Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810

Ref: 9526

February 18, 2026

Mr. Pascal Rettig, Chair
Planning Board
City of Amesbury
62 Friend Street
Amesbury, MA 02193

Re: Response to Transportation Engineering Peer Review
Rocky Hill Residential Development – Elm Street
Amesbury, Massachusetts

Dear Chair Rettig and Members of the Planning Board:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the February 9, 2026 memorandum prepared by VHB concerning their review of the November 2024 *Transportation Impact Assessment* (the "November 2024 TIA") prepared by VAI in support of the proposed residential development to be located off of Elm Street in the "Rocky Hill" area that is generally between Elm Street, Interstate 95 (I-95) and I-495 in Amesbury, Massachusetts (hereafter referred to as the "Project"). Listed below are the comments that were identified by VHB in the subject memorandum followed by our response on behalf of the Project proponent. Where indicated, a response will be provided by another member of the Project team under separate cover.

Transportation Impact Assessment Review

Existing Conditions

Comment 1: ***Study Area*** *- The study area appropriately considers the key roadway and intersections most likely to experience any impacts as a result of the Project. Figures 2 and 3 accurately depict roadway jurisdiction, lane use/geometry, and pedestrian facilities at the study area locations. No expansion or modification of this study area is required.*

Response: **No response required.**

Comment 2: ***Traffic Volumes*** *- The underlying peak period turning movement counts (TMCs) for the TIA analysis were conducted in July 2023, February 2024, and September 2024. These counts were conducted during the typical weekday morning and evening peak periods. A seasonal adjustment factor was applied to the February traffic counts while none was applied to the July or September counts due to those having been conducted in months shown to experience higher-than-average volumes. The observed 2023 volumes also were increased using an appropriate annual growth rate to reflect the 2024 existing conditions evaluated in this study.*

Response: **No response required.**

Comment 2: *Separate from the local approval process, additional counts were conducted at the Route 110 (Macy Street) Elm Street/Clark's Road intersection in April 2025. These counts were conducted on April 30, 2025 (from 7 AM and 7 PM) as part of the Functional Design Report (FDR)[1] which evaluates this and other locations along Route 110 (Macy Street). That design submittal is currently being reviewed by MassDOT. That study also included analysis of Saturday conditions using TMCs conducted on July 15, 2023 from 11 AM to 2 PM. The Saturday FDR analysis of that location should be provided for reference (in addition to the prior FEIR analysis noted earlier). Also, analysis of the proposed Elm Street Site driveway should be provided for the Saturday peak hour based on these or other available volumes.*

Response: **The August 2025 *Functional Design Report/Project Framework Document* (FDR) for the Route 110 improvements was submitted to the City on February 12, 2026, along with the Transportation component of the August 2025 *Final Environmental Impact Report* (FEIR), the November 7, 2025 MassDOT Section 61 Finding and the technical appendix that is associated with the November 2024 TIA.**

As requested, an analysis of traffic operations (i.e., motorist delays, vehicle queuing and level of service (LOS)) was performed at the Project site driveway intersection with Elm Street during the Saturday midday peak-hour using the Saturday traffic count data that was presented in the August 2025 FDR. In order to be consistent with the analyses that were presented in the August 2025 FDR, the future conditions horizon year was established as 2032 and the traffic volumes were balanced along Elm Street between Route 110 and the Project site driveway. Traffic volumes associated with the Hampton Inn Amesbury were estimated using trip-generation statistics published by the Institute of Transportation Engineers (ITE) for a similar land use[2] and were assigned based on a review of existing travel patterns at the driveway. Table A1 summarizes the results of the traffic operations analysis for the Project site driveway intersection with Elm Street under 2032 Build Saturday midday peak-hour traffic volume conditions, with the associated traffic volume network and detailed analysis worksheets attached.

As can be seen in Table A1, all movements exiting the Project site driveway to Elm Street were shown to operate at a level-of-service (LOS) E during the Saturday midday peak-hour due to the relatively large volume of conflicting traffic traveling along Elm Street during the peak periods. That being said, the resulting residual vehicle queue (up to three (3) vehicles) can be contained along the Project site driveway without inhibiting access, or the movement of vehicles, pedestrians or bicyclists along Elm Street. All movements along Elm Street are predicted to operate at LOS A with negligible vehicle queuing.

[1]Functional Design Report/Project Framework Document – Route 110 Improvements, Amesbury, Massachusetts, VAI (Andover, Massachusetts), August 2025.

[2]Trip Generation Manual (12th Edition), Institute of Transportation Engineers (Washington, DC), 2025; Land Use Code (LUC) 310, *Hotel* (92 rooms).

Table A1
TRAFFIC OPERATIONS ANALYSIS SUMMARY
ELM STREET AT THE PROJECT SITE DRIVEWAY

Unsignalized Intersection/Peak-Hour/Movement	2032 Build Demand	Delay	LOS	Queue 95th
Elm Street at Hampton Inn and Project Site				
Saturday Midday Peak-Hour:				
Hampton Inn Driveway EB LT/RT	21	16.6	C	0
Project Site Driveway WB LT/RT	121	35.9	E	3
Elm Street NB LT/TH/RT	493	0.3	A	0
Elm Street SB LT/TH/RT	477	0.5	A	0

[a]Demand in vehicles per hour.
[b]Average control delay per vehicle (in seconds).
[c]Level of service.
[d]Queue length in vehicles.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Comment 3: ***Pedestrian and Bicycle Facilities*** *– the TIA provides detail descriptions of current pedestrian and bicycle accommodations in the study area with a corresponding graphic. A brief narrative also is provided documenting the minimal pedestrian and biking activity which currently exists in this area.*

Response: **No response required.**

Comment 4: ***Public Transportation*** *– the TIA provides an appropriate inventory of existing MeVA public transportation accommodations within the area. Potential improvements associated with the existing Elm Street bus stop are discussed later in this memorandum*

Response: **No response required.**

Comment 5: ***Crash Analysis*** *– The study provides a comprehensive crash analysis which indicates a relatively low crash experience in recent years within the study area. Notwithstanding the low crash history, a Roadway Safety Audit (RSA) was conducted in June 2025 in association with this Project. The RSA evaluated both the intersections of Route 110 with Elm Street/Clark's Road and Merrill Street/Rabbit Road (within the Town of Salisbury). Project mitigation proposed to address the existing deficiencies identified in the RSA are discussed later in this memorandum*

Response: **No response required.**

Comment 6: ***Vehicle Speeds*** *– The data collection for the study indicates that the current "85th percentile speed" on Clark's Road is 33 miles per hour (mph) heading northbound and 29 mph heading southbound. Both are higher than the statutory 25 mph speed limit on this roadway. The exact location of these speed measurements is not identified and should be provided relative to the proposed Site driveway location.*

Response: **The speed measurements were conducted on Elm Street south of the driveway that serves the Hampton Inn.**

Future Conditions

Comment 1: *Future Traffic Growth – the TIA appropriately considers potential future traffic growth based on typical background growth and site-specific traffic generated by other planned development projects in the area. VHB agrees with both the 1.5-percent annual traffic growth rate identified (which is consistent with other recent studies in the area) and the list of six nearby development projects. Traffic assignment for the background project was done following accepted industry practices.*

Response: **No response required.**

Comment 2: ***Planned Roadway Improvements*** *– VHB agrees with the inclusion of both the recently awarded MassWorks grant improvements at the Route 110 (Macy Street)/ Elm Street/Clark's Road intersection and the planned Starbuck's Clark's Road mitigation as being significant future projects within the study area. The TIA references a 250-foot segment of Clark's Road being widened. However, the limits of the work currently under construction at this location appear to be only 150 feet to the south of the intersection before starting its taper back to a single lane. The extent and timing for completion of this work should be clarified.*

Response: **During the formal design process, the limit of the roadway widening along Clark's Road was reduced to approximately 150 feet in order to avoid an existing utility pole and to preserve existing landscaping. These improvements are expected to be complete in the spring of 2026.**

Comment 3: ***Project-Generated Traffic*** *– Project trip generation was calculated appropriately based on the 11th edition of the "Trip Generation Manual[3]" published by the Institute of Transportation Engineers (ITE). This database includes studies of several comparable residential developments and use of the ITE data is the accepted industry standard for estimating trip generation. VHB agrees with this methodology and the study conservatively did not reduce the project automobile values due to the nearby public transportation and/or walking and biking. However, ITE recently published an updated 12th edition of this manual in August 2025. While the resulting trip generation estimates based on the newer data should not differ significantly compared to those based on the 11th edition, this should be documented. Also, trip generation for Saturday daily and peak-hour conditions also should be provided*

Response: **Table A2 summarizes the trip-generation calculations for the Project obtained using the 12th Edition of *Trip Generation* and compares the resulting values to those that are presented in the November 2024 TIA which were developed using the 11th Edition of *Trip Generation*. As requested Saturday daily and peak-hour trip calculations are also provided.**

[3] Trip Generation Manual (12th Edition), Institute of Transportation Engineers (Washington, DC), 2025.

Table A2
TRIP-GENERATION SUMMARY AND COMPARISON[a]

Time Period	Vehicle Trips (A) 12th Edition	(B) November 2024 TIA[b]	(A-B) Difference
Average Weekday:			
Entering	1,240	1,369	-129
Exiting	1,240	1,369	-129
Total	2,480	2,738	-258
Weekday Morning Peak-Hour:			
Entering	40	39	+1
Exiting	126	124	+2
Total	166	163	+3
Weekday Evening Peak-Hour:			
Entering	125	130	-5
Exiting	79	78	+1
Total	204	208	-4
Saturday:			
Entering	1,010	1,109	-99
Exiting	1,010	1,109	-99
Total	2,020	2,218	-198
Saturday Midday Peak-Hour:			
Entering	87	92	-5
Exiting	121	89	+32
Total	208	181	+27

[a]Based on ITE LUCs 210, *Single-Family Detached Housing* (8 units); 215, *Single-Family Attached Housing* (83 units); and 220, *Multifamily Housing (Low-Rise)* (309 units).
[b]As shown in Table 5 of the November 2024 TIA. Saturday and Saturday midday peak-hour traffic volumes were developed using the 11th Edition of *Trip Generation*.

As can be seen in Table A2, using the 12th Edition of *Trip Generation*, the Project is expected to generate approximately 258 *fewer* vehicle trips on an average weekday and 198 *fewer* vehicle trips on a Saturday (both two-way, 24-hour volumes) when compared to the resulting values obtained using the 11th Edition of *Trip Generation*, with 3 *additional* vehicle trips during the weekday morning peak-hour, 4 *fewer* vehicle trips during the weekday evening peak-hour and 27 *additional* vehicle trips during the Saturday midday peak-hour. As surmised by VHB, the noted variations in the peak-hour trip calculations using the 11th Edition of *Trip Generation* and that form the basis of the November 2024 TIA are not considered material to the extent that they would alter the findings or conclusions that are presented therein or the design of the site access or off-site improvements.

Comment 4: ***Trip Distribution and Assignment*** *– The regional assignment of Project trips was based on U.S. census data and observed travel patterns. The resulting regional trip distribution is appropriate for use on this Project.*

Response: **No response required**

Comment 5 ***Future Traffic Volumes – Build Condition*** *– VHB agrees with the documentation presented which indicates that the Project should result less than a three-percent increase in traffic volumes on any of the study area roadways compared to the 2032 No-Build condition*

Response: **No response required.**

Comment 6: *Parking Generation – A parking demand analysis should be provided comparing the anticipated compared to the on-site parking supply. While the Project exceeds zoning requirements, identifying the likely peak demand based on standard ITE data would be helpful.*

Response: **As requested, a parking demand analysis was performed for the project using data published by the Institute of Transportation Engineers (ITE).[4] The ITE parking data is based on observations that have been conducted at specific land uses, including residential land uses that are similar to those that are proposed to be located within the Project site, and includes predictive parking demand data that can be used as a guide to determine the adequacy of parking to support a specific land use or uses under study. Table A3 summarizes the ITE peak parking demand data for land uses that are proposed to be located within the Project site.**

Table A3
PEAK PARKING DEMAND RATIOS

	Peak Parking Demand Ratio per 1,000 sf	
Land Use/Day of Week	**Mean**	**85th Percentile[a]**
Single-Family Detached Housing[b]		
Weekday:	**2.60**	**--**
Saturday:	**2.65**	**--**
Single-Family Attached Housing[c]		
Weekday:	**1.41**	**2.27**
Saturday:	**1.31**	**--**
Multifamily Housing (Low-Rise)[d]		
Weekday:	**1.27**	**1.59**
Saturday:	**1.18**	**1.44**

[a]The 85th percentile peak-parking demand is the parking demand at which 85 percent of the observed values fall below and 15 percent of the values are above.
[b]Obtained from: *Shared Parking*, Third Edition; Urban Land Institute; Washington, D.C.; 2020. Rates are based on a 3+ bedroom residential unit.
[c]ITE LUC 215, *Single-Family Attached Housing.*
[d]ITE LUC 220, *Multifamily Housing (Low-Rise).*

[4] *Parking Generation*, 6th Edition; Institute of Transportation Engineers; Washington, D.C.; October 2023.

The base peak parking demand for each use to be located within the Project site were developed by applying the peak parking demand ratios shown in Table A3 to each of the proposed land uses based on the size of the respective demised areas. Table A4 summarizes the resulting overall peak parking demand for the Project site with the detailed parking demand calculations attached.

Table A4
PEAK PARKING DEMANDS

	Peak Parking Demand (No. of Parking Spaces Occupied)	
Day of Week	**Mean**	**85th Percentile[a]**
Weekday:	**532**	**702**
Saturday:	**496**	**576**

[a]The average observed peak parking demand ratio was used where an 85th percentile peak parking demand ratio was not available.

As can be seen in Table A4, using the average observed peak parking demand ratios, the Project is predicted to have a peak parking demand of 532 occupied parking spaces on a weekday and 496 occupied parking spaces on a Saturday. Using the observed 85th percentile peak parking demand ratios, the Project is predicted to have a peak parking demand of 702 occupied parking spaces on a weekday and 576 occupied parking spaces on a Saturday. ITE is clear that the 85th percentile parking demand ratios are not intended to recommend a policy about the level of parking that should be supplied and is provided solely as a qualitative reference.

The targeted parking ratio for the Project is 1.5 parking spaces per residential unit, or 600 parking spaces based on 400 residential units. Additional parking will be provided for guests and at the amenity building. The proposed parking supply (a minimum of 1.5 parking spaces per unit) will meet or exceed the parking requirements of Section VIII, *Off Street Parking and Loading*, of the City of Amesbury Zoning Ordinance[5] and falls within the predicted parking demands for a residential community with the proposed residential unit types as documented by the ITE.

Sight Distance Evaluation

Comment 1: ***Sight Distance*** *– Both the stopping sight distance and intersection sight distance measurements were compared to industry standards3 based on a 35-mph design speed for Elm Street. This results in a slightly conservative analysis as the observed 85th percentile speeds were 33 mph and 29 mph in the respective northbound and southbound*

[5]The City of Amesbury Zoning Ordinance requires a minimum of 1.5 parking spaces per dwelling or apartment unit.

directions. A detailed discussion of this analysis and the standards referenced are provided in the TIA. Stopping sight distance refers to the sight lines of traffic approaching the Site driveway from either direction on Elm Street. Intersection sight distance refers to the sight lines of exiting Site traffic looking to the left and right. The TIA documents that both of these standards are satisfied.

Response: **No response required.**

Traffic Operations Analysis

Comment 1: ***Route 110 (Macy Street) at Carriagetown Marketplace*** *– The TIA analysis indicates that the Project will have a negligible impact at the Route 110 (Macy Street)/ Carriagetown Marketplace signalized driveway. This location is projected to operate at LOS A and LOS B under the 2032 Build condition. No further analysis is required for the TIA's evaluation of this location (which is not part of the MassWorks design project).*

Response: **No response required.**

Comment 2: ***Route 110 (Macy Street) at I-95 North and I-95 South*** *– The critical turning movements from both the I-95 North and I-95 South ramps are projected to operate at LOS F during both critical peak hours. However, both locations are included in the planned Route 110 (Macy Street) MassWorks roadway improvements project. This will include a new signal at the Route 110 (Macy Street)/ I-95 South intersection. This intersection is project to operate at LOS A during both critical peak hours.*

While the Route 110 (Macy Street)/ I-95 North intersection will remain unsignalized, the critical Route 110 (Macy Street) eastbound left-turn movement will improve to LOS B and LOS C during the weekday morning and evening peak hours, respectively. The right-turn movement from the I-95 North ramp will function at LOS A under both peak hours. Both improvements in LOS are primarily due to the addition of a third westbound travel lane on Route 110 (Macy Street).

