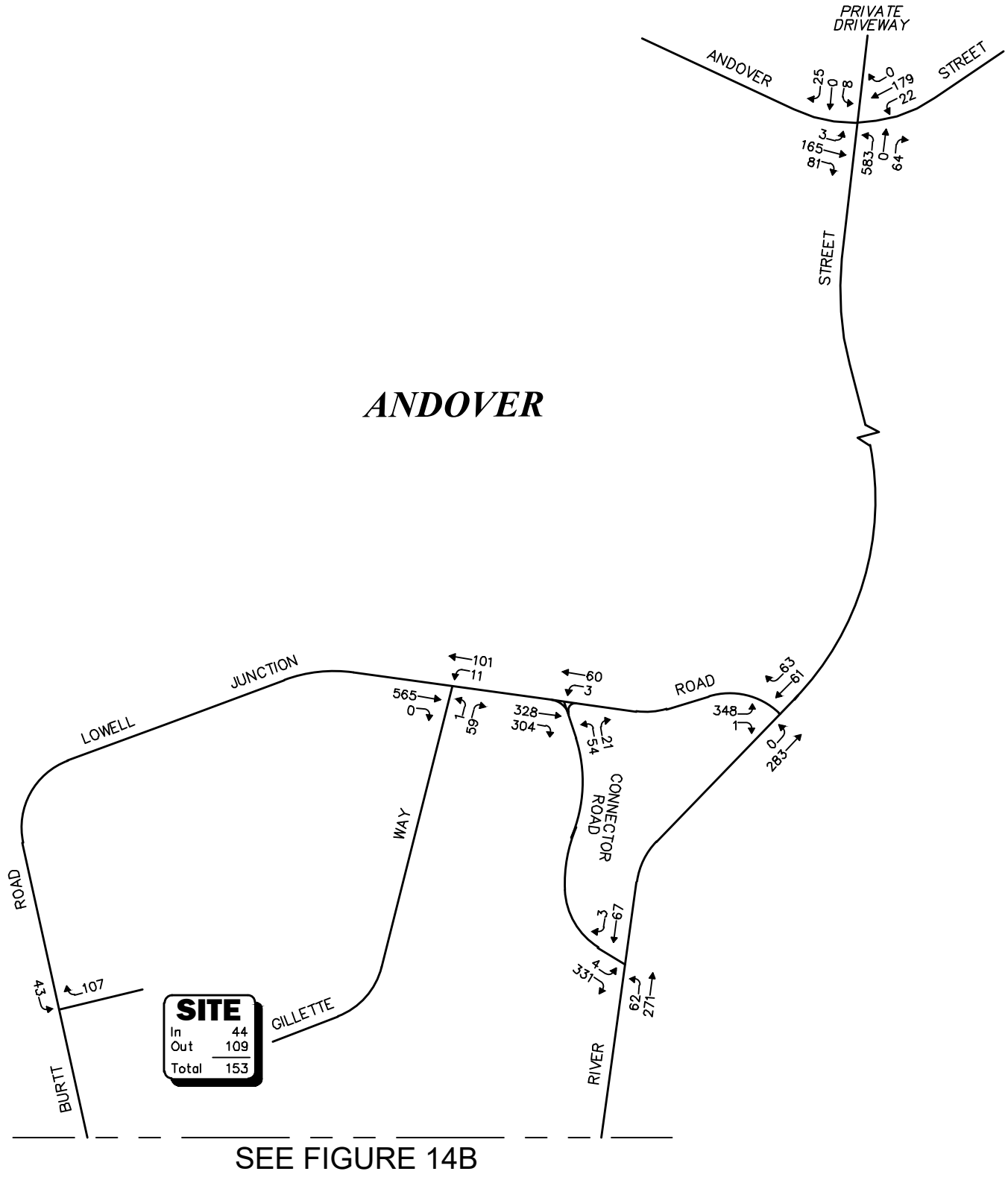


Not To Scale

Figure 13B

2031 Build
Weekday Morning
Peak-Hour Traffic Volumes

Vanasse & Associates inc



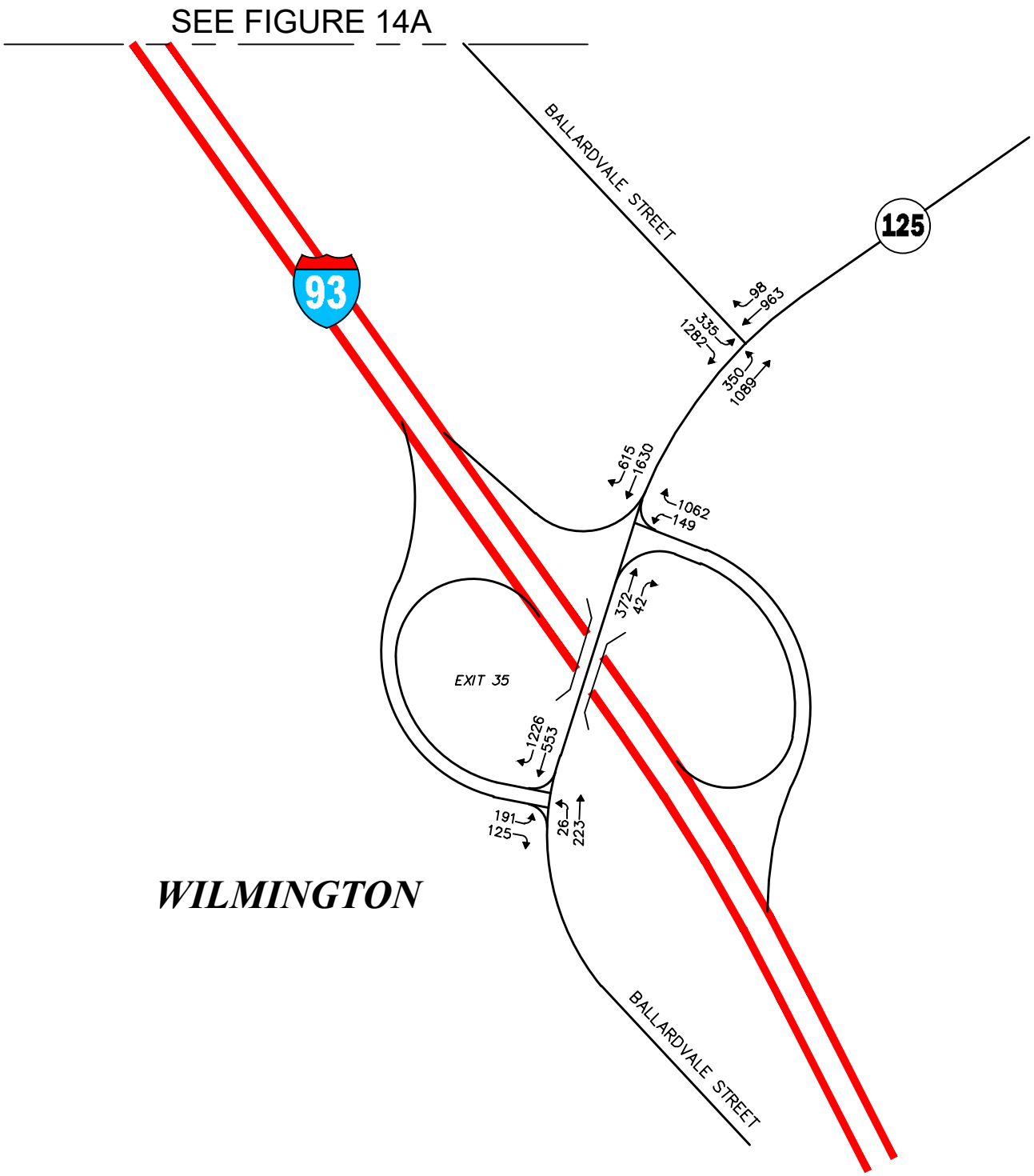
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 14A

2031 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc



Not To Scale

Figure 14B

2031 Build
Weekday Evening
Peak-Hour Traffic Volumes

Vanasse & Associates inc

MASSDOT CRASH RATE WORKSHEETS

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Wilmington COUNT DATE : Jul-24

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Route 125

MINOR STREET(S) : Ballardvale Street

INTERSECTION DIAGRAM (Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	1,212	830		1,342		**3,384**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **37,600**

TOTAL # OF CRASHES : 24 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **4.80**

CRASH RATE CALCULATION : **0.35** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Manufacturing Development

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Wilmington COUNT DATE : Jul-24

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Route 125

MINOR STREET(S) : I-93 NB Ramps

INTERSECTION DIAGRAM
(Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	340	1,808	1,044			**3,192**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **35,467**

TOTAL # OF CRASHES : 10 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **2.00**

CRASH RATE CALCULATION : **0.15** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Manufacturing Development

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Wilmington COUNT DATE : Jul-24

DISTRICT : 4 UNSIGNALIZED : SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Route 125

MINOR STREET(S) : I-93 SB Ramps

INTERSECTION DIAGRAM
(Label Approaches)

↑ *North*

PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	EB	WB	NB	SB		
PEAK HOURLY VOLUMES (AM) :	210-	1,439		266		**1,705**

" K " FACTOR : **0.090** INTERSECTION ADT (**V**) = TOTAL DAILY APPROACH VOLUME : **18,944**

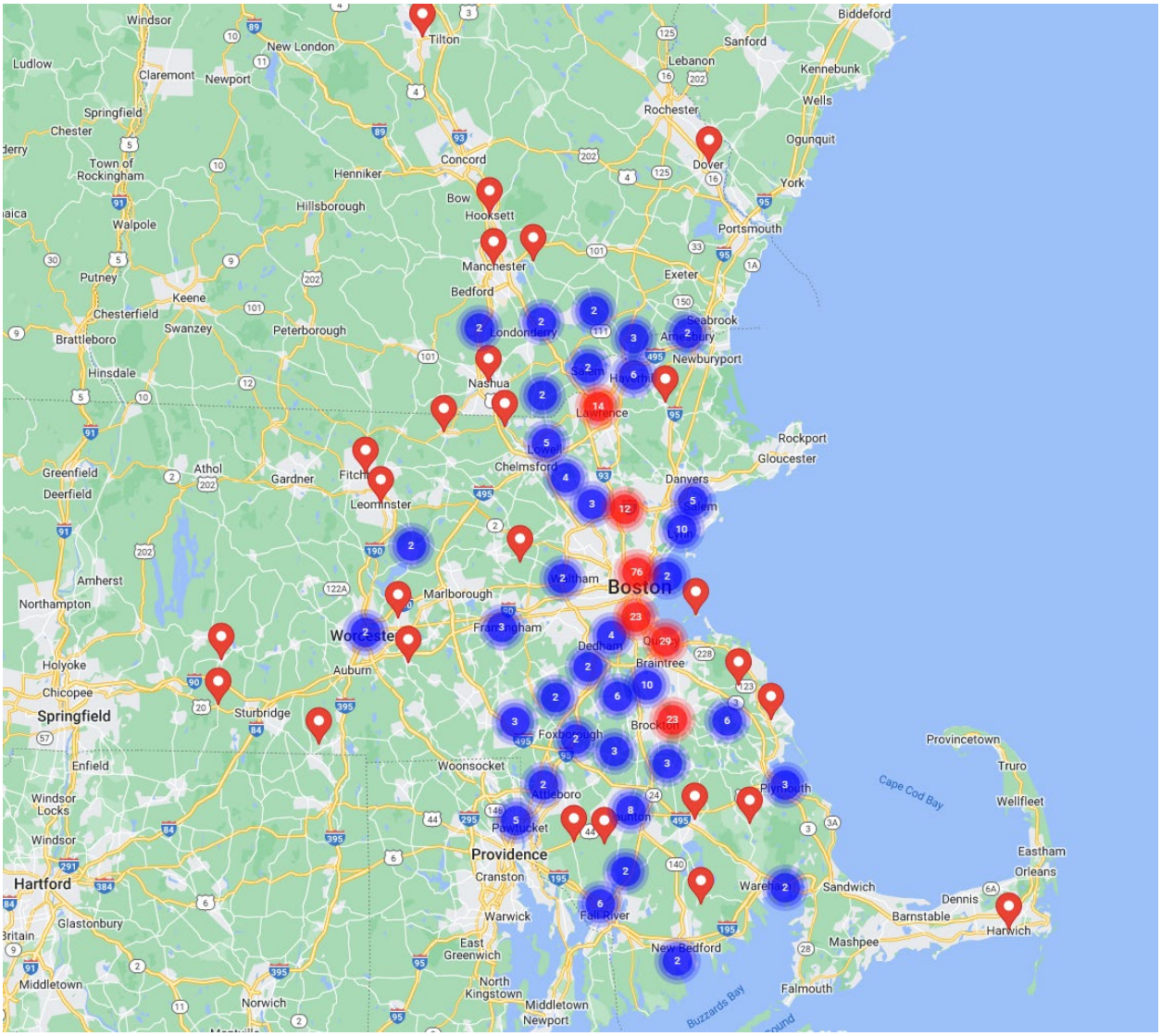
TOTAL # OF CRASHES : 12 # OF YEARS : 5 AVERAGE # OF CRASHES PER YEAR (**A**) : **2.40**

CRASH RATE CALCULATION : **0.35** RATE = $\frac{(A * 1{,}000{,}000)}{(V * 365)}$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Manufacturing Development

