MEMORANDUM

TO: TAG CENTRAL, LLC
c/o Mr. A.J. Alevizos
The Alevizos Group
1070 E Indiantown Road, Suite 308
Jupiter, FL 33477

FROM: Mr. Jeffrey S. Dirk, P.E.*, PTOE, FITE
Managing Partner *and*
Mr. Andrew J. Arseneault
Senior Transportation Engineer
Vanasse & Associates, Inc.
35 New England Business Center Drive
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Andover, MA 01810-1066
(978) 269-6830
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**Professional Engineer in CT, MA, ME, NH, RI and VA*

DATE: December 21, 2023

RE: 9883

SUBJECT: Preliminary Transportation Impact Assessment
Proposed Multifamily Residential Development – 444 East Central Street (Route 140)
Franklin, Massachusetts

Vanasse & Associates, Inc. (VAI) has conducted a Preliminary Transportation Impact Assessment (PTIA) in order to provide an initial assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 444 East Central Street (Route 140) in Franklin, Massachusetts (hereafter referred to as the "Project"). This assessment: i) reviews the existing conditions context of the transportation infrastructure serving the Project site; ii) qualitatively evaluates the potential impact of the Project along East Central Street; and iii) provides a preliminary evaluation of lines of sight at the Project site driveway intersection.

Based on this preliminary assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1] the Project is predicted to generate approximately 1,346 vehicle trips on an average weekday and 1,212 vehicle trips on a Saturday (both two way, 24-hour volumes), with approximately 123 vehicle trips expected during the weekday morning peak-hour, 126 vehicle trips expected during the weekday evening peak-hour and 105 vehicle trips expected during the Saturday midday peak-hour;
2. No apparent safety deficiencies were noted with respect to the motor vehicle crash history along the Route 140 corridor in the vicinity of the Project site based on a review of information available through the Massachusetts Department of Transportation (MassDOT);
3. Traffic volumes along the Route 140 corridor outside of the immediate proximity of the Project site are expected to be less than 10 percent on a daily and peak-hour basis, which is within the range on normal daily traffic volume fluctuations and would not be expected to result in a significant impact (increase) on motorist delays or vehicle queuing over existing or anticipated future conditions without the Project;

[1] *Trip Generation*, 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

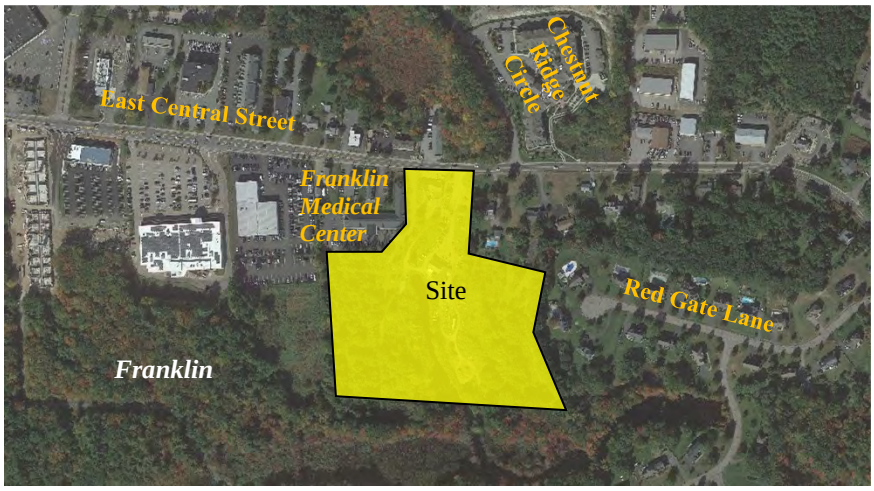
4. Given the incremental increase in traffic that the Project represents over existing conditions, the measures to off-set the predicted impact of the Project are expected to be limited to traffic signal timing improvements, sign and pavement marking enhancements and/or pedestrian and bicycle accommodations;
5. Based on the number of new parking spaces that are to be constructed at the Project site and the need to obtain a State Highway Access Permit from MassDOT, the Project may require the filing of an Environmental Notification Form (ENF); and
6. A review of Google© imagery indicates that the sight lines at the Project site driveway intersection appear to be unimpeded.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with implementation of the recommendations defined herein. These findings will be further evaluated as a part of the formal Transportation Impact Assessment (TIA) that will be prepared in support of the local approval process.

The following details our preliminary assessment of the Project.

PROJECT DESCRIPTION

The Project will entail the construction of a multifamily residential development to be located at 444 East Central Street (Route 140) in Franklin, Massachusetts. As proposed, the Project will entail the construction of four (4) four-story multifamily residential buildings that will include a total of 229 units and one (1) three-story multifamily residential building that will include 36 units, or a total of 265 multifamily residential units, with a clubhouse, supporting amenities and parking.



Imagery ©2023 Google

The Project site encompasses approximately 15.00± acres of land that is bounded by the East Central Street, commercial and residential properties to the north; areas of open and wooded space and low-lying wetland areas to the south; residential properties to the east; and areas of open and wooded space and commercial properties to the west. The Project site currently contains several commercial buildings that operate as a nursery and greenhouse (Stobbart's Nurseries) with supporting parking areas and appurtenances, all of which will be removed to accommodate the Project.

Primary access to the Project will be provided by way of the existing driveway that serves the Project site and intersects the south side of East Central Street approximately 225 feet west of Chestnut Ridge Circle. Secondary access for emergency vehicles will be provided by way of an internal (to the Project site) drive connection to the adjacent property to the west (Franklin Medical Center) which also provides access to East Central Street by way of a driveway located approximately 400 feet west of Chestnut Ridge Circle. The abutting property owner will be allowed to use the secondary access to access their property by way of an access easement; however, the use of the secondary access by residents and visitors of the Project will be prohibited. The Project will require the issuance of a State Highway Access Permit from MassDOT for access to East Central Street (Route 140), a State Highway under MassDOT jurisdiction.

On-site parking will be provided for 358 vehicles, or a parking ratio of 1.35 parking spaces per unit, which is below the parking requirements of Section 185-21, *Parking, Loading, and Driveway Requirements*, of the Zoning Bylaws of the Town of Franklin,[2] but is within the range of values documented by the ITE for a multifamily residential community in a similar setting.[3] The ITE parking demand observations indicate that the peak parking demands ratio for a multifamily residential community range from 0.39 to 3.16 spaces per residential unit.