No further analysis is required of these locations for VHB's review of the TIA. However, conditions at both intersections should continue to be evaluated by others as part of the ongoing design work along the Route 110 (Macy Street) corridor. Both MassDOT and the Amesbury Department of Public Works (DPW) have put considerable effort into reviewing the MassWorks design to date. To avoid duplicating efforts, the DPW should provide a summary of its review to document the findings to date. This also could be supplemented with a public presentation of these findings, which would be helpful to address concerns unrelated to the potential impacts of this single development Project. This meeting would be held by the City independent of this Project (and at no cost to the applicant).

Response: **No response required from the Applicant.**

Comment 3: ***Elm Street at Rocky Hill Road*** *– During the weekday morning and evening peak hours there currently are 102 and 94 vehicles turning right onto Rocky Hill Road from Elm Street. With only roughly twenty houses along this roadway, a significant portion of*

this traffic may be cut through traffic heading to Route 110 (Macy Street) heading westbound. This should be evaluated with potential mitigation (speed humps, speed feedback signs, or other measures) explored to help discourage this pattern. While the Project would not be adding to this movement. However, it could increase the volume of left turns from Elm Street onto Rocky Hill Road. This would be due to residents potentially turning right from the Site instead of making the more difficult exiting left-turn movement and then needing to pass through the Route 110 (Macy Street)/Elm Street/Clark's Road signalized intersection.

Response: **Given the proximity of the Project site to Route 110 and with consideration of the improvements that will be completed at the Route 110 (Macy Street)/Elm Street/Clark's Road signalized intersection, the Project is not expected to induce additional cut-through traffic along Rocky Hill Road.**

Comment 4: ***Elm Street at the Carriagetown Marketplace*** *– The critical exiting movements from Carriagetown Marketplace at its intersections with Elm Street will operate at or near capacity during peak-hour conditions under the 2032 Build condition. However, the Project should not be adding any traffic to the critical exiting left-turn movements onto Elm Street and, therefore, will have a negligible impact at this location.*

Response: **No response required.**

Comment 5: ***Route 110 (Macy Street)/Elm Street/Clark's Road*** *– This intersection is projected to operate at LOS F during both the weekday morning and evening peak hours under the 2032 Build condition. However, significant improvements are planned at this and other locations along Route 110 (Macy Street) as part of the planned MassWorks improvements project. Following those improvements, the overall intersection LOS will remain at LOS F during the weekday morning peak hour but will improve slightly to LOS E during the weekday evening peak hour. With the improvements in place, there also will be reduced delays and queuing for some movements. Conditions along this corridor also will benefit from the implementation of the planned Route 110 (Macy Street) coordinated signal system extending from the Carriagetown Marketplace to Merril Stret/Rabbit Road in Salisbury. The design of these planned improvements is currently under review by MassDOT as part of the ongoing state design/review process. VHB understands that the proposed lane configuration for the Clark's Road approach has since changed, with a shared left-/through- lane and exclusive right-turn lane now proposed. Updated analysis should be provided reflecting this condition, including the FDR analysis of Saturday peak hour conditions.*

As noted earlier, the future conditions analysis considers multiple definitively known developments projects which could impact traffic conditions in the study area. This includes a potential "40R" residential project including 110 multifamily units and eight single-family homes. Access to this property would be provided via "Elm Street extension". This existing roadway runs generally parallel to Route 110 (Macy Street) roughly 120 feet to the north of that roadway's signalized intersection with Elm Street. Providing safe and efficient access to that development ultimately will be the responsibility of the developer of that project. However, the applicant should identify any accommodations that were considered in the off-site improvements design to help

minimize impacts associated with this future development. While that development may not generate significant volumes, the proximity of Elm Street extension to the Route 110 (Macy Street)/Elm Street/Clark's Road intersection could impact the overall operation of this location.

As noted earlier, it would be beneficial to have the Amesbury DPW provide a summary of its review of this location to date. VHB's current review is focused on the Project's potential impacts to the area, and not the precise MassWorks design details which have been evaluated thoroughly by MassDOT and the Amesbury DPW.

Response: **As requested, the traffic operations analysis for the Route 110 (Macy Street)/ Elm Street/Clark's Road intersection for the weekday morning and evening peak hours has been revised to reflect the lane use and traffic signal timings that are presented in the August 2025 FDR; the August 2025 FDR includes an analysis of the Saturday midday peak-hour that includes the revised Clark's Road lane configuration and has been provided to the City under separate cover. Table A5 summarizes the results of the revised traffic operations analysis.**

As can be seen in Table A5, with the implementation of the proposed improvements along the Route 110 corridor, traffic operations at the Route 110 (Macy Street)/ Elm Street/Clark's Road intersection are predicted to improve over 2031 No-Build conditions such that no movement operates at a level-of-service (LOS) of F or has a volume to capacity (v/c) ratio greater than 1.0.

The design of the improvements at the Route 110 (Macy Street)/Elm Street/ Clark's Road intersection that are a part of the MassWorks funded improvement project are being advanced with consideration of the future residential development that would be accessed from Elm Street Extension. These considerations may include the installation of "Do Not Block" signs and pavement markings on Elm Street at Elm Street Extension or turn restrictions for vehicles exiting Elm Street Extension. The specific design features will continue to be evaluated with the City and MassDOT as the MassWorks project advances.

Comment 6: ***Elm Street/Proposed Site driveway*** *– As noted earlier, the TIA did not include counts or analysis of Saturday conditions. Capacity analysis should be provided for the proposed Elm Street Site driveway intersection using the previously conducted traffic counts in this area as discussed earlier. Exiting Site traffic is projected to operate at LOS F during both critical peak hours, but with queues not exceeding 125 feet in length within the Site. Negligible delays and queues are projected for traffic turning left into the Site. Exiting traffic is planned to be under Stop control. While this appears appropriate in the context of Elm Street, a signal warrant analysis should be conducted for this location. This should include analysis of eight-hour signal warrants using available count data for Elm Street in this area. Signalization or other potential access control measures should be discussed.*

The proposed Site driveway is slightly offset by the existing Hampton Inn driveway on the west side of Elm Street. Consideration should be given to shifting the Site driveway slightly to the west. Consistent with the low volumes of traffic observed at the hotel site, there is negligible queueing for entering and exiting traffic. In addition to the mitigation

analysis requested above, "Do not block the box" striping on Elm Street may be beneficial for both the Hampton Inn and the proposed Site driveways. While the analysis indicates Elm Street vehicle queues should not extend to this location, this level of queuing has been observed under current conditions. Maintaining clear access to both properties is critical to provide appropriate emergency vehicle access.

Response: **An evaluation of traffic operations at the Project site driveway intersection with Elm Street during the Saturday midday peak-hour has been completed and summarized herein.**

As requested, a Traffic Signal Warrants Analysis (TSWA) has been performed for the Project site driveway intersection with Elm Street following the methodology defined in the Manual on Uniform Traffic Control Devices (MUTCD)[6] and using the data from the automatic traffic recorder (ATR) count that was performed in February 2024 on Elm Street just south of the Project site driveway. An approach speed of <40 mph was assumed along with the following intersection geometry:

- **Elm Street Approaches: 1 travel lane**
- **Project Site Driveway: 1 travel lane**

The average weekday traffic volumes associated with the Project were distributed over a 24-hour period using the time-of-day traffic distribution presented in the 12th Edition of Trip Generation published by the ITE[7] and assigned to Elm Street based on the trip distribution pattern that is presented in the November 2024 TIA. The 2024 traffic volumes were adjusted to 2026 traffic volume conditions by applying a background traffic growth rate of 1.5 percent per year as identified in the November 2024 TIA prior to the addition of Project-related traffic in order to establish the design year traffic volumes from which to perform the TSWA for the intersection.

Based on this analysis, it was determined that the installation of a traffic control signal at the Elm Street/Project site driveway intersection is <u>not warranted</u> (justified) under 2026 design year traffic volume conditions. The volume of traffic on the minor street approach (Project site driveway) does not meet the minimum traffic volume thresholds under either Warrant 1, *Eight-Hour Vehicular Volume,* or Warrant 2, *Four-Hour Vehicular Volume*. As such, the same conclusion (the installation of a traffic control signal is not warranted) would result from an evaluation of future year traffic volume conditions at the intersection. The detailed TSWA is included as an attachment.

As noted there is a slight off-set between the Project site driveway and the driveway to the Hampton Inn that does not impact the operation of the driveways. The Project site driveway has been situated to allow for the primary structure that is associated with the existing single-family home that fronts along Elm Street (No. 287) to be

[6] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.
[7] *Trip Generation*, 12th Edition; Institute of Transportation Engineers; Washington, DC; August 2025.

retained. Shifting the driveway further to the south to align with the driveway to the Hampton Inn would require the demolition of the home.

To the extent so desired by the City and subject to receipt of all necessary rights, permits and approvals, the Applicant is willing to install "Do Not Block" signs and pavement markings on Elm Street at the Project site driveway.

Comment 7: ***Elm Street crossing/bus stop*** *– The TIA notes that the Project applicant proposes to install a Rectangular Rapid Flashing Beacon (RRFB) at the existing crosswalk across Elm Street adjacent to the Site. The applicant also has committed to installing a bus shelter at the existing MeVA bus stop to the northwest of the Site. An update should be provided regarding the status of this commitment and if there are any right-of-way constraints or other issues associated with this mitigation and any sidewalk modifications.*

For regional context, discussion should be provided regarding the long-planned connection between the Riverwalk Trail to the south and the Amesbury Ghost Trail and how these facilities could be accessed by Site residents.

Response: **The Applicant has been and will continue to work with the City and MeVa concerning the establishment of a bus stop at or in the vicinity of the Project site. To the extent that a bus shelter is installed, it will be situated at a location where there is available public right-of-way or easements can be obtained.**

In addition, the Applicant has been and will continue to work with the City to establish connections between the Project site and the Riverwalk Trail and the Amesbury Ghost Trail. These connections are likely to take the form of both an on- and off-road accommodation with wayfinding signs provided.

Mitigation summary

Comment: *VAI presented a summary of the Project's mitigation commitments at a September 22, 2025 public meeting for the Project. That mitigation, as summarized on VAI's presentation material from that meeting, is provided below for reference. The following information which should be confirmed, updated, or supplemented by the Applicant as needed:*

Route 110 Coordinated Traffic Signal System

> *Design and implement an optimal traffic signal timing, phasing and coordination plan inclusive of the following intersections:*

- *Route 110 at the Carriagetown Marketplace Driveway;*
- *Route 110 at Elm Street and Clark's Road;*
- *Route 110 at the I-95 Southbound Off-Ramp (future); and*
- *Route 110 at Merrill Street and Rabbit Road (not currently coordinated)*

The initial traffic signal timing improvements will be completed prior to the issuance of any Certificate of Occupancy for the Project and will be reviewed thereafter as a part of the annual traffic Monitoring and Reporting Program.

Response: **No change to the mitigation commitment.**

Comment: ***Route 110 Corridor Improvements***

> *Prepare an Interchange Improvement Study (IIS) and a MassWorks grant application for submission by the City for the design and construction of the identified improvements. The MassWorks grant application and supporting plans have been submitted by the City and are currently under review by the state.*

Response: **This mitigation commitment has been completed.**

Comment: ***Route 110 at Elm Street and Clark's Road***

> *In an effort improve operating conditions at the Route 110/Elm Street/Clark's Road intersection and within the Route 110/I-95 interchange, the following improvements at the Route 110/Elm Street/Clark's Road intersection:*

- *Widen Route 110 westbound to accommodate three (3) through travel lanes between the I 95 southbound offramp to a point approximately 300 feet west of Elm Street;*
- *Reconstruct the intersection and traffic signal system to accommodate the additional through travel lane, including a section of the Salisbury Point Ghost Trail that is situated along the north side Route 110; and*
- *Design and implement an optimal traffic signal timing, phasing and coordination plan.*

Response: **These improvements are currently under design and are being funded as a part of the MassWorks grant.**

Comment: ***Safety Improvements***

> *In an effort to off-set the predicted impact of the Project and to improve safety at Route 110/Merrill Street/Rabbit Road and Route 110/Elm Street/Clarks Road intersection intersections, the Project proponent will:*

- *facilitate the completion of a Road Safety Audit (RSA) at both intersections (complete); and*
- *design and implement the short-term, low-cost improvements that are identified as an outcome of the RSA.*

Response: **These improvements are currently under design and are being funded as a part of the MassWorks grant.**

Comment: ***Elm Street Pedestrian Crossing***

> *To facilitate pedestrian access to the Project and connectivity to public transportation (discussion follows), the Carriagetown Marketplace and the Salisbury Point Ghost Trail, a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) will be installed at the existing crosswalk across the Elm Street northwest leg of the Elm Street/Hampton Inn Amesbury driveway intersection to include pedestrian crossing warning signs at and in advance of the crossing.*

Response: **This improvement is currently under design and is being funded as a part of the MassWorks grant.**

Comment: *The applicant also has committed to implement a comprehensive Transportation Demand Management (TDM) program to help minimize travel to and from the Site by single-occupant automobile. The applicant also will conduct an annual post-opening traffic monitoring program of multiple study area locations for five years.*

Response: **No change to the mitigation commitment.**

Comment: *As requested earlier, it would be helpful to have a similar summary of the primary design elements of the MassWorks Route 110 (Macy Street) design by the Amesbury DPW.*

Response: **No response required from the Applicant.**

We trust that this information is responsive to the comments that were identified in the February 9, 2026 memorandum prepared by VHB concerning their review of the materials that have been submitted in support of the Project. 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.

