



Traffic Impact Study

38 Great Hill Road
Derby, Connecticut

Prepared for:
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Traffic Impact Study 38 Great Hill Road Derby, Connecticut

This study examines the traffic impact of a residential development at 38 Great Hill Road in Derby, Connecticut. Levels of Service (LOS) for traffic flows under 2024 existing and 2027 no-build and build traffic conditions were analyzed to identify any deficiencies in existing and future traffic operations at area intersections. For the purpose of this traffic study, 2027 was assumed to be the year during which the development is completed and occupied.

I. Summary

- The residential development is projected to generate 149, 212, and 198 vehicular trips during the respective weekday morning, weekday afternoon, and Saturday midday peak hours.
- The traffic impact of the project will be negligible. After the residential units are built and occupied, traffic movements at area intersections will operate at favorable LOS A, B, or C during the peak traffic hours.
- Recent-year accident records for intersections and roadway segments near the development were reviewed. No abnormal accident patterns were identified.

II. Project Description

The residential development at 38 Great Hill Road will include one existing house that will remain, 311 new residential units, a 10,000 SF community building, a 4,600 SF repurposed barn, and a 17,000 SF event hall. Three driveways on Great Hill Road and one driveway on Silver Hill Road are proposed.

III. Existing Traffic Conditions

For the evaluation of the quality of traffic operation in the vicinity of the development, the following signalized and unsignalized intersections were analyzed for the study:

- Route 334 (Great Hill Road and Fountain Lake Road) and Southwest Road;
- Route 334 (Great Hill Road and Wakelee Avenue), Lower Derby Avenue, and Route 8 southbound on ramp;
- Great Hill Road and Derby Neck Road;
- Silver Hill Road and Derby Neck Road;
- Site driveways and Great Hill Road; and
- Site driveway and Silver Hill Road.

Traffic counts were collected at the existing intersections in September and October 2024. Traffic volumes for three peak hours—7:00 am-8:00 am and 4:45 pm-5:45 pm for weekday and 12:30 pm-1:30 pm for Saturday—were identified and were used for the traffic analyses. The peak-hour traffic volumes are shown in Figures 1, 2, and 3 of the Appendices.

Capacity Analysis

For the assessment of the quality of traffic flow, intersection capacity analysis was conducted for the existing, future no-build, and future build traffic conditions. Capacity analysis provides an indication of how well roadway facilities serve the traffic demands placed upon them. Synchro 12, a software package that includes the evaluation criteria of the *Highway Capacity Manual, 2000 Edition and 7th Edition*, was used to analyze the intersections.

Level of service (LOS) is the term used to describe the different operating conditions that occur on a given roadway segment or intersection under various traffic conditions. It is a qualitative measure of the effects of a number of factors including roadway geometry, speed, travel delay, freedom to maneuver, and safety. Six levels of service can be defined for each type of facility. Each level of service (LOS) is given a letter designation from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

Table 1 that follows shows the capacity analysis results for the analyzed intersections under the 2024 existing traffic conditions. All traffic approaches at area intersections and the signalized intersection of Route 334 and Route 8 southbound on ramp as a whole are operating at favorable LOS A, B, or C with short delays during the three peak hours.

Table 1 Capacity Analyses for Existing Conditions

Intersection	2024 Existing Conditions								
	Weekday Morning Peak Hour of Adjacent Streets			Weekday Afternoon Peak Hour of Adjacent Streets			Sunday Midday Peak Hour of Adjacent Streets		
	Delay (sec)	LOS	95th-Percentile Queue (ft)	Delay (sec)	LOS	95th-Percentile Queue (ft)	Delay (sec)	LOS	95th-Percentile Queue (ft)
Route 8 SB On Ramp, Rt. 334 (Wakelee Ave.), Lower Derby Ave., and Rt. 334 (Great Hill Rd.) (Signalized)									
EB Left Turn	18.7	B	73	18.7	B	68	18.3	B	68
EB Through and Right	26.2	C	214	26.2	C	131	23.4	C	187
SB Through	17.5	B	217	17.5	B	139	16.2	B	136
SB Right Turn	16.5	B	172	16.5	B	87	15.4	B	83
NB Left Turn	28.6	C	144	28.6	C	215	24.7	C	158
NB Through	5.8	A	47	5.8	A	85	5.6	A	50
Intersection	19.5	B	-	19.5	B	-	18.1	B	-
Southwest Rd., Rt. 334 (Great Hill Rd.), and Rt. 334 (Fountain Lake Rd.) (Unsignalized)									
NB	13.4	B	-	13.4	B	-	13.6	B	-
WB Left Turn	8.5	A	-	8.5	A	-	8.1	A	-
Derby Neck Rd. and Great Hill Rd. (Unsignalized)									
EB Left Turn	0.0	A	-	0.0	A	-	7.3	A	-
SB	8.7	A	-	8.7	A	-	8.7	A	-
Hawthorne Ave., Silver Hill Rd., and Derby Neck Rd. (Unsignalized)									
EB Left Turn	7.2	A	-	7.2	A	-	7.3	A	-
SB	8.7	A	-	8.7	A	-	8.7	A	-

EB Eastbound
WB Westbound
NB Northbound
SB Southbound
LOS Level of Service

IV. Future Traffic Conditions

For the purpose of this traffic impact study, it was assumed that the development will be built and occupied in 2027.

As a comparison for demonstrating the traffic impact of the project, a 2027 no-build scenario is included in the study. Figures 4, 5, and 6 of the Appendices show the 2027 no-build traffic volumes, which were generated by using an annual traffic growth rate of 0.9 percent between 2024 and 2027 that was recommended by the CTDOT Bureau of Policy and Planning and by including traffic from a potential industrial development Fountain Lake Industrial Park to the north; for this study, a building floor space of 150,000 SF was assumed for this industrial park that will be developed by others.