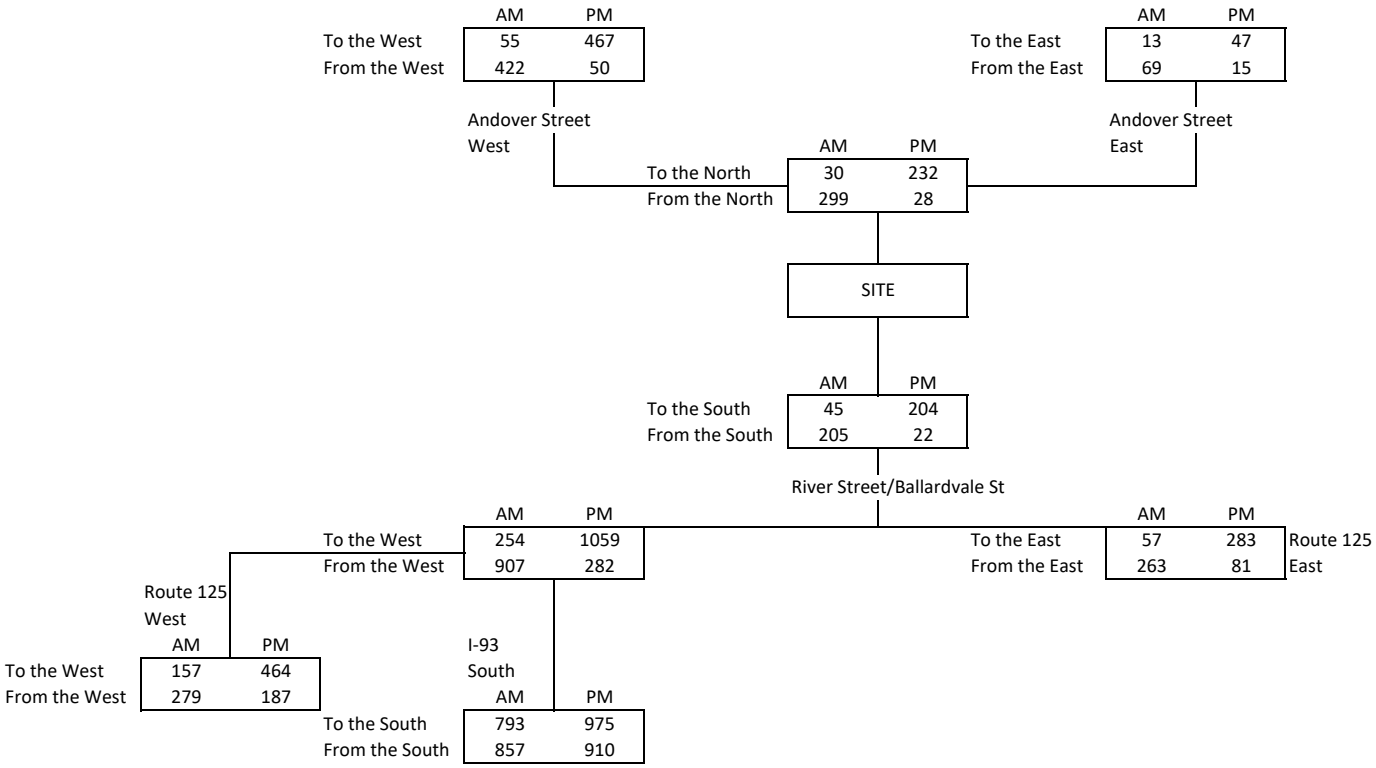
TRIP DISTRIBUTION DATA



Locations of employees of the proposed site

Trip Distribution Based on Zip Code Data

Employee Zip Codes	Number of Employees	Andover Street (East)		Andover Street (West)		Route 125 (East)		Route 125 (West)		I-93 (North)		I-93 (South)	
		Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number
Cambridge	8		0		0		0		0		0	100%	8
Chelsea	6		0		0		0		0		0	100%	6
Haverhill	6	20%	1	20%	1	60%	4		0		0		0
Lawrence	10	20%	2	20%	2	60%	6		0		0		0
Lynn	9	45%	4		0		0		0		0	55%	5
Malden	6		0		0		0		0		0	100%	6
Worcester	2		0	100%	2		0		0		0		0
Woburn	3		0		0		0		0		0	100%	3
Winthrop	2		0		0		0		0		0	100%	2
Wilmington	1		0		0		0	30%	0		0	70%	1
Weston	1		0		0		0		0		0	100%	1
Warren	1		0	55%	1		0		0		0	45%	0
Waltham	1		0		0		0		0		0	100%	1
Wakefield	2		0		0		0		0		0	100%	2
Tyngsboro	1		0	100%	1		0		0		0		0
Tewksbury	1		0	100%	1		0		0		0		0
Swampscott	1		0		0		0		0		0	100%	1
Stoneham	1		0		0		0		0		0	100%	1
Somerville	6		0		0		0		0		0	100%	6
Shrewsbury	1		0	70%	1		0		0		0	30%	0
Sandow	1		0	100%	1		0		0		0		0
Salem	2		0	100%	2		0		0		0		0
Salem	2	40%	1		0	30%	1		0		0	30%	1
Revere	3		0		0		0		0		0	100%	3
Reading	4		0	45%	2		0		0		0	55%	2
Plaistow	2		0	100%	2		0		0		0		0
Pepperell	1		0	100%	1		0		0		0		0
Pelham	2		0	100%	2		0		0		0		0
Peabody	3	40%	1		0	40%	1		0		0	20%	1
Newton	1		0	100%	1		0		0		0		0
Nashua	1		0	100%	1		0		0		0		0
Methuen	4	30%	1	70%	3		0		0		0		0
Merrimack	2		0	100%	2		0		0		0		0
Melrose	3		0		0		0		0		0	100%	3
Medford	4		0		0		0		0		0	100%	4
Manchester	1		0	100%	1		0		0		0		0
Lynnfield	2		0		0	40%	1		0		0	60%	1
Lowell	4		0	100%	4		0		0		0		0
Lincoln	1		0	45%	0		0		0		0	55%	1
Leominster	1		0	55%	1		0		0		0	45%	0
Lancaster	1		0	100%	1		0		0		0		0
Hooksett	1		0	100%	1		0		0		0		0
Hampstead	1		0	100%	1		0		0		0		0
Grafton	1		0	55%	1		0		0		0	45%	0
Georgetown	1		0	100%	1		0		0		0		0
Framingham	2		0		0		0		0		0	100%	2
Fitchburg	1		0	100%	1		0		0		0		0
Everett	3		0		0		0		0		0	100%	3
Dracut	1		0	100%	1		0		0		0		0
Derry	2		0	100%	2		0		0		0		0
Clinton	1		0	100%	1		0		0		0		0
Burlington	2		0		0		0		0		0	100%	2
Billerica town	3		0	70%	2		0	30%	1		0		0
Auburn	1		0	100%	1		0		0		0		0
Ashland	1		0	55%	1		0		0		0	45%	0
Arlington tow	1		0		0		0		0		0	100%	1
Amesbury To	2		0	100%	2		0		0		0		0
Allston	1		0		0		0		0		0	100%	1
Acton town	1		0	40%	0		0		0		0	60%	1
	140		10		47		12		1		0		70
			7.5%		33.3%		8.7%		0.9%		0.0%		49.6%
	SAY		**8%**		**33%**		**9%**		**1%**		**0%**		**49%** 100%


AM PM
To the West 55 467
From the West 422 50
Andover Street West
AM PM
To the East 13 47
From the East 69 15
Andover Street East
AM PM
To the North 30 232
From the North 299 28
SITE
AM PM
To the South 45 204
From the South 205 22
River Street/Ballardvale St
AM PM
To the West 254 1059
From the West 907 282
AM PM
To the East 57 283
From the East 263 81
Route 125 East
Route 125 West
AM PM
To the West 157 464
From the West 279 187
I-93 South
AM PM
To the South 793 975
From the South 857 910

Trip Distribution Based on the Baseline Traffic Volumes

New Residences for emplyyes	Number of Employees	Andover Street (East)		Andover Street (West)		Route 125 (East)		Route 125 (West)		I-93 (North)		I-93 (South)	
		Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number
Boston city	35	7%	2	48%	17	9%	3	9%	3	0%	0	27%	9
Quincy	22	7%	2	48%	11	9%	2	9%	2	0%	0	27%	6
Brockton	11	7%	1	48%	5	9%	1	9%	1	0%	0	27%	3
Dorchester	17	7%	1	48%	8	9%	2	9%	2	0%	0	27%	5
Randolph	8	7%	1	48%	4	9%	1	9%	1	0%	0	27%	2
Whitman	3	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Weymouth	5	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
West Roxbu	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
West Bridge	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Walpole	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Taunton	4	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
Swansea	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Stoughton	4	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
Somerset	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
South Dartm	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Roxbury	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Roslindale	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Rockland	4	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
Rehoboth	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Readville	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Raynham	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Plymouth	3	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Pembroke	4	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
Pawtucket	4	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
Onset	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Norwood	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Norwell	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
North Attlebo	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Norfolk	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Milton	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Middleborou	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Miami	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Manttapan	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Marshfield	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Mansfield	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Hyde Park	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Hull	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Holbrook	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Harwich	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Hanson	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Hanover	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Franklin	4	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
Foxborough	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Fall River	4	7%	0	48%	2	9%	0	9%	0	0%	0	27%	1
Easton	3	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
East Wareha	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
East Bridgev	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
East Taunto	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Dudley	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Dover	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Dighton	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Carver	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Canton	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Brimfield	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Bridgewater	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Braintree	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
Berkley	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Avon	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Attleboro city	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Assonet	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Acushnet	1	7%	0	48%	0	9%	0	9%	0	0%	0	27%	0
Abington	2	7%	0	48%	1	9%	0	9%	0	0%	0	27%	1
	194		14		93		17		17		0		52
			7.0%		48.0%		9.0%		9.0%		0.0%		27.0%
	SAY		**7%**		**48%**		**9%**		**9%**		**0%**		**27%**

100%

TRIP GENERATION DATA

			Mon-Fri	Mon-Fri	Mon, Wed, Fri		Tue, Thu, Sat						
		COUNT	Day Shift	Split Shift	A	B	C	D	A/C	B/D	A/C/Day/Split		
		Shift Hours	8AM-5PM	6AM-2:30PM	6AM-6PM	6PM-6AM	6AM-6PM	6PM-6AM	6AM-6PM	6PM-6AM			
	Group A	155	20	0	34	34	34	33	68	67	88		
	Group B	0	0	0	0	0	0	0	0	0	0		
	Group C	59	59	0	0	0	0	0	0	0	59		
	Group D	7	7	0	0	0	0	0	0	0	7		
	Group E	6	12	0	0	0	0	0	0	0	12		
	Group F	15	7	0	2	2	2	2	4	4	11		
	Group G	8	2	0	2	1	2	1	4	2	6		
	Group H	0	0	0	0	0	0	0	0	0	0		
	Group I	0	0	0	0	0	0	0	0	0	0		
	Group J	150	0	150	0	0	0	0	0	0	150		
	Totals	400	107	150	38	37	38	36	76	73	333	650	
ARRIVALS			7-8										
ARRIVAL HOUR			7-8AM	5-6AM	5-6AM	5-6PM	5-6AM	5-6PM					
ENTERING DURING MORNING PEAK HOUR?			YES	NO	NO	NO	NO	NO					
ENTERING DURING EVENING PEAK HOUR?			NO	NO	NO	YES	NO	YES					
DEPARTURE			5-6										
DEPARTURE HOUR			5-6PM	2:30-3:30PM	6-7PM	6-7AM	6-7PM	6-7AM					
EXITING DURING MORNING PEAK HOUR?			NO	NO	NO	NO	NO	NO					
EXITING DURING EVENING PEAK HOUR?			YES	NO	NO	NO	NO	NO					
EMPLOYEE TRIPS									TOTAL	BUT EITHER B OR D, NOT BOTH SO DEDUCT ONE			
MORNING PEAK HOUR 7-8AM										REVISED TOTAL	DROP OFFS	NEW TOTAL	
ENTER			107	0	0	0	0	0	107	107	0	107	
EXIT			0	0	0	0	0	0	0	0	6	6	
TOTAL			107	0	0	0	0	0	107	107	6	113	
EVENING PEAK HOUR 5-6PM													
ENTER			0	0	0	37	0	36	73	37	6	43	
EXIT			107	0	0	0	0	0	107	107	0	107	
TOTAL			107	0	0	37	0	36	180	144	6	150	
	3/7/2024												
	Contractors w	50											
	No M3/Embrace												
	Core teams spread out evenly on shifts												
	Packaging in MIO												
	FM / MTO is included , at another 150 to Day Shift												
	Shifted MTO to 150 2/28/24 per leadership				did not yet update graph* need to redo								

EMPIRICAL TRUCK TRIP-RATES COMPARISON

Time Period/ Directional Distribution	ITE Trip Rate[a] (A)	TMC Truck Trips[b] (B)
Weekday Daily	0.450	--
Weekday Morning Peak Hour: Total	0.030	0.010
Weekday Evening Peak Hour: Total	0.030	0.015

[a]Based on truck trip rates from LUC 140.
[b]Based on TMC data rates (Existing Trips/1000sf); *June 2023*.

(Weekday Morning Park Hour * Weekday Daily) / (Weekday Morning Peak Hour)
(TMC Truck Trips ITE Trip Rates) / (ITE Trip Rates)

(0.010 * 0.450) / (0.030) = 0.15 truck trips/KSF Weekday Daily TMC Truck Rates

EMPIRICAL TRUCK TRIP-RATES COMPARISON PROPOSED

Time Period/ Directional Distribution	Truck Trips[a] /KSF
Weekday Daily	0.15

[a]Based on observed AM truck trip rate applied to ratio of weekday daily and weekday morning trip rates for LUC 140.

EMPIRICAL TRUCK TRIP-GENERATION COMPARISON

Time Period/ Directional Distribution	Proposed Truck Trips[a]
Weekday Daily	32

[a]Based on Truck Trip Rates for proposed site expansion, 201,684 sf.

CAPACITY ANALYSIS

2024 Baseline Weekday Morning Peak Hour
2024 Baseline Weekday Evening Peak Hour
2031 No-Build Weekday Morning Peak Hour
2031 No-Build Weekday Evening Peak Hour
2031 Build Weekday Morning Peak Hour
2031 Build Weekday Evening Peak Hour
Modified Andover Street at River Street Intersection Analysis
Modified Connector Road at Lowell Junction Road Intersection Analysis

2024 Baseline Weekday Morning Peak Hour

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	35	0	0	31	302	315
Future Volume (Veh/h)	35	0	0	31	302	315
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.60	0.60	0.92	0.92
Hourly flow rate (vph)	40	0	0	52	328	342
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	551	499	670			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551	499	670			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	92	100	100			
cM capacity (veh/h)	480	576	930			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	40	52	670
Volume Left	40	0	0
Volume Right	0	0	342
cSH	480	930	1700
Volume to Capacity	0.08	0.00	0.39
Queue Length 95th (ft)	7	0	0
Control Delay (s/veh)	13.2	0.0	0.0
Lane LOS	B		
Approach Delay (s/veh)	13.2	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	30	45	16	299	205	5
Future Volume (Veh/h)	30	45	16	299	205	5
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	43	65	18	336	259	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			43		415	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			43		415	43
tC, single (s)			4.2		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.3
p0 queue free %			99		55	99
cM capacity (veh/h)			1498		577	1033

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	43	65	354	265
Volume Left	0	0	18	259
Volume Right	0	65	0	6
cSH	1700	1700	1498	591
Volume to Capacity	0.03	0.04	0.01	0.45
Queue Length 95th (ft)	0	0	1	58
Control Delay (s/veh)	0.0	0.0	0.5	16.0
Lane LOS			A	C
Approach Delay (s/veh)	0.0		0.5	16.0
Approach LOS				C

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	188	31	287	13	2	48
Future Volume (Veh/h)	188	31	287	13	2	48
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.90	0.90	0.74	0.74
Hourly flow rate (vph)	214	35	319	14	3	65
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	333				789	326
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	333				789	326
tC, single (s)	4.2				6.4	6.7
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.8
p0 queue free %	82				99	89
cM capacity (veh/h)	1199				298	610

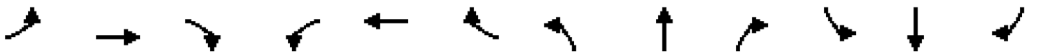
Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	249	333	68
Volume Left	214	0	3
Volume Right	0	14	65
cSH	1199	1700	583
Volume to Capacity	0.18	0.20	0.12
Queue Length 95th (ft)	16	0	10
Control Delay (s/veh)	7.7	0.0	12.0
Lane LOS	A		B
Approach Delay (s/veh)	7.7	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	49	1	28	470	6	16
Future Volume (Veh/h)	49	1	28	470	6	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.89	0.89	0.61	0.61
Hourly flow rate (vph)	59	1	31	528	10	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			60		650	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			60		650	60
tC, single (s)			4.2		6.6	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.7	3.4
p0 queue free %			98		98	97
cM capacity (veh/h)			1512		403	976