Jeffrey S. Dirk

Jeffrey S. Dirk, P.E., PTOE, FITE
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Professional Engineer in CT, MA, ME, NH, RI, and VA

JSD/jsd

Attachments

Table A5
MITIGATED SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

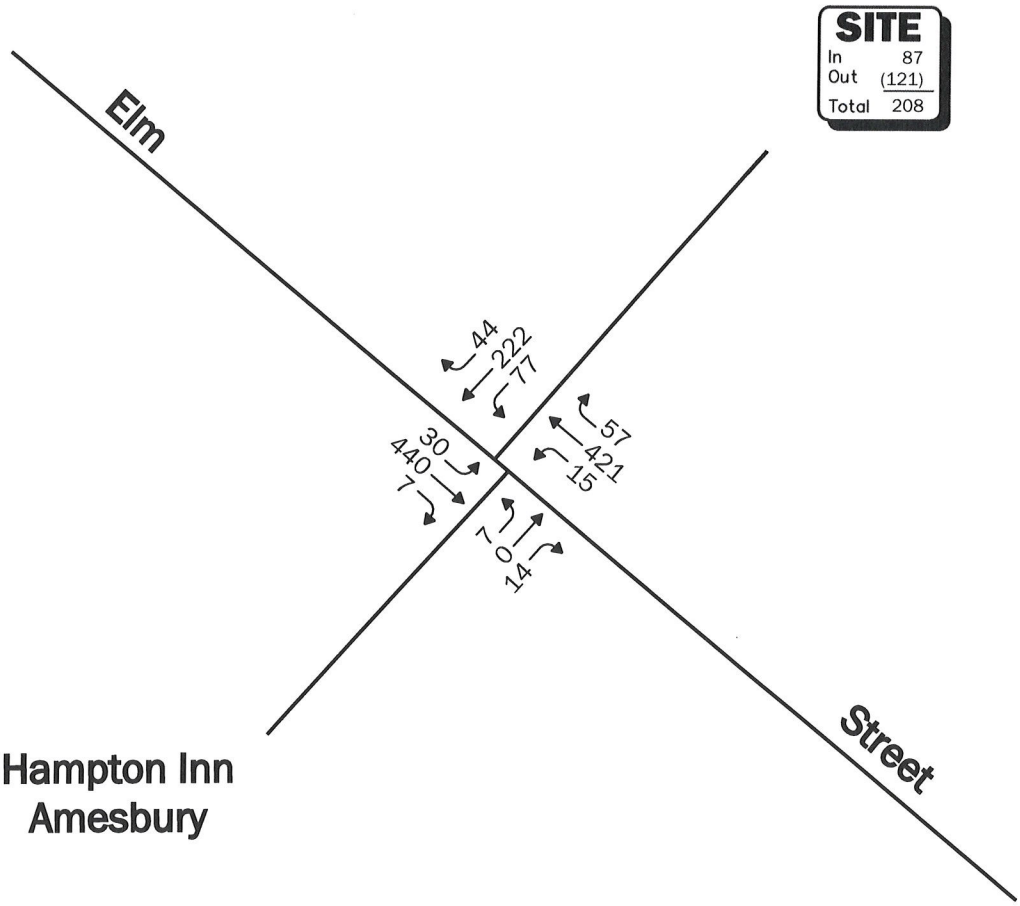
	2031 No-Build				2031 Build				2031 Build (Mitigated)			
Signalized Intersection/Peak-Hour/Movement	V/C[a]	Delay[b]	LOS[c]	Queue[d] 50th/95th	V/C	Delay	LOS	Queue 50th/95th	V/C	Delay	LOS	Queue 50th/95th
Route 110 at Elm Street and Clarks Road												
Weekday Morning:												
Route 110 EB UT/LT	0.42	50.3	D	2/3	0.61	57.4	E	2/4	0.52	70.6	E	3/5
Route 110 EB TH/RT	1.49	>80.0	F	26/32	1.49	>80.0	F	26/32	0.94	46.3	D	29/36
Route 110 WB UT/LT	0.60	49.9	D	3/6	0.69	57.6	E	3/6	0.56	59.2	E	4/8
Route 110 WB TH	0.90	45.7	D	12/17	0.90	46.5	D	12/17	0.40	28.6	C	9/12
Route 110 WB RT	0.21	9.5	A	0/1	0.22	8.6	A	0/1	0.22	5.7	A	0/1
Clarks Road NB LT	0.54	45.2	D	3/6	0.62	50.3	D	3/6	--	--	--	--
Clarks Road NB TH/RT	0.33	42.4	D	1/4	0.37	44.1	D	1/4	--	--	--	--
Clarks Road NB LT/TH	--	--	--	--	--	--	--	--	0.58	56.9	E	5/6
Clarks Road NB RT	--	--	--	--	--	--	--	--	0.13	55.8	E	0/2
Elm Street SB LT	0.54	30.1	C	6/13	0.56	28.8	C	6/15	0.91	68.5	E	11/15
Elm Street SB TH/RT	0.13	25.8	C	1/4	0.14	24.2	C	1/4	0.23	45.5	D	2/5
Overall	--	**>80.0**	**F**	--	--	**>80.0**	**F**	--	--	**43.6**	**D**	--
Weekday Evening:												
Route 110 EB UT/LT	0.77	71.3	E	3/7	1.09	>80.0	F	5/10	0.63	66.1	E	6/9
Route 110 EB TH/RT	1.25	>80.0	F	23/27	1.25	>80.0	F	14/25	0.90	40.8	D	26/35
Route 110 WB UT/LT	0.79	70.2	E	3/7	0.79	70.2	E	3/7	0.58	64.9	E	5/6
Route 110 WB TH	1.37	>80.0	F	27/32	1.37	>80.0	F	27/32	0.73	35.6	D	17/22
Route 110 WB RT	0.45	13.9	B	2/4	0.49	12.5	B	2/5	0.44	14.3	B	1/5
Clarks Road NB LT	0.42	39.6	D	3/6	0.55	45.1	D	3/6	--	--	--	--
Clarks Road NB TH/RT	0.60	43.3	D	4/9	0.81	65.1	E	4/9	--	--	--	--
Clarks Road NB LT/TH	--	--	--	--	--	--	--	--	0.69	61.9	E	7/9
Clarks Road NB RT	--	--	--	--	--	--	--	--	0.07	56.0	E	0/0
Elm Street SB LT	0.47	33.4	C	4/10	0.46	30.7	C	5/11	0.72	59.4	E	8/10
Elm Street SB TH/RT	0.29	31.8	C	2/6	0.27	30.3	C	3/7	0.43	52.9	D	4/7
Overall	--	**>80.0**	**F**	--	--	**>80.0**	**F**	--	--	**40.3**	**D**	--

[a]Volume-to-capacity ratio.
[b]Control (signal) delay per vehicle in seconds.
[c]Level of service.
[d]Queue length in vehicles.
NB = northbound; SB = southbound; EB = eastbound; WB = westbound.
UT = U-turning movement; LT = left-turning movements; TH = through movements; RT = right-turning movements.

ATTACHMENTS

FIGURE 1A – SATURDAY MIDDAY PEAK-HOUR TRAFFIC VOLUMES
ITE LUC 310 HOTEL SATURDAY MIDDAY PEAK-HOUR
PROJECT SITE DRIVEWAY SATURDAY MIDDAY PEAK-HOUR ANALYSIS
ITE 12TH EDITION TRIP GENERATION CALCULATIONS
ITE PARKING GENERATION STATISTICS
ROUTE 110/CLARKS ROAD/ELM STREET REVISED CAPACITY ANALYSIS
TRAFFIC SIGNAL WARRANTS ANALYSIS (TSWA)

FIGURE 1A – SATURDAY MIDDAY PEAK-HOUR TRAFFIC VOLUMES



Not To Scale

Figure 1A
2032 Build
Saturday Midday
Peak-Hour Traffic Volumes

Vanasse & Associates inc

ITE LUC 310 HOTEL SATURDAY MIDDAY PEAK-HOUR

Graph Look Up

Graph Look Up
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Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 310

LAND USE GROUP: (300-399) Lodging

LAND USE : 310 - Hotel

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Rooms

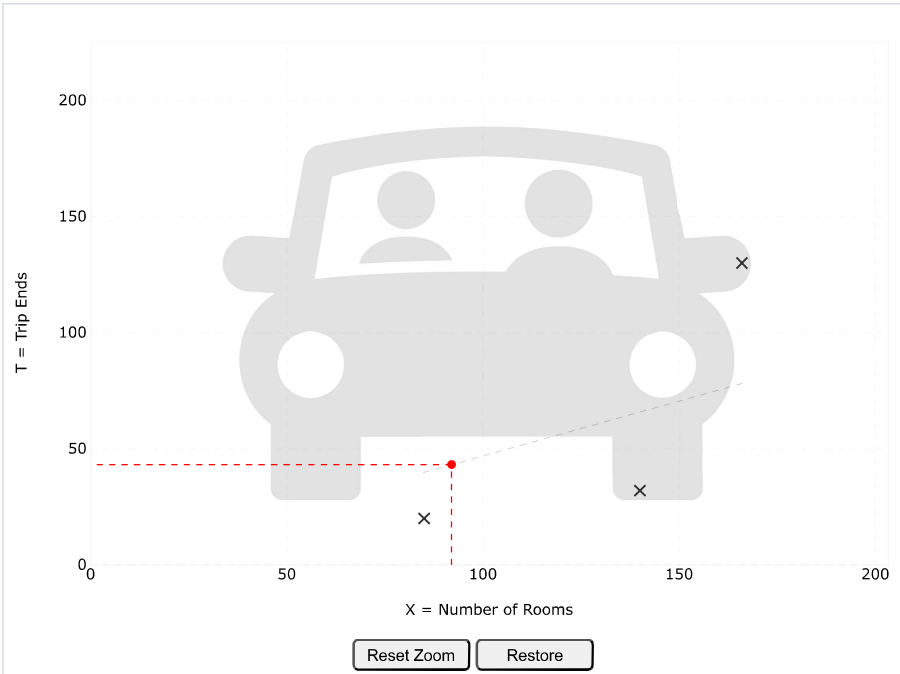
TIME PERIOD: Saturday, Peak Hour of Generator

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 92 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Hotel (310) Click for Description and Data Plots

Independent Variable:
Rooms

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
3

Avg. Num. of Rooms:
130

Average Rate:
0.47

Range of Rates:
0.23 - 0.78

Standard Deviation:
0.33

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
51% entering, 49% exiting

Calculated Trip Ends:
Average Rate: 43 (Total), 22 (Entry), 21 (Exit)

PROJECT SITE DRIVEWAY SATURDAY MIDDAY PEAK-HOUR ANALYSIS

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	0	14	77	0	44	15	421	57	30	440	7
Future Vol, veh/h	7	0	14	77	0	44	15	421	57	30	440	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	15	84	0	48	16	458	62	33	478	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1038	1099	482	1065	1072	489	486	0	0	520	0	0
Stage 1	547	547	-	521	521	-	-	-	-	-	-	-
Stage 2	490	552	-	543	551	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	209	212	584	200	220	579	1077	-	-	1047	-	-
Stage 1	521	517	-	538	531	-	-	-	-	-	-	-
Stage 2	560	515	-	524	515	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	180	199	584	183	206	579	1077	-	-	1047	-	-
Mov Cap-2 Maneuver	180	199	-	183	206	-	-	-	-	-	-	-
Stage 1	499	495	-	527	520	-	-	-	-	-	-	-
Stage 2	502	504	-	488	493	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	16.57	35.9	0.26	0.54
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	53	-	-	334	243	113	-	-
HCM Lane V/C Ratio	0.015	-	-	0.068	0.54	0.031	-	-
HCM Ctrl Dly (s/v)	8.4	0	-	16.6	35.9	8.6	0	-
HCM Lane LOS	A	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	2.9	0.1	-	-

ITE 12TH EDITION TRIP GENERATION CALCULATIONS

Graph Look Up

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Add-ons to do more
Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 210

LAND USE GROUP: (200-299) Residential

LAND USE : 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

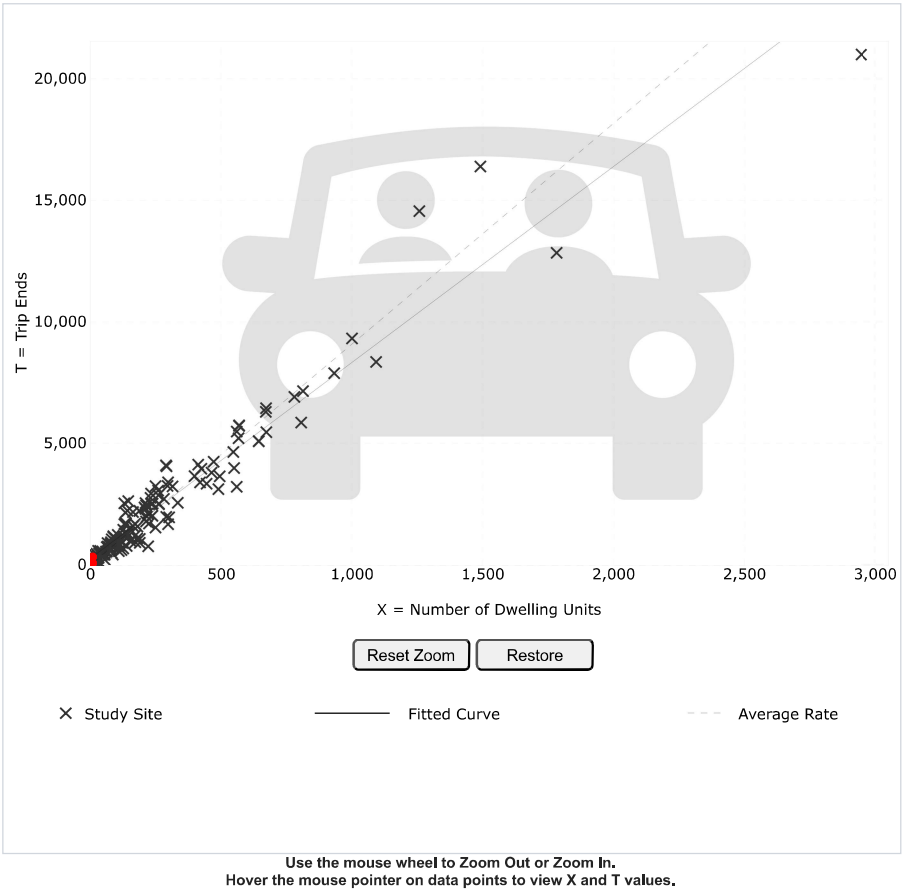
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 8 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
155

Avg. Num. of Dwelling Units:
261

Average Rate:
9.09

Range of Rates:
3.47 - 23.80

Standard Deviation:
2.29

Fitted Curve Equation:
T = 8.07(X) + 265.45

R^2:
0.94

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 73 (Total), 36 (Entry), 37 (Exit)
Fitted Curve: 330 (Total), 165 (Entry), 165 (Exit)

Graph Look Up

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DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 210

LAND USE GROUP: (200-299) Residential

LAND USE : 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

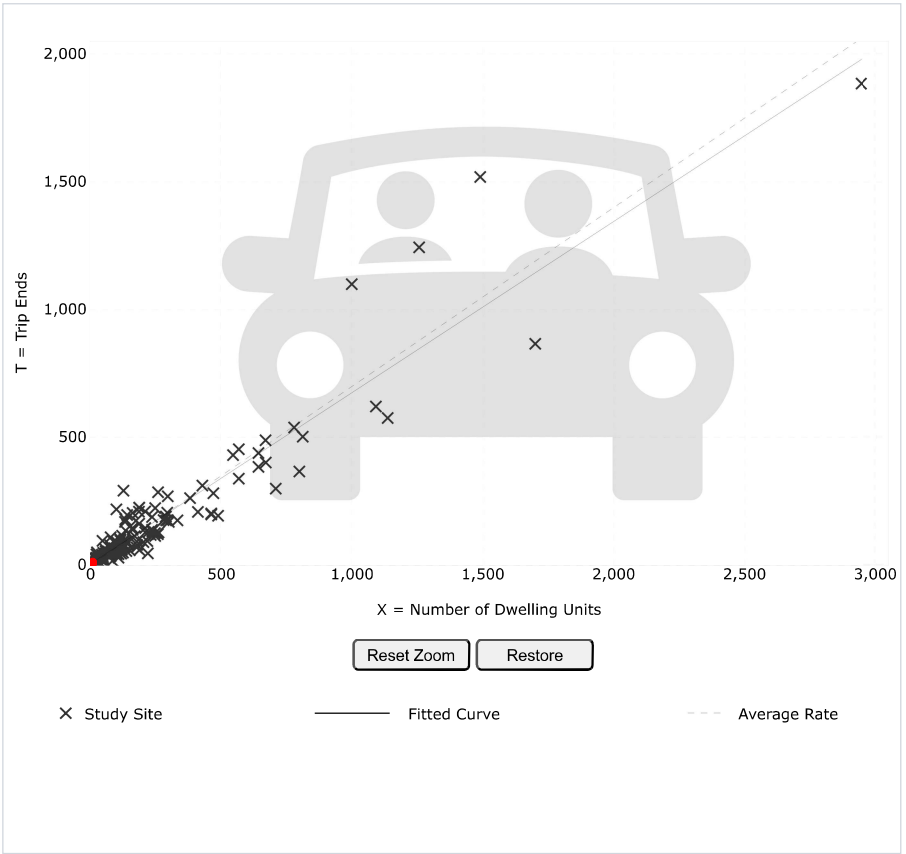
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Stre

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 8 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
153

Avg. Num. of Dwelling Units:
239

Average Rate:
0.70

Range of Rates:
0.22 - 2.27

Standard Deviation:
0.26

Fitted Curve Equation:
T = 0.67(X) + 5.59

R^2:
0.89

Directional Distribution:
27% entering, 73% exiting

Calculated Trip Ends:
Average Rate: 6 (Total), 2 (Entry), 4 (Exit)
Fitted Curve: 11 (Total), 3 (Entry), 8 (Exit)

Graph Look Up

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DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 210