EXISTING CONDITIONS CONTEXT

In order to establish the existing conditions context of the Project with respect to the transportation infrastructure, a review of existing roadway geometrics; pedestrian and bicycle facilities; posted speed limits; traffic volumes; and land use information was completed along East Central Street in the vicinity of the Project site. The following provides a description of the transportation infrastructure serving the Project site.

Roadway

East Central Street (Route 140)

- Two-lane urban principal arterial roadway under MassDOT jurisdiction;
- Traverses the study area in a general east-west direction between the Wrentham Town Line (where East Central Street becomes Franklin Street) and Main Street (where East Central Street becomes West Central Street);
- Provides two approximately 12-foot wide travel lanes in the vicinity of the Project site that are separated by a double-yellow centerline, with 2± foot wide marked shoulders provided;
- Accommodates approximately 17,090 vehicles per day on an average weekday east of Chestnut Street and 16,620 vehicles on a Saturday,[4] with approximately 1,122 vehicles per hour (vph) during the weekday morning peak-hour (7:45 to 8:45 AM), approximately 1,538 vph during the weekday evening peak-hour (4:30 to 5:30 AM)[5] and approximately 1,645 vph during the Saturday midday peak-hour (12:15 to 1:15 PM);[6]

[2]In the Commercial II Zoning District, two (2) parking spaces per residential unit are required.

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

[4]*Transportation Impact Assessment*, Central Square Mixed-Use Development, 340 East Central Street (Route 140), Franklin, Massachusetts; VAI; May 2020.

[5]*Transportation Impact Assessment*, TAJ Estates of Franklin II – 230 East Central Street (Route 140), Franklin, Massachusetts; VAI; January 19, 2022.

[6]VAI, op. cit. 3, May 2020.

- The posted speed limit in the vicinity of the Project site is 40 mph;
- A sidewalk is provided along the north side of the roadway east of the Project site and along both sides of the roadway to the west;
- Illumination is provided by way of streetlights mounted on wood poles;
- Land use within the study area consists of the Project site, residential and commercial properties, and the Franklin Town Hall.

Pedestrian And Bicycle Facilities

Sidewalks are provided continually along the north side of East Central Street east of the Project site and along both sides to the west, with a marked crosswalk provided across East Central Street to the west of the Project site at the East Central Street/Big Y driveway/Franklin Town Hall driveway intersection that is incorporated into the traffic signal system at the intersection (i.e., pedestrian traffic signal equipment and phasing are provided). Formal bicycle facilities are not provided in the vicinity of the Project site; however, East Central Street generally provides sufficient width to accommodate bicycle travel in a shared traveled-way configuration (i.e., bicyclists and motor vehicles sharing the traveled-way),[7] with bicycle detection provided as a part of the traffic signal system at the East Central Street/Big Y driveway/Franklin Town Hall driveway intersection.

Public Transportation

Regularly scheduled, fixed-route, public transportation services are not currently provided within the study area or to the Project site. The Greater Attleboro-Taunton Regional Transit Authority (GATRA) operates an on-demand microtransit service which allows transit riders to request a ride within the Town of Franklin through the GATRA GO United program. To the west of the Project site, the Massachusetts Bay Transportation Authority (MBTA) provides Commuter Rail service to South Station in Boston on the Franklin Line from Franklin Station, which is located at 75 Depot Street (an approximate 6-minute driving distance from the Project site). Additionally, GATRA provides Dial-a-Ride paratransit services to eligible persons residing within the Town of Franklin who cannot use fixed-route transit all or some of the time due to a physical, cognitive, or mental disability in compliance with the Americans with Disabilities Act (ADA).

MOTOR VEHICLE CRASH DATA

A review of the MassDOT statewide high crash location list indicated that there are no locations along the Route 140 corridor between and including Chestnut Street and the Wrentham town line that are defined as Highway Safety Improvement Program (HSIP) eligible crash locations. Based on this review, ***no discernible safety deficiencies were apparent in the vicinity of the Project site***.

PROJECT-GENERATED TRAFFIC

As proposed, the Project will entail the construction of a 265-unit multifamily residential community, including 229 units to be located in four (4) four-story multifamily residential buildings and 36 units to be located in one (1) three-story residential building. In order to develop the traffic characteristics of the

[7] A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.

Project, trip-generation statistics published by the ITE[8] for similar land uses as those proposed was used. ITE Land Use Codes (LUCs) 220, , *Multifamily Housing (Mid-Rise)*, and 221, *Multifamily Housing (Mid-Rise)*, were used to establish the base trip-generation calculations for the Project, the results of which are summarized in Table 1.

Table 1
TRIP-GENERATION SUMMARY[a]

	Vehicle Trips		
Time Period/Direction	(A) Proposed Low-Rise Residential Development Trips (36 units)	(B) Proposed Mid-Rise Residential Development Trips (229 units)	(C=A+B) Total Trips
Average Weekday Daily:			
Entering	153	520	673
Exiting	153	520	673
Total	306	1,040	1,346
Weekday Morning Peak Hour:			
Entering	8	21	29
Exiting	26	68	94
Total	34	89	123
Weekday Evening Peak Hour:			
Entering	23	55	78
Exiting	13	35	48
Total	36	90	126
Saturday:			
Entering	82	524	606
Exiting	82	524	606
Total	164	1,048	1,212
Saturday Midday Peak Hour:			
Entering	8	46	54
Exiting	8	43	51
Total	16	89	105

[a]Based on ITE LUC 220, *Multifamily Housing (Low-Rise).*
[b]Based on ITE LUC 221, *Multifamily Housing (Mid-Rise).*

As can be seen in Table 1, the Project is expected to generate approximately 1,346 vehicle trips on an average weekday and 1,212 vehicle trips on a Saturday (both two way, 24-hour volumes), with approximately 123 vehicle trips (29 vehicles entering and 94 exiting) expected during the weekday morning peak-hour, 126 vehicle trips (78 vehicles entering and 48 exiting) expected during the weekday evening peak-hour and 105 vehicle trips (54 vehicles entering and 51 exiting) expected during the Saturday midday peak-hour.

[8]Institute of Transportation Engineers, op. cit. 1.