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	60	559	36
Volume Left	0	31	10
Volume Right	1	0	26
cSH	1700	1512	700
Volume to Capacity	0.04	0.02	0.05
Queue Length 95th (ft)	0	2	4
Control Delay (s/veh)	0.0	0.6	10.4
Lane LOS		A	B
Approach Delay (s/veh)	0.0	0.6	10.4
Approach LOS			B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	243	422	69	194	4	55	0	13	0	0	2
Future Volume (Veh/h)	3	243	422	69	194	4	55	0	13	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.86	0.86	0.86	0.50	0.50	0.50
Hourly flow rate (vph)	4	293	508	80	226	5	64	0	15	0	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	231			801			948	946	547	959	1198	229
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			801			948	946	547	959	1198	229
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.7
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.8
p0 queue free %	100			90			70	100	97	100	100	99
cM capacity (veh/h)	1349			831			215	237	525	214	169	705

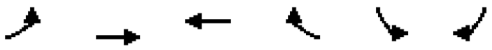
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	805	311	79	4
Volume Left	4	80	64	0
Volume Right	508	5	15	4
cSH	1349	831	242	705
Volume to Capacity	0.00	0.10	0.33	0.01
Queue Length 95th (ft)	0	8	34	0
Control Delay (s/veh)	0.1	3.3	26.9	10.1
Lane LOS	A	A	D	B
Approach Delay (s/veh)	0.1	3.3	26.9	10.1
Approach LOS			D	B

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	73.6%	ICU Level of Service	D	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	926	670	1215	61	270
v/c Ratio	0.88	0.47	0.83	0.39	0.24
Control Delay (s/veh)	46.1	2.2	36.7	57.6	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	46.1	2.2	36.7	57.6	13.3
Queue Length 50th (ft)	337	45	433	45	47
Queue Length 95th (ft)	409	56	#594	87	73
Internal Link Dist (ft)		1178	828	293	
Turn Bay Length (ft)	275			255	125
Base Capacity (vph)	1097	1433	1457	210	1089
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	0.84	0.47	0.83	0.29	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	907	657	867	263	57	254
Future Volume (vph)	907	657	867	263	57	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	13
Total Lost time (s)	7.0	5.5	5.5		6.5	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.88
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3303	1783	3365		1626	2295
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3303	1783	3365		1626	2295
Peak-hour factor, PHF	0.98	0.98	0.93	0.93	0.94	0.94
Adj. Flow (vph)	926	670	932	283	61	270
RTOR Reduction (vph)	0	0	22	0	0	44
Lane Group Flow (vph)	926	670	1193	0	61	226
Heavy Vehicles (%)	6%	3%	4%	2%	11%	28%
Turn Type	Prot	NA	NA		Prot	pt+ov
Protected Phases	1	6	2		8	1 8
Permitted Phases						
Actuated Green, G (s)	38.3	96.5	51.2		11.5	56.3
Effective Green, g (s)	38.3	96.5	51.2		11.5	49.8
Actuated g/C Ratio	0.32	0.80	0.43		0.10	0.42
Clearance Time (s)	7.0	5.5	5.5		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	1054	1433	1435		155	952
v/s Ratio Prot	c0.28	0.38	c0.35		c0.04	0.10
v/s Ratio Perm						
v/c Ratio	0.88	0.47	0.83		0.39	0.24
Uniform Delay, d1	38.6	3.7	30.6		51.0	22.8
Progression Factor	0.97	0.33	1.00		1.00	1.00
Incremental Delay, d2	6.9	0.9	5.7		1.6	0.1
Delay (s)	44.4	2.1	36.3		52.6	22.9
Level of Service	D	A	D		D	C
Approach Delay (s/veh)		26.6	36.3		28.4	
Approach LOS		C	D		C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	819	997	196	13	884
v/c Ratio	0.42	0.41	0.13	0.04	0.82
Control Delay (s/veh)	13.3	12.0	0.1	39.2	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	13.3	12.0	0.1	39.2	30.8
Queue Length 50th (ft)	147	204	0	8	247
Queue Length 95th (ft)	183	287	m0	26	327
Internal Link Dist (ft)	1461	1178			
Turn Bay Length (ft)			350		150
Base Capacity (vph)	1971	2447	1476	361	1145
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	0.42	0.41	0.13	0.04	0.77

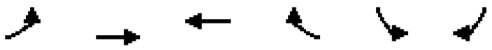
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	707	38	0	937	184	13	0	857	0	0	0
Future Volume (vph)	0	707	38	0	937	184	13	0	857	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	16	12	12	12	12	12	12
Total Lost time (s)		6.5			5.0	4.0	5.0		5.0			
Lane Util. Factor		0.95			0.95	1.00	1.00		0.88			
Frt		0.99			1.00	0.85	1.00		0.85			
Flt Protected		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3446			3406	1476	1805		2682			
Flt Permitted		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3446			3406	1476	1805		2682			
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	0	777	42	0	997	196	13	0	884	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	192	0	0	0
Lane Group Flow (vph)	0	816	0	0	997	196	13	0	692	0	0	0
Heavy Vehicles (%)	0%	4%	3%	0%	6%	24%	0%	0%	6%	2%	2%	2%
Turn Type		NA			NA	Free	Prot		custom			
Protected Phases		6			2		4		4 5			
Permitted Phases						Free						
Actuated Green, G (s)		68.6			86.3	120.0	23.7		39.9			
Effective Green, g (s)		68.6			86.3	120.0	23.7		39.9			
Actuated g/C Ratio		0.57			0.72	1.00	0.20		0.33			
Clearance Time (s)		6.5			5.0		5.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1969			2449	1476	356		891			
v/s Ratio Prot		0.24			c0.29		0.01		c0.26			
v/s Ratio Perm						0.13						
v/c Ratio		0.41			0.41	0.13	0.04		0.78			
Uniform Delay, d1		14.4			6.7	0.0	38.9		36.0			
Progression Factor		0.85			1.71	1.00	1.00		1.00			
Incremental Delay, d2		0.6			0.4	0.1	0.0		4.3			
Delay (s)		12.8			11.8	0.1	39.0		40.4			
Level of Service		B			B	A	D		D			
Approach Delay (s/veh)		12.8			9.9			40.3			0.0	
Approach LOS		B			A			D			A	

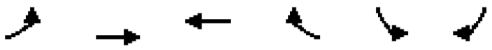
Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	31	310	176	891	496	77
v/c Ratio	0.06	0.38	0.27	0.52	0.32	0.04
Control Delay (s/veh)	19.5	24.9	28.1	4.9	20.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.5	24.9	28.1	4.9	20.9	0.0
Queue Length 50th (ft)	13	160	82	151	121	0
Queue Length 95th (ft)	32	235	143	203	160	0
Internal Link Dist (ft)		801	1461		1046	
Turn Bay Length (ft)	165				125	200
Base Capacity (vph)	500	807	655	1711	1527	1779
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.38	0.27	0.52	0.32	0.04

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	279	157	793	466	72
Future Volume (vph)	28	279	157	793	466	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	12	16
Total Lost time (s)	5.0	6.0	5.0	6.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1863	1810	1711	3273	1812
Flt Permitted	0.53	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1013	1863	1810	1711	3273	1812
Peak-hour factor, PHF	0.90	0.90	0.89	0.89	0.94	0.94
Adj. Flow (vph)	31	310	176	891	496	77
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	31	310	176	891	496	77
Heavy Vehicles (%)	0%	2%	5%	7%	7%	1%
Turn Type	pm+pt	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2	8	8	1 8
Permitted Phases	6			1 2		2
Actuated Green, G (s)	53.0	53.0	43.4	109.0	55.0	110.0
Effective Green, g (s)	53.0	53.0	43.4	104.0	55.0	104.0
Actuated g/C Ratio	0.44	0.44	0.36	0.87	0.46	0.87
Clearance Time (s)	5.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	484	822	654	1568	1500	1721
v/s Ratio Prot	0.00	0.17	0.10	c0.26	0.15	0.02
v/s Ratio Perm	0.03			0.26		0.02
v/c Ratio	0.06	0.38	0.27	0.57	0.33	0.04
Uniform Delay, d1	19.3	22.4	27.1	2.1	20.7	1.1
Progression Factor	1.00	1.00	0.95	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.3	0.2	0.4	0.6	0.0
Delay (s)	19.4	23.8	25.9	2.6	21.3	1.1
Level of Service	B	C	C	A	C	A
Approach Delay (s/veh)		23.4	6.4		18.6	
Approach LOS		C	A		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2024 Baseline Weekday Evening Peak Hour

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	250	1	0	250	53	31
Future Volume (Veh/h)	250	1	0	250	53	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.89	0.89	0.87	0.87
Hourly flow rate (vph)	275	1	0	281	61	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	360	79	97			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	360	79	97			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	57	100	100			
cM capacity (veh/h)	641	987	1509			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	276	281	97
Volume Left	275	0	0
Volume Right	1	0	36
cSH	642	1509	1700
Volume to Capacity	0.43	0.00	0.06
Queue Length 95th (ft)	54	0	0
Control Delay (s/veh)	14.8	0.0	0.0
Lane LOS	B		
Approach Delay (s/veh)	14.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	232	204	3	28	22	19
Future Volume (Veh/h)	232	204	3	28	22	19
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Hourly flow rate (vph)	249	219	4	40	31	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			249		297	249
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			249		297	249
tC, single (s)			4.1		6.6	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			100		95	97
cM capacity (veh/h)			1328		650	795

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	249	219	44	58
Volume Left	0	0	4	31
Volume Right	0	219	0	27
cSH	1700	1700	1328	1217
Volume to Capacity	0.15	0.13	0.00	0.05
Queue Length 95th (ft)	0	0	0	4
Control Delay (s/veh)	0.0	0.0	0.7	10.3
Lane LOS			A	B
Approach Delay (s/veh)	0.0		0.7	10.3
Approach LOS				B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	29	239	59	3	4	228
Future Volume (Veh/h)	29	239	59	3	4	228
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.90	0.90	0.87	0.87
Hourly flow rate (vph)	33	275	66	3	5	262
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	69				409	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	69				409	68
tC, single (s)	4.4				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.5				3.5	3.3
p0 queue free %	98				99	74
cM capacity (veh/h)	1366				588	993

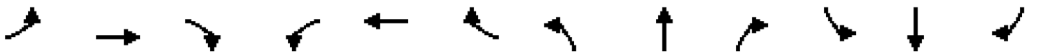
Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	308	69	267
Volume Left	33	0	5
Volume Right	0	3	262
cSH	1366	1700	980
Volume to Capacity	0.02	0.04	0.27
Queue Length 95th (ft)	2	0	28
Control Delay (s/veh)	1.0	0.0	10.0
Lane LOS	A		B
Approach Delay (s/veh)	1.0	0.0	10.0
Approach LOS			B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	377	0	9	39	1	51
Future Volume (Veh/h)	377	0	9	39	1	51
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.75	0.75	0.77	0.77
Hourly flow rate (vph)	414	0	12	52	1	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			414		490	414
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			414		490	414
tC, single (s)			4.8		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.8		3.5	3.4
p0 queue free %			99		100	90
cM capacity (veh/h)			868		534	630

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	414	64	67
Volume Left	0	12	1
Volume Right	0	0	66
cSH	1700	868	628
Volume to Capacity	0.24	0.01	0.11
Queue Length 95th (ft)	0	1	9
Control Delay (s/veh)	0.0	1.8	11.4
Lane LOS		A	B
Approach Delay (s/veh)	0.0	1.8	11.4
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	149	50	15	161	0	467	0	47	8	0	25
Future Volume (Veh/h)	3	149	50	15	161	0	467	0	47	8	0	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.90	0.90	0.90	0.38	0.38	0.38
Hourly flow rate (vph)	3	171	57	18	196	0	519	0	52	21	0	66
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	196			228			504	438	200	490	466	196
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196			228			504	438	200	490	466	196
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			0	100	94	95	100	92
cM capacity (veh/h)	1389			1352			439	508	847	457	489	840

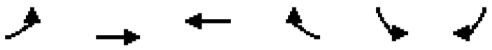
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	231	214	571	87
Volume Left	3	18	519	21
Volume Right	57	0	52	66
cSH	1389	1352	459	699
Volume to Capacity	0.00	0.01	1.24	0.12
Queue Length 95th (ft)	0	1	581	11
Control Delay (s/veh)	0.1	0.8	153.9	10.9
Lane LOS	A	A	F	B
Approach Delay (s/veh)	0.1	0.8	153.9	10.9
Approach LOS			F	B

Intersection Summary				
Average Delay	80.7			
Intersection Capacity Utilization	59.4%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	340	1120	988	329	1231
v/c Ratio	0.49	0.94	0.78	0.95	0.86
Control Delay (s/veh)	37.0	25.9	27.7	72.0	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.0	25.9	27.7	72.0	24.9
Queue Length 50th (ft)	90	514	224	164	278
Queue Length 95th (ft)	123	#684	269	#298	351
Internal Link Dist (ft)		1213	793	282	
Turn Bay Length (ft)	275			255	125
Base Capacity (vph)	695	1193	1267	346	1437
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	0.49	0.94	0.78	0.95	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	282	930	749	81	283	1059
Future Volume (vph)	282	930	749	81	283	1059
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	13
Total Lost time (s)	7.0	5.5	5.5		6.5	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3273	1818	3512		1787	2880
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3273	1818	3512		1787	2880
Peak-hour factor, PHF	0.83	0.83	0.84	0.84	0.86	0.86
Adj. Flow (vph)	340	1120	892	96	329	1231
RTOR Reduction (vph)	0	0	10	0	0	39
Lane Group Flow (vph)	340	1120	978	0	329	1192
Heavy Vehicles (%)	7%	1%	1%	4%	1%	2%
Turn Type	Prot	NA	NA		Prot	pt+ov
Protected Phases	1	6	2		8	1 8
Permitted Phases						
Actuated Green, G (s)	16.9	52.5	28.6		15.5	38.9
Effective Green, g (s)	16.9	52.5	28.6		15.5	32.4
Actuated g/C Ratio	0.21	0.66	0.36		0.19	0.41
Clearance Time (s)	7.0	5.5	5.5		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	691	1193	1255		346	1166
v/s Ratio Prot	0.10	c0.62	0.28		0.18	c0.41
v/s Ratio Perm						
v/c Ratio	0.49	0.94	0.78		0.95	1.02
Uniform Delay, d1	27.8	12.3	22.9		31.9	23.8
Progression Factor	1.24	0.87	1.00		1.00	1.00
Incremental Delay, d2	0.5	13.2	4.8		37.4	32.1
Delay (s)	35.0	23.9	27.7		69.3	55.9
Level of Service	C	C	C		E	E
Approach Delay (s/veh)		26.5	27.7		58.7	
Approach LOS		C	C		E	

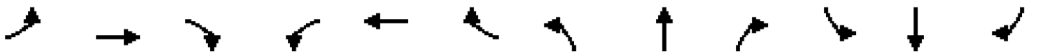
Intersection Summary			
HCM 2000 Control Delay (s/veh)	39.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	366	1434	553	161	1096
v/c Ratio	0.46	0.67	0.31	0.33	0.60
Control Delay (s/veh)	27.4	11.4	0.2	23.6	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.4	11.4	0.2	23.6	7.7
Queue Length 50th (ft)	78	245	0	63	112
Queue Length 95th (ft)	120	356	m0	95	141
Internal Link Dist (ft)	1476	1213			
Turn Bay Length (ft)			350		150
Base Capacity (vph)	798	2146	1794	609	1834
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	0.46	0.67	0.31	0.26	0.60