LAND USE GROUP: (200-299) Residential

LAND USE : 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

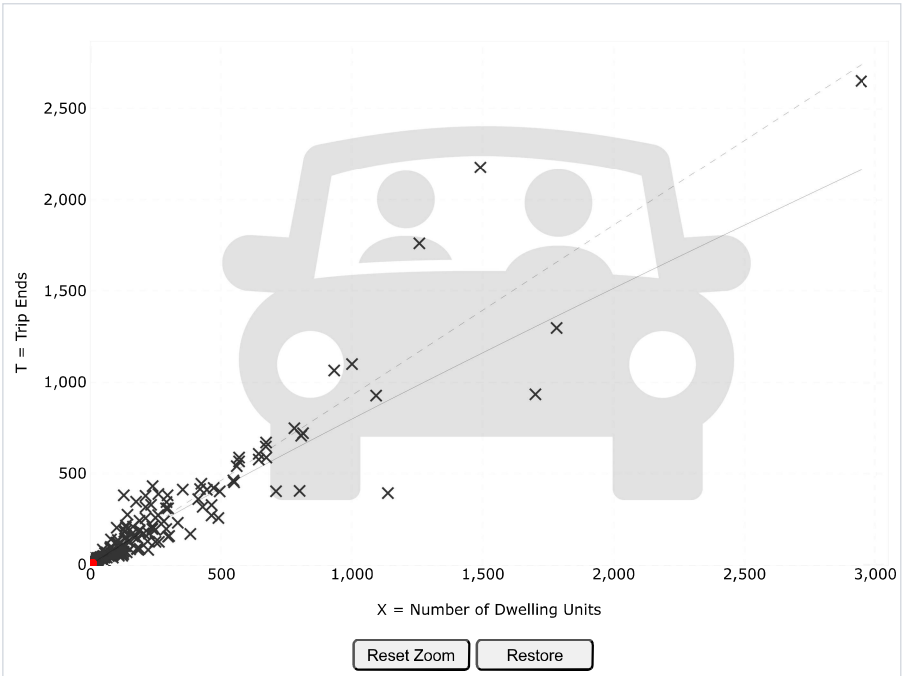
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Stre

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 8 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
166

Avg. Num. of Dwelling Units:
266

Average Rate:
0.93

Range of Rates:
0.35 - 2.98

Standard Deviation:
0.33

Fitted Curve Equation:
Ln(T) = 0.92 Ln(X) + 0.33

R^2:
0.90

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 7 (Total), 5 (Entry), 2 (Exit)
Fitted Curve: 9 (Total), 6 (Entry), 3 (Exit)

Graph Look Up

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DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 210

LAND USE GROUP: (200-299) Residential

LAND USE : 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

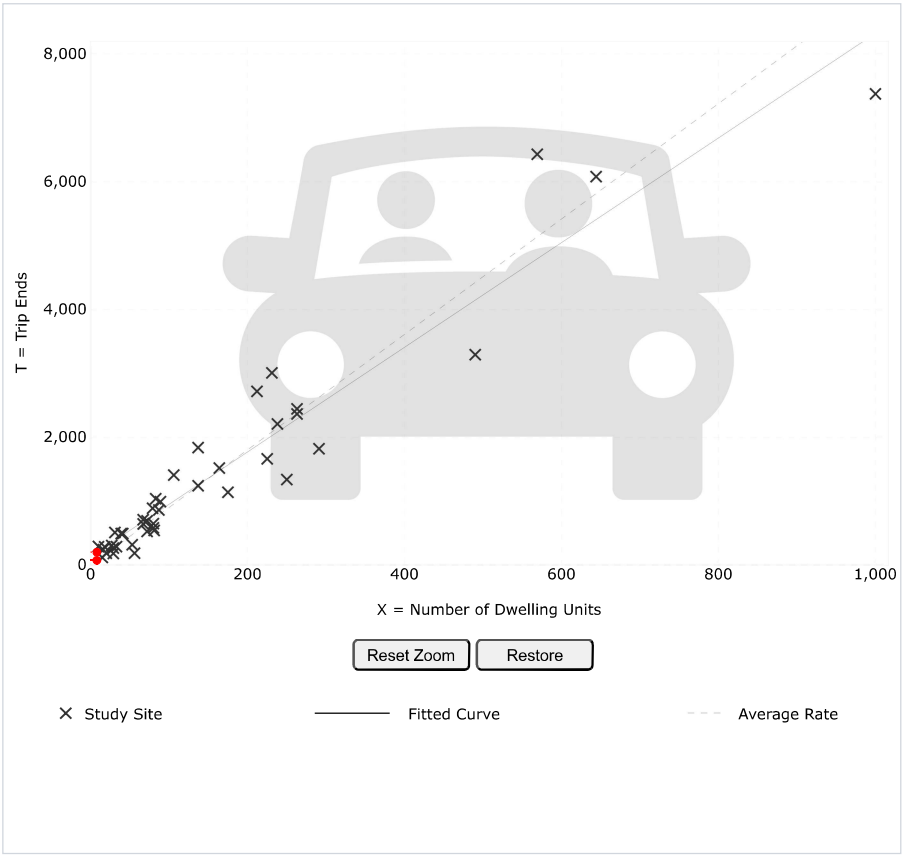
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Saturday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 8 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
42

Avg. Num. of Dwelling Units:
159

Average Rate:
9.03

Range of Rates:
3.36 - 28.90

Standard Deviation:
2.51

Fitted Curve Equation:
T = 8.19(X) + 134.24

R^2:
0.92

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 72 (Total), 36 (Entry), 36 (Exit)
Fitted Curve: 200 (Total), 100 (Entry), 100 (Exit)

Graph Look Up

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Add-ons to do more

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DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 210

LAND USE GROUP: (200-299) Residential

LAND USE : 210 - Single-Family Detached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

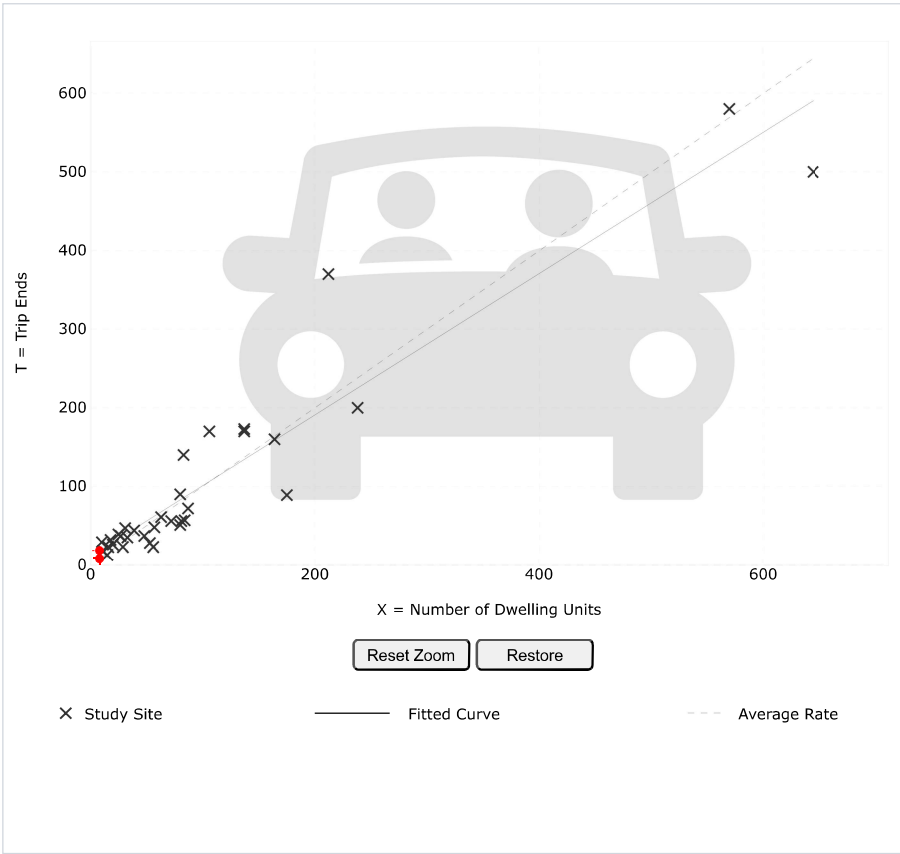
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Saturday, Peak Hour of Generator

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 8 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Detached Housing (210) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
33

Avg. Num. of Dwelling Units:
106

Average Rate:
1.00

Range of Rates:
0.41 - 2.90

Standard Deviation:
0.36

Fitted Curve Equation:
T = 0.90(X) + 10.97

R^2:
0.89

Directional Distribution:
53% entering, 47% exiting

Calculated Trip Ends:
Average Rate: 8 (Total), 4 (Entry), 4 (Exit)
Fitted Curve: 18 (Total), 10 (Entry), 8 (Exit)

Graph Look Up

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Add-ons to do more
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Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 215

LAND USE GROUP: (200-299) Residential

LAND USE : 215 - Single-Family Attached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

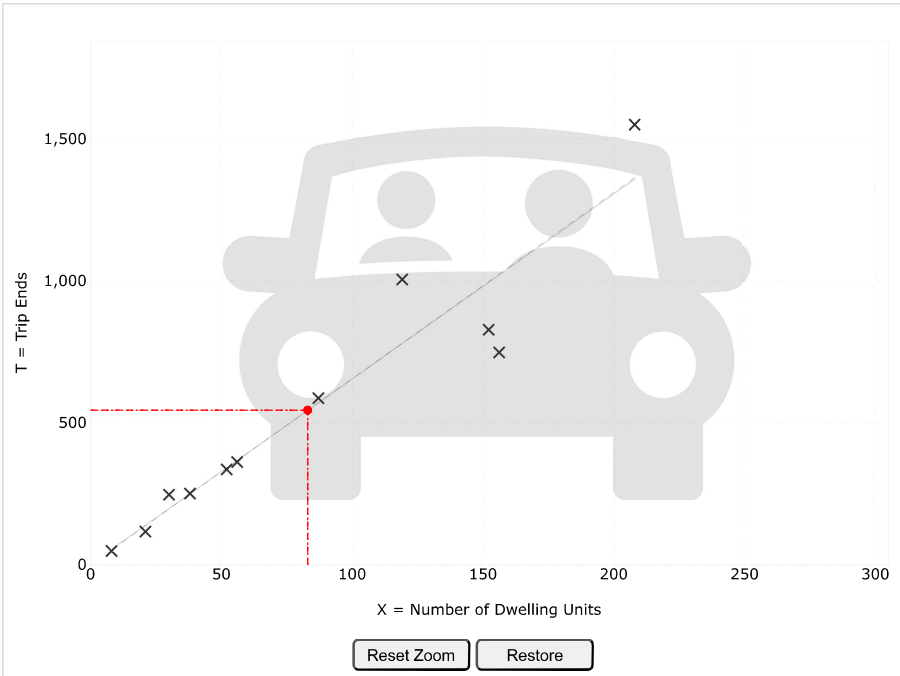
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 83 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Attached Housing (215) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
11

Avg. Num. of Dwelling Units:
84

Average Rate:
6.57

Range of Rates:
4.80 - 8.45

Standard Deviation:
1.28

Fitted Curve Equation:
T = 6.53(X) + 3.25

R^2:
0.91

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 545 (Total), 273 (Entry), 272 (Exit)
Fitted Curve: 545 (Total), 273 (Entry), 272 (Exit)

Graph Look Up

Graph Look Up
How to Use ITETripGen
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Comments

Add-ons to do more
Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 215

LAND USE GROUP: (200-299) Residential

LAND USE : 215 - Single-Family Attached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

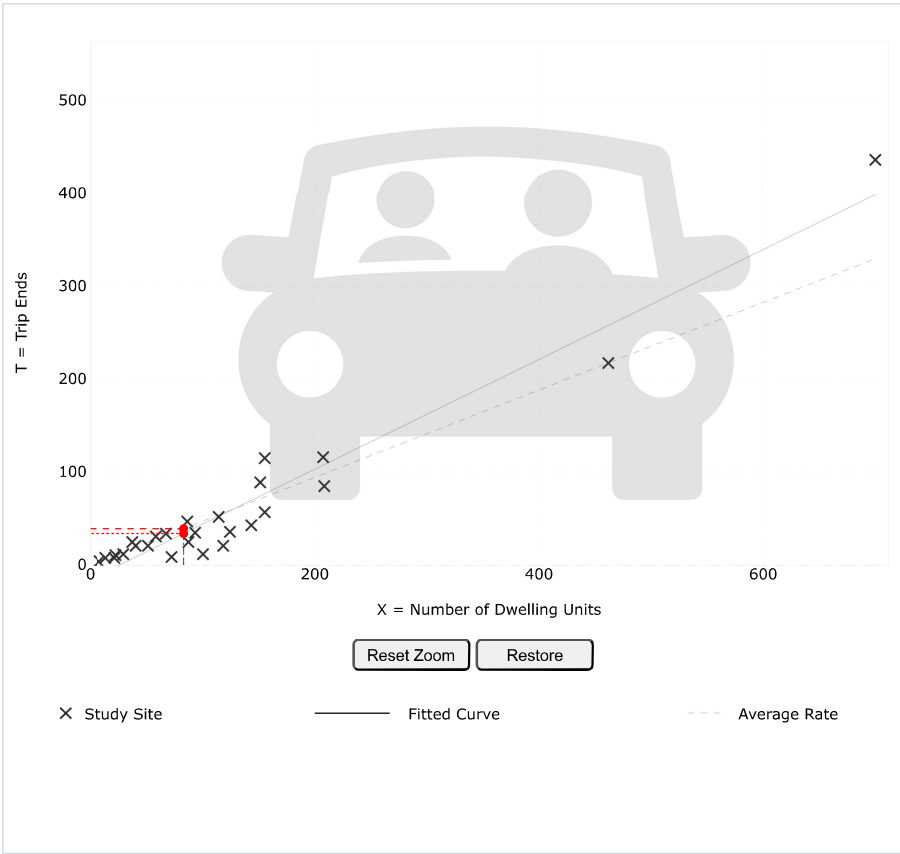
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Stre

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 83 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Attached Housing (215) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
26

Avg. Num. of Dwelling Units:
129

Average Rate:
0.47

Range of Rates:
0.12 - 0.74

Standard Deviation:
0.16

Fitted Curve Equation:
T = 0.59(X) - 15.25

R^2:
0.94

Directional Distribution:
25% entering, 75% exiting

Calculated Trip Ends:
Average Rate: 39 (Total), 10 (Entry), 29 (Exit)
Fitted Curve: 34 (Total), 8 (Entry), 26 (Exit)

Graph Look Up

Graph Look Up
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Add-ons to do more
Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 215

LAND USE GROUP: (200-299) Residential

LAND USE : 215 - Single-Family Attached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

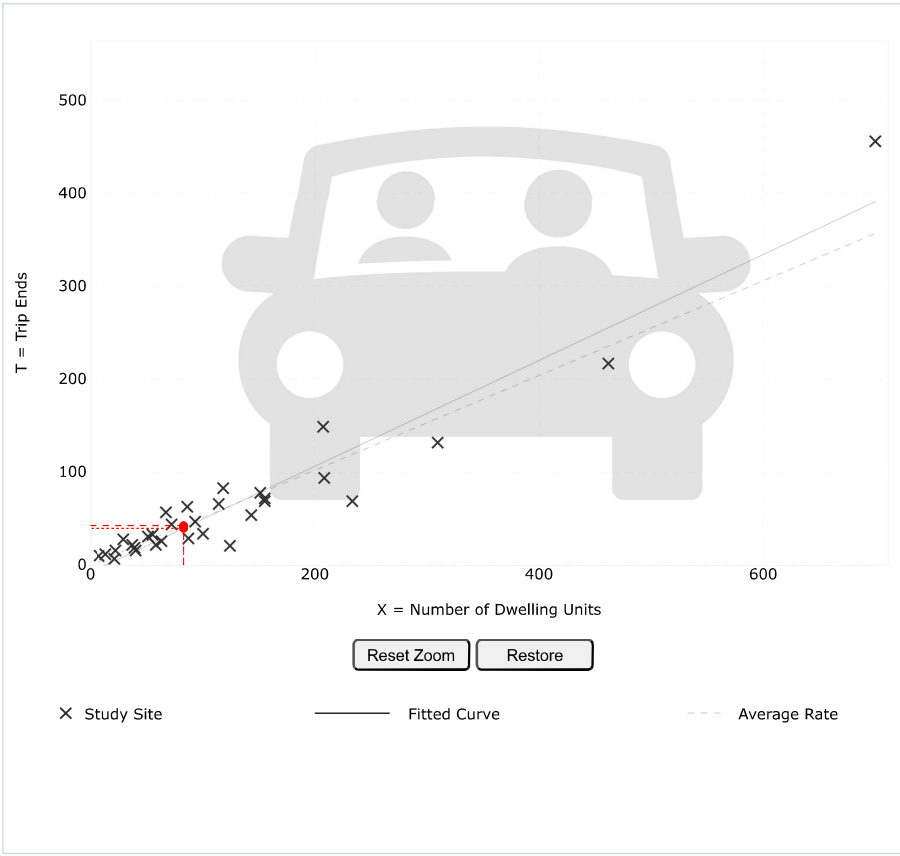
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Stre