PROJECT-RELATED IMPACTS AND IMPROVEMENT MEASURES

Project-Related Impacts

The Project is expected to add 1,346 vehicle trips to Route 140 on an average weekday, or an approximate 7.9 percent increase in traffic over existing conditions, and 1,212 vehicles on a Saturday, or an approximate 7.3 percent increase. Focusing on the peak hours, the project is expected to add 123 vehicle trips during the weekday morning peak-hour, or an approximate 11.0 percent increase, 126 vehicle trips during the weekday evening peak-hour, or an approximate 8.2 percent increase, and 105 vehicles during the Saturday midday peak-hour, or an approximate 6.4 percent increase.

The identified traffic volume increases outside of the immediate proximity of the Project site will be lower as trips are dispersed to the east and west along Route 140. For context, daily traffic volumes generally fluctuate by up to 10 percent over the course of a week. Accordingly, and with consideration of trip dispersal, the Project is not expected to result in a significant impact on traffic operations (i.e., increase in motorist delay or vehicle queuing) over existing or anticipated future conditions without the Project.

Improvement Measures

East Central Street and the intersecting roadways in the vicinity of the Project site appear to provide sufficient capacity to accommodate the additional traffic that will be generated by the Project with consideration of the dispersal of trips over the respective peak hours. That being said, it is expected that minor improvements may be required at the signalized intersections along East Central Street including King Street/Chestnut Street and the Big Y driveway/Franklin Town Hall driveway that may include the following:

- Traffic signal timing and phasing improvements
- Replacement/repair of pedestrian pushbuttons and/or signal indications
- Sign and pavement marking installation

These preliminary findings will be refined in conjunction with the preparation of the formal TIA.

STATE PERMITTING

East Central Street (Route 140) is a State Highway under the jurisdiction of MassDOT. As such, the Project will require the issuance of a State Highway Access Permit from MassDOT for: i) access to Project site; and ii) any necessary or required improvements along East Central Street, such as traffic signal timing adjustments. This will also subject the Project to review under the Massachusetts Environmental Policy Act (MEPA).

The MEPA Transportation thresholds are defined under 301 CMR 11.03 (6)(a) and 301 CMR 11.03 (6)(b). The MEPA Transportation thresholds that would be applicable to the Project would be as follows:

301 CMR 11.03 (6)(a) – Environmental Notification Form and Environmental Impact Report

1. Generation of 3,000 or more new ADT (average daily vehicle trips) on roadways providing access to a single location.
2. Construction of 1,000 or more new parking spaces at a single location.

301 CMR 11.03 (6)(b) - Environmental Notification Form

1. Generation of 2,000 or more new ADT (average daily vehicle trips) on roadways providing access to a single location.
2. Generation of 1,000 or more new ADT (average daily vehicle trips) on roadways providing access to a single location and construction of 150 or more new parking spaces at a single location.
3. Construction of 300 or more new parking spaces at a single location.

As documented as a part of this preliminary assessment, the Project is expected to generate an ADT (unadjusted average weekday traffic) of 1,326 vehicles per day and will include the construction of 358 parking spaces. To the extent that the nursey that occupies the Project site is currently in operation or has been operational within the past 2 years, the traffic generated by the nursery and the number of existing parking spaces within the Project site can be used to reduce the volume of new traffic generated by the Project and the number of new parking spaces provided.

Even with consideration of the existing use that operates within the Project site, it is expected that the net increase in parking at the Project site will be greater than 300 parking spaces and, as such, the filing of an Environmental Notification Form (ENF) will be required for the Project.

SUMMARY

VAI has conducted a PTIA in order to provide an initial assessment of the potential impacts on the transportation infrastructure associated with the proposed construction of a multifamily residential development to be located at 444 East Central Street (Route 140) in Franklin, Massachusetts. This assessment has: i) reviewed the existing conditions context of the transportation infrastructure serving the Project site; ii) qualitatively evaluated the potential impact of the Project along East Central Street; and iii) provided a preliminary evaluation of lines of sight at the Project site driveway intersection.

Based on this preliminary assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE[9] the Project is predicted to generate approximately 1,346 vehicle trips on an average weekday and 1,212 vehicle trips on a Saturday (both two way, 24-hour volumes), with approximately 123 vehicle trips expected during the weekday morning peak-hour, 126 vehicle trips expected during the weekday evening peak-hour and 105 vehicle trips expected during the Saturday midday peak-hour;
2. No apparent safety deficiencies were noted with respect to the motor vehicle crash history along the Route 140 corridor in the vicinity of the Project site based on a review of information available through MassDOT;
3. Traffic volumes along the Route 140 corridor outside of the immediate proximity of the Project site are expected to be less than 10 percent on a daily and peak-hour basis, which is within the range on normal daily traffic volume fluctuations and would not be expected to result in a significant impact (increase) on motorist delays or vehicle queuing over existing or anticipated future conditions without the Project;

[9]Institute of Transportation Engineers, op. cit. 1.

4. Given the incremental increase in traffic that the Project represents over existing conditions, the measures to off-set the predicted impact of the Project are expected to be limited to traffic signal timing improvements, sign and pavement marking enhancements and/or pedestrian and bicycle accommodations;
5. Based on the number of new parking spaces that are to be constructed at the Project site and the need to obtain a State Highway Access Permit from MassDOT, the Project may require the filing of an ENF; and
6. A review of Google© imagery indicates that the sight lines at the Project site driveway intersection appear to be unimpeded.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the recommendations that follow. These initial recommendations will be revisited and refined in conjunction with the formal TIA.

RECOMMENDATIONS

Project Access

The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation:

- The Project site driveway and internal circulating drives should be a minimum of 24 feet in width and designed to accommodate the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.
- The emergency vehicle access lanes should be a minimum of 20-feet in width and paved or constructed of a stabilized base material that will support travel by the largest responding emergency vehicle.
- Vehicles exiting the Project site should be placed under STOP-sign control with a marked STOP-line provided.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices* (MUTCD).[10]
- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23 feet in order to facilitate parking maneuvers.
- A sidewalk should be provided within the Project site to link the residential buildings to the clubhouse and should extend thereafter to East Central Street.
- Americans with Disabilities Act (ADA)-compliant wheelchair ramps should be provided at pedestrian crossings to be modified or constructed in conjunction with the Project.

[10] *Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.

- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveways should be designed and maintained so as not to restrict lines of sight.