Table 2 details the capacity analysis results for the 2024 no-build traffic conditions. There will be little change in the LOS and average delays during the three peak hours. All traffic movements will continue to operate at LOS A, B, or C during the peak hours.

Table 2 Capacity Analyses for No-Build Conditions

Intersection	2027 No-Build Conditions								
	Weekday Morning Peak Hour of Adjacent Streets			Weekday Afternoon Peak Hour of Adjacent Streets			Sunday Midday Peak Hour of Adjacent Streets		
	Delay (sec)	LOS	95th- Percentile Queue (ft)	Delay (sec)	LOS	95th- Percentile Queue (ft)	Delay (sec)	LOS	95th- Percentile Queue (ft)
Route 8 SB On Ramp, Rt. 334 (Wakelee Ave.), Lower Derby Ave., and Rt. 334 (Great Hill Rd.) (Signalized)									
EB Left Turn	19.3	B	77	20.3	C	75	18.6	B	76
EB Through and Right	28.7	C	227	23.8	C	160	25.2	C	207
SB Through	18.2	B	222	17.6	B	143	16.8	B	139
SB Right Turn	17.7	B	186	16.7	B	92	16.0	B	89
NB Left Turn	31.1	C	165	30.1	C	242	25.9	C	168
NB Through	5.8	A	48	5.7	A	87	5.8	A	52
Intersection	21.0	C	-	19.1	B	-	19.2	B	-
Southwest Rd., Rt. 334 (Great Hill Rd.), and Rt. 334 (Fountain Lake Rd.) (Unsignalized)									
NB	13.7	B	-	14.5	B	-	13.9	B	-
WB Left Turn	8.6	A	-	8.0	A	-	8.2	A	-
Derby Neck Rd. and Great Hill Rd. (Unsignalized)									
EB Left Turn	0.0	A	-	7.3	A	-	7.3	A	-
SB	8.8	A	-	8.7	A	-	8.8	A	-
Hawthorne Ave., Silver Hill Rd., and Derby Neck Rd. (Unsignalized)									
EB Left Turn	7.3	A	-	7.3	A	-	7.3	A	-
SB	8.7	A	-	8.8	A	-	8.9	A	-

EB Eastbound
WB Westbound
NB Northbound
SB Southbound
LOS Level of Service

Trip Generation

The peak-hour vehicular trips generated by a potential development at the Fountain Lake Industrial Park to the north by others (Table 3A) and by the development at 38 Great Hill Road (Table 3B) were estimated primarily using data from ITE (Institute of Transportation Engineers) *Trip Generation Manual, 11th Edition*. Because the ITE manual does not include land use categories for the event hall and the barn at 38 Great Hill Road that will be available for event rentals, the trips for these two buildings were based on the 84 parking spaces on the site plan with the assumption that half of the spaces will be filled during each of the weekday afternoon and the Saturday midday peak hours.

The development at 38 Great Hill Road is projected to generate 149, 212, and 198 vehicular trips during the respective weekday morning, weekday afternoon, and Saturday midday peak hours.

Table 3A Trip Generation for Background Development by Others (vph)

Industrial Park (ITE LU 130) (150,000 SF)			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	41	10	51
Weekday Afternoon Peak Hour of Adjacent Street	11	40	51
Saturday Midday Peak Hour of Adjacent Street	21	45	66

vph Vehicles per hour

Table 3B Trip Generation for 38 Great Hill Road (vph)

Multifamily Housing (Mid-Rise), Not Close to Rail Transit (ITE LU 221) (240 Units)			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	20	69	89
Weekday Afternoon Peak Hour of Adjacent Street	57	37	94
Saturday Midday Peak Hour of Adjacent Street	48	46	94
Single-Family Attached Housing (ITE LU 215) (44 Units)			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	7	14	21
Weekday Afternoon Peak Hour of Adjacent Street	14	11	25
Saturday Midday Peak Hour of Adjacent Street	12	13	25
Single-Family Detached Housing (ITE LU 210) (27 Units)			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	5	14	19
Weekday Afternoon Peak Hour of Adjacent Street	16	9	25
Saturday Midday Peak Hour of Adjacent Street	14	11	25
Single-Family Detached Housing (ITE LU 210) (One Existing House)			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	0	1	1
Weekday Afternoon Peak Hour of Adjacent Street	1	0	1
Saturday Midday Peak Hour of Adjacent Street	1	0	1
Recreational Community Center (ITE LU 495) (10,000 SF Community Building)			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	13	6	19
Weekday Afternoon Peak Hour of Adjacent Street	12	13	25
Saturday Midday Peak Hour of Adjacent Street	6	5	11
Event Hall (17,000 SF) and Barn (4,600 SF) (84 Parking Spaces, Assuming 50% Hourly Arrivals)			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	0	0	0
Weekday Afternoon Peak Hour of Adjacent Street	42	0	42
Saturday Midday Peak Hour of Adjacent Street	42	0	42
Total			
	Entry	Exit	Entry & Exit
Weekday Morning Peak Hour of Adjacent Street	45	104	149
Weekday Afternoon Peak Hour of Adjacent Street	142	70	212
Saturday Midday Peak Hour of Adjacent Street	123	75	198

vph Vehicles per hour

Table 4 depicts the distribution of the site-generated trips along the area routes. The distribution takes into account the relative traffic volumes of the area roadways and the development patterns in this part of Derby. Traffic volumes for the 2027 build conditions, which combine the no-build volumes and the new site trips, are presented in Figures 8, 9, and 10.