Intersection Summary

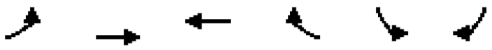
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	302	38	0	1305	503	134	0	910	0	0	0
Future Volume (vph)	0	302	38	0	1305	503	134	0	910	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	16	12	12	12	12	12	12
Total Lost time (s)		6.5			5.0	4.0	5.0		5.0			
Lane Util. Factor		0.95			0.95	1.00	1.00		0.88			
Frt		0.98			1.00	0.85	1.00		0.85			
Flt Protected		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3398			3574	1794	1805		2760			
Flt Permitted		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3398			3574	1794	1805		2760			
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.83	0.83	0.83	0.92	0.92	0.92
Adj. Flow (vph)	0	325	41	0	1434	553	161	0	1096	0	0	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	0	114	0	0	0
Lane Group Flow (vph)	0	354	0	0	1434	553	161	0	982	0	0	0
Heavy Vehicles (%)	0%	5%	0%	0%	1%	2%	0%	0%	3%	2%	2%	2%
Turn Type		NA			NA	Free	Prot		custom			
Protected Phases		6			2		4		4 5			
Permitted Phases						Free						
Actuated Green, G (s)		18.5			48.0	80.0	22.0		50.0			
Effective Green, g (s)		18.5			48.0	80.0	22.0		50.0			
Actuated g/C Ratio		0.23			0.60	1.00	0.28		0.63			
Clearance Time (s)		6.5			5.0		5.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		785			2144	1794	496		1725			
v/s Ratio Prot		0.10			c0.40		0.09		c0.36			
v/s Ratio Perm						0.31						
v/c Ratio		0.45			0.67	0.31	0.32		0.57			
Uniform Delay, d1		26.4			10.7	0.0	23.1		8.7			
Progression Factor		1.00			0.88	1.00	1.00		1.00			
Incremental Delay, d2		0.4			0.9	0.2	0.4		0.4			
Delay (s)		26.8			10.3	0.2	23.5		9.2			
Level of Service		C			B	A	C		A			
Approach Delay (s/veh)		26.8			7.5			11.0			0.0	
Approach LOS		C			A			B			A	

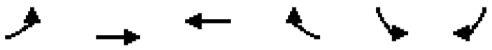
Intersection Summary			
HCM 2000 Control Delay (s/veh)	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	25	201	504	1060	174	128
v/c Ratio	0.06	0.18	0.58	0.59	0.22	0.07
Control Delay (s/veh)	6.8	7.8	18.4	1.4	20.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.8	7.8	18.4	1.4	20.9	0.1
Queue Length 50th (ft)	4	38	163	0	29	0
Queue Length 95th (ft)	13	70	272	0	51	0
Internal Link Dist (ft)		757	1476		887	
Turn Bay Length (ft)	165				125	200
Base Capacity (vph)	508	1101	875	1756	907	1778
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.18	0.58	0.60	0.19	0.07

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	23	187	464	975	153	113
Future Volume (vph)	23	187	464	975	153	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	12	16
Total Lost time (s)	5.0	6.0	5.0	6.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1900	1881	1794	3213	1830
Flt Permitted	0.28	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	538	1900	1881	1794	3213	1830
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.88	0.88
Adj. Flow (vph)	25	201	504	1060	174	128
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	25	201	504	1060	174	128
Heavy Vehicles (%)	0%	0%	1%	2%	9%	0%
Turn Type	pm+pt	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2	8	8	1 8
Permitted Phases	6			1 2		2
Actuated Green, G (s)	40.2	40.2	31.4	57.5	16.3	58.5
Effective Green, g (s)	40.2	40.2	31.4	52.5	16.3	52.5
Actuated g/C Ratio	0.59	0.59	0.46	0.77	0.24	0.77
Clearance Time (s)	5.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	1115	862	1532	764	1669
v/s Ratio Prot	0.00	0.11	0.27	c0.16	0.05	0.02
v/s Ratio Perm	0.03			0.43		0.05
v/c Ratio	0.06	0.18	0.58	0.69	0.23	0.08
Uniform Delay, d1	7.5	6.5	13.7	4.0	21.0	2.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.4	1.0	1.4	0.2	0.0
Delay (s)	7.6	6.9	14.7	5.3	21.2	2.0
Level of Service	A	A	B	A	C	A
Approach Delay (s/veh)		7.0	8.4		13.1	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2031 No-Build Weekday Morning Peak Hour

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	46	0	0	36	342	374
Future Volume (Veh/h)	46	0	0	36	342	374
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.60	0.60	0.92	0.92
Hourly flow rate (vph)	52	0	0	60	372	407
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	636	576	779			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	636	576	779			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	88	100	100			
cM capacity (veh/h)	428	521	847			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	52	60	779
Volume Left	52	0	0
Volume Right	0	0	407
cSH	428	847	1700
Volume to Capacity	0.12	0.00	0.46
Queue Length 95th (ft)	10	0	0
Control Delay (s/veh)	14.6	0.0	0.0
Lane LOS	B		
Approach Delay (s/veh)	14.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	40	55	18	356	244	6
Future Volume (Veh/h)	40	55	18	356	244	6
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	58	80	20	400	309	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			58		498	58
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			58		498	58
tC, single (s)			4.2		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.3
p0 queue free %			99		40	99
cM capacity (veh/h)			1479		516	1014

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	58	80	420	317
Volume Left	0	0	20	309
Volume Right	0	80	0	8
cSH	1700	1700	1479	527
Volume to Capacity	0.03	0.05	0.01	0.60
Queue Length 95th (ft)	0	0	1	98
Control Delay (s/veh)	0.0	0.0	0.5	21.6
Lane LOS			A	C
Approach Delay (s/veh)	0.0		0.5	21.6
Approach LOS				C

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	225	36	325	14	2	58
Future Volume (Veh/h)	225	36	325	14	2	58
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.90	0.90	0.74	0.74
Hourly flow rate (vph)	256	41	361	16	3	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	377				922	369
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	377				922	369
tC, single (s)	4.2				6.4	6.7
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.8
p0 queue free %	78				99	86
cM capacity (veh/h)	1155				235	575

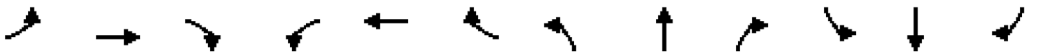
Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	297	377	81
Volume Left	256	0	3
Volume Right	0	16	78
cSH	1155	1700	546
Volume to Capacity	0.22	0.22	0.15
Queue Length 95th (ft)	21	0	13
Control Delay (s/veh)	8.0	0.0	12.7
Lane LOS	A		B
Approach Delay (s/veh)	8.0	0.0	12.7
Approach LOS			B

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	66	1	31	562	7	18
Future Volume (Veh/h)	66	1	31	562	7	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.89	0.89	0.61	0.61
Hourly flow rate (vph)	80	1	35	631	11	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			81		782	81
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			81		782	81
tC, single (s)			4.2		6.6	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.7	3.4
p0 queue free %			98		97	97
cM capacity (veh/h)			1486		335	950

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	81	666	41
Volume Left	0	35	11
Volume Right	1	0	30
cSH	1700	1486	636
Volume to Capacity	0.05	0.02	0.06
Queue Length 95th (ft)	0	2	5
Control Delay (s/veh)	0.0	0.7	11.0
Lane LOS		A	B
Approach Delay (s/veh)	0.0	0.7	11.0
Approach LOS			B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	270	493	82	215	4	68	0	15	0	0	2
Future Volume (Veh/h)	3	270	493	82	215	4	68	0	15	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.86	0.86	0.85	0.50	0.50	0.50
Hourly flow rate (vph)	4	325	594	95	250	5	79	0	18	0	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	255			919			1077	1075	622	1091	1370	253
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	255			919			1077	1075	622	1091	1370	253
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.7
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.8
p0 queue free %	100			87			54	100	96	100	100	99
cM capacity (veh/h)	1322			751			171	193	476	168	129	682

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	923	350	97	4
Volume Left	4	95	79	0
Volume Right	594	5	18	4
cSH	1322	751	194	682
Volume to Capacity	0.00	0.13	0.50	0.01
Queue Length 95th (ft)	0	11	62	0
Control Delay (s/veh)	0.1	4.0	40.8	10.3
Lane LOS	A	A	E	B
Approach Delay (s/veh)	0.1	4.0	40.8	10.3
Approach LOS			E	B

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

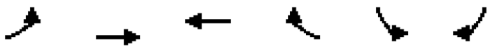
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1085	882	1407	71	313
v/c Ratio	1.01	0.64	1.06	0.34	0.26
Control Delay (s/veh)	63.0	3.6	77.4	52.6	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	63.0	3.6	77.4	52.6	14.9
Queue Length 50th (ft)	~425	49	~621	51	64
Queue Length 95th (ft)	m#521	m95	#762	98	96
Internal Link Dist (ft)		1039	766	272	
Turn Bay Length (ft)	275			255	125
Base Capacity (vph)	1073	1374	1327	210	1188
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	1.01	0.64	1.06	0.34	0.26

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1063	864	1003	306	67	294
Future Volume (vph)	1063	864	1003	306	67	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	13
Total Lost time (s)	7.0	5.5	5.5		6.5	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.88
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3303	1783	3365		1626	2295
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3303	1783	3365		1626	2295
Peak-hour factor, PHF	0.98	0.98	0.93	0.93	0.94	0.94
Adj. Flow (vph)	1085	882	1078	329	71	313
RTOR Reduction (vph)	0	0	24	0	0	24
Lane Group Flow (vph)	1085	882	1383	0	71	289
Heavy Vehicles (%)	6%	3%	4%	2%	11%	28%
Turn Type	Prot	NA	NA		Prot	pt+ov
Protected Phases	1	6	2		8	1 8
Permitted Phases						
Actuated Green, G (s)	39.0	92.5	46.5		15.5	61.0
Effective Green, g (s)	39.0	92.5	46.5		15.5	54.5
Actuated g/C Ratio	0.33	0.77	0.39		0.13	0.45
Clearance Time (s)	7.0	5.5	5.5		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	1073	1374	1303		210	1042
v/s Ratio Prot	c0.33	0.49	c0.41		c0.04	0.13
v/s Ratio Perm						
v/c Ratio	1.01	0.64	1.06		0.34	0.28
Uniform Delay, d1	40.5	6.2	36.8		47.6	20.5
Progression Factor	0.96	0.34	1.00		1.00	1.00
Incremental Delay, d2	24.1	1.4	43.0		4.3	0.1
Delay (s)	62.9	3.5	79.8		51.9	20.6
Level of Service	E	A	E		D	C
Approach Delay (s/veh)		36.3	79.8		26.4	
Approach LOS		D	E		C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	51.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	1011	1144	236	14	1081
v/c Ratio	0.54	0.47	0.16	0.04	0.99
Control Delay (s/veh)	15.1	14.3	0.1	39.2	56.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	15.1	14.3	0.1	39.2	56.0
Queue Length 50th (ft)	196	264	0	9	410
Queue Length 95th (ft)	231	m262	m0	28	#581
Internal Link Dist (ft)	1673	1039			
Turn Bay Length (ft)			350		150
Base Capacity (vph)	1856	2440	1476	361	1096
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	0.54	0.47	0.16	0.04	0.99

Intersection Summary

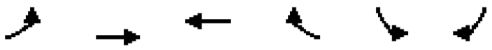
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	878	42	0	1075	222	14	0	1049	0	0	0
Future Volume (vph)	0	878	42	0	1075	222	14	0	1049	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	16	12	12	12	12	12	12
Total Lost time (s)		6.5			5.0	4.0	5.0		5.0			
Lane Util. Factor		0.95			0.95	1.00	1.00		0.88			
Frt		0.99			1.00	0.85	1.00		0.85			
Flt Protected		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3449			3406	1476	1805		2682			
Flt Permitted		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3449			3406	1476	1805		2682			
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	0	965	46	0	1144	236	14	0	1081	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	113	0	0	0
Lane Group Flow (vph)	0	1008	0	0	1144	236	14	0	968	0	0	0
Heavy Vehicles (%)	0%	4%	3%	0%	6%	24%	0%	0%	6%	2%	2%	2%
Turn Type		NA			NA	Free	Prot		custom			
Protected Phases		6			2		4		4 5			
Permitted Phases						Free						
Actuated Green, G (s)		64.5			86.0	120.0	24.0		44.0			
Effective Green, g (s)		64.5			86.0	120.0	24.0		44.0			
Actuated g/C Ratio		0.54			0.72	1.00	0.20		0.37			
Clearance Time (s)		6.5			5.0		5.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1853			2440	1476	361		983			
v/s Ratio Prot		c0.29			0.34		0.01		c0.36			
v/s Ratio Perm						0.16						
v/c Ratio		0.54			0.47	0.16	0.04		0.99			
Uniform Delay, d1		18.1			7.3	0.0	38.7		37.7			
Progression Factor		0.77			1.91	1.00	1.00		1.00			
Incremental Delay, d2		1.1			0.3	0.1	0.0		24.9			
Delay (s)		15.0			14.1	0.1	38.7		62.5			
Level of Service		B			B	A	D		E			
Approach Delay (s/veh)		15.0			11.7			62.2			0.0	
Approach LOS		B			B			E			A	

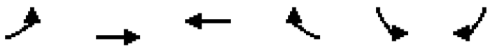
Intersection Summary			
HCM 2000 Control Delay (s/veh)	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	34	383	206	1018	612	85
v/c Ratio	0.07	0.47	0.32	0.59	0.40	0.05
Control Delay (s/veh)	19.6	26.7	26.7	6.5	22.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.6	26.7	26.7	6.5	22.0	0.1
Queue Length 50th (ft)	15	208	104	200	156	0
Queue Length 95th (ft)	35	297	153	222	202	0
Internal Link Dist (ft)		782	1673		852	
Turn Bay Length (ft)	165				125	200
Base Capacity (vph)	474	807	653	1711	1527	1778
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.47	0.32	0.59	0.40	0.05

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	31	345	183	906	575	80
Future Volume (vph)	31	345	183	906	575	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	12	16
Total Lost time (s)	5.0	6.0	5.0	6.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1863	1810	1711	3273	1812
Flt Permitted	0.50	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	945	1863	1810	1711	3273	1812
Peak-hour factor, PHF	0.90	0.90	0.89	0.89	0.94	0.94
Adj. Flow (vph)	34	383	206	1018	612	85
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	34	383	206	1018	612	85
Heavy Vehicles (%)	0%	2%	5%	7%	7%	1%
Turn Type	pm+pt	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2	8	8	1 8
Permitted Phases	6			1 2		2
Actuated Green, G (s)	53.0	53.0	43.4	109.0	55.0	110.0
Effective Green, g (s)	53.0	53.0	43.4	104.0	55.0	104.0
Actuated g/C Ratio	0.44	0.44	0.36	0.87	0.46	0.87
Clearance Time (s)	5.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	457	822	654	1568	1500	1721
v/s Ratio Prot	0.00	0.21	0.11	c0.30	0.19	0.02
v/s Ratio Perm	0.03			0.30		0.02
v/c Ratio	0.07	0.47	0.31	0.65	0.41	0.05
Uniform Delay, d1	19.5	23.6	27.6	2.4	21.7	1.1
Progression Factor	1.00	1.00	0.87	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.9	0.3	0.9	0.8	0.0
Delay (s)	19.6	25.4	24.4	3.3	22.5	1.1
Level of Service	B	C	C	A	C	A
Approach Delay (s/veh)		25.0	6.8		19.9	
Approach LOS		C	A		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2031 No-Build Weekday Evening Peak Hour