- Snow accumulations (windrows) within sight triangle areas should be promptly removed where such accumulations would impede sight lines.

Transportation Demand Management Program

The following Transportation Demand Management (TDM) measures should be considered for implementation as part of the Project in an effort to encourage the use of alternative modes of transportation to single-occupant vehicles:

- A transportation coordinator should be assigned for the Project to coordinate the TDM program;

- Information regarding public transportation services, maps, schedules, and fare information should be posted in a central location and/or otherwise made available to residents;

- A "welcome packet" should be provided to new residents detailing available public transportation services, bicycle and walking alternatives, and other commuting options;

- Pedestrian accommodations should be incorporated within the Project site;

- A central maildrop should be provided; and

- Secure bicycle parking should be provided at appropriate locations within the Project site and include both exterior and interior (weather protected) bicycle parking.

With implementation of the aforementioned recommendations, safe and efficient access will be provided to the Project site and the Project can be accommodated within the confines of the existing and improved transportation system.

cc: File

ATTACHMENTS

PROJECT SITE PLAN
TRIP-GENERATION CALCULATIONS

PROJECT SITE PLAN

Project Summary

265 Units

1.35 Ratio

358 Parking Spaces

(30 Free-Standing Garages)

444 E. Central Street

Franklin, MA

12/20/2023

Conceptual Site Plan

CUBE 3 | 370 Merrimack Street, Suite 337 | Lawrence, MA 01843 | 978.989.9900 | cube3.com

TRIP-GENERATION CALCULATIONS

Graph Look Up

ITETripGen Web-based App

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- Support Documents
- Add Users
- Comments

Add-ons to do more

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Query | Filter

DATA SOURCE: Trip Generation Manual, 11th 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

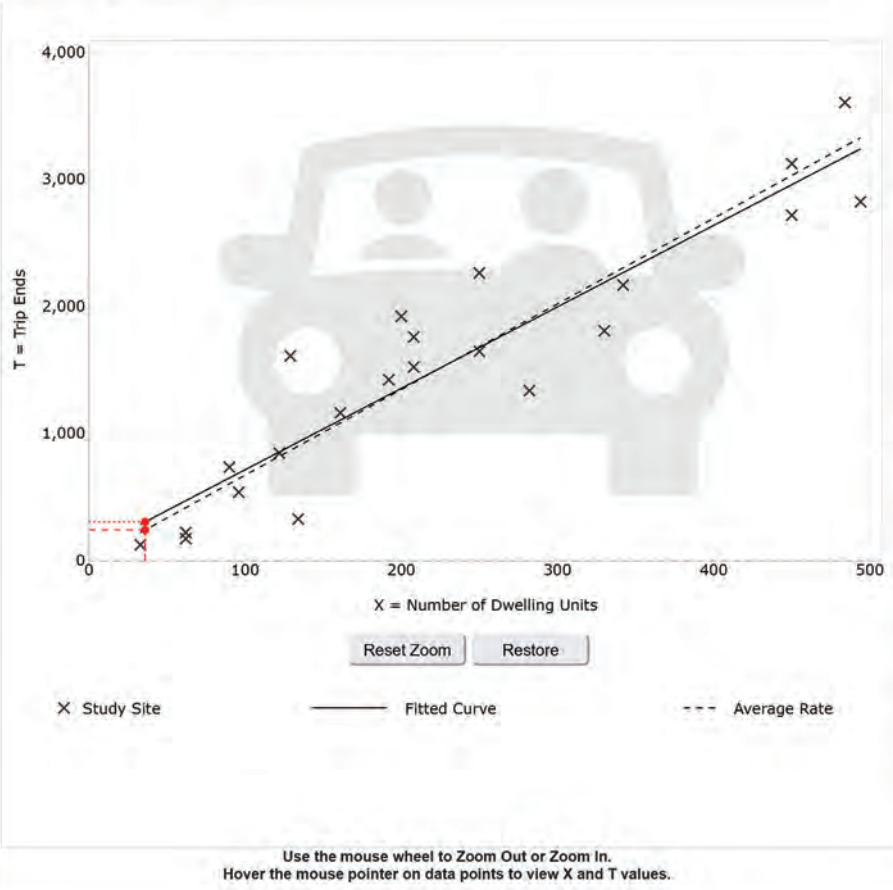
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 36 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:
22

Avg. Num. of Dwelling Units:
229

Average Rate:
6.74

Range of Rates:
2.46 - 12.50

Standard Deviation:
1.79

Fitted Curve Equation:
$T = 6.41(X) + 75.31$

R^2:
0.86

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 243 (Total), 121 (Entry), 122 (Exit)
Fitted Curve: 306 (Total), 153 (Entry), 153 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th 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

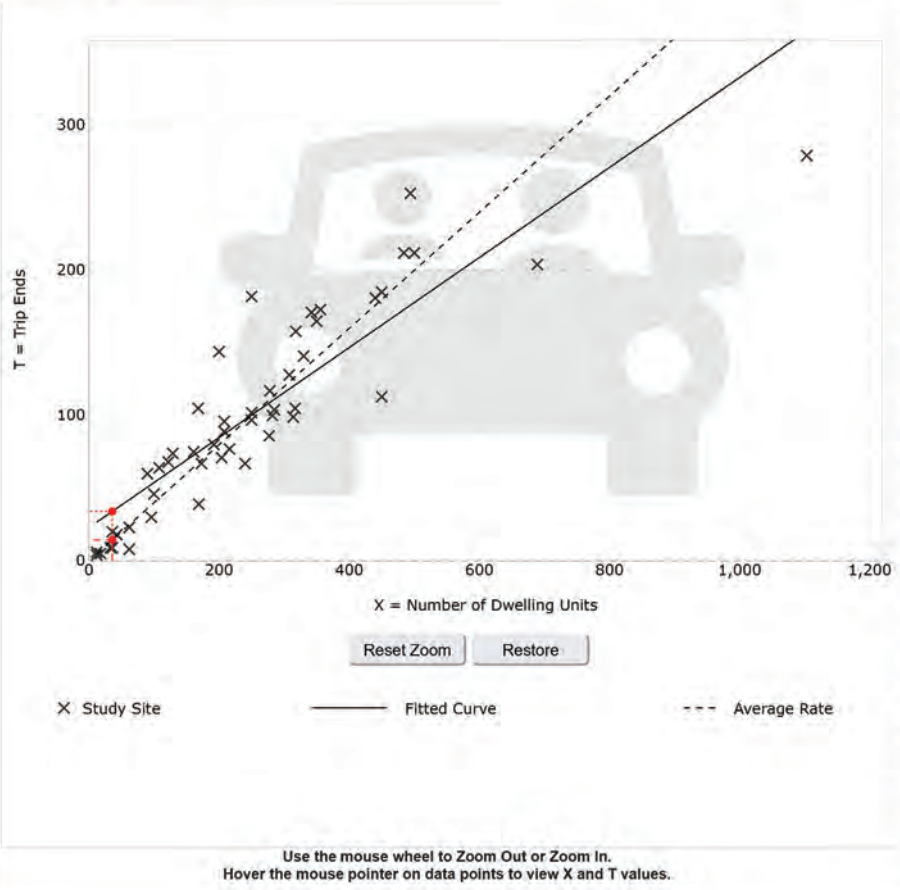
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic,