Table 4 Trip Distribution

To / From Route	Entry/Exit
North: Route 8	25%
North: Route 334 (Great Hill Road)	10%
South: Route 8	35%
South and East: Hawthorne Avenue via Silver Hill Road	10%
East: Silver Hill Road	10%
West: Derby Neck Road via Great Hill Road	10%
Total	100%

Capacity Analysis

Table 5 shows the capacity analysis results for the 2027 build traffic conditions. All LOS for the traffic approaches and the signalized intersection will continue to operate at favorable LOS, A, B, or C during the three peak hours. The incremental increases in average delays between the no-build and build conditions will be limited. For example, at the signalized intersection of Route 334 and the Route 8 southbound on ramp, the intersection-level traffic delay will only increase by zero to 1.1 seconds per vehicle during the three peak hours after the residential development is built and occupied. The traffic impact of the development will be negligible.

Table 5 Capacity Analyses for Build Conditions

Intersection	2027 Build Conditions								
	Weekday Morning Peak Hour of Adjacent Streets			Weekday Afternoon Peak Hour of Adjacent Streets			Sunday Midday Peak Hour of Adjacent Streets		
	Delay (sec)	LOS	95th- Percentile Queue (ft)	Delay (sec)	LOS	95th- Percentile Queue (ft)	Delay (sec)	LOS	95th- Percentile Queue (ft)
Route 8 SB On Ramp, Rt. 334 (Wakelee Ave.), Lower Derby Ave., and Rt. 334 (Great Hill Rd.) (Signalized)									
EB Left Turn	19.4	B	84	20.3	C	80	18.5	B	80
EB Through and Right	31.3	C	247	24.6	C	173	25.2	C	214
SB Through	18.5	B	222	17.7	B	143	16.7	B	137
SB Right Turn	18.6	B	195	17.4	B	114	16.4	B	105
NB Left Turn	31.4	C	165	30.7	C	242	25.5	C	163
NB Through	5.9	A	48	5.8	A	87	5.8	A	50
Intersection	22.1	C	-	19.6	B	-	19.2	B	-
Southwest Rd., Rt. 334 (Great Hill Rd.), and Rt. 334 (Fountain Lake Rd.) (Unsignalized)									
NB	14.1	B	-	13.7	B	-	13.4	B	-
WB Left Turn	8.6	A	-	8.1	A	-	8.2	A	-
Great Hill Rd. and Driveway #1 (Unsignalized)									
WB	8.6	A	-	8.6	A	-	8.6	A	-
SB Left Turn	7.3	A	-	7.3	A	-	7.3	A	-
Derby Neck Rd. and Great Hill Rd. (Unsignalized)									
EB Left Turn	0.0	A	-	7.3	A	-	7.3	A	-
SB	8.8	A	-	8.8	A	-	8.9	A	-
Hawthorne Ave., Silver Hill Rd., and Derby Neck Rd. (Unsignalized)									
EB Left Turn	7.3	A	-	7.3	A	-	7.3	A	-
SB	8.9	A	-	8.9	A	-	9.0	A	-
Great Hill Rd. and Driveway #3 (Unsignalized)									
WB	8.8	A	-	8.8	A	-	8.8	A	-
SB Left Turn	0.0	A	-	0.0	A	-	0.0	A	-
Great Hill Rd. and Driveway #2 (Unsignalized)									
WB	8.5	A	-	8.6	A	-	8.5	A	-
SB Left Turn	7.3	A	-	7.3	A	-	7.3	A	-
Silver Hill Rd. and Driveway #4 (Unsignalized)									
NB Left Turn	7.3	A	-	7.4	A	-	7.4	A	-
EB	8.9	A	-	9.2	A	-	9.2	A	-

EB Eastbound
 WB Westbound
 NB Northbound
 SB Southbound
 LOS Level of Service

V. Traffic Accident Record Summary

Traffic accident records for Great Hill Road and Silver Hill Road in Derby, Southwest Road in Seymour, and the segment of Route 334 at the intersection of Southwest Road in Seymour during 2021-2023 were reviewed. The details are summarized in Table 6.

Zero accident was recorded for Great Hill Road and Silver Hill Road during the three years. Three accidents occurred on Southwest Road, including two collisions with roadside objects and one sideswipe accidents between vehicles in opposite directions.

13 accidents occurred on Route 334 at the Southwest Road intersection. Five of the accidents involved collisions with roadside objects including trees and guiderails. There were three sideswipe accidents between vehicles of opposite directions, one overturn accident, two rear-end accidents, and two front-to-front accidents.

Based on the numbers and locations of the accidents over the three-year period and the accident categories in the table, no abnormal accident patterns were identified from these records. Because the development traffic will be adequately accommodated by the existing roadways in the area and will not create congestions at the area intersections, it is not expected to adversely affect the safety conditions of the adjacent roadways.

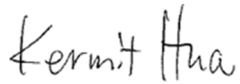
Table 6 Accident Record Summary

	Southwest Road (Seymour)	Route 334 at Southwest Road Intersection, Mile 1.97 to 2.04
Location		
Year		
2021	1	2
2022	2	4
2023	0	7
Total	3	13
Accident Severity		
Fatality		
Injury (No Fatality)	0	6
Property Damage Only	3	7
Total	3	13
Type of Collision		
Sideswipe-Opposite Direction	1	3
Overturn		1
Front to Rear		2
Front to Front		2
Fixed Object	2	5
Total	3	13

Source: Connecticut Crash Data Repository

VI. Conclusions

Area traffic operation was analyzed for a residential development at 38 Great Hill Road under the 2024 existing and the 2027 no-build and build traffic conditions. Traffic generated by the development will be adequately and safely accommodated by the adjacent roadways and intersections. The traffic impact of the development will be negligible.