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 83 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Attached Housing (215) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
31

Avg. Num. of Dwelling Units:
131

Average Rate:
0.51

Range of Rates:
0.17 - 1.25

Standard Deviation:
0.16

Fitted Curve Equation:
T = 0.57(X) - 7.84

R^2:
0.92

Directional Distribution:
57% entering, 43% exiting

Calculated Trip Ends:
Average Rate: 42 (Total), 24 (Entry), 18 (Exit)
Fitted Curve: 39 (Total), 22 (Entry), 17 (Exit)

Graph Look Up

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Add-ons to do more
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Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 215

LAND USE GROUP: (200-299) Residential

LAND USE : 215 - Single-Family Attached Housing

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

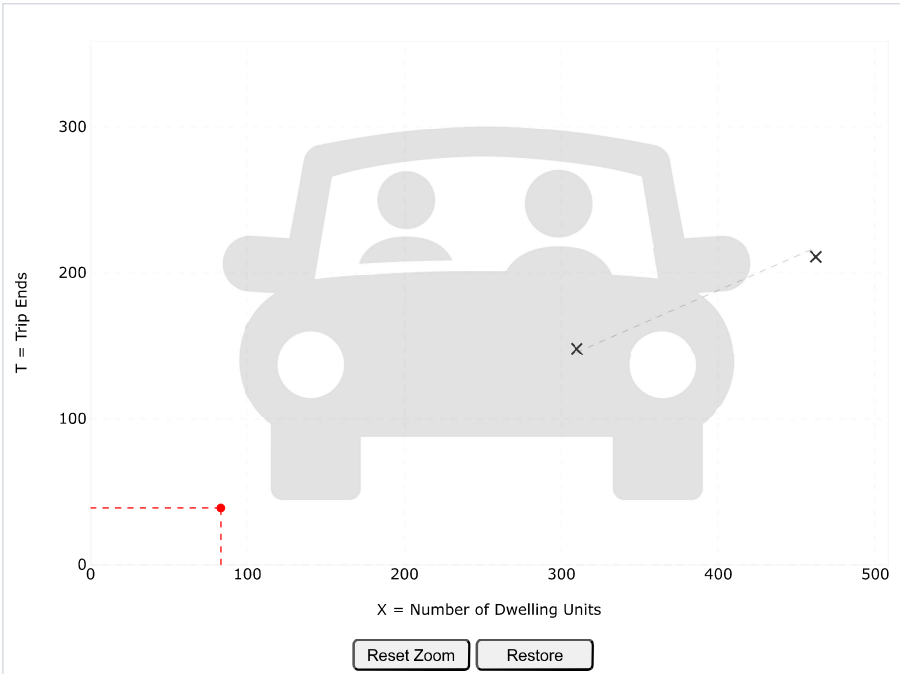
TIME PERIOD: Saturday, Peak Hour of Generator

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 83 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Single-Family Attached Housing (215) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
2

Avg. Num. of Dwelling Units:
386

Average Rate:
0.47

Range of Rates:
0.46 - 0.48

Standard Deviation:
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 39 (Total), 19 (Entry), 20 (Exit)

Graph Look Up

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Add-ons to do more
Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

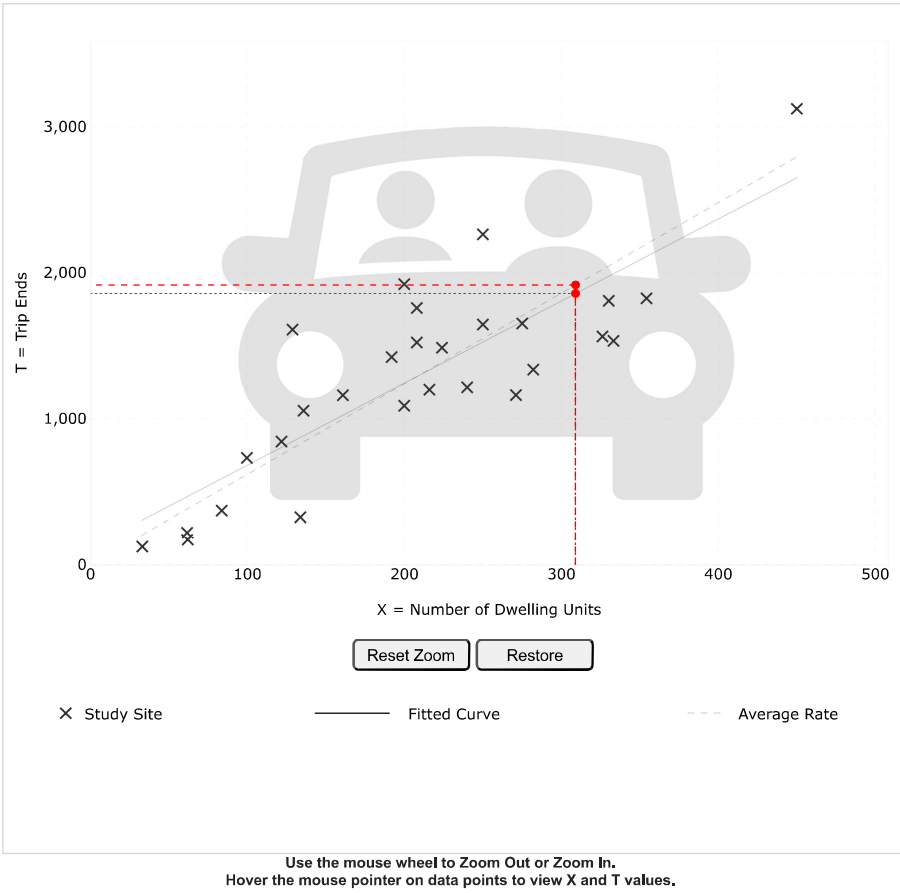
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 309 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
28

Avg. Num. of Dwelling Units:
208

Average Rate:
6.21

Range of Rates:
2.46 - 12.50

Standard Deviation:
1.87

Fitted Curve Equation:
T = 5.63(X) + 120.45

R^2:
0.70

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1919 (Total), 959 (Entry), 960 (Exit)
Fitted Curve: 1860 (Total), 930 (Entry), 930 (Exit)

Graph Look Up

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Add-ons to do more
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Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

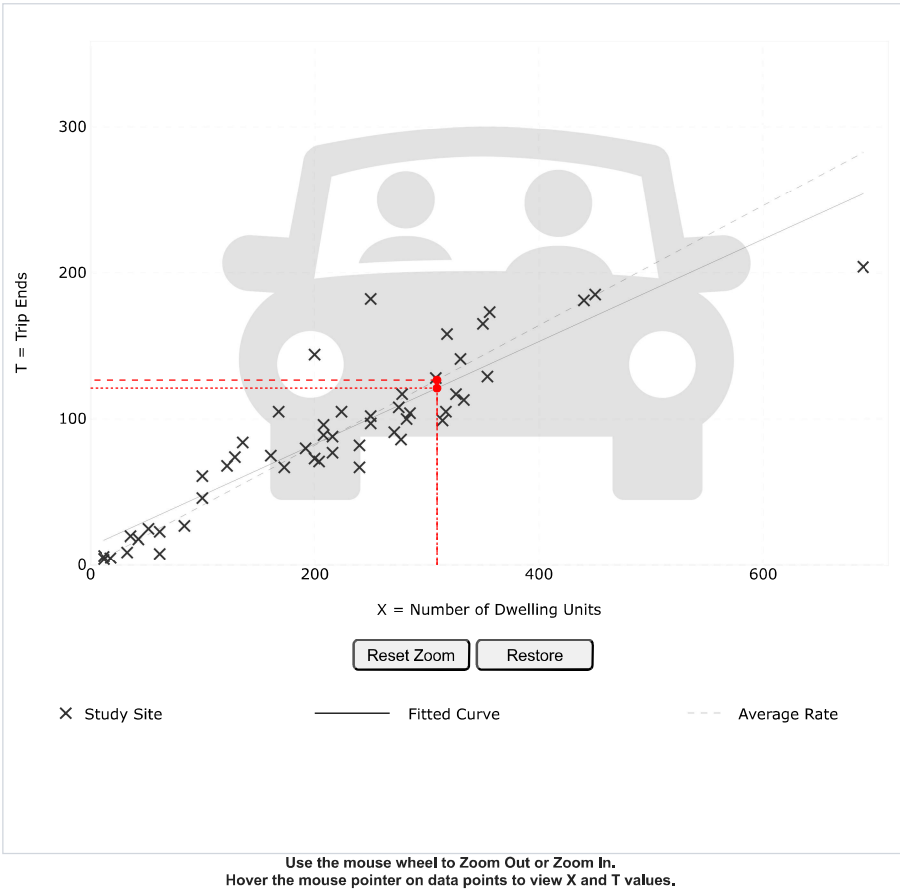
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Stre

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 309 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
51

Avg. Num. of Dwelling Units:
219

Average Rate:
0.41

Range of Rates:
0.13 - 0.73

Standard Deviation:
0.10

Fitted Curve Equation:
T = 0.35(X) + 12.93

R^2:
0.81

Directional Distribution:
24% entering, 76% exiting

Calculated Trip Ends:
Average Rate: 127 (Total), 30 (Entry), 97 (Exit)
Fitted Curve: 121 (Total), 29 (Entry), 92 (Exit)

Graph Look Up

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Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

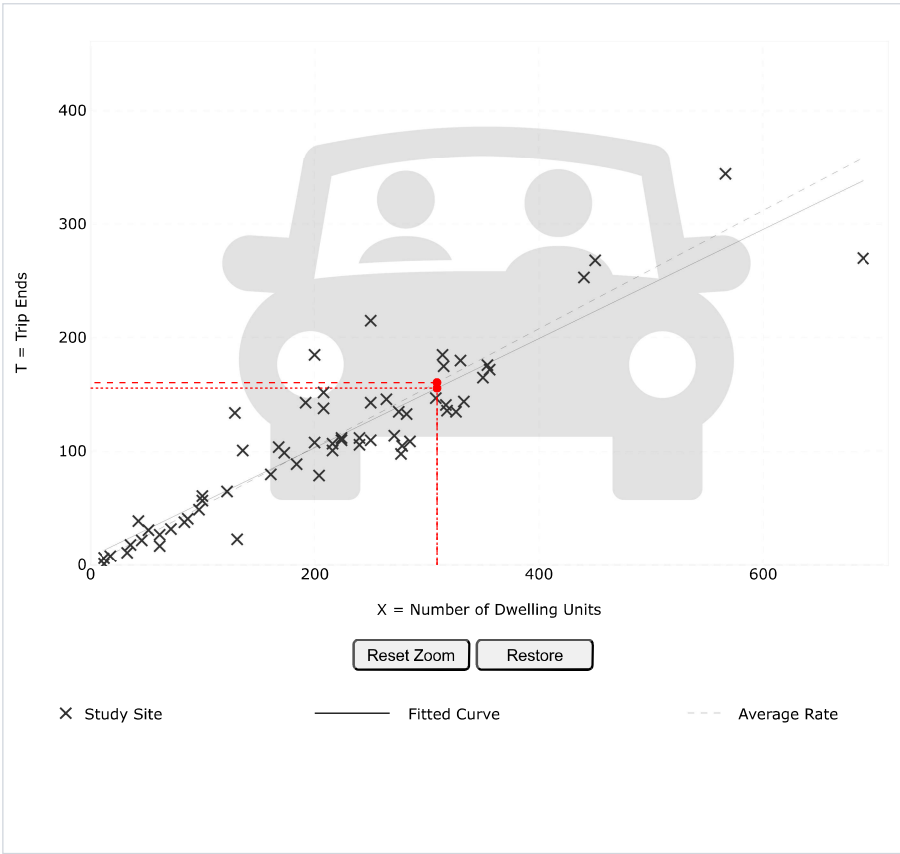
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Stre

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 309 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
61

Avg. Num. of Dwelling Units:
215

Average Rate:
0.52

Range of Rates:
0.08 - 1.04

Standard Deviation:
0.13

Fitted Curve Equation:
T = 0.48(X) + 7.35

R^2:
0.83

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 161 (Total), 100 (Entry), 61 (Exit)
Fitted Curve: 156 (Total), 97 (Entry), 59 (Exit)

Add-ons to do more
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Add-ons to do more
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Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

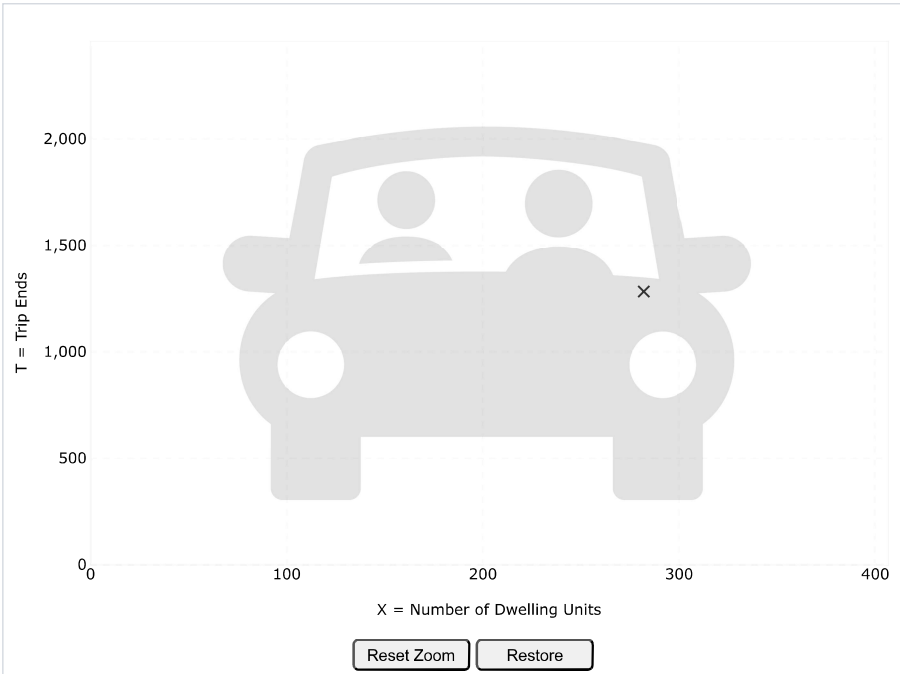
TIME PERIOD: Saturday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 309 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
1

Avg. Num. of Dwelling Units:
282

Average Rate:
4.55

Range of Rates:
4.55 - 4.55

Standard Deviation:
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1406 (Total), 703 (Entry), 703 (Exit)

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Add-ons to do more
Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE : 220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

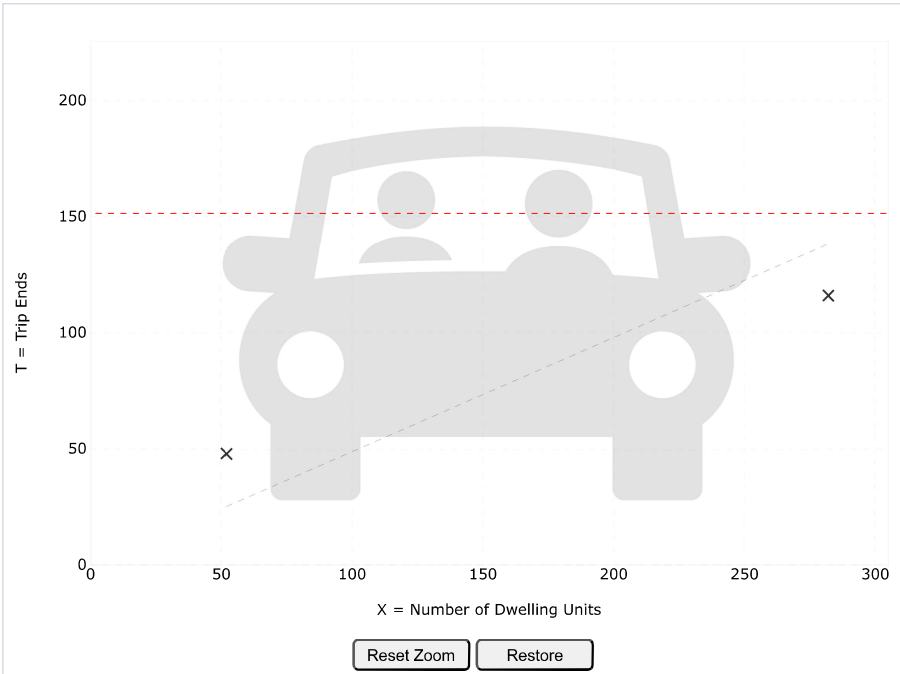
TIME PERIOD: Saturday, Peak Hour of Generator