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 36 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:
49

Avg. Num. of Dwelling Units:
249

Average Rate:
0.40

Range of Rates:
0.13 - 0.73

Standard Deviation:
0.12

Fitted Curve Equation:
T = 0.31(X) + 22.85

R^2:
0.79

Directional Distribution:
24% entering, 76% exiting

Calculated Trip Ends:
Average Rate: 14 (Total), 3 (Entry), 11 (Exit)
Fitted Curve: 34 (Total), 8 (Entry), 26 (Exit)

Graph Look Up

ITETripGen Web-based App

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- TGM Appendices
- Support Documents
- Add Users
- Comments

Add-ons to do more

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DATA SOURCE: Trip Generation Manual, 11th 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

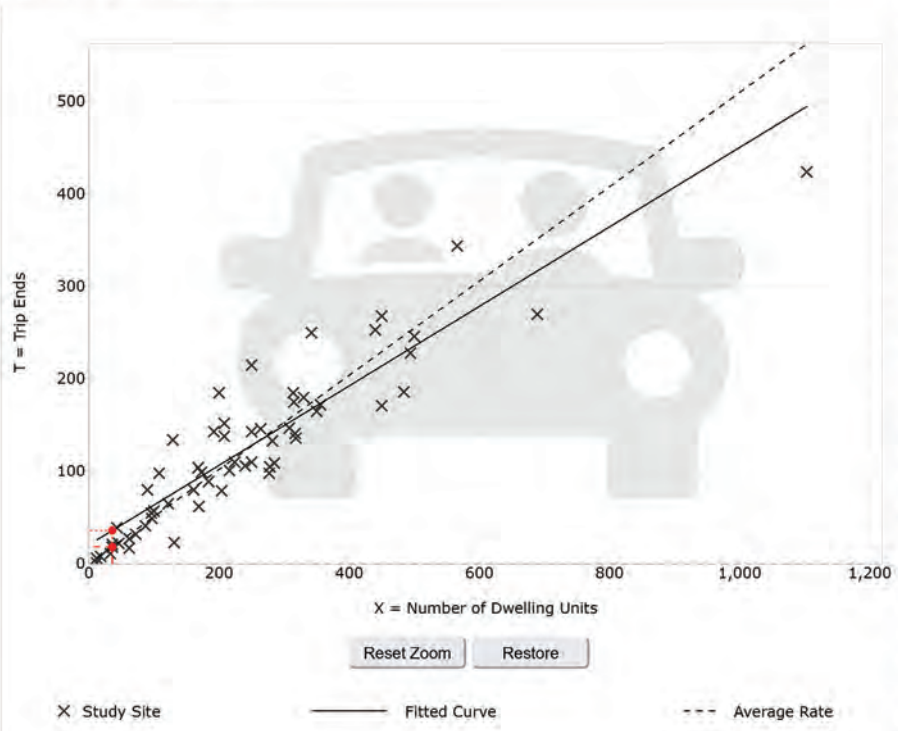
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic,

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 36 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:
59

Avg. Num. of Dwelling Units:
241

Average Rate:
0.51

Range of Rates:
0.08 - 1.04

Standard Deviation:
0.15

Fitted Curve Equation:
T = 0.43(X) + 20.55

R^2:
0.84

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 18 (Total), 12 (Entry), 6 (Exit)
Fitted Curve: 36 (Total), 23 (Entry), 13 (Exit)

Graph Look Up

ITETripGen Web-based App

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DATA SOURCE: Trip Generation Manual, 11th 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

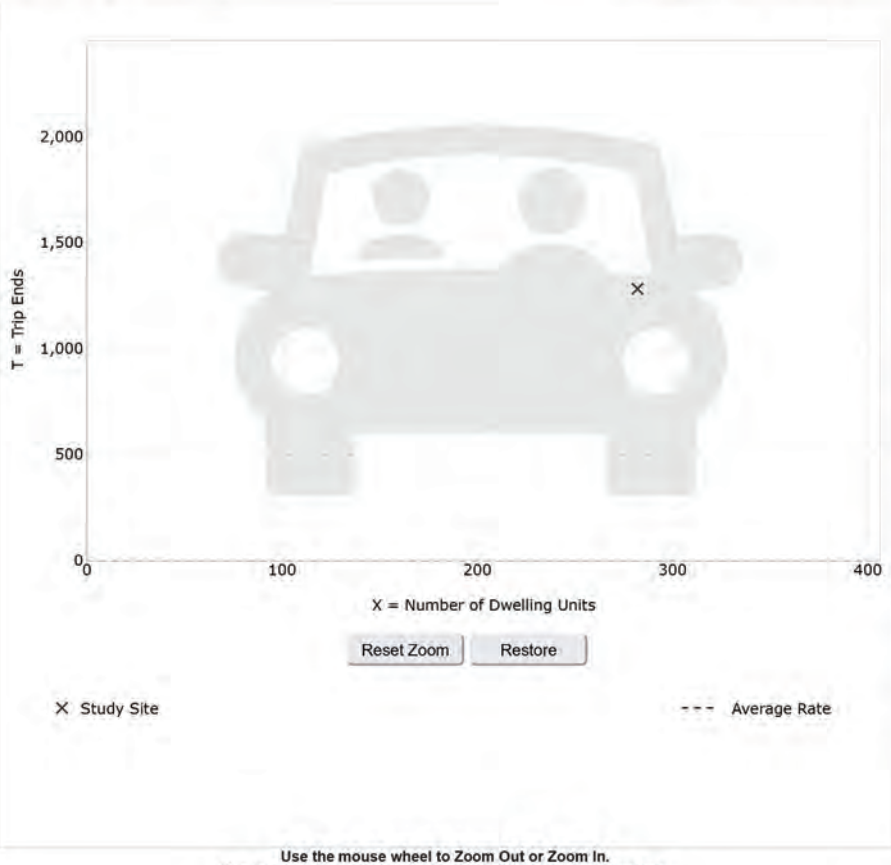
TIME PERIOD: Saturday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 36 Calculate