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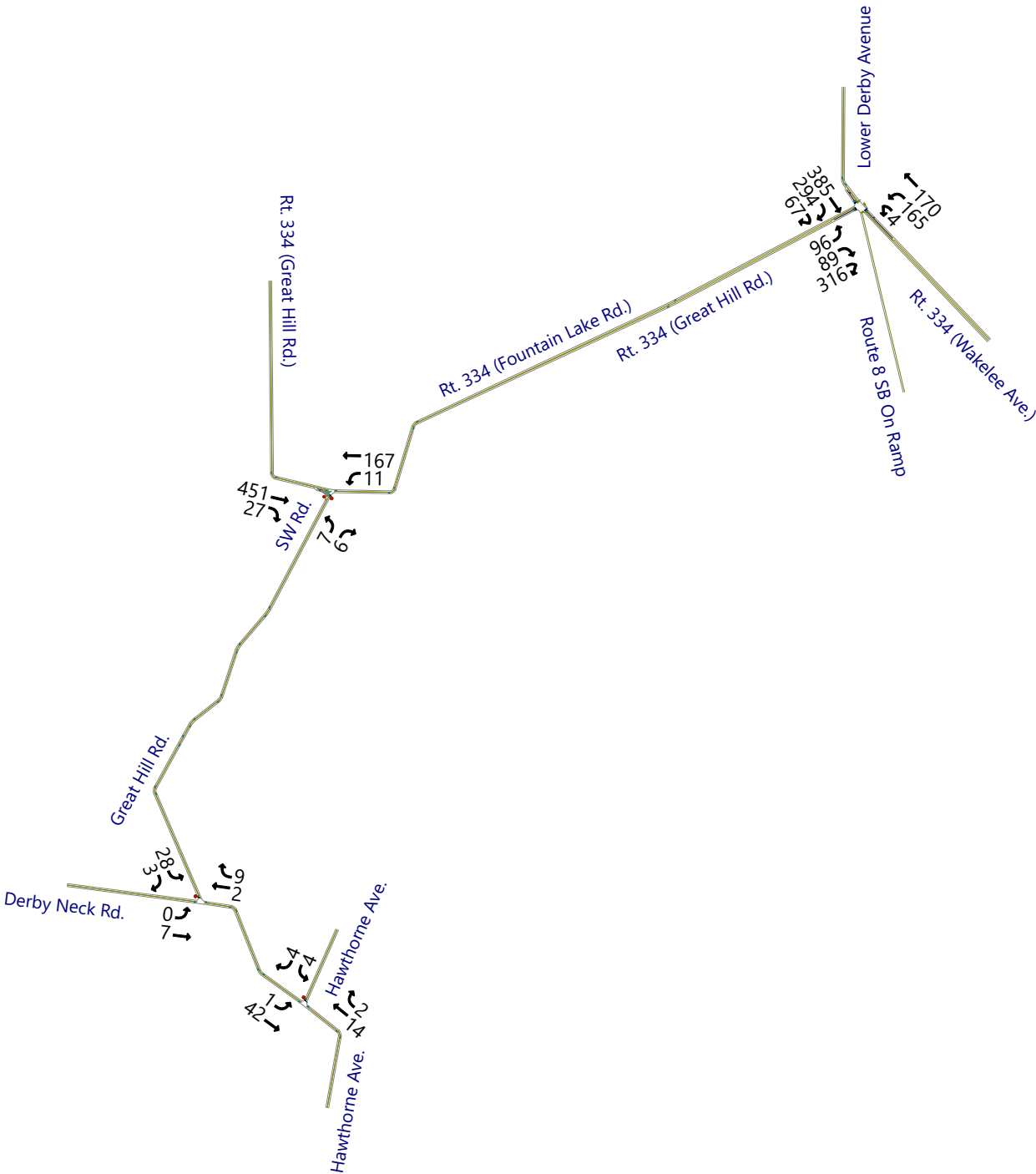