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 309 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
2

Avg. Num. of Dwelling Units:
167

Average Rate:
0.49

Range of Rates:
0.41 - 0.92

Standard Deviation:
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
38% entering, 62% exiting

Calculated Trip Ends:
Average Rate: 151 (Total), 58 (Entry), 93 (Exit)

ITE PARKING GENERATION STATISTICS

FIGURE 2-2 (continued)

	Weekday (parking spaces/unit land use)		Weekend (parking spaces/unit land use)		Peak ratio	Units	Source
Land use	**Visitors**	**Employees**	**Visitors**	**Employees**			
Hotel–business	1.00	0.15	1.00	0.15	1.15	key	2,3
Hotel–leisure	1.00	0.15	1.00	0.15	1.15	key	2,3
Restaurant/lounge	6.67	1.20	7.67	1.33	9.00	ksf GLA	2,3
Meeting/banquet (0–20 sq ft/key)	scaled from 0 to 30	scaled from 0 to 2.0	scaled from 0 to 20	scaled from 0 to 2.0	scaled from 0 to 32	ksf GLA	2,3
Meeting/banquet (20–50 sq ft/key)	scaled from 30 to 20	scaled from 2 to 1.5	scaled from 20 to 10	scaled from 2 to 1.5	scaled from 32 to 21.5	ksf GLA	2,3
Meeting/banquet (50–100 sq ft/key)	scaled from 20 to 10	scaled from 1.5 to 1.0	scaled from 10 to 5.5	scaled from 1.5 to 1.0	scaled from 21.5 to 11.1	ksf GLA	2,3
Convention (100–200 sq ft/key)	scaled from 10 to 5.5	scaled from 1 to 0.5	5.50	scaled from 1 to 0.5	scaled from 11.1 to 6	ksf GLA	2,3
Convention (>200 sq ft/key)	use convention center but adjust for captive on site						2,3
Residential							
Studio efficiency	0.10	0.85	0.15	0.85	1.00	unit	2,3
1 bedroom	0.10	0.90	0.15	0.90	1.05	unit	2,3
2 bedrooms	0.10	1.65	0.15	1.65	1.80	unit	2,3
3+ bedrooms	0.10	2.50	0.15	2.50	2.65	unit	2,3
Senior housing	0.55	0.30	0.42	0.30	0.85	unit	2,3
Office <25,000 sq ft	0.30	3.50	0.03	0.35	3.80	ksf GFA	3
Office 25,000–100,000 sq ft	sliding scale between <25,000 and 100,000				scaled from 3.8 to 3.4	ksf GFA	3
Office = 100,000 sq ft	0.25	3.15	0.03	0.32	3.40	ksf GFA	3
Office 100,000–500,000 sq ft	sliding scale between 100,000 and 200,000				scaled from 3.4 to 2.8	ksf GFA	3
Office >500,000 sq ft	0.20	2.60	0.02	0.26	2.80	ksf GFA	3
Open plan/ high-density office	0.25	5.75	0.03	0.58	6.00	ksf GFA	2
Medical/dental office	3.00	1.60	0.00	0.00	4.60	ksf GFA	2,3
Bank (drive-in branch)	3.50	2.50	3.00	1.75	6.00	ksft GFA	2,3
Arena	0.27	0.03	0.30	0.03	0.33	seat	2
Pro football stadium	0.30	0.01	0.30	0.01	0.31	seat	2
Pro baseball stadium	0.31	0.01	0.34	0.01	0.35	seat	2

Sources:

1. *Parking Requirements for Shopping Centers,* 2nd ed. (Washington, DC: ULI, 1999).
2. Developed by Team Members from a combination of sources.
3. *Parking Generation,* 5th ed. (Washington, DC: Institute of Transportation Engineers, 2019).

Note: New land uses and changes to second edition titles shown in **bold.** Changes or new ratios are highlighted in blue.

Graph Look Up

ITEParkGen Web App

- Graph Look-Up
- How to Use ITEParkGen
- PGM Desk Reference
- Support Documents
- Add Users
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Query | Filter

DATA SOURCE: Parking Generation Manual, 6th Ed

SEARCH BY LAND USE CODE: 215

LAND USE GROUP: (200-299) Residential

LAND USE: 215 - Single-Family Attached Housing

LAND USE SUBCATEGORY: Not Close to Rail Transit

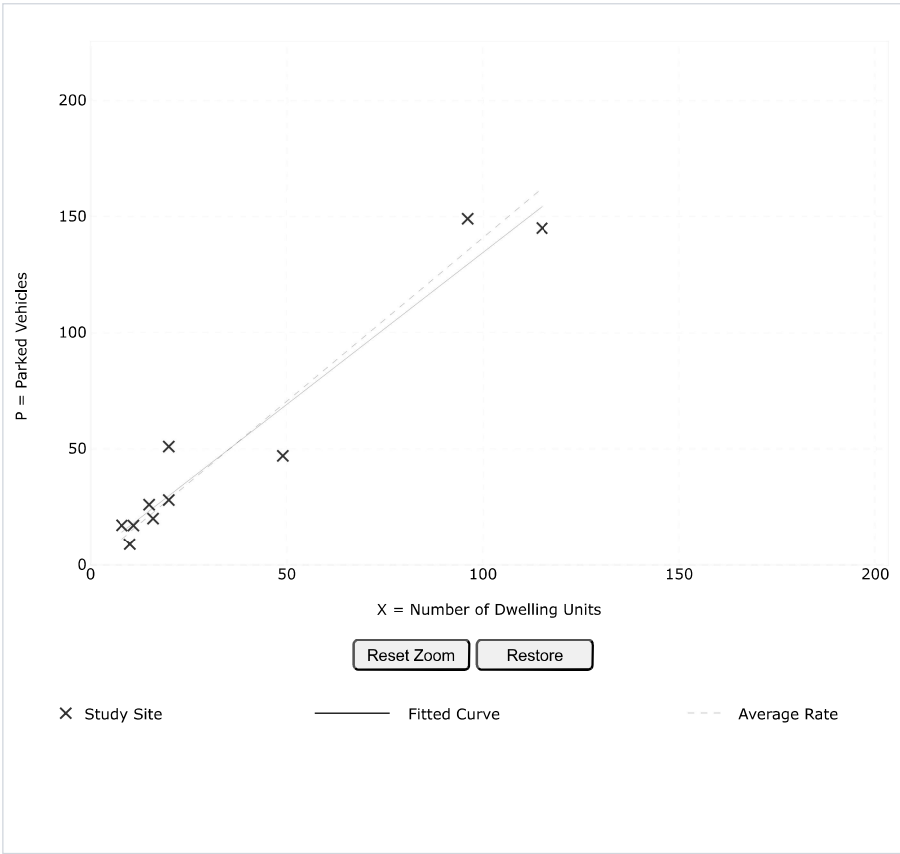
SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday (Monday - Friday)

ENTER IV VALUE TO CALCULATE PARKING DEMAND: Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and P values.

DATA STATISTICS

Land Use:
Single-Family Attached Housing - Not Close to Rail Transit (215) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday (Monday - Friday)

Setting/Location:
General Urban/Suburban

Number of Studies:
10

Avg. Num. of Dwelling Units:
36

Average Rate:
1.41

Range of Rates:
0.90 - 2.55

33rd / 85th Percentile:
1.26 / 2.27

95% Confidence Interval:
***

Standard Deviation:
0.39

Coefficient of Variation:
28%

Fitted Curve Equation:
P = 1.31(X) + 3.62

R^2:
0.94

Graph Look Up

ITEParkGen Web App

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Query | Filter

DATA SOURCE: Parking Generation Manual, 6th Ed

SEARCH BY LAND USE CODE: 215

LAND USE GROUP: (200-299) Residential

LAND USE: 215 - Single-Family Attached Housing

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

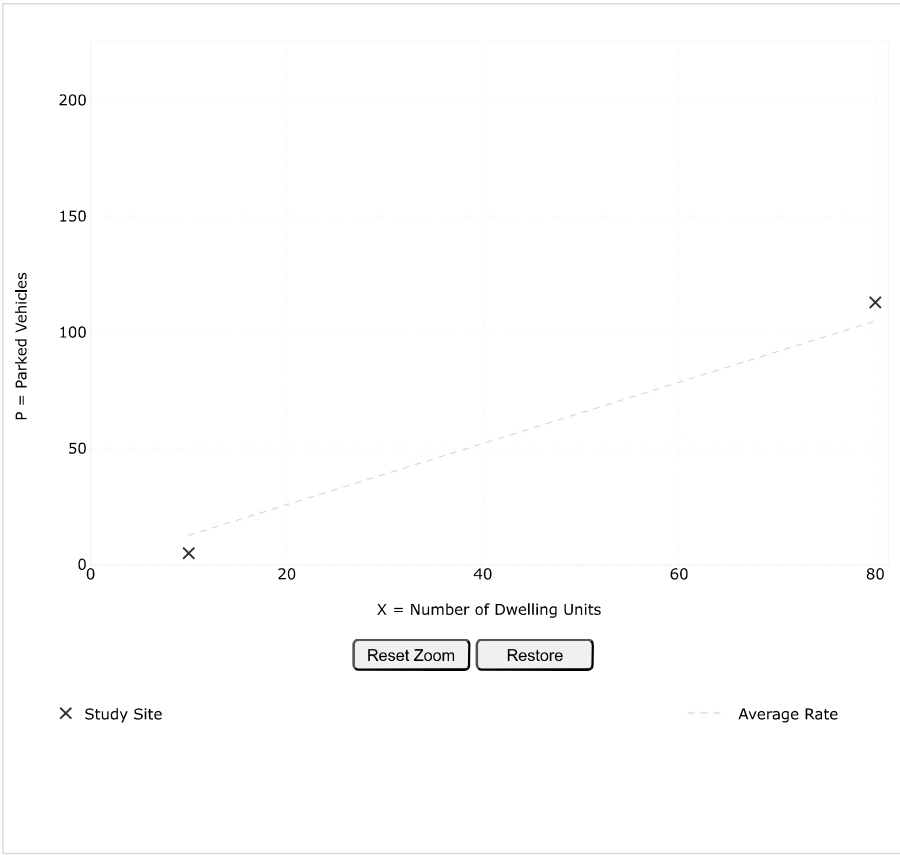
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Saturday

ENTER IV VALUE TO CALCULATE PARKING DEMAND: Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and P values.

DATA STATISTICS

Land Use:
Single-Family Attached Housing - Not Close to Rail Transit (215) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday

Setting/Location:
General Urban/Suburban

Number of Studies:
2

Avg. Num. of Dwelling Units:
45

Average Rate:
1.31

Range of Rates:
0.50 - 1.41

33rd / 85th Percentile:
*** / ***

95% Confidence Interval:
***

Standard Deviation:
***

Coefficient of Variation:
***

Fitted Curve Equation:
***

R^2:
***

Graph Look Up

Graph Look-Up
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Comments

Query | Filter

DATA SOURCE: Parking Generation Manual, 6th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE: 220 - Multifamily Housing - 2+ BR (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

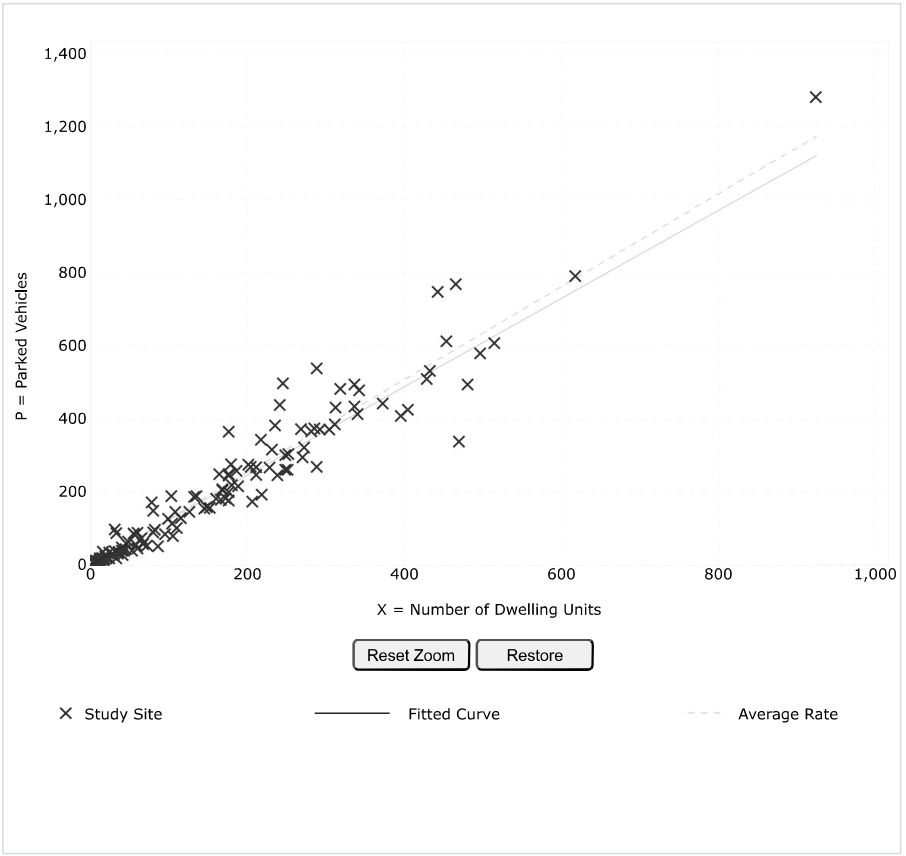
SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday (Monday - Friday)

ENTER IV VALUE TO CALCULATE PARKING DEMAND: Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and P values.

DATA STATISTICS

Land Use:
Multifamily Housing - 2+ BR (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday (Monday - Friday)

Setting/Location:
General Urban/Suburban

Number of Studies:
143

Avg. Num. of Dwelling Units:
154

Average Rate:
1.27

Range of Rates:
0.58 - 3.16

33rd / 85th Percentile:
1.07 / 1.59

95% Confidence Interval:
1.22 - 1.32

Standard Deviation:
0.29

Coefficient of Variation:
23%

Fitted Curve Equation:
$Ln(P) = 0.99\ Ln(X) + 0.26$

R^2:
0.95

Graph Look Up

ITEParkGen Web App

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- PGM Desk Reference
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- Comments

Query | Filter

DATA SOURCE: Parking Generation Manual, 6th Ed

SEARCH BY LAND USE CODE: 220

LAND USE GROUP: (200-299) Residential

LAND USE: 220 - Multifamily Housing - 2+ BR (Low-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

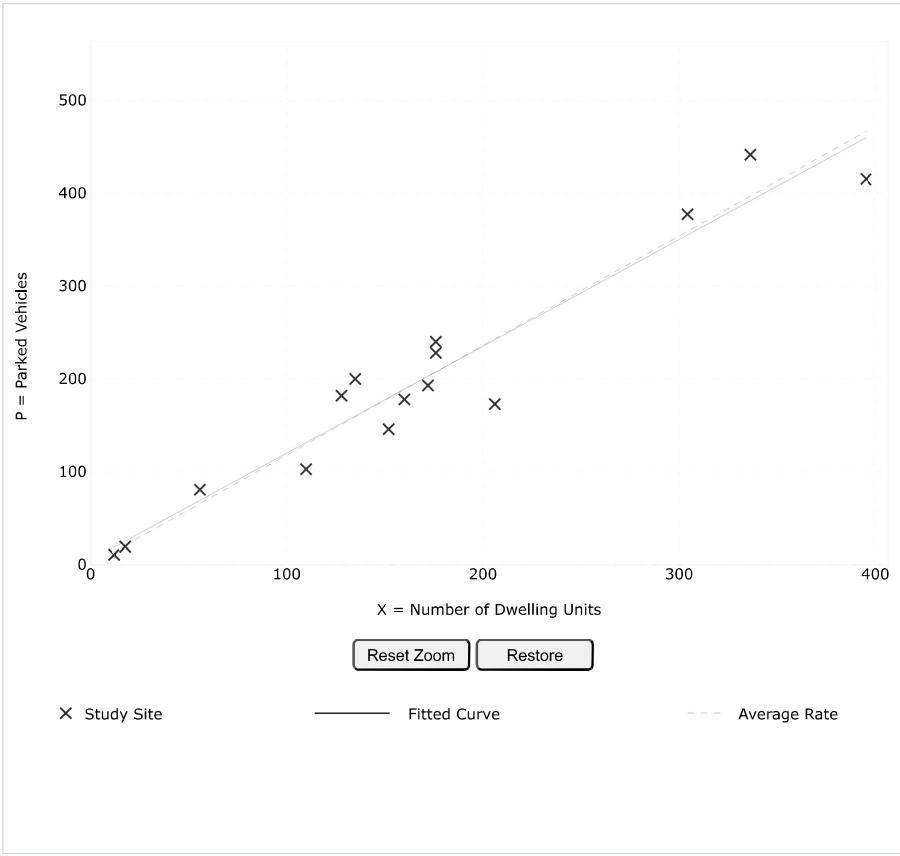
SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Saturday

ENTER IV VALUE TO CALCULATE PARKING DEMAND: Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and P values.