Data Plot and Equation

Caution – Small Sample Size



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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: 164 (Total), 82 (Entry), 82 (Exit)

Graph Look Up

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How to Use ITETripGen
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Query | Filter

DATA SOURCE:
Trip Generation Manual, 11th 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

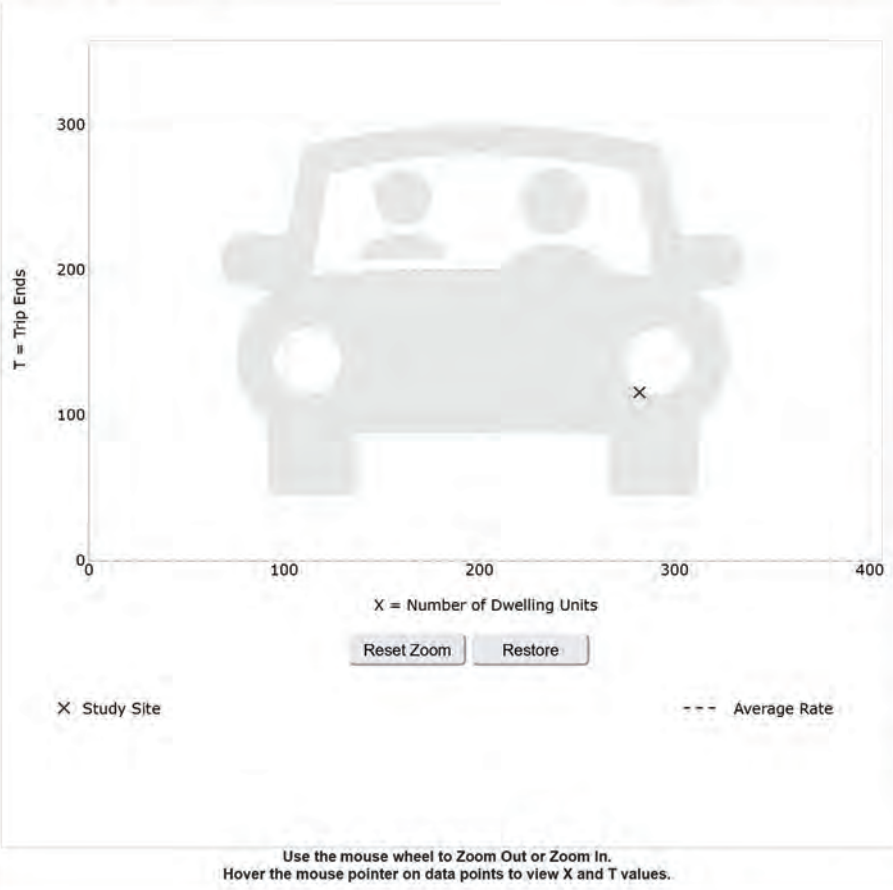
TIME PERIOD:
Saturday, Peak Hour of Generator

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
36 Calculate

Data Plot and Equation

Caution – Small Sample Size



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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:
1

Avg. Num. of Dwelling Units:
282

Average Rate:
0.41

Range of Rates:
0.41 - 0.41

Standard Deviation:
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
Not available

Calculated Trip Ends:
Average Rate: 15 (Total)

Add-ons to do more
Try OTISS Pro

Graph Look Up

ITETripGen Web-based App

- Graph Look Up
- How to Use ITETripGen
- TGM Desk Reference
- TGM Appendices
- Support Documents
- Add Users
- Comments

Add-ons to do more

Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 221

LAND USE GROUP: (200-299) Residential

LAND USE : 221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

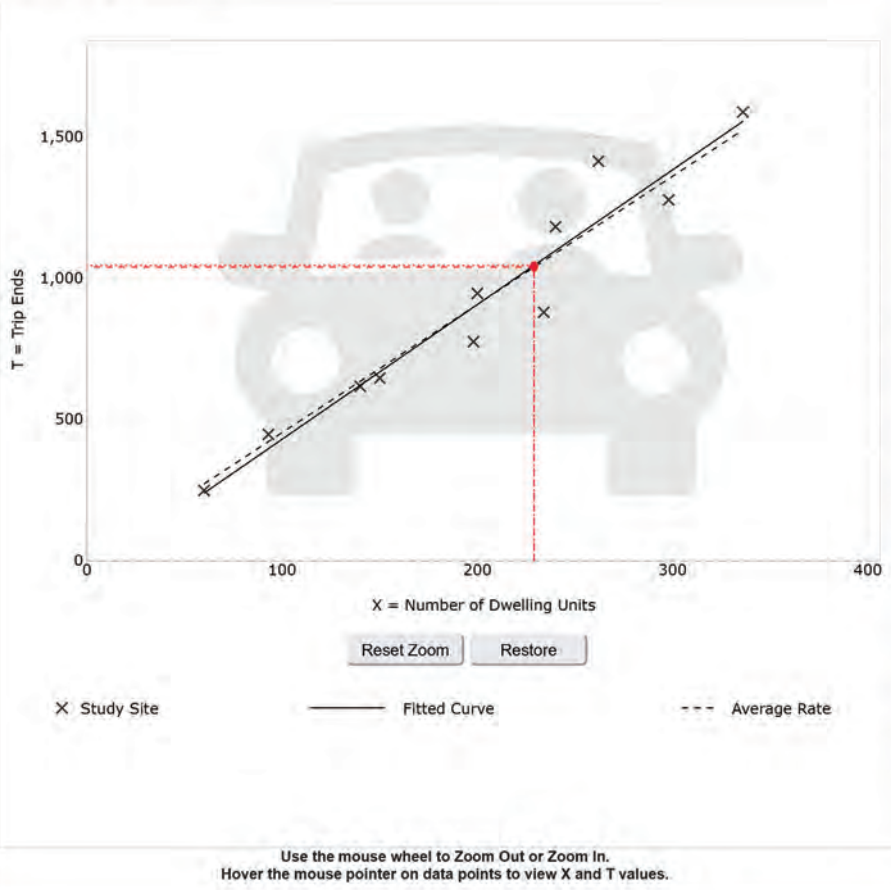
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 229 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 (Mid-Rise) - Not Close to Rail Transit (221) 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:
201