**Figure 1 2024 Existing Traffic Volumes
Weekday Morning Peak Hour of Adjacent Streets**

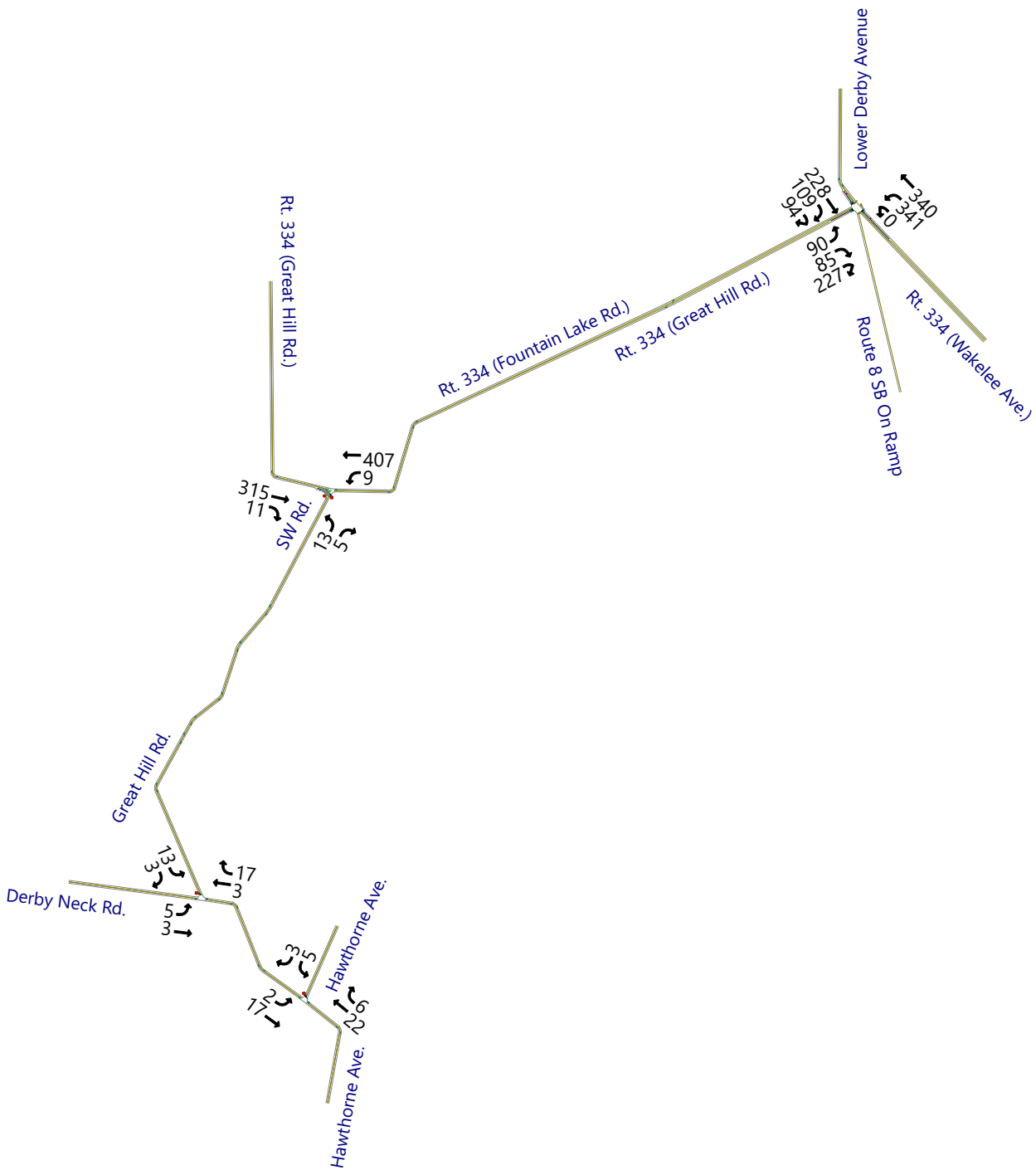