DATA STATISTICS

Land Use:
Multifamily Housing - 2+ BR (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday

Setting/Location:
General Urban/Suburban

Number of Studies:
15

Avg. Num. of Dwelling Units:
169

Average Rate:
1.18

Range of Rates:
0.84 - 1.48

33rd / 85th Percentile:
1.07 / 1.44

95% Confidence Interval:
***

Standard Deviation:
0.19

Coefficient of Variation:
16%

Fitted Curve Equation:
P = 1.15(X) + 5.12

R^2:
0.93

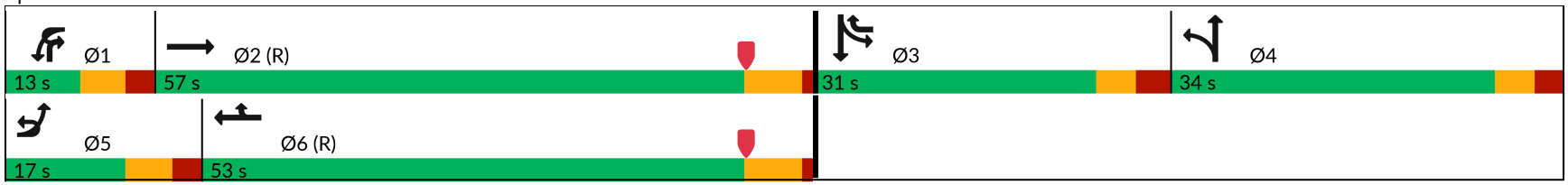
ROUTE 110/CLARKS ROAD/ELM STREET REVISED CAPACITY ANALYSIS

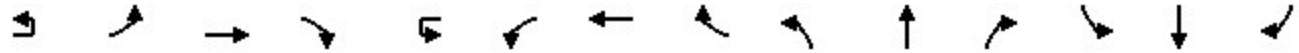
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	1	64	1316	61	2	91	872	319	82	30	157	565	52	45
Future Volume (vph)	1	64	1316	61	2	91	872	319	82	30	157	565	52	45
Lane Util. Factor	0.95	1.00	0.95	0.95	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.993					0.850			0.850		0.930	
Flt Protected		0.950				0.950				0.965		0.950		
Satd. Flow (prot)	0	1689	3453	0	0	1805	4988	1531	0	1772	1546	3319	1708	0
Flt Permitted		0.950				0.950				0.965		0.950		
Satd. Flow (perm)	0	1689	3453	0	0	1805	4988	1531	0	1772	1546	3319	1708	0
Satd. Flow (RTOR)			4					339			194		29	
Adj. Flow (vph)	1	68	1400	65	2	97	928	339	101	37	194	601	55	48
Lane Group Flow (vph)	0	69	1465	0	0	99	928	339	0	138	194	601	103	0
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pt+ov	Split	NA	Over	Split	NA	
Protected Phases	5	5	2		1!	1	6	6 3	4	4	1!	3	3	
Permitted Phases														
Detector Phase	5	5	2		1	1	6	6 3	4	4	1	3	3	
Switch Phase														
Minimum Initial (s)	6.0	6.0	10.0		6.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	14.0	14.0	16.0		12.5	12.5	24.0		33.5	33.5	12.5	12.5	12.5	
Total Split (s)	17.0	17.0	57.0		13.0	13.0	53.0		34.0	34.0	13.0	31.0	31.0	
Total Split (%)	12.6%	12.6%	42.2%		9.6%	9.6%	39.3%		25.2%	25.2%	9.6%	23.0%	23.0%	
Maximum Green (s)	10.5	10.5	51.0		6.5	6.5	47.0		28.0	28.0	6.5	24.5	24.5	
Yellow Time (s)	4.0	4.0	5.0		4.0	4.0	5.0		3.5	3.5	4.0	3.5	3.5	
All-Red Time (s)	2.5	2.5	1.0		2.5	2.5	1.0		2.5	2.5	2.5	3.0	3.0	
Lost Time Adjust (s)		-2.5	-2.0			-2.5	-2.0			-2.0	-2.5	-2.5	-2.5	
Total Lost Time (s)		4.0	4.0			4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lead	Lag		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?									Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	C-Min		None	None	C-Min		None	None	None	None	None	
Walk Time (s)	7.0	7.0					7.0		7.0	7.0				
Flash Don't Walk (s)	0.5	0.5					11.0		20.5	20.5				
Pedestrian Calls (#/hr)	3	3					3		3	3				
v/c Ratio		0.47	0.94			0.56	0.39	0.29		0.58	0.60	0.91	0.28	

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		76.3	47.2			68.3	30.1	1.4		63.1	15.8	71.4	35.0	
Queue Delay		0.0	0.0			0.0	0.0	0.3		0.0	0.0	0.0	0.0	
Total Delay (s/veh)		76.3	47.2			68.3	30.1	1.7		63.1	15.8	71.4	35.0	
Queue Length 50th (ft)		62	707			83	221	0		116	0	272	55	
Queue Length 95th (ft)		121	#904			#188	317	31		150	51	#377	110	
Internal Link Dist (ft)			1089				423			469			580	
Turn Bay Length (ft)		400				115		200			150	300		
Base Capacity (vph)		166	1551			177	2381	1182		393	326	663	364	
Starvation Cap Reductn		0	0			0	0	353		0	0	0	0	
Spillback Cap Reductn		0	0			0	0	0		0	0	0	0	
Storage Cap Reductn		0	0			0	0	0		0	0	0	0	
Reduced v/c Ratio		0.42	0.94			0.56	0.39	0.41		0.35	0.60	0.91	0.28	

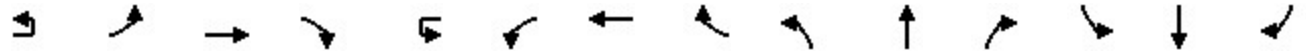
Intersection Summary
Cycle Length: 135
Actuated Cycle Length: 135
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 135
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 5: Clarks Road/Elm Street & Route 110





Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	1	64	1316	61	2	91	872	319	82	30	157	565	52	45
Future Volume (vph)	1	64	1316	61	2	91	872	319	82	30	157	565	52	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	11	11	11	11	11	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	0.95			1.00	0.91	1.00		1.00	1.00	0.97	1.00	
Frt		1.00	0.99			1.00	1.00	0.85		1.00	0.85	1.00	0.93	
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)		1689	3454			1805	4988	1531		1772	1546	3319	1708	
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)		1689	3454			1805	4988	1531		1772	1546	3319	1708	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.81	0.81	0.81	0.94	0.94	0.94
Adj. Flow (vph)	1	68	1400	65	2	97	928	339	101	37	194	601	55	48
RTOR Reduction (vph)	0	0	2	0	0	0	0	104	0	0	175	0	23	0
Lane Group Flow (vph)	0	69	1463	0	0	99	928	235	0	138	19	601	80	0
Heavy Vehicles (%)	0%	7%	4%	0%	0%	0%	4%	2%	0%	0%	1%	2%	0%	0%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pt+ov	Split	NA	Over	Split	NA	
Protected Phases	5	5	2		1!	1	6	6 3	4	4	1!	3	3	
Permitted Phases														
Actuated Green, G (s)		8.1	58.6			10.7	61.2	91.7		16.2	10.7	24.5	24.5	
Effective Green, g (s)		10.6	60.6			13.2	63.2	93.7		18.2	13.2	27.0	27.0	
Actuated g/C Ratio		0.08	0.45			0.10	0.47	0.69		0.13	0.10	0.20	0.20	
Clearance Time (s)		6.5	6.0			6.5	6.0			6.0	6.5	6.5	6.5	
Vehicle Extension (s)		2.0	2.0			2.0	2.0			2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		132	1550			176	2335	1062		238	151	663	341	
v/s Ratio Prot		0.04	c0.42			c0.05	c0.19	0.15		c0.08	0.01	c0.18	0.05	
v/s Ratio Perm														
v/c Ratio		0.52	0.94			0.56	0.40	0.22		0.58	0.13	0.91	0.23	
Uniform Delay, d1		59.8	35.6			58.1	23.5	7.5		54.8	55.6	52.8	45.3	
Progression Factor		1.16	0.98			0.98	1.20	0.76		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.5	11.5			2.2	0.5	0.0		2.1	0.1	15.7	0.1	
Delay (s)		70.6	46.3			59.2	28.6	5.7		56.9	55.8	68.5	45.5	



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Level of Service		E	D			E	C	A		E	E	E	D	
Approach Delay (s/veh)			47.4				25.2			56.3			65.1	
Approach LOS			D				C			E			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	43.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.

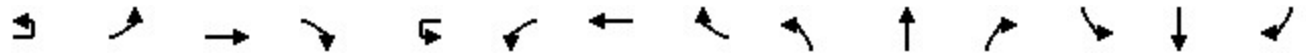
c Critical Lane Group

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	1	147	1251	49	1	108	1480	592	86	73	85	383	78	56
Future Volume (vph)	1	147	1251	49	1	108	1480	592	86	73	85	383	78	56
Lane Util. Factor	0.95	1.00	0.95	0.95	0.91	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.994					0.850			0.850		0.937	
Flt Protected		0.950				0.950				0.974		0.950		
Satd. Flow (prot)	0	1805	3521	0	0	1805	5136	1546	0	1770	1561	3351	1721	0
Flt Permitted		0.950				0.950				0.974		0.950		
Satd. Flow (perm)	0	1805	3521	0	0	1805	5136	1546	0	1770	1561	3351	1721	0
Satd. Flow (RTOR)			3					528			171		22	
Adj. Flow (vph)	1	156	1331	52	1	113	1542	617	108	91	106	416	85	61
Lane Group Flow (vph)	0	157	1383	0	0	114	1542	617	0	199	106	416	146	0
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pt+ov	Split	NA	Over	Split	NA	
Protected Phases	5	5	2		1!	1	6	6 3	4	4	1!	3	3	
Permitted Phases														
Detector Phase	5	5	2		1	1	6	6 3	4	4	1	3	3	
Switch Phase														
Minimum Initial (s)	6.0	6.0	10.0		6.0	6.0	10.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	14.0	14.0	16.0		12.5	12.5	24.0		33.5	33.5	12.5	12.5	12.5	
Total Split (s)	27.0	27.0	57.0		20.0	20.0	50.0		34.0	34.0	20.0	29.0	29.0	
Total Split (%)	19.3%	19.3%	40.7%		14.3%	14.3%	35.7%		24.3%	24.3%	14.3%	20.7%	20.7%	
Maximum Green (s)	20.5	20.5	51.0		13.5	13.5	44.0		28.0	28.0	13.5	22.5	22.5	
Yellow Time (s)	4.0	4.0	5.0		4.0	4.0	5.0		3.5	3.5	4.0	3.5	3.5	
All-Red Time (s)	2.5	2.5	1.0		2.5	2.5	1.0		2.5	2.5	2.5	3.0	3.0	
Lost Time Adjust (s)		-2.5	-2.0			-2.5	-2.0			-2.0	-2.5	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0			4.0	4.0			4.0	4.0	4.5	4.5	
Lead/Lag	Lead	Lead	Lag		Lead	Lead	Lag		Lag	Lag	Lead	Lead	Lead	
Lead-Lag Optimize?									Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Min		None	None	C-Min		None	None	None	None	None	
Walk Time (s)	7.0	7.0					7.0		7.0	7.0				
Flash Don't Walk (s)	0.5	0.5					11.0		20.5	20.5				
Pedestrian Calls (#/hr)	3	3					3		3	3				
v/c Ratio		0.63	0.90			0.57	0.73	0.54		0.69	0.33	0.73	0.47	

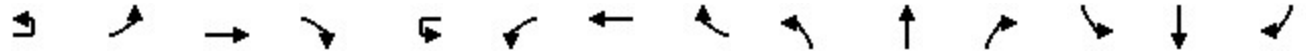
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)		71.4	42.2			70.1	37.3	3.9		66.9	2.9	63.0	49.4	
Queue Delay		0.0	1.2			0.0	1.3	0.5		0.0	0.0	0.0	0.0	
Total Delay (s/veh)		71.4	43.3			70.1	38.6	4.4		66.9	2.9	63.0	49.4	
Queue Length 50th (ft)		137	638			107	426	10		173	0	187	102	
Queue Length 95th (ft)		210	#870			m142	538	114		214	0	246	174	
Internal Link Dist (ft)			1089				423			469			580	
Turn Bay Length (ft)		400				115		200			150	300		
Base Capacity (vph)		296	1539			215	2102	1155		379	336	586	319	
Starvation Cap Reductn		0	0			0	337	191		0	0	0	0	
Spillback Cap Reductn		0	47			0	0	0		0	2	0	0	
Storage Cap Reductn		0	0			0	0	0		0	0	0	0	
Reduced v/c Ratio		0.53	0.93			0.53	0.87	0.64		0.53	0.32	0.71	0.46	

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 115
Control Type: Actuated-Coordinated
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.
! Phase conflict between lane groups.