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	301	1	0	283	61	44
Future Volume (Veh/h)	301	1	0	283	61	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.89	0.89	0.87	0.87
Hourly flow rate (vph)	331	1	0	318	70	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	414	96	121			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	414	96	121			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	45	100	100			
cM capacity (veh/h)	597	967	1479			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	332	318	121
Volume Left	331	0	0
Volume Right	1	0	51
cSH	598	1479	1700
Volume to Capacity	0.56	0.00	0.07
Queue Length 95th (ft)	85	0	0
Control Delay (s/veh)	18.3	0.0	0.0
Lane LOS	C		
Approach Delay (s/veh)	18.3	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	281	242	3	41	29	21
Future Volume (Veh/h)	281	242	3	41	29	21
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Hourly flow rate (vph)	302	260	4	59	41	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			302		369	302
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			302		369	302
tC, single (s)			4.1		6.6	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.3
p0 queue free %			100		93	96
cM capacity (veh/h)			1270		590	742

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	302	260	63	71
Volume Left	0	0	4	41
Volume Right	0	260	0	30
cSH	1700	1700	1270	1021
Volume to Capacity	0.18	0.15	0.00	0.07
Queue Length 95th (ft)	0	0	0	6
Control Delay (s/veh)	0.0	0.0	0.5	10.9
Lane LOS			A	B
Approach Delay (s/veh)	0.0		0.5	10.9
Approach LOS				B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	37	271	67	3	4	269
Future Volume (Veh/h)	37	271	67	3	4	269
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.90	0.90	0.87	0.87
Hourly flow rate (vph)	43	311	74	3	5	309
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	77				473	76
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	77				473	76
tC, single (s)	4.4				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.5				3.5	3.3
p0 queue free %	97				99	69
cM capacity (veh/h)	1357				536	983

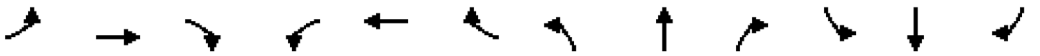
Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	354	77	314
Volume Left	43	0	5
Volume Right	0	3	309
cSH	1357	1700	970
Volume to Capacity	0.03	0.05	0.32
Queue Length 95th (ft)	2	0	35
Control Delay (s/veh)	1.2	0.0	10.5
Lane LOS	A		B
Approach Delay (s/veh)	1.2	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	458	0	10	58	1	57
Future Volume (Veh/h)	458	0	10	58	1	57
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.75	0.75	0.77	0.77
Hourly flow rate (vph)	503	0	13	77	1	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			503		606	503
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			503		606	503
tC, single (s)			4.8		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.8		3.5	3.4
p0 queue free %			98		100	87
cM capacity (veh/h)			797		456	561

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	503	90	75
Volume Left	0	13	1
Volume Right	0	0	74
cSH	1700	797	559
Volume to Capacity	0.30	0.02	0.13
Queue Length 95th (ft)	0	1	12
Control Delay (s/veh)	0.0	1.5	12.4
Lane LOS		A	B
Approach Delay (s/veh)	0.0	1.5	12.4
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	165	65	19	179	0	543	0	57	8	0	25
Future Volume (Veh/h)	3	165	65	19	179	0	543	0	57	8	0	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.90	0.90	0.90	0.38	0.38	0.38
Hourly flow rate (vph)	3	190	75	23	218	0	603	0	63	21	0	66
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	218			265			564	498	228	561	535	218
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	218			265			564	498	228	561	535	218
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			0	100	92	95	100	92
cM capacity (veh/h)	1364			1311			398	468	817	401	445	817

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	268	241	666	87
Volume Left	3	23	603	21
Volume Right	75	0	63	66
cSH	1364	1311	418	654
Volume to Capacity	0.00	0.02	1.59	0.13
Queue Length 95th (ft)	0	1	940	11
Control Delay (s/veh)	0.1	0.9	301.4	11.4
Lane LOS	A	A	F	B
Approach Delay (s/veh)	0.1	0.9	301.4	11.4
Approach LOS			F	B

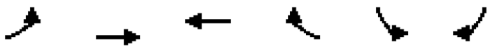
Intersection Summary			
Average Delay	160.0		
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	395	1306	1259	380	1428
v/c Ratio	0.57	1.09	1.00	1.10	1.01
Control Delay (s/veh)	37.3	67.7	51.8	110.9	48.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.3	67.7	51.8	110.9	48.1
Queue Length 50th (ft)	107	~762	322	~219	~392
Queue Length 95th (ft)	138	#857	#419	#358	#526
Internal Link Dist (ft)		1276	719	8125	
Turn Bay Length (ft)	275			255	125
Base Capacity (vph)	695	1193	1262	346	1415
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	0.57	1.09	1.00	1.10	1.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	328	1084	963	95	327	1228
Future Volume (vph)	328	1084	963	95	327	1228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	13
Total Lost time (s)	7.0	5.5	5.5		6.5	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3273	1818	3517		1787	2880
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3273	1818	3517		1787	2880
Peak-hour factor, PHF	0.83	0.83	0.84	0.84	0.86	0.86
Adj. Flow (vph)	395	1306	1146	113	380	1428
RTOR Reduction (vph)	0	0	9	0	0	14
Lane Group Flow (vph)	395	1306	1250	0	380	1414
Heavy Vehicles (%)	7%	1%	1%	4%	1%	2%
Turn Type	Prot	NA	NA		Prot	pt+ov
Protected Phases	1	6	2		8	1 8
Permitted Phases						
Actuated Green, G (s)	17.0	52.5	28.5		15.5	39.0
Effective Green, g (s)	17.0	52.5	28.5		15.5	32.5
Actuated g/C Ratio	0.21	0.66	0.36		0.19	0.41
Clearance Time (s)	7.0	5.5	5.5		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	695	1193	1252		346	1170
v/s Ratio Prot	0.12	c0.72	0.36		0.21	c0.49
v/s Ratio Perm						
v/c Ratio	0.57	1.09	1.00		1.10	1.21
Uniform Delay, d1	28.2	13.8	25.7		32.3	23.8
Progression Factor	1.22	0.76	1.00		1.00	1.00
Incremental Delay, d2	0.8	53.2	25.1		77.4	102.2
Delay (s)	35.1	63.6	50.8		109.7	125.9
Level of Service	D	E	D		F	F
Approach Delay (s/veh)		57.0	50.8		122.5	
Approach LOS		E	D		F	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	80.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.25		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	443	1732	676	180	1255
v/c Ratio	0.56	0.87	0.38	0.32	0.70
Control Delay (s/veh)	29.3	16.7	0.1	21.9	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.3	16.7	0.1	21.9	10.7
Queue Length 50th (ft)	100	374	0	65	176
Queue Length 95th (ft)	146	m373	m0	105	210
Internal Link Dist (ft)	1444	1276			
Turn Bay Length (ft)			350		150
Base Capacity (vph)	797	1997	1794	609	1775
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	0.56	0.87	0.38	0.30	0.71

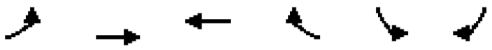
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	370	42	0	1576	615	149	0	1042	0	0	0
Future Volume (vph)	0	370	42	0	1576	615	149	0	1042	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	16	12	12	12	12	12	12
Total Lost time (s)		6.5			5.0	4.0	5.0		5.0			
Lane Util. Factor		0.95			0.95	1.00	1.00		0.88			
Frt		0.98			1.00	0.85	1.00		0.85			
Flt Protected		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3402			3574	1794	1805		2760			
Flt Permitted		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3402			3574	1794	1805		2760			
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.83	0.83	0.83	0.92	0.92	0.92
Adj. Flow (vph)	0	398	45	0	1732	676	180	0	1255	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	74	0	0	0
Lane Group Flow (vph)	0	432	0	0	1732	676	180	0	1182	0	0	0
Heavy Vehicles (%)	0%	5%	0%	0%	1%	2%	0%	0%	3%	2%	2%	2%
Turn Type		NA			NA	Free	Prot		custom			
Protected Phases		6			2		4		4 5			
Permitted Phases						Free						
Actuated Green, G (s)		18.5			44.7	80.0	25.3		50.0			
Effective Green, g (s)		18.5			44.7	80.0	25.3		50.0			
Actuated g/C Ratio		0.23			0.56	1.00	0.32		0.63			
Clearance Time (s)		6.5			5.0		5.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		786			1996	1794	570		1725			
v/s Ratio Prot		0.13			c0.48		0.10		c0.43			
v/s Ratio Perm						0.38						
v/c Ratio		0.55			0.87	0.38	0.32		0.68			
Uniform Delay, d1		27.1			15.1	0.0	20.8		9.8			
Progression Factor		1.00			0.97	1.00	1.00		1.00			
Incremental Delay, d2		0.8			0.5	0.1	0.3		1.1			
Delay (s)		27.9			15.2	0.1	21.1		11.0			
Level of Service		C			B	A	C		B			
Approach Delay (s/veh)		27.9			11.0			12.2			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

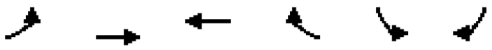
c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	28	238	596	1279	217	142
v/c Ratio	0.08	0.22	0.70	0.71	0.26	0.08
Control Delay (s/veh)	7.1	8.4	22.8	2.4	21.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	7.1	8.4	22.8	2.4	21.0	0.1
Queue Length 50th (ft)	5	47	211	0	37	0
Queue Length 95th (ft)	14	82	#383	0	62	0
Internal Link Dist (ft)		783	1444		1069	
Turn Bay Length (ft)	165				125	200
Base Capacity (vph)	425	1074	850	1787	885	1804
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.22	0.70	0.72	0.25	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	26	221	548	1177	191	125
Future Volume (vph)	26	221	548	1177	191	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	12	16
Total Lost time (s)	5.0	6.0	5.0	6.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1900	1881	1794	3213	1830
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	378	1900	1881	1794	3213	1830
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.88	0.88
Adj. Flow (vph)	28	238	596	1279	217	142
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	28	238	596	1279	217	142
Heavy Vehicles (%)	0%	0%	1%	2%	9%	0%
Turn Type	pm+pt	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2	8	8	1 8
Permitted Phases	6			1 2		2
Actuated Green, G (s)	40.1	40.1	31.2	59.1	18.0	60.1
Effective Green, g (s)	40.1	40.1	31.2	54.1	18.0	54.1
Actuated g/C Ratio	0.57	0.57	0.45	0.77	0.26	0.77
Clearance Time (s)	5.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	315	1086	837	1538	825	1673
v/s Ratio Prot	0.01	0.13	0.32	c0.21	0.07	0.03
v/s Ratio Perm	0.04			0.50		0.05
v/c Ratio	0.09	0.22	0.71	0.83	0.26	0.08
Uniform Delay, d1	9.3	7.3	15.8	5.1	20.8	2.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.5	2.9	4.0	0.2	0.0
Delay (s)	9.4	7.8	18.7	9.1	20.9	2.0
Level of Service	A	A	B	A	C	A
Approach Delay (s/veh)		8.0	12.1		13.4	
Approach LOS		A	B		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	70.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2031 Build Weekday Morning Peak Hour

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	49	0	0	36	342	421
Future Volume (Veh/h)	49	0	0	36	342	421
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.60	0.60	0.92	0.92
Hourly flow rate (vph)	56	0	0	60	372	458
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	661	601	830			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	661	601	830			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	87	100	100			
cM capacity (veh/h)	415	504	811			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	56	60	830
Volume Left	56	0	0
Volume Right	0	0	458
cSH	415	811	1700
Volume to Capacity	0.13	0.00	0.49
Queue Length 95th (ft)	12	0	0
Control Delay (s/veh)	15.0	0.0	0.0
Lane LOS	C		
Approach Delay (s/veh)	15.0	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	43	59	18	403	305	6
Future Volume (Veh/h)	43	59	18	403	305	6
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	62	86	20	453	386	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			62		555	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		555	62
tC, single (s)			4.2		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.3
p0 queue free %			99		19	99
cM capacity (veh/h)			1474		479	1009

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	62	86	473	394
Volume Left	0	0	20	386
Volume Right	0	86	0	8
cSH	1700	1700	1474	486
Volume to Capacity	0.04	0.05	0.01	0.81
Queue Length 95th (ft)	0	0	1	192
Control Delay (s/veh)	0.0	0.0	0.4	36.9
Lane LOS			A	E
Approach Delay (s/veh)	0.0		0.4	36.9
Approach LOS				E

Intersection Summary			
Average Delay	14.5		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	280	36	325	14	2	62
Future Volume (Veh/h)	280	36	325	14	2	62
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.90	0.90	0.74	0.74
Hourly flow rate (vph)	318	41	361	16	3	84
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	377				1046	369
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	377				1046	369
tC, single (s)	4.2				6.4	6.7
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.8
p0 queue free %	73				98	85
cM capacity (veh/h)	1160				185	578

Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	359	377	87
Volume Left	318	0	3
Volume Right	0	16	84
cSH	1160	1700	539
Volume to Capacity	0.27	0.22	0.16
Queue Length 95th (ft)	28	0	14
Control Delay (s/veh)	8.5	0.0	13.0
Lane LOS	A		B
Approach Delay (s/veh)	8.5	0.0	13.0
Approach LOS			B

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	72	1	32	669	7	19
Future Volume (Veh/h)	72	1	32	669	7	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.89	0.89	0.61	0.61
Hourly flow rate (vph)	87	1	36	752	11	31
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			88		912	88
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			88		912	88
tC, single (s)			4.2		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.3		3.7	3.5
p0 queue free %			98		96	97
cM capacity (veh/h)			1459		279	928

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	88	788	42
Volume Left	0	36	11
Volume Right	1	0	31
cSH	1700	1459	577
Volume to Capacity	0.05	0.02	0.07
Queue Length 95th (ft)	0	2	6
Control Delay (s/veh)	0.0	0.7	11.7
Lane LOS		A	B
Approach Delay (s/veh)	0.0	0.7	11.7
Approach LOS			B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	270	533	89	215	4	70	0	16	0	0	2
Future Volume (Veh/h)	3	270	533	89	215	4	70	0	16	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.86	0.86	0.86	0.50	0.50	0.50
Hourly flow rate (vph)	4	325	642	103	250	5	81	0	19	0	0	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	255			967			1117	1115	646	1132	1434	253
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	255			967			1117	1115	646	1132	1434	253
tC, single (s)	4.1			4.1			7.2	6.5	6.3	7.1	6.5	6.7
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.8
p0 queue free %	100			86			49	100	96	100	100	99
cM capacity (veh/h)	1322			720			158	179	461	155	116	682

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	971	358	100	4
Volume Left	4	103	81	0
Volume Right	642	5	19	4
cSH	1322	720	181	682
Volume to Capacity	0.00	0.14	0.55	0.01
Queue Length 95th (ft)	0	12	72	0
Control Delay (s/veh)	0.1	4.4	47.2	10.3
Lane LOS	A	A	E	B
Approach Delay (s/veh)	0.1	4.4	47.2	10.3
Approach LOS			E	B

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	85.1%	ICU Level of Service	E	
Analysis Period (min)	15			