Average Rate:
4.54

Range of Rates:
3.76 - 5.40

Standard Deviation:
0.51

Fitted Curve Equation:
T = 4.77(X) - 46.46

R^2:
0.93

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1040 (Total), 520 (Entry), 520 (Exit)
Fitted Curve: 1046 (Total), 523 (Entry), 523 (Exit)

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Add-ons to do more

Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 221

LAND USE GROUP: (200-299) Residential

LAND USE : 221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

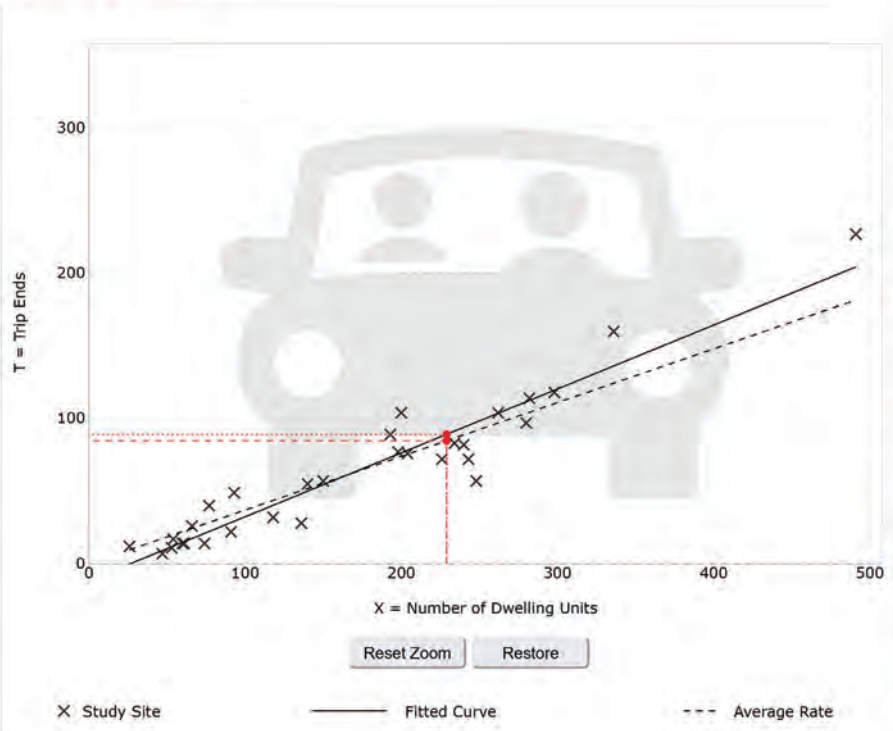
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic,

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 229 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 (Mid-Rise) - Not Close to Rail Transit (221) 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:
30

Avg. Num. of Dwelling Units:
173

Average Rate:
0.37

Range of Rates:
0.15 - 0.53

Standard Deviation:
0.09

Fitted Curve Equation:
T = 0.44(X) - 11.61

R^2:
0.91

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 85 (Total), 19 (Entry), 66 (Exit)
Fitted Curve: 89 (Total), 21 (Entry), 68 (Exit)

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Add-ons to do more

Try OTISS Pro

Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 221

LAND USE GROUP: (200-299) Residential

LAND USE : 221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

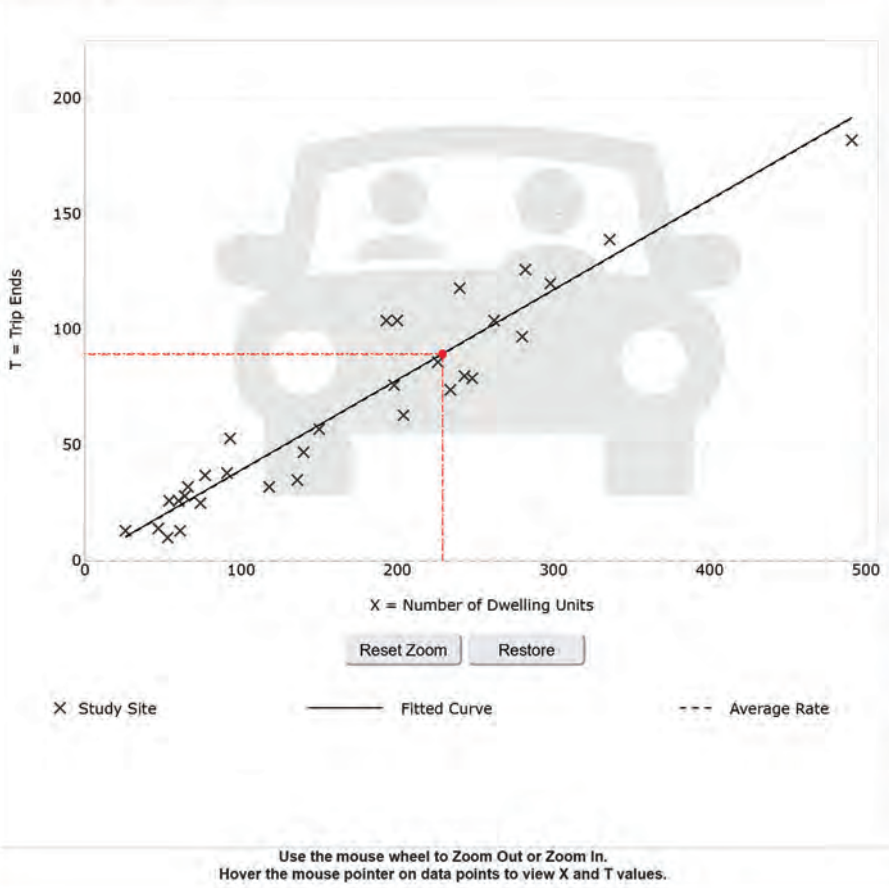
INDEPENDENT VARIABLE (IV): Dwelling Units