**Figure 2 2024 Existing Traffic Volumes
Weekday Afternoon Peak Hour of Adjacent Streets**

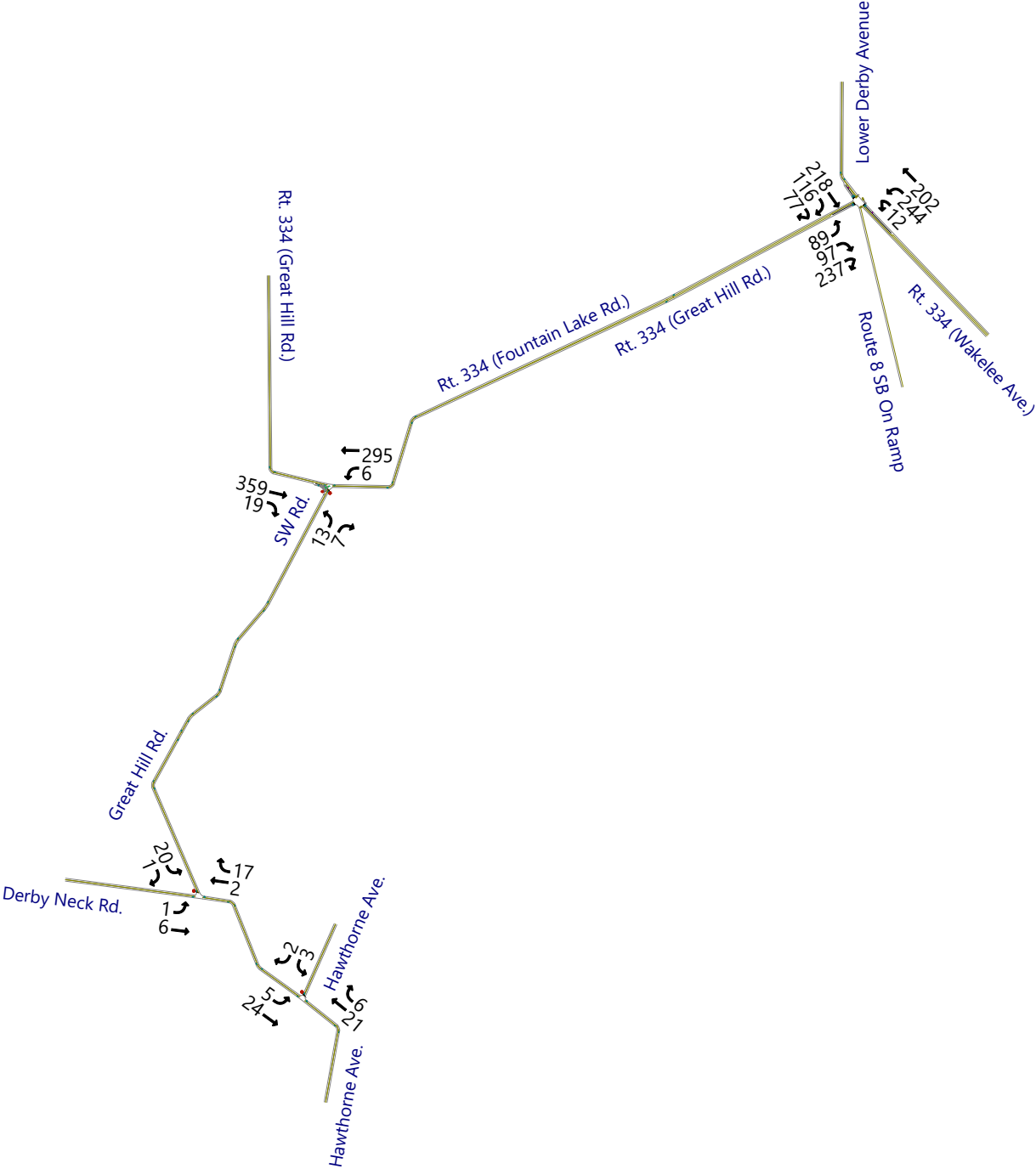
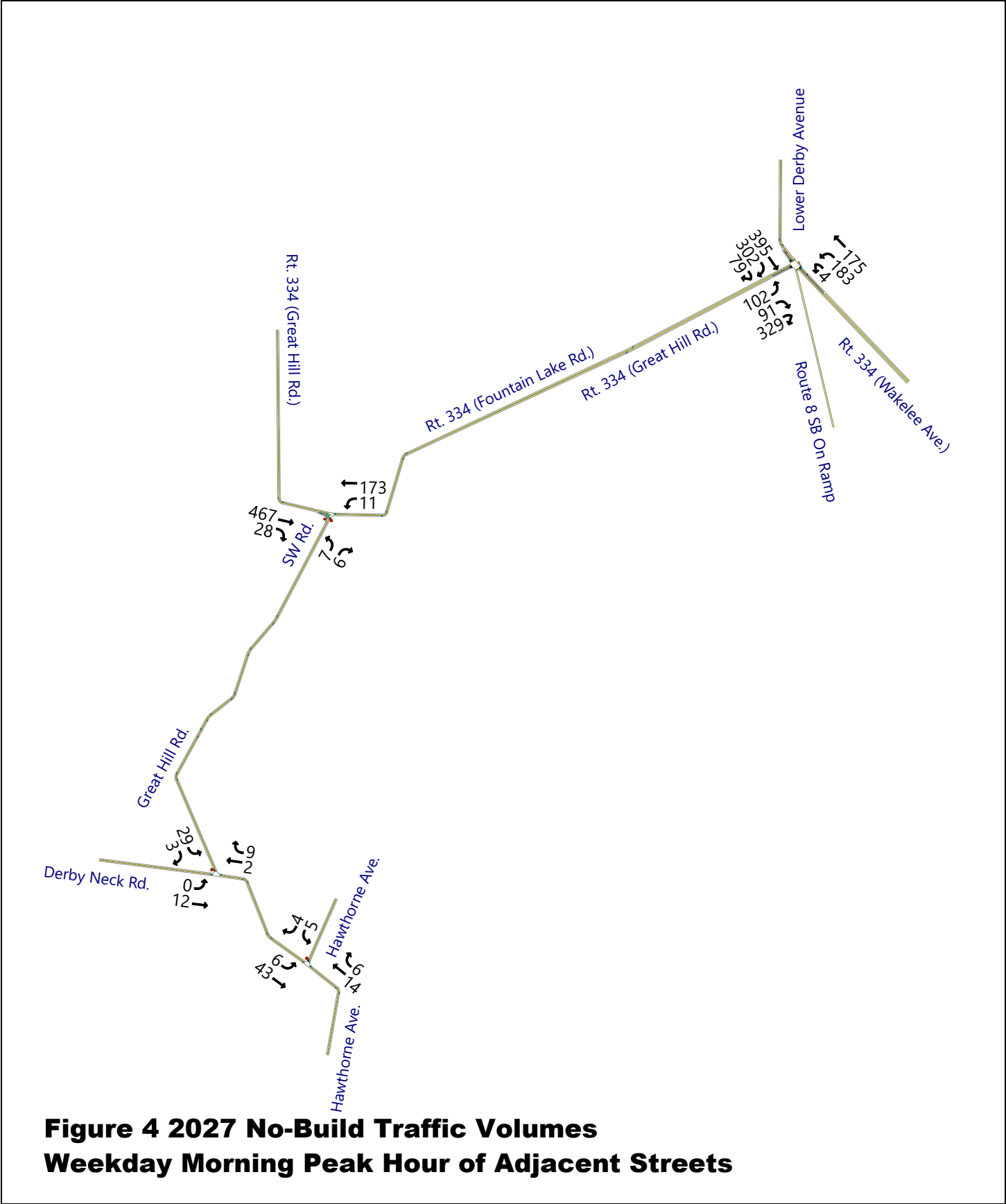