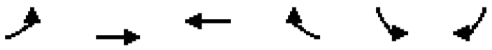
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1139	882	1416	71	317
v/c Ratio	1.06	0.64	1.07	0.34	0.27
Control Delay (s/veh)	76.4	3.5	79.6	52.6	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	76.4	3.5	79.6	52.6	15.0
Queue Length 50th (ft)	~496	47	~628	51	64
Queue Length 95th (ft)	m#542	m86	#769	98	97
Internal Link Dist (ft)		1039	766	272	
Turn Bay Length (ft)	275			255	125
Base Capacity (vph)	1073	1374	1327	210	1188
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	1.06	0.64	1.07	0.34	0.27

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1116	864	1003	314	67	298
Future Volume (vph)	1116	864	1003	314	67	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	13
Total Lost time (s)	7.0	5.5	5.5		6.5	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.88
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3303	1783	3362		1626	2295
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3303	1783	3362		1626	2295
Peak-hour factor, PHF	0.98	0.98	0.93	0.93	0.94	0.94
Adj. Flow (vph)	1139	882	1078	338	71	317
RTOR Reduction (vph)	0	0	25	0	0	24
Lane Group Flow (vph)	1139	882	1391	0	71	293
Heavy Vehicles (%)	6%	3%	4%	2%	11%	28%
Turn Type	Prot	NA	NA		Prot	pt+ov
Protected Phases	1	6	2		8	1 8
Permitted Phases						
Actuated Green, G (s)	39.0	92.5	46.5		15.5	61.0
Effective Green, g (s)	39.0	92.5	46.5		15.5	54.5
Actuated g/C Ratio	0.33	0.77	0.39		0.13	0.45
Clearance Time (s)	7.0	5.5	5.5		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	1073	1374	1302		210	1042
v/s Ratio Prot	c0.34	0.49	c0.41		c0.04	0.13
v/s Ratio Perm						
v/c Ratio	1.06	0.64	1.07		0.34	0.28
Uniform Delay, d1	40.5	6.2	36.8		47.6	20.5
Progression Factor	0.94	0.33	1.00		1.00	1.00
Incremental Delay, d2	39.1	1.3	45.4		4.3	0.1
Delay (s)	77.2	3.4	82.1		51.9	20.6
Level of Service	E	A	F		D	C
Approach Delay (s/veh)		45.0	82.1		26.4	
Approach LOS		D	F		C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	56.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	1016	1148	236	14	1131
v/c Ratio	0.55	0.47	0.16	0.04	1.03
Control Delay (s/veh)	15.2	14.3	0.1	39.2	68.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	15.2	14.3	0.1	39.2	68.3
Queue Length 50th (ft)	198	265	0	9	~482
Queue Length 95th (ft)	234	m262	m0	28	#631
Internal Link Dist (ft)	1673	1039			
Turn Bay Length (ft)			350		150
Base Capacity (vph)	1856	2440	1476	361	1094
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	0.55	0.47	0.16	0.04	1.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

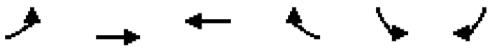
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	883	42	0	1079	222	14	0	1097	0	0	0
Future Volume (vph)	0	883	42	0	1079	222	14	0	1097	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	16	12	12	12	12	12	12
Total Lost time (s)		6.5			5.0	4.0	5.0		5.0			
Lane Util. Factor		0.95			0.95	1.00	1.00		0.88			
Frt		0.99			1.00	0.85	1.00		0.85			
Flt Protected		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3449			3406	1476	1805		2682			
Flt Permitted		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3449			3406	1476	1805		2682			
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	0	970	46	0	1148	236	14	0	1131	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	111	0	0	0
Lane Group Flow (vph)	0	1013	0	0	1148	236	14	0	1020	0	0	0
Heavy Vehicles (%)	0%	4%	3%	0%	6%	24%	0%	0%	6%	2%	2%	2%
Turn Type		NA			NA	Free	Prot		custom			
Protected Phases		6			2		4		4 5			
Permitted Phases						Free						
Actuated Green, G (s)		64.5			86.0	120.0	24.0		44.0			
Effective Green, g (s)		64.5			86.0	120.0	24.0		44.0			
Actuated g/C Ratio		0.54			0.72	1.00	0.20		0.37			
Clearance Time (s)		6.5			5.0		5.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1853			2440	1476	361		983			
v/s Ratio Prot		c0.29			0.34		0.01		c0.38			
v/s Ratio Perm						0.16						
v/c Ratio		0.55			0.47	0.16	0.04		1.04			
Uniform Delay, d1		18.2			7.3	0.0	38.7		38.0			
Progression Factor		0.77			1.91	1.00	1.00		1.00			
Incremental Delay, d2		1.1			0.3	0.1	0.0		39.0			
Delay (s)		15.1			14.2	0.1	38.7		77.0			
Level of Service		B			B	A	D		E			
Approach Delay (s/veh)		15.1			11.8			76.5			0.0	
Approach LOS		B			B			E			A	

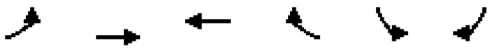
Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	34	389	206	1022	612	85
v/c Ratio	0.07	0.48	0.32	0.60	0.40	0.05
Control Delay (s/veh)	19.6	26.9	26.8	6.5	22.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.6	26.9	26.8	6.5	22.0	0.1
Queue Length 50th (ft)	15	212	104	202	156	0
Queue Length 95th (ft)	35	302	153	224	202	0
Internal Link Dist (ft)		782	1673		852	
Turn Bay Length (ft)	165				125	200
Base Capacity (vph)	474	807	653	1711	1527	1778
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.48	0.32	0.60	0.40	0.05

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	31	350	183	910	575	80
Future Volume (vph)	31	350	183	910	575	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	12	16
Total Lost time (s)	5.0	6.0	5.0	6.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1863	1810	1711	3273	1812
Flt Permitted	0.50	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	945	1863	1810	1711	3273	1812
Peak-hour factor, PHF	0.90	0.90	0.89	0.89	0.94	0.94
Adj. Flow (vph)	34	389	206	1022	612	85
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	34	389	206	1022	612	85
Heavy Vehicles (%)	0%	2%	5%	7%	7%	1%
Turn Type	pm+pt	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2	8	8	1 8
Permitted Phases	6			1 2		2
Actuated Green, G (s)	53.0	53.0	43.4	109.0	55.0	110.0
Effective Green, g (s)	53.0	53.0	43.4	104.0	55.0	104.0
Actuated g/C Ratio	0.44	0.44	0.36	0.87	0.46	0.87
Clearance Time (s)	5.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	457	822	654	1568	1500	1721
v/s Ratio Prot	0.00	0.21	0.11	c0.30	0.19	0.02
v/s Ratio Perm	0.03			0.30		0.02
v/c Ratio	0.07	0.47	0.31	0.65	0.41	0.05
Uniform Delay, d1	19.5	23.6	27.6	2.5	21.7	1.1
Progression Factor	1.00	1.00	0.88	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.0	0.3	0.9	0.8	0.0
Delay (s)	19.6	25.6	24.5	3.3	22.5	1.1
Level of Service	B	C	C	A	C	A
Approach Delay (s/veh)		25.1	6.9		19.9	
Approach LOS		C	A		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2031 Build Weekday Evening Peak Hour

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	336	1	0	283	61	58
Future Volume (Veh/h)	336	1	0	283	61	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.89	0.89	0.87	0.87
Hourly flow rate (vph)	369	1	0	318	70	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	422	104	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422	104	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	38	100	100			
cM capacity (veh/h)	591	957	1459			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	370	318	137
Volume Left	369	0	0
Volume Right	1	0	67
cSH	591	1459	1700
Volume to Capacity	0.63	0.00	0.08
Queue Length 95th (ft)	108	0	0
Control Delay (s/veh)	20.7	0.0	0.0
Lane LOS	C		
Approach Delay (s/veh)	20.7	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	9.3		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	328	304	3	60	54	21
Future Volume (Veh/h)	328	304	3	60	54	21
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Hourly flow rate (vph)	353	327	4	86	76	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			353		447	353
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			353		447	353
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		86	96
cM capacity (veh/h)			1217		546	695

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	353	327	90	106
Volume Left	0	0	4	76
Volume Right	0	327	0	30
cSH	1700	1700	1217	761
Volume to Capacity	0.21	0.19	0.00	0.14
Queue Length 95th (ft)	0	0	0	12
Control Delay (s/veh)	0.0	0.0	0.4	12.0
Lane LOS			A	B
Approach Delay (s/veh)	0.0		0.4	12.0
Approach LOS				B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	62	271	67	3	4	331
Future Volume (Veh/h)	62	271	67	3	4	331
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.90	0.90	0.87	0.87
Hourly flow rate (vph)	71	311	74	3	5	380
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	77				529	76
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	77				529	76
tC, single (s)	4.3				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.4				3.5	3.3
p0 queue free %	95				99	61
cM capacity (veh/h)	1415				488	983

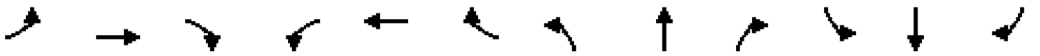
Direction, Lane #	NB 1	SB 1	SE 1
Volume Total	382	77	385
Volume Left	71	0	5
Volume Right	0	3	380
cSH	1415	1700	970
Volume to Capacity	0.05	0.05	0.40
Queue Length 95th (ft)	4	0	48
Control Delay (s/veh)	1.8	0.0	11.1
Lane LOS	A		B
Approach Delay (s/veh)	1.8	0.0	11.1
Approach LOS			B

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	565	0	11	101	1	59
Future Volume (Veh/h)	565	0	11	101	1	59
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.75	0.75	0.77	0.77
Hourly flow rate (vph)	621	0	15	135	1	77
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			621		786	621
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			621		786	621
tC, single (s)			4.8		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.8		3.5	3.4
p0 queue free %			98		100	84
cM capacity (veh/h)			702		356	475

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	621	150	78
Volume Left	0	15	1
Volume Right	0	0	77
cSH	1700	702	473
Volume to Capacity	0.37	0.02	0.16
Queue Length 95th (ft)	0	2	15
Control Delay (s/veh)	0.0	1.2	14.1
Lane LOS		A	B
Approach Delay (s/veh)	0.0	1.2	14.1
Approach LOS			B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	165	81	22	179	0	583	0	64	8	0	25
Future Volume (Veh/h)	3	165	81	22	179	0	583	0	64	8	0	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.90	0.90	0.90	0.38	0.38	0.38
Hourly flow rate (vph)	3	190	93	27	218	0	648	0	71	21	0	66
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	218			283			581	515	237	586	561	218
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	218			283			581	515	237	586	561	218
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			0	100	91	94	100	92
cM capacity (veh/h)	1364			1291			387	456	807	381	429	817

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	286	245	719	87
Volume Left	3	27	648	21
Volume Right	93	0	71	66
cSH	1364	1291	408	640
Volume to Capacity	0.00	0.02	1.76	0.14
Queue Length 95th (ft)	0	2	1123	12
Control Delay (s/veh)	0.1	1.0	376.5	11.5
Lane LOS	A	A	F	B
Approach Delay (s/veh)	0.1	1.0	376.5	11.5
Approach LOS			F	B

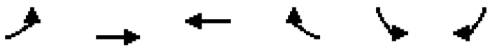
Intersection Summary				
Average Delay	203.4			
Intersection Capacity Utilization	72.9%	ICU Level of Service	C	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	422	1306	1263	390	1491
v/c Ratio	0.61	1.09	1.00	1.13	1.05
Control Delay (s/veh)	38.0	67.5	52.8	120.4	61.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	38.0	67.5	52.8	120.4	61.5
Queue Length 50th (ft)	115	~762	~324	~229	~467
Queue Length 95th (ft)	150	#858	#421	#370	#564
Internal Link Dist (ft)		1276	719	8125	
Turn Bay Length (ft)	275			255	125
Base Capacity (vph)	695	1193	1261	346	1415
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	0.61	1.09	1.00	1.13	1.05

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	350	1084	963	98	335	1282
Future Volume (vph)	350	1084	963	98	335	1282
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	13
Total Lost time (s)	7.0	5.5	5.5		6.5	7.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.88
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3273	1818	3515		1787	2880
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3273	1818	3515		1787	2880
Peak-hour factor, PHF	0.83	0.83	0.84	0.84	0.86	0.86
Adj. Flow (vph)	422	1306	1146	117	390	1491
RTOR Reduction (vph)	0	0	10	0	0	14
Lane Group Flow (vph)	422	1306	1253	0	390	1477
Heavy Vehicles (%)	7%	1%	1%	4%	1%	2%
Turn Type	Prot	NA	NA		Prot	pt+ov
Protected Phases	1	6	2		8	1 8
Permitted Phases						
Actuated Green, G (s)	17.0	52.5	28.5		15.5	39.0
Effective Green, g (s)	17.0	52.5	28.5		15.5	32.5
Actuated g/C Ratio	0.21	0.66	0.36		0.19	0.41
Clearance Time (s)	7.0	5.5	5.5		6.5	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	695	1193	1252		346	1170
v/s Ratio Prot	0.13	c0.72	0.36		0.22	c0.51
v/s Ratio Perm						
v/c Ratio	0.61	1.09	1.00		1.13	1.26
Uniform Delay, d1	28.5	13.8	25.8		32.3	23.8
Progression Factor	1.22	0.76	1.00		1.00	1.00
Incremental Delay, d2	1.1	53.0	25.7		87.4	125.2
Delay (s)	35.8	63.4	51.4		119.7	148.9
Level of Service	D	E	D		F	F
Approach Delay (s/veh)		56.7	51.4		142.9	
Approach LOS		E	D		F	

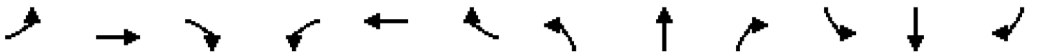
Intersection Summary			
HCM 2000 Control Delay (s/veh)	88.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBR
Lane Group Flow (vph)	445	1791	676	180	1280
v/c Ratio	0.56	0.90	0.38	0.31	0.71
Control Delay (s/veh)	29.4	17.7	0.1	21.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.4	17.7	0.1	21.8	11.1
Queue Length 50th (ft)	100	391	0	65	184
Queue Length 95th (ft)	146	m379	m0	105	219
Internal Link Dist (ft)	1444	1276			
Turn Bay Length (ft)			350		150
Base Capacity (vph)	797	1984	1794	609	1769
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	0.56	0.90	0.38	0.30	0.72

Intersection Summary

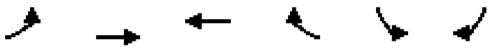
m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	372	42	0	1630	615	149	0	1062	0	0	0
Future Volume (vph)	0	372	42	0	1630	615	149	0	1062	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	16	12	12	16	12	12	12	12	12	12
Total Lost time (s)		6.5			5.0	4.0	5.0		5.0			
Lane Util. Factor		0.95			0.95	1.00	1.00		0.88			
Frt		0.98			1.00	0.85	1.00		0.85			
Flt Protected		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3402			3574	1794	1805		2760			
Flt Permitted		1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3402			3574	1794	1805		2760			
Peak-hour factor, PHF	0.93	0.93	0.93	0.91	0.91	0.91	0.83	0.83	0.83	0.92	0.92	0.92
Adj. Flow (vph)	0	400	45	0	1791	676	180	0	1280	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	73	0	0	0
Lane Group Flow (vph)	0	434	0	0	1791	676	180	0	1207	0	0	0
Heavy Vehicles (%)	0%	5%	0%	0%	1%	2%	0%	0%	3%	2%	2%	2%
Turn Type		NA			NA	Free	Prot		custom			
Protected Phases		6			2		4		4 5			
Permitted Phases						Free						
Actuated Green, G (s)		18.5			44.4	80.0	25.6		50.0			
Effective Green, g (s)		18.5			44.4	80.0	25.6		50.0			
Actuated g/C Ratio		0.23			0.55	1.00	0.32		0.63			
Clearance Time (s)		6.5			5.0		5.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		786			1983	1794	577		1725			
v/s Ratio Prot		0.13			c0.50		0.10		c0.44			
v/s Ratio Perm						0.38						
v/c Ratio		0.55			0.90	0.38	0.31		0.70			
Uniform Delay, d1		27.1			15.9	0.0	20.5		10.0			
Progression Factor		1.00			0.97	1.00	1.00		1.00			
Incremental Delay, d2		0.8			0.7	0.1	0.3		1.3			
Delay (s)		27.9			16.2	0.1	20.9		11.3			
Level of Service		C			B	A	C		B			
Approach Delay (s/veh)		27.9			11.8			12.4			0.0	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