Splits and Phases: 5: Clarks Road/Elm Street & Route 110



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	1	147	1251	49	1	108	1480	592	86	73	85	383	78	56
Future Volume (vph)	1	147	1251	49	1	108	1480	592	86	73	85	383	78	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	11	11	11	11	11	11	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0	4.0	4.5	4.5	
Lane Util. Factor		1.00	0.95			1.00	0.91	1.00		1.00	1.00	0.97	1.00	
Frt		1.00	0.99			1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)		1805	3522			1805	5136	1546		1769	1561	3351	1722	
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (perm)		1805	3522			1805	5136	1546		1769	1561	3351	1722	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.96	0.96	0.96	0.96	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	1	156	1331	52	1	113	1542	617	108	91	106	416	85	61
RTOR Reduction (vph)	0	0	2	0	0	0	0	206	0	0	94	0	18	0
Lane Group Flow (vph)	0	157	1381	0	0	114	1542	411	0	199	12	416	128	0
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	1%	1%	2%	0%	0%	1%	0%	0%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pt+ov	Split	NA	Over	Split	NA	
Protected Phases	5	5	2		1!	1	6	6 3	4	4	1!	3	3	
Permitted Phases														
Actuated Green, G (s)		16.8	59.2			12.9	55.3	83.3		20.9	12.9	22.0	22.0	
Effective Green, g (s)		19.3	61.2			15.4	57.3	85.3		22.9	15.4	24.0	24.0	
Actuated g/C Ratio		0.14	0.44			0.11	0.41	0.61		0.16	0.11	0.17	0.17	
Clearance Time (s)		6.5	6.0			6.5	6.0			6.0	6.5	6.5	6.5	
Vehicle Extension (s)		3.0	3.0			3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		248	1539			198	2102	941		289	171	574	295	
v/s Ratio Prot		c0.09	c0.39			0.06	0.30	0.27		c0.11	0.01	c0.12	0.07	
v/s Ratio Perm														
v/c Ratio		0.63	0.90			0.58	0.73	0.44		0.69	0.07	0.72	0.43	
Uniform Delay, d1		57.0	36.5			59.2	34.9	14.6		55.2	55.9	54.9	51.9	
Progression Factor		1.08	0.91			1.05	0.97	0.96		1.00	1.00	1.00	1.00	
Incremental Delay, d2		4.5	7.7			2.8	1.6	0.2		6.7	0.2	4.5	1.0	
Delay (s)		66.1	40.8			64.9	35.6	14.3		61.9	56.0	59.4	52.9	



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Level of Service		E	D			E	D	B		E	E	E	D	
Approach Delay (s/veh)			43.4				31.3			59.8			57.7	
Approach LOS			D				C			E			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

TRAFFIC SIGNAL WARRANTS ANALYSIS

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use			
Source: ITE *Trip Generation Manual* , 12th Edition			
Land Use Code	210		
Land Use	Single-Family Detached Housing		
Setting	General Urban/Suburban		
Time Period	Weekday		
# Data Sites	20		
	% of 24-Hour Vehicle Trips		
Time	Total	Entering	Exiting
12:00 - 1:00 AM	0.5%	0.6%	0.4%
1:00 - 2:00 AM	0.2%	0.2%	0.2%
2:00 - 3:00 AM	0.2%	0.2%	0.2%
3:00 - 4:00 AM	0.3%	0.3%	0.3%
4:00 - 5:00 AM	0.9%	0.6%	1.1%
5:00 - 6:00 AM	1.6%	0.8%	2.4%
6:00 - 7:00 AM	3.9%	2.2%	5.7%
7:00 - 8:00 AM	6.8%	4.1%	9.4%
8:00 - 9:00 AM	6.2%	4.5%	7.9%
9:00 - 10:00 AM	5.1%	4.2%	6.0%
10:00 - 11:00 AM	5.1%	4.4%	5.8%
11:00 - 12:00 PM	5.2%	5.0%	5.3%
12:00 - 1:00 PM	5.6%	5.6%	5.6%
1:00 - 2:00 PM	5.7%	5.8%	5.6%
2:00 - 3:00 PM	6.7%	7.2%	6.1%
3:00 - 4:00 PM	7.5%	8.3%	6.8%
4:00 - 5:00 PM	8.8%	10.2%	7.3%
5:00 - 6:00 PM	7.9%	9.6%	6.3%
6:00 - 7:00 PM	6.9%	8.0%	5.8%
7:00 - 8:00 PM	5.1%	5.9%	4.3%
8:00 - 9:00 PM	4.2%	5.2%	3.1%
9:00 - 10:00 PM	3.0%	3.6%	2.4%
10:00 - 11:00 PM	1.7%	2.2%	1.2%
11:00 - 12:00 AM	1.0%	1.3%	0.7%
	100.0%	100.0%	100.0%

Project-Generated AWT	Total	Enter/Exit
ITE LUC 210	74	37
Single Family Detached		

Time	Total	Entering	Exiting
12:00 - 1:00 AM	0	0	0
1:00 - 2:00 AM	0	0	0
2:00 - 3:00 AM	0	0	0
3:00 - 4:00 AM	0	0	0
4:00 - 5:00 AM	1	0	0
5:00 - 6:00 AM	1	0	1
6:00 - 7:00 AM	3	1	2
7:00 - 8:00 AM	5	2	3
8:00 - 9:00 AM	5	2	3
9:00 - 10:00 AM	4	2	2
10:00 - 11:00 AM	4	2	2
11:00 - 12:00 PM	4	2	2
12:00 - 1:00 PM	4	2	2
1:00 - 2:00 PM	4	2	2
2:00 - 3:00 PM	5	3	2
3:00 - 4:00 PM	6	3	3
4:00 - 5:00 PM	6	4	3
5:00 - 6:00 PM	6	4	2
6:00 - 7:00 PM	5	3	2
7:00 - 8:00 PM	4	2	2
8:00 - 9:00 PM	3	2	1
9:00 - 10:00 PM	2	1	1
10:00 - 11:00 PM	1	1	0
11:00 - 12:00 AM	1	0	0
	74	37	37

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use			
Source: ITE *Trip Generation Manual*, 12th Edition			
Land Use Code	215		
Land Use	Single-Family Attached Housing		
Setting	General Urban/Suburban		
Time Period	Weekday		
# Data Sites	7		
	% of 24-Hour Vehicle Trips		
Time	Total	Entering	Exiting
12:00 - 1:00 AM	0.5%	0.7%	0.3%
1:00 - 2:00 AM	0.2%	0.4%	0.1%
2:00 - 3:00 AM	0.3%	0.2%	0.3%
3:00 - 4:00 AM	0.3%	0.3%	0.4%
4:00 - 5:00 AM	0.7%	0.4%	1.0%
5:00 - 6:00 AM	1.4%	0.1%	2.6%
6:00 - 7:00 AM	3.5%	1.1%	5.8%
7:00 - 8:00 AM	7.9%	2.7%	13.2%
8:00 - 9:00 AM	6.6%	3.8%	9.3%
9:00 - 10:00 AM	5.3%	3.7%	6.9%
10:00 - 11:00 AM	4.1%	4.0%	4.3%
11:00 - 12:00 PM	5.3%	4.8%	5.7%
12:00 - 1:00 PM	5.2%	5.4%	5.1%
1:00 - 2:00 PM	4.7%	4.5%	4.8%
2:00 - 3:00 PM	5.8%	5.5%	6.0%
3:00 - 4:00 PM	6.5%	8.2%	4.8%
4:00 - 5:00 PM	7.5%	9.8%	5.1%
5:00 - 6:00 PM	9.4%	12.1%	6.8%
6:00 - 7:00 PM	8.2%	9.8%	6.6%
7:00 - 8:00 PM	5.9%	7.3%	4.5%
8:00 - 9:00 PM	4.7%	5.9%	3.5%
9:00 - 10:00 PM	3.0%	4.8%	1.3%
10:00 - 11:00 PM	2.0%	3.0%	1.1%
11:00 - 12:00 AM	0.9%	1.5%	0.4%
	100.0%	100.0%	100.0%

Project-Generated AWT	Total	Enter/Exit
ITE LUC 215	546	273
Single Family Attached		

Time	Total	Entering	Exiting
12:00 - 1:00 AM	3	2	1
1:00 - 2:00 AM	1	1	0
2:00 - 3:00 AM	1	0	1
3:00 - 4:00 AM	2	1	1
4:00 - 5:00 AM	4	1	3
5:00 - 6:00 AM	7	0	7
6:00 - 7:00 AM	19	3	16
7:00 - 8:00 AM	43	7	36
8:00 - 9:00 AM	36	10	25
9:00 - 10:00 AM	29	10	19
10:00 - 11:00 AM	23	11	12
11:00 - 12:00 PM	29	13	15
12:00 - 1:00 PM	29	15	14
1:00 - 2:00 PM	25	12	13
2:00 - 3:00 PM	32	15	16
3:00 - 4:00 PM	35	22	13
4:00 - 5:00 PM	41	27	14
5:00 - 6:00 PM	52	33	19
6:00 - 7:00 PM	45	27	18
7:00 - 8:00 PM	32	20	12
8:00 - 9:00 PM	26	16	9
9:00 - 10:00 PM	17	13	4
10:00 - 11:00 PM	11	8	3
11:00 - 12:00 AM	5	4	1
	546	273	273

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use			
Source: ITE *Trip Generation Manual* , 12th Edition			
Land Use Code	220		
Land Use	ifamily Housing (Low-Rise) - Not Close to Rail Tr		
Setting	General Urban/Suburban		
Time Period	Weekday		
# Data Sites	8		
	% of 24-Hour Vehicle Trips		
Time	Total	Entering	Exiting
12:00 - 1:00 AM	0.6%	0.8%	0.3%
1:00 - 2:00 AM	0.4%	0.4%	0.3%
2:00 - 3:00 AM	0.4%	0.4%	0.3%
3:00 - 4:00 AM	0.4%	0.5%	0.4%
4:00 - 5:00 AM	0.8%	0.4%	1.2%
5:00 - 6:00 AM	1.6%	0.7%	2.5%
6:00 - 7:00 AM	4.2%	1.6%	6.7%
7:00 - 8:00 AM	6.6%	2.4%	10.7%
8:00 - 9:00 AM	6.0%	3.4%	8.6%
9:00 - 10:00 AM	4.1%	2.9%	5.3%
10:00 - 11:00 AM	3.9%	2.9%	5.0%
11:00 - 12:00 PM	4.6%	4.6%	4.7%
12:00 - 1:00 PM	5.0%	5.0%	4.9%
1:00 - 2:00 PM	4.6%	4.4%	4.8%
2:00 - 3:00 PM	5.5%	5.9%	5.0%
3:00 - 4:00 PM	6.2%	7.0%	5.3%
4:00 - 5:00 PM	7.9%	10.1%	5.7%
5:00 - 6:00 PM	9.5%	11.3%	7.7%
6:00 - 7:00 PM	8.2%	9.9%	6.6%
7:00 - 8:00 PM	5.9%	7.4%	4.4%
8:00 - 9:00 PM	5.1%	6.6%	3.7%
9:00 - 10:00 PM	3.9%	5.3%	2.6%
10:00 - 11:00 PM	3.0%	3.9%	2.1%
11:00 - 12:00 AM	1.7%	2.2%	1.2%
	100.0%	100.0%	100.0%

Project-Generated AWT	Total	Enter/Exit
ITE LUC 215	1,860	930
Single Family Attached		

Time	Total	Entering	Exiting
12:00 - 1:00 AM	10	7	3
1:00 - 2:00 AM	7	4	3
2:00 - 3:00 AM	7	3	3
3:00 - 4:00 AM	8	4	4
4:00 - 5:00 AM	15	4	12
5:00 - 6:00 AM	29	6	23
6:00 - 7:00 AM	77	15	62
7:00 - 8:00 AM	122	23	99
8:00 - 9:00 AM	112	32	80
9:00 - 10:00 AM	77	27	49
10:00 - 11:00 AM	73	27	46
11:00 - 12:00 PM	86	42	43
12:00 - 1:00 PM	92	46	46
1:00 - 2:00 PM	85	41	44
2:00 - 3:00 PM	102	55	47
3:00 - 4:00 PM	115	65	50
4:00 - 5:00 PM	147	94	53
5:00 - 6:00 PM	177	105	72
6:00 - 7:00 PM	153	92	61
7:00 - 8:00 PM	109	68	41
8:00 - 9:00 PM	96	61	35
9:00 - 10:00 PM	73	49	24
10:00 - 11:00 PM	55	36	19
11:00 - 12:00 AM	31	21	11
	1860	930	930

Total Project Generated (LUCs 210, 215 and 220)

Time	Total	Entering	Exiting
12:00 - 1:00 AM	13	9	4
1:00 - 2:00 AM	8	5	3
2:00 - 3:00 AM	8	4	4
3:00 - 4:00 AM	10	5	5
4:00 - 5:00 AM	20	5	15
5:00 - 6:00 AM	38	7	31
6:00 - 7:00 AM	99	19	80
7:00 - 8:00 AM	170	31	139
8:00 - 9:00 AM	152	44	108
9:00 - 10:00 AM	109	39	70
10:00 - 11:00 AM	100	40	60
11:00 - 12:00 PM	118	57	61
12:00 - 1:00 PM	125	63	62
1:00 - 2:00 PM	116	56	60
2:00 - 3:00 PM	138	73	65
3:00 - 4:00 PM	156	91	65
4:00 - 5:00 PM	195	125	70
5:00 - 6:00 PM	235	142	93
6:00 - 7:00 PM	203	122	81
7:00 - 8:00 PM	146	91	55
8:00 - 9:00 PM	124	79	45
9:00 - 10:00 PM	92	63	29
10:00 - 11:00 PM	68	45	23
11:00 - 12:00 AM	37	25	12
	2480	1240	1240

Project Generated Trip Distribution
Based on TIA Trip Dist @ Driveway

Entering Trips			88%	12%
Exiting Trips	64%	36%		

Time	WB LT	WB RT	NB TH	NB RT	SB LT	SB TH
12:00 - 1:00 AM	3	1		8	1	
1:00 - 2:00 AM	2	1		4	1	
2:00 - 3:00 AM	3	1		4	0	
3:00 - 4:00 AM	3	2		4	1	
4:00 - 5:00 AM	10	5		4	1	
5:00 - 6:00 AM	20	11		6	1	
6:00 - 7:00 AM	51	29		17	2	
7:00 - 8:00 AM	89	50		27	4	
8:00 - 9:00 AM	69	39		39	5	
9:00 - 10:00 AM	45	25		34	5	
10:00 - 11:00 AM	38	22		35	5	
11:00 - 12:00 PM	39	22		50	7	
12:00 - 1:00 PM	40	22		55	8	
1:00 - 2:00 PM	38	22		49	7	
2:00 - 3:00 PM	42	23		64	9	
3:00 - 4:00 PM	42	23		80	11	
4:00 - 5:00 PM	45	25		110	15	
5:00 - 6:00 PM	60	33		125	17	
6:00 - 7:00 PM	52	29		107	15	
7:00 - 8:00 PM	35	20		80	11	
8:00 - 9:00 PM	29	16		70	9	
9:00 - 10:00 PM	19	10		55	8	
10:00 - 11:00 PM	15	8		40	5	
11:00 - 12:00 AM	8	4		22	3	

Raw Data

Collected on 2/14/24

Time:	Project Site WB LT	Project Site WB RT	Elm Street NB NB TH	Elm Street NB NB RT	Elm Street SB SB LT	Elm Street SB SB TH
12:00 AM						
1:00 AM						
2:00 AM						
3:00 AM						
4:00 AM						
5:00 AM						
6:00 AM						
7:00 AM			228			529
8:00 AM			312			445
9:00 AM			273			338
10:00 AM			289			296
11:00 AM			273			348
12:00 PM			332			345
1:00 PM			358			341
2:00 PM			435			383
3:00 PM			603			411
4:00 PM			599			428
5:00 PM			598			411
6:00 PM			386			289
7:00 PM						
8:00 PM						
9:00 PM						
10:00 PM						
11:00 PM						

2026 Existing Volumes

1.0508295 = U4-7 Feb. Factor to Avg. Month + Grown 2 y

Time:	Project Site WB LT	Project Site WB RT	Elm Street NB NB TH	Elm Street NB NB RT
12:00 AM				
1:00 AM				
2:00 AM				
3:00 AM				
4:00 AM				
5:00 AM				
6:00 AM				
7:00 AM	0	0	240	0
8:00 AM	0	0	328	0
9:00 AM	0	0	287	0
10:00 AM	0	0	304	0
11:00 AM	0	0	287	0
12:00 PM	0	0	349	0
1:00 PM	0	0	376	0
2:00 PM	0	0	457	0
3:00 PM	0	0	634	0
4:00 PM	0	0	629	0
5:00 PM	0	0	628	0
6:00 PM	0	0	406	0
7:00 PM				
8:00 PM				
9:00 PM				
10:00 PM				
11:00 PM				

2026 Build

2026 Existing + Project Generated

	Project Site		Elm Street NB		Elm Street SB	
Time:	WB LT	WB RT	NB TH	NB RT	SB LT	SB TH
12:00 AM						
1:00 AM						
2:00 AM						
3:00 AM						
4:00 AM						
5:00 AM						
6:00 AM						
7:00 AM	89	50	240	27	4	556
8:00 AM	69	39	328	39	5	468
9:00 AM	45	25	287	34	5	355
10:00 AM	38	22	304	35	5	311
11:00 AM	39	22	287	50	7	366
12:00 PM	40	22	349	55	8	363
1:00 PM	38	22	376	49	7	358
2:00 PM	42	23	457	64	9	402
3:00 PM	42	23	634	80	11	432
4:00 PM	45	25	629	110	15	450
5:00 PM	60	33	628	125	17	432
6:00 PM	52	29	406	107	15	304
7:00 PM						
8:00 PM						
9:00 PM						
10:00 PM						
11:00 PM						