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic,

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 229 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 (Mid-Rise) - Not Close to Rail Transit (221) 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:
169

Average Rate:
0.39

Range of Rates:
0.19 - 0.57

Standard Deviation:
0.08

Fitted Curve Equation:
T = 0.39(X) + 0.34

R^2:
0.91

Directional Distribution:
61% entering, 39% exiting

Calculated Trip Ends:
Average Rate: 89 (Total), 54 (Entry), 35 (Exit)
Fitted Curve: 90 (Total), 55 (Entry), 35 (Exit)

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Query | Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 221

LAND USE GROUP: (200-299) Residential

LAND USE : 221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

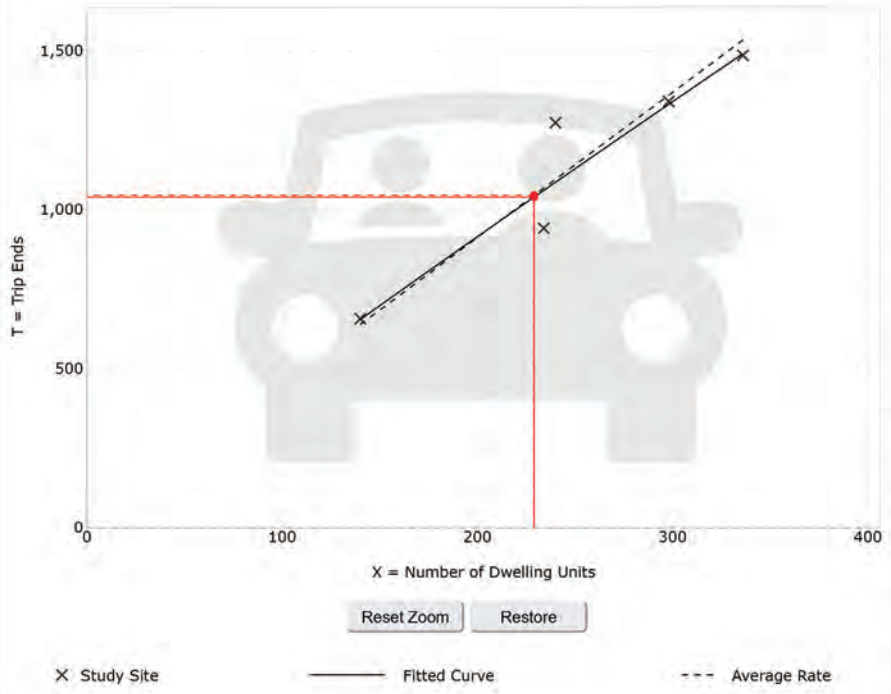
TIME PERIOD: Saturday

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 229 Calculate

Data Plot and Equation

Caution – Small Sample Size



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Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
5

Avg. Num. of Dwelling Units:
250

Average Rate:
4.57

Range of Rates:
4.03 - 5.31

Standard Deviation:
0.46

Fitted Curve Equation:
Ln(T) = 0.94 Ln(X) + 1.84

R^2:
0.91

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1047 (Total), 523 (Entry), 524 (Exit)
Fitted Curve: 1041 (Total), 520 (Entry), 521 (Exit)

Add-ons to do more
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DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 221

LAND USE GROUP: (200-299) Residential

LAND USE : 221 - Multifamily Housing (Mid-Rise)

LAND USE SUBCATEGORY: Not Close to Rail Transit

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): Dwelling Units

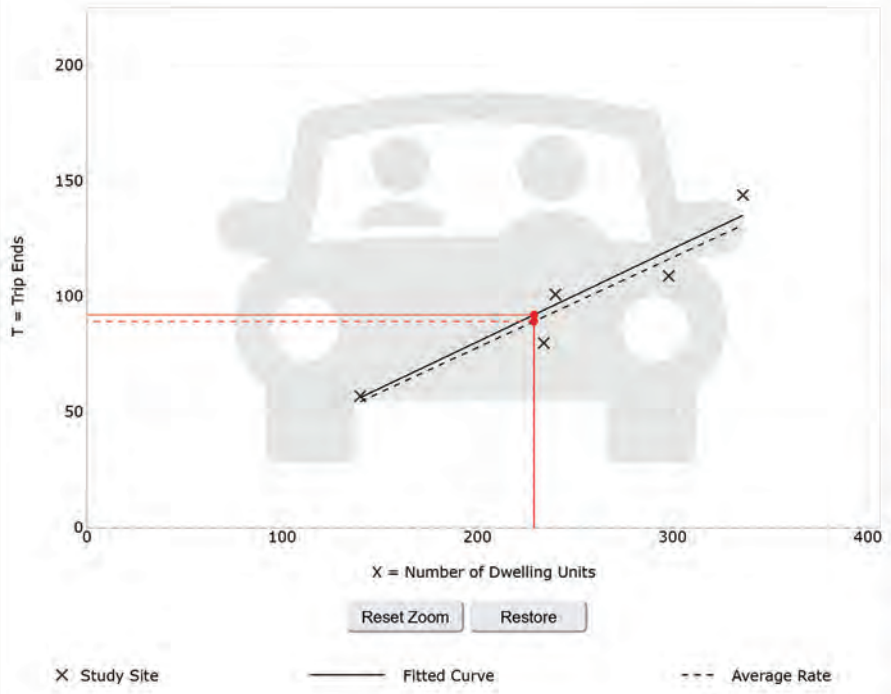
TIME PERIOD: Saturday, Peak Hour of Generator

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 229 Calculate

Data Plot and Equation

Caution – Small Sample Size



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Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Mid-Rise) - Not Close to Rail Transit (221) 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:
5

Avg. Num. of Dwelling Units:
250

Average Rate:
0.39

Range of Rates:
0.34 - 0.43

Standard Deviation:
0.04

Fitted Curve Equation:
Ln(T) = 1.00 Ln(X) - 0.91

R^2:
0.92

Directional Distribution:
51% entering, 49% exiting

Calculated Trip Ends:
Average Rate: 89 (Total), 46 (Entry), 43 (Exit)
Fitted Curve: 92 (Total), 47 (Entry), 45 (Exit)