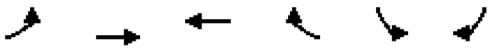
c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	28	240	601	1333	217	142
v/c Ratio	0.08	0.22	0.71	0.74	0.26	0.08
Control Delay (s/veh)	7.1	8.4	23.2	2.8	21.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	7.1	8.4	23.2	2.8	21.0	0.1
Queue Length 50th (ft)	5	48	214	0	37	0
Queue Length 95th (ft)	14	83	#387	0	62	0
Internal Link Dist (ft)		783	1444		1069	
Turn Bay Length (ft)	165				125	200
Base Capacity (vph)	421	1071	847	1783	882	1799
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.22	0.71	0.75	0.25	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	26	223	553	1226	191	125
Future Volume (vph)	26	223	553	1226	191	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	12	16
Total Lost time (s)	5.0	6.0	5.0	6.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1900	1881	1794	3213	1830
Flt Permitted	0.19	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	368	1900	1881	1794	3213	1830
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.88	0.88
Adj. Flow (vph)	28	240	601	1333	217	142
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	28	240	601	1333	217	142
Heavy Vehicles (%)	0%	0%	1%	2%	9%	0%
Turn Type	pm+pt	NA	NA	custom	Prot	pt+ov
Protected Phases	1	6	2	8	8	1 8
Permitted Phases	6			1 2		2
Actuated Green, G (s)	40.1	40.1	31.2	59.3	18.2	60.3
Effective Green, g (s)	40.1	40.1	31.2	54.3	18.2	54.3
Actuated g/C Ratio	0.57	0.57	0.44	0.77	0.26	0.77
Clearance Time (s)	5.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	310	1083	834	1538	831	1673
v/s Ratio Prot	0.01	0.13	0.32	c0.22	0.07	0.03
v/s Ratio Perm	0.05			0.52		0.05
v/c Ratio	0.09	0.22	0.72	0.87	0.26	0.08
Uniform Delay, d1	9.4	7.4	16.0	5.5	20.7	1.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.5	3.1	5.4	0.2	0.0
Delay (s)	9.5	7.9	19.1	10.9	20.9	2.0
Level of Service	A	A	B	B	C	A
Approach Delay (s/veh)		8.1	13.5		13.4	
Approach LOS		A	B		B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Modified Andover Street at River Street Intersection Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	270	493	82	215	4	68	0	15	0	0	2
Future Volume (vph)	3	270	493	82	215	4	68	0	15	0	0	2
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.86	0.86	0.85	0.50	0.50	0.50
Hourly flow rate (vph)	4	325	594	95	250	5	79	0	18	0	0	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	923	350	97	4
Volume Left (vph)	4	95	79	0
Volume Right (vph)	594	5	18	4
Hadj (s)	-0.36	0.08	0.20	0.25
Departure Headway (s)	4.3	5.2	6.6	7.0
Degree Utilization, x	1.11	0.50	0.18	0.01
Capacity (veh/h)	816	683	523	475
Control Delay (s/veh)	86.5	13.4	11.0	10.0
Approach Delay (s/veh)	86.5	13.4	11.0	10.0
Approach LOS	F	B	B	B

Intersection Summary				
Delay	62.3			
Level of Service	F			
Intersection Capacity Utilization	82.1%	ICU Level of Service	E	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	57.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	270	493	82	215	4	68	0	15	0	0	2
Future Vol, veh/h	3	270	493	82	215	4	68	0	15	0	0	2
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.86	0.86	0.85	0.50	0.50	0.50
Heavy Vehicles, %	0	2	1	0	3	0	9	0	8	0	0	50
Mvmt Flow	4	325	594	95	250	5	79	0	18	0	0	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	79.6	13.5	11.3	9.4
HCM LOS	F	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	82%	0%	27%	0%
Vol Thru, %	0%	35%	71%	0%
Vol Right, %	18%	64%	1%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	83	766	301	2
LT Vol	68	3	82	0
Through Vol	0	270	215	0
RT Vol	15	493	4	2
Lane Flow Rate	97	923	350	4
Geometry Grp	1	1	1	1
Degree of Util (X)	0.177	1.095	0.499	0.007
Departure Headway (Hd)	6.876	4.273	5.308	6.393
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	525	849	683	563
Service Time	4.876	2.327	3.308	4.393
HCM Lane V/C Ratio	0.185	1.087	0.512	0.007
HCM Control Delay, s/veh	11.3	79.6	13.5	9.4
HCM Lane LOS	B	F	B	A
HCM 95th-tile Q	0.6	24.1	2.8	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	82	217	68	15	273	493
Future Volume (Veh/h)	82	217	68	15	273	493
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.85	0.83	0.83
Hourly flow rate (vph)	95	252	79	18	329	594
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1340	88			97	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1340	88			97	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	28	74			78	
cM capacity (veh/h)	133	968			1496	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	347	97	923
Volume Left	95	0	329
Volume Right	252	18	0
cSH	355	1700	1496
Volume to Capacity	0.98	0.06	0.22
Queue Length 95th (ft)	273	0	21
Control Delay (s/veh)	76.9	0.0	4.6
Lane LOS	F		A
Approach Delay (s/veh)	76.9	0.0	4.6
Approach LOS	F		

Intersection Summary			
Average Delay	22.7		
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	165	65	19	179	0	543	0	57	8	0	25
Future Volume (vph)	3	165	65	19	179	0	543	0	57	8	0	25
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.90	0.90	0.90	0.38	0.38	0.38
Hourly flow rate (vph)	3	190	75	23	218	0	603	0	63	21	0	66

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	268	241	666	87
Volume Left (vph)	3	23	603	21
Volume Right (vph)	75	0	63	66
Hadj (s)	-0.16	0.03	0.12	-0.36
Departure Headway (s)	6.4	6.7	5.9	6.5
Degree Utilization, x	0.48	0.45	1.09	0.16
Capacity (veh/h)	540	522	613	492
Control Delay (s/veh)	15.2	15.0	86.9	10.7
Approach Delay (s/veh)	15.2	15.0	86.9	10.7
Approach LOS	C	B	F	B

Intersection Summary			
Delay	52.7		
Level of Service	F		
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	51.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	165	65	19	179	0	543	0	57	8	0	25
Future Vol, veh/h	3	165	65	19	179	0	543	0	57	8	0	25
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.90	0.90	0.90	0.38	0.38	0.38
Heavy Vehicles, %	0	0	2	0	1	0	0	0	0	0	0	4
Mvmt Flow	3	190	75	23	218	0	603	0	63	21	0	66
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	15.7	15.4	84.1	10.9
HCM LOS	C	C	F	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	91%	1%	10%	24%
Vol Thru, %	0%	71%	90%	0%
Vol Right, %	10%	28%	0%	76%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	600	233	198	33
LT Vol	543	3	19	8
Through Vol	0	165	179	0
RT Vol	57	65	0	25
Lane Flow Rate	667	268	241	87
Geometry Grp	1	1	1	1
Degree of Util (X)	1.082	0.477	0.445	0.155
Departure Headway (Hd)	5.843	6.722	6.96	6.699
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	620	538	522	538
Service Time	3.91	4.722	4.96	4.699
HCM Lane V/C Ratio	1.076	0.498	0.462	0.162
HCM Control Delay, s/veh	84.1	15.7	15.4	10.9
HCM Lane LOS	F	C	C	B
HCM 95th-tile Q	19.2	2.6	2.3	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	204	543	57	168	65
Future Volume (Veh/h)	19	204	543	57	168	65
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.90	0.90	0.87	0.87
Hourly flow rate (vph)	23	249	603	63	193	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1096	635			666	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1096	635			666	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	48			79	
cM capacity (veh/h)	189	481			933	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	272	666	268
Volume Left	23	0	193
Volume Right	249	63	0
cSH	425	1700	933
Volume to Capacity	0.64	0.39	0.21
Queue Length 95th (ft)	109	0	19
Control Delay (s/veh)	27.3	0.0	7.7
Lane LOS	D		A
Approach Delay (s/veh)	27.3	0.0	7.7
Approach LOS	D		

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	270	533	89	215	4	70	0	16	0	0	2
Future Volume (vph)	3	270	533	89	215	4	70	0	16	0	0	2
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.86	0.86	0.86	0.50	0.50	0.50
Hourly flow rate (vph)	4	325	642	103	250	5	81	0	19	0	0	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	971	358	100	4
Volume Left (vph)	4	103	81	0
Volume Right (vph)	642	5	19	4
Hadj (s)	-0.37	0.08	0.20	0.25
Departure Headway (s)	4.4	5.2	6.6	7.0
Degree Utilization, x	1.18	0.52	0.18	0.01
Capacity (veh/h)	814	681	522	472
Control Delay (s/veh)	109.4	13.7	11.1	10.1
Approach Delay (s/veh)	109.4	13.7	11.1	10.1
Approach LOS	F	B	B	B

Intersection Summary			
Delay	78.4		
Level of Service	F		
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	73.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	270	533	89	215	4	70	0	16	0	0	2
Future Vol, veh/h	3	270	533	89	215	4	70	0	16	0	0	2
Peak Hour Factor	0.83	0.83	0.83	0.86	0.86	0.86	0.86	0.86	0.86	0.50	0.50	0.50
Heavy Vehicles, %	0	2	1	0	3	0	9	0	8	0	0	50
Mvmt Flow	4	325	642	103	250	5	81	0	19	0	0	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	102.3	13.9	11.5	9.6
HCM LOS	F	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	81%	0%	29%	0%
Vol Thru, %	0%	33%	70%	0%
Vol Right, %	19%	66%	1%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	806	308	2
LT Vol	70	3	89	0
Through Vol	0	270	215	0
RT Vol	16	533	4	2
Lane Flow Rate	100	971	358	4
Geometry Grp	1	1	1	1
Degree of Util (X)	0.183	1.158	0.513	0.007
Departure Headway (Hd)	6.99	4.294	5.384	6.537
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	517	845	673	551
Service Time	4.99	2.342	3.384	4.537
HCM Lane V/C Ratio	0.193	1.149	0.532	0.007
HCM Control Delay, s/veh	11.5	102.3	13.9	9.6
HCM Lane LOS	B	F	B	A
HCM 95th-tile Q	0.7	28.9	2.9	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	89	217	70	16	273	533
Future Volume (Veh/h)	89	217	70	16	273	533
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.83	0.83
Hourly flow rate (vph)	103	252	81	19	329	642
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1391	91			100	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1391	91			100	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	17	74			78	
cM capacity (veh/h)	123	964			1493	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	355	100	971
Volume Left	103	0	329
Volume Right	252	19	0
cSH	324	1700	1493
Volume to Capacity	1.10	0.06	0.22
Queue Length 95th (ft)	341	0	21
Control Delay (s/veh)	114.7	0.0	4.6
Lane LOS	F		A
Approach Delay (s/veh)	114.7	0.0	4.6
Approach LOS	F		

Intersection Summary			
Average Delay	31.7		
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	165	81	22	179	0	583	0	64	8	0	25
Future Volume (vph)	3	165	81	22	179	0	583	0	64	8	0	25
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.90	0.90	0.90	0.38	0.38	0.38
Hourly flow rate (vph)	3	190	93	27	218	0	648	0	71	21	0	66

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	286	245	719	87
Volume Left (vph)	3	27	648	21
Volume Right (vph)	93	0	71	66
Hadj (s)	-0.18	0.04	0.12	-0.36
Departure Headway (s)	6.4	6.7	6.0	6.6
Degree Utilization, x	0.51	0.46	1.19	0.16
Capacity (veh/h)	541	517	609	481
Control Delay (s/veh)	16.0	15.3	124.4	10.9
Approach Delay (s/veh)	16.0	15.3	124.4	10.9
Approach LOS	C	C	F	B

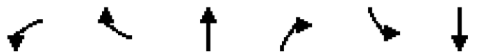
Intersection Summary				
Delay	73.8			
Level of Service	F			
Intersection Capacity Utilization	72.9%	ICU Level of Service	C	
Analysis Period (min)	15			

Intersection	
Intersection Delay, s/veh	73.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	165	81	22	179	0	583	0	64	8	0	25
Future Vol, veh/h	3	165	81	22	179	0	583	0	64	8	0	25
Peak Hour Factor	0.87	0.87	0.87	0.82	0.82	0.82	0.90	0.90	0.90	0.38	0.38	0.38
Heavy Vehicles, %	0	0	2	0	1	0	0	0	0	0	0	4
Mvmt Flow	3	190	93	27	218	0	648	0	71	21	0	66
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	16.8	16.1	123	11.3
HCM LOS	C	C	F	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	90%	1%	11%	24%
Vol Thru, %	0%	66%	89%	0%
Vol Right, %	10%	33%	0%	76%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	647	249	201	33
LT Vol	583	3	22	8
Through Vol	0	165	179	0
RT Vol	64	81	0	25
Lane Flow Rate	719	286	245	87
Geometry Grp	1	1	1	1
Degree of Util (X)	1.191	0.506	0.452	0.159
Departure Headway (Hd)	5.966	6.942	7.249	6.951
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	611	524	500	519
Service Time	3.977	4.942	5.249	4.951
HCM Lane V/C Ratio	1.177	0.546	0.49	0.168
HCM Control Delay, s/veh	123	16.8	16.1	11.3
HCM Lane LOS	F	C	C	B
HCM 95th-tile Q	25.1	2.8	2.3	0.6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	204	583	64	168	81
Future Volume (Veh/h)	22	204	583	64	168	81
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.90	0.90	0.87	0.87
Hourly flow rate (vph)	27	249	648	71	193	93
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1163	684			719	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1163	684			719	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	45			78	
cM capacity (veh/h)	170	451			892	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	276	719	286
Volume Left	27	0	193
Volume Right	249	71	0
cSH	388	1700	892
Volume to Capacity	0.71	0.42	0.22
Queue Length 95th (ft)	134	0	21
Control Delay (s/veh)	34.1	0.0	7.6
Lane LOS	D		A
Approach Delay (s/veh)	34.1	0.0	7.6
Approach LOS	D		

Intersection Summary			
Average Delay	9.0		
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

Modified Connector Road at Lowell Junction Road Intersection Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	43	59	18	403	305	6
Future Volume (vph)	43	59	18	403	305	6
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	62	86	20	453	386	8