**Figure 3 2024 Existing Traffic Volumes
Saturday Midday Peak Hour of Adjacent Streets**



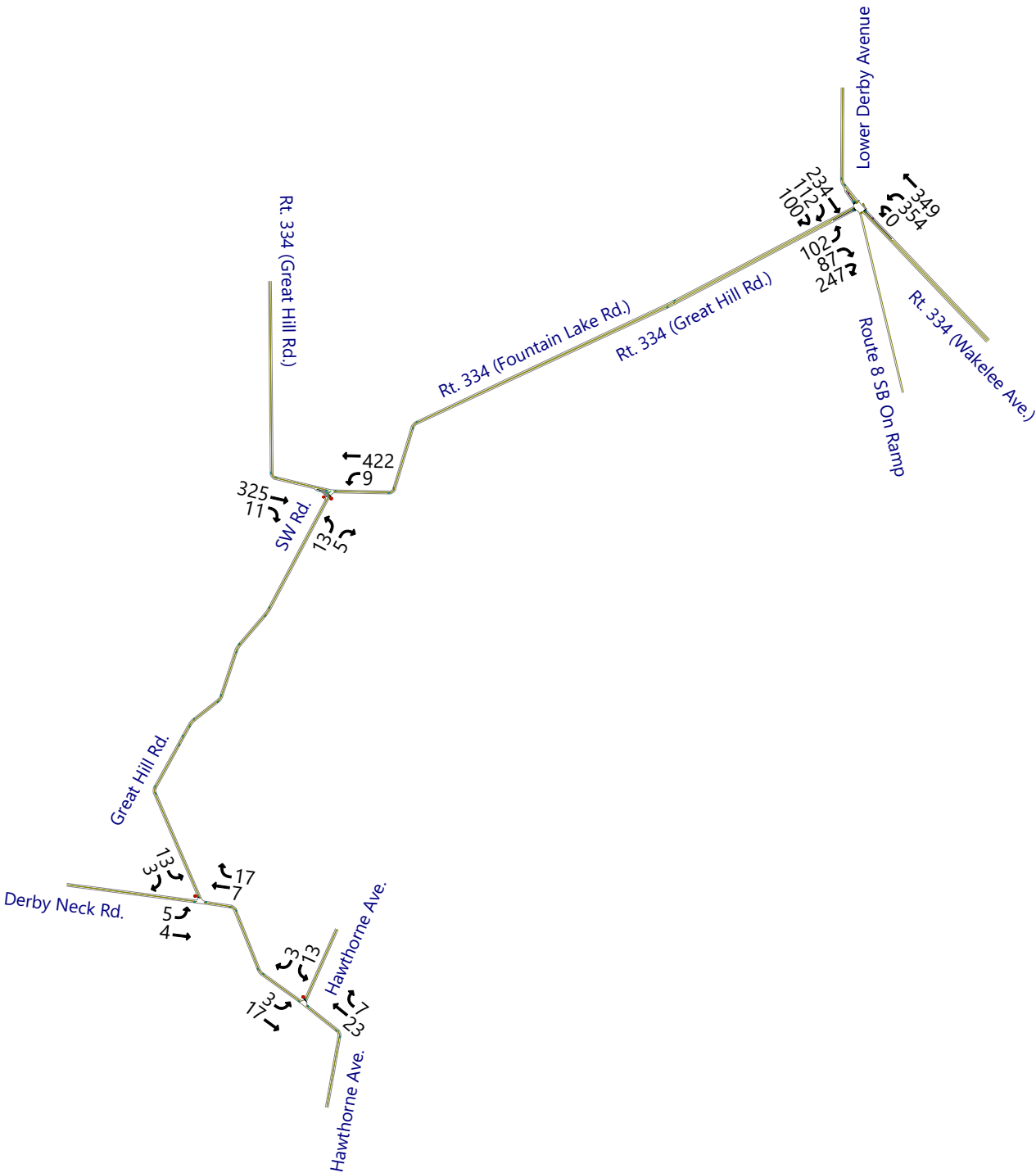
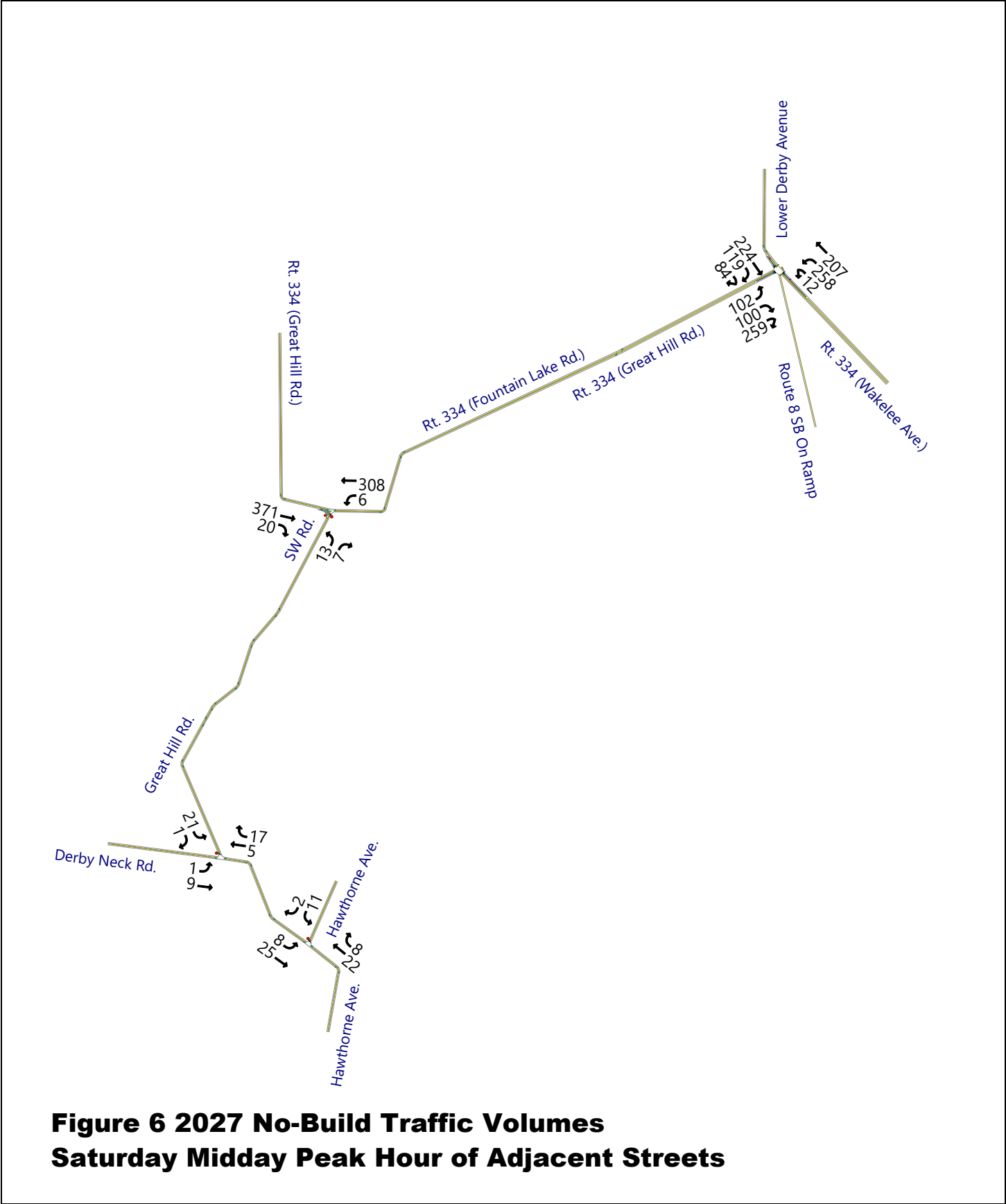
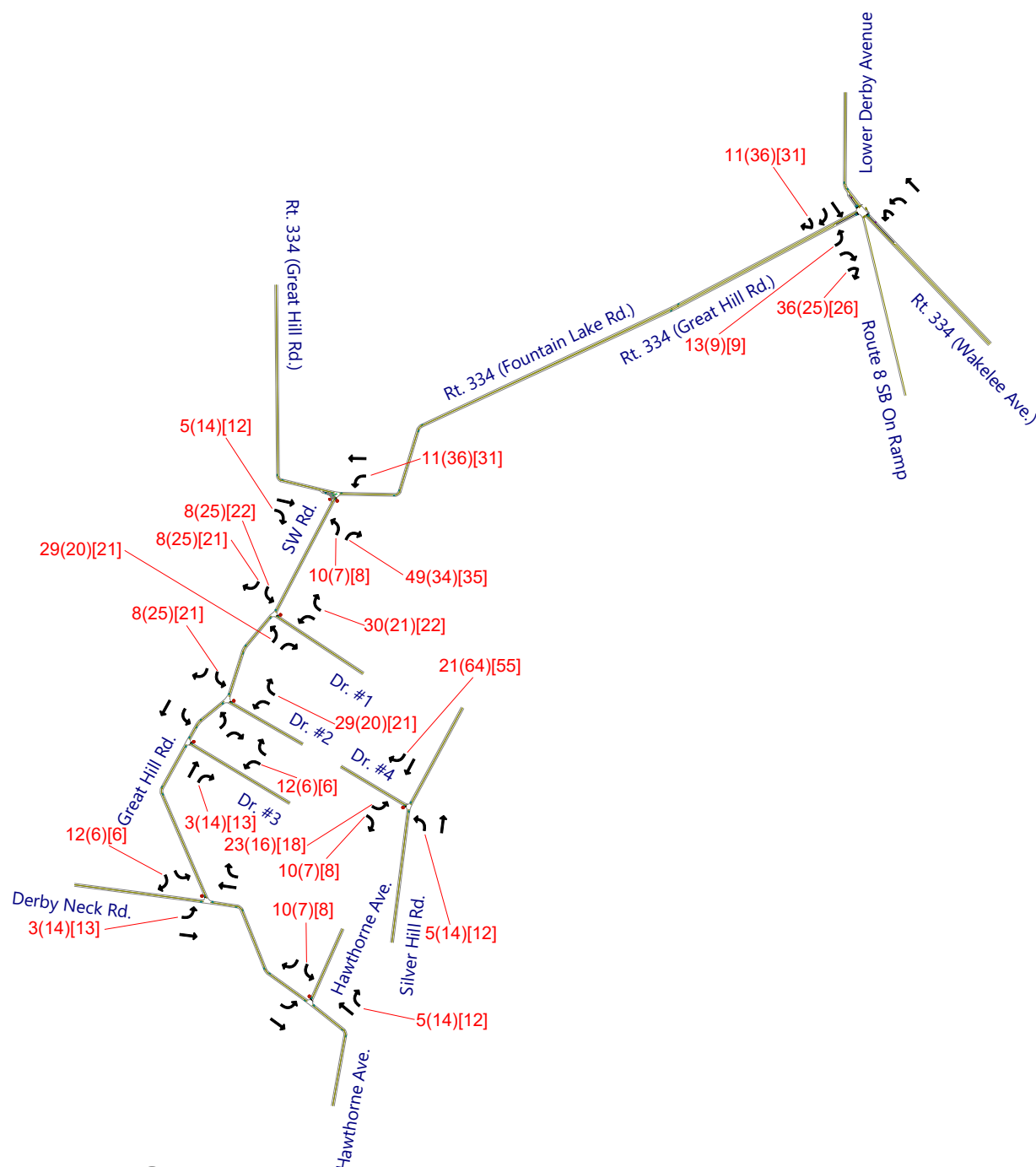


**Figure 5 2027 No-Build Traffic Volumes
Weekday Afternoon Peak Hour of Adjacent Streets**



38 Great Hill Road, Derby, Connecticut, 2027 No-Build Conditions, Saturday Midday Peak Hour
KWH Enterprise, LLC