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	62	86	473	386	8
Volume Left (vph)	0	0	20	386	0
Volume Right (vph)	0	86	0	0	8
Hadj (s)	0.00	-0.07	0.03	0.30	-0.60
Departure Headway (s)	5.8	3.2	5.2	5.7	3.2
Degree Utilization, x	0.10	0.08	0.69	0.61	0.01
Capacity (veh/h)	558	1121	665	606	1121
Control Delay (s/veh)	9.5	6.5	18.9	17.0	6.2
Approach Delay (s/veh)	7.7		18.9	16.8	
Approach LOS	A		C	C	

Intersection Summary			
Delay	16.5		
Level of Service	C		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	27.3
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	59	18	403	305	6
Future Vol, veh/h	43	59	18	403	305	6
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Heavy Vehicles, %	0	31	13	1	6	0
Mvmt Flow	62	86	20	453	386	8
Number of Lanes	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay, s/veh	10.6	32.2	27.8
HCM LOS	B	D	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1
Vol Left, %	100%	0%	0%	0%	4%
Vol Thru, %	0%	0%	100%	0%	96%
Vol Right, %	0%	100%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	305	6	43	59	421
LT Vol	305	0	0	0	18
Through Vol	0	0	43	0	403
RT Vol	0	6	0	59	0
Lane Flow Rate	386	8	62	86	473
Geometry Grp	5	5	5	5	3b
Degree of Util (X)	0.752	0.012	0.118	0.157	0.823
Departure Headway (Hd)	7.013	5.694	6.806	6.629	6.26
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	513	626	523	537	577
Service Time	4.772	3.451	4.594	4.417	4.321
HCM Lane V/C Ratio	0.752	0.013	0.119	0.16	0.82
HCM Control Delay, s/veh	28.2	8.5	10.5	10.7	32.2
HCM Lane LOS	D	A	B	B	D
HCM 95th-tile Q	6.5	0	0.4	0.6	8.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	328	304	3	60	54	21
Future Volume (vph)	328	304	3	60	54	21
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Hourly flow rate (vph)	353	327	4	86	76	30

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2
Volume Total (vph)	353	327	90	76	30
Volume Left (vph)	0	0	4	76	0
Volume Right (vph)	0	327	0	0	30
Hadj (s)	0.02	-0.57	0.06	0.44	-0.60
Departure Headway (s)	4.2	3.2	4.5	5.3	3.2
Degree Utilization, x	0.42	0.29	0.11	0.11	0.03
Capacity (veh/h)	833	1113	761	625	1121
Control Delay (s/veh)	10.2	7.5	8.1	9.0	6.3
Approach Delay (s/veh)	8.9		8.1	8.2	
Approach LOS	A		A	A	

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	328	304	3	60	54	21
Future Vol, veh/h	328	304	3	60	54	21
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Heavy Vehicles, %	1	2	0	3	14	0
Mvmt Flow	353	327	4	86	76	30
Number of Lanes	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay, s/veh	10.9	9.1	10.1
HCM LOS	B	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1
Vol Left, %	100%	0%	0%	0%	5%
Vol Thru, %	0%	0%	100%	0%	95%
Vol Right, %	0%	100%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	21	328	304	63
LT Vol	54	0	0	0	3
Through Vol	0	0	328	0	60
RT Vol	0	21	0	304	0
Lane Flow Rate	76	30	353	327	90
Geometry Grp	5	5	5	5	3b
Degree of Util (X)	0.144	0.044	0.484	0.386	0.131
Departure Headway (Hd)	6.838	5.386	4.938	4.253	5.244
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	523	661	730	847	682
Service Time	4.599	3.146	2.665	1.979	3.286
HCM Lane V/C Ratio	0.145	0.045	0.484	0.386	0.132
HCM Control Delay, s/veh	10.8	8.4	12.2	9.6	9.1
HCM Lane LOS	B	A	B	A	A
HCM 95th-tile Q	0.5	0.1	2.7	1.8	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	43	59	18	403	305	6
Future Volume (Veh/h)	43	59	18	403	305	6
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	62	86	20	453	386	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			148		598	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			148		598	105
tC, single (s)			4.2		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.3
p0 queue free %			99		15	99
cM capacity (veh/h)			1369		452	955

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	148	473	394
Volume Left	0	20	386
Volume Right	86	0	8
cSH	1700	1369	457
Volume to Capacity	0.09	0.01	0.86
Queue Length 95th (ft)	0	1	221
Control Delay (s/veh)	0.0	0.5	45.3
Lane LOS		A	E
Approach Delay (s/veh)	0.0	0.5	45.3
Approach LOS			E

Intersection Summary			
Average Delay	17.8		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	328	304	3	60	54	21
Future Volume (Veh/h)	328	304	3	60	54	21
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Hourly flow rate (vph)	353	327	4	86	76	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			680		611	517
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			680		611	517
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		83	95
cM capacity (veh/h)			922		437	563

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	680	90	106
Volume Left	0	4	76
Volume Right	327	0	30
cSH	1700	922	466
Volume to Capacity	0.40	0.00	0.23
Queue Length 95th (ft)	0	0	22
Control Delay (s/veh)	0.0	0.4	15.0
Lane LOS		A	B
Approach Delay (s/veh)	0.0	0.4	15.0
Approach LOS			B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	43	59	18	403	305	6
Future Volume (vph)	43	59	18	403	305	6
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Hourly flow rate (vph)	62	86	20	453	386	8

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	148	473	394
Volume Left (vph)	0	20	386
Volume Right (vph)	86	0	8
Hadj (s)	-0.04	0.03	0.28
Departure Headway (s)	5.9	5.5	5.9
Degree Utilization, x	0.24	0.72	0.65
Capacity (veh/h)	557	640	580
Control Delay (s/veh)	10.8	21.1	19.1
Approach Delay (s/veh)	10.8	21.1	19.1
Approach LOS	B	C	C

Intersection Summary			
Delay	18.8		
Level of Service	C		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	19.6
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	59	18	403	305	6
Future Vol, veh/h	43	59	18	403	305	6
Peak Hour Factor	0.69	0.69	0.89	0.89	0.79	0.79
Heavy Vehicles, %	0	31	13	1	6	0
Mvmt Flow	62	86	20	453	386	8
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay, s/veh	10.3	22.9	19.2
HCM LOS	B	C	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	98%	0%	4%
Vol Thru, %	0%	42%	96%
Vol Right, %	2%	58%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	311	102	421
LT Vol	305	0	18
Through Vol	0	43	403
RT Vol	6	59	0
Lane Flow Rate	394	148	473
Geometry Grp	1	1	1
Degree of Util (X)	0.647	0.229	0.738
Departure Headway (Hd)	5.916	5.577	5.617
Convergence, Y/N	Yes	Yes	Yes
Cap	610	640	643
Service Time	3.964	3.64	3.663
HCM Lane V/C Ratio	0.646	0.231	0.736
HCM Control Delay, s/veh	19.2	10.3	22.9
HCM Lane LOS	C	B	C
HCM 95th-tile Q	4.7	0.9	6.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	328	304	3	60	54	21
Future Volume (vph)	328	304	3	60	54	21
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Hourly flow rate (vph)	353	327	4	86	76	30

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	680	90	106
Volume Left (vph)	0	4	76
Volume Right (vph)	327	0	30
Hadj (s)	-0.26	0.06	0.14
Departure Headway (s)	4.1	5.0	5.7
Degree Utilization, x	0.77	0.12	0.17
Capacity (veh/h)	866	683	582
Control Delay (s/veh)	19.2	8.7	9.8
Approach Delay (s/veh)	19.2	8.7	9.8
Approach LOS	C	A	A

Intersection Summary			
Delay	17.0		
Level of Service	C		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

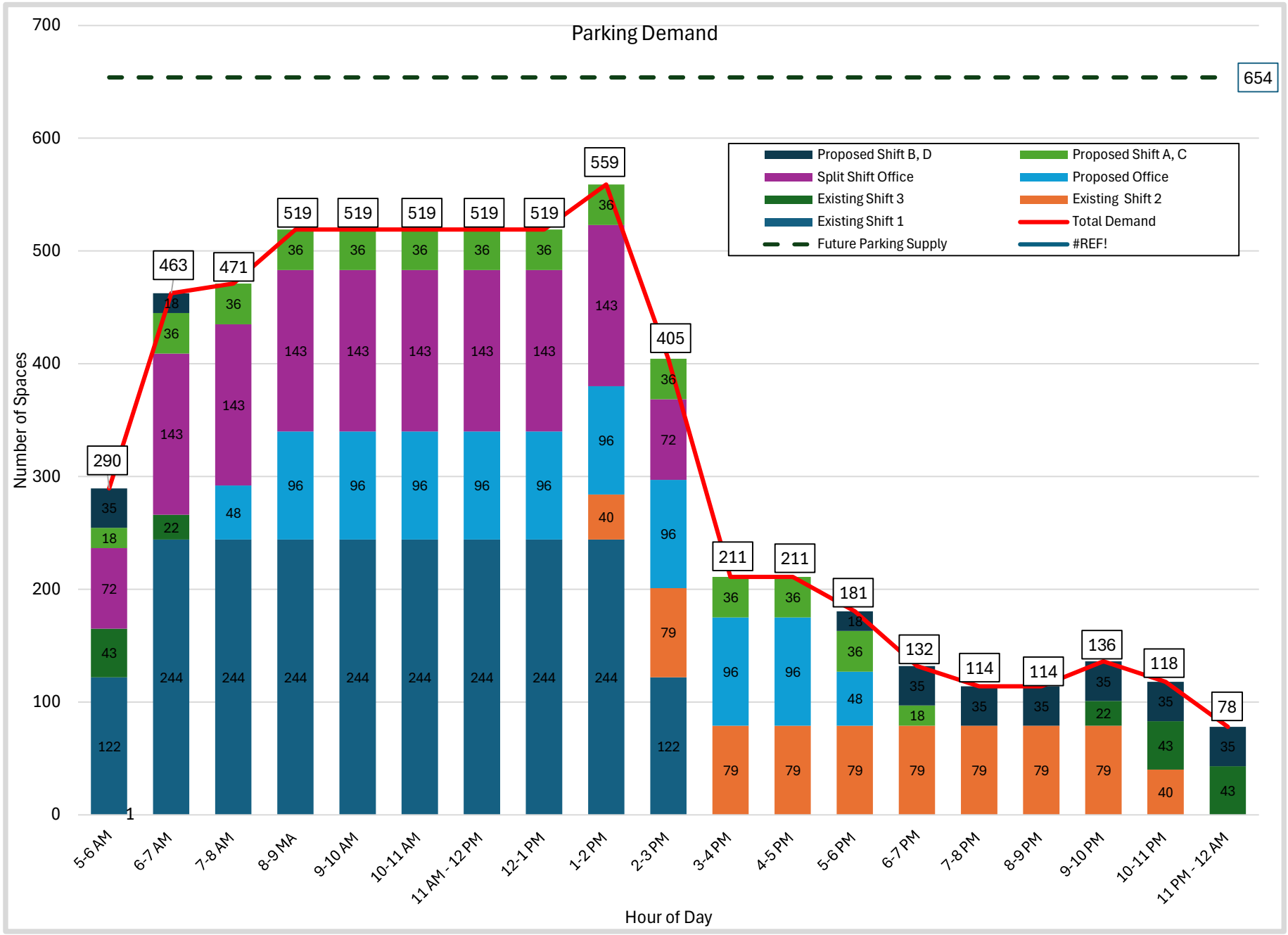
Intersection	
Intersection Delay, s/veh	16.8
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	328	304	3	60	54	21
Future Vol, veh/h	328	304	3	60	54	21
Peak Hour Factor	0.93	0.93	0.70	0.70	0.71	0.71
Heavy Vehicles, %	1	2	0	3	14	0
Mvmt Flow	353	327	4	86	76	30
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay, s/veh	18.9	8.6	9.9
HCM LOS	C	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	72%	0%	5%
Vol Thru, %	0%	52%	95%
Vol Right, %	28%	48%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	75	632	63
LT Vol	54	0	3
Through Vol	0	328	60
RT Vol	21	304	0
Lane Flow Rate	106	680	90
Geometry Grp	1	1	1
Degree of Util (X)	0.168	0.764	0.122
Departure Headway (Hd)	5.717	4.045	4.883
Convergence, Y/N	Yes	Yes	Yes
Cap	624	897	732
Service Time	3.784	2.069	2.932
HCM Lane V/C Ratio	0.17	0.758	0.123
HCM Control Delay, s/veh	9.9	18.9	8.6
HCM Lane LOS	A	C	A
HCM 95th-tile Q	0.6	7.5	0.4

PARKING ANALYSIS


Parking Demand
654
Proposed Shift B, D
Proposed Shift A, C
Split Shift Office
Proposed Office
Existing Shift 3
Existing Shift 2
Existing Shift 1
Total Demand
Future Parking Supply
#REF!
Number of Spaces
Hour of Day
700
600
500
400
300
200
100
0
5-6 AM
6-7 AM
7-8 AM
8-9 MA
9-10 AM
10-11 AM
11 AM - 12 PM
12-1 PM
1-2 PM
2-3 PM
3-4 PM
4-5 PM
5-6 PM
6-7 PM
7-8 PM
8-9 PM
9-10 PM
10-11 PM
11 PM - 12 AM
290
463
471
519
519
519
519
519
559
405
211
211
181
132
114
114
136
118
78

			Includes 5% Adj Factor - Normal sick days, vacations					Includes Addl 5% Adj Factor - Drop-offs, office only		
Eight hour shift (standard work week)			Existing	5%	Adj.	Proposed	5%	5%	Adj.	
first shift	m-f	6:00 AM - 2:30 PM	257		244					
second shift	m-f	2:00 - 10:30 PM	83		79					
third shift	sun-f	10:00 PM - 6:30 AM	45		43					
Office	M-F	8:00 AM - 5:00 PM				107			96	
Split Shift Office	M-F	6:00 AM - 2:30 PM				150			143	
Twelve hour shift (7-day schedule)										
A shift	M, T, W & every other Sunday	6:00 AM - 6:00 PM				38			36	
B shift	S, M, T & every other Sat	6:00 PM - 6:00 AM				37			35	
C shift	Th, F, S & every other Sun	6:00 AM - 6:00 PM				38			36	
D shift	W, Th, F & every other Sat	6:00 PM - 6:00 AM				36			34	

Hour Entered	Existing Shift 1	Existing Shift 2	Existing Shift 3	Proposed Office	Split Shift Office	Proposed Shift A, C	Proposed Shift B, D	Total Demand	Future Parking Supply	
5-6 AM	122		43		72	18	35	290	654	
6-7 AM	244		22		143	36	18	463	654	
7-8 AM	244			48	143	36		471	654	
8-9 MA	244			96	143	36		519	654	
9-10 AM	244			96	143	36		519	654	
10-11 AM	244			96	143	36		519	654	
11 AM - 12 PM	244			96	143	36		519	654	
12-1 PM	244			96	143	36		519	654	
1-2 PM	244	40		96	143	36		559	654	
2-3 PM	122	79		96	72	36		405	654	
3-4 PM		79		96		36		211	654	
4-5 PM		79		96		36		211	654	
5-6 PM		79		48		36	18	181	654	
6-7 PM		79				18	35	132	654	
7-8 PM		79					35	114	654	
8-9 PM		79					35	114	654	
9-10 PM		79	22				35	136	654	
10-11 PM		40	43				35	118	654	
11 PM - 12 AM			43				35	78	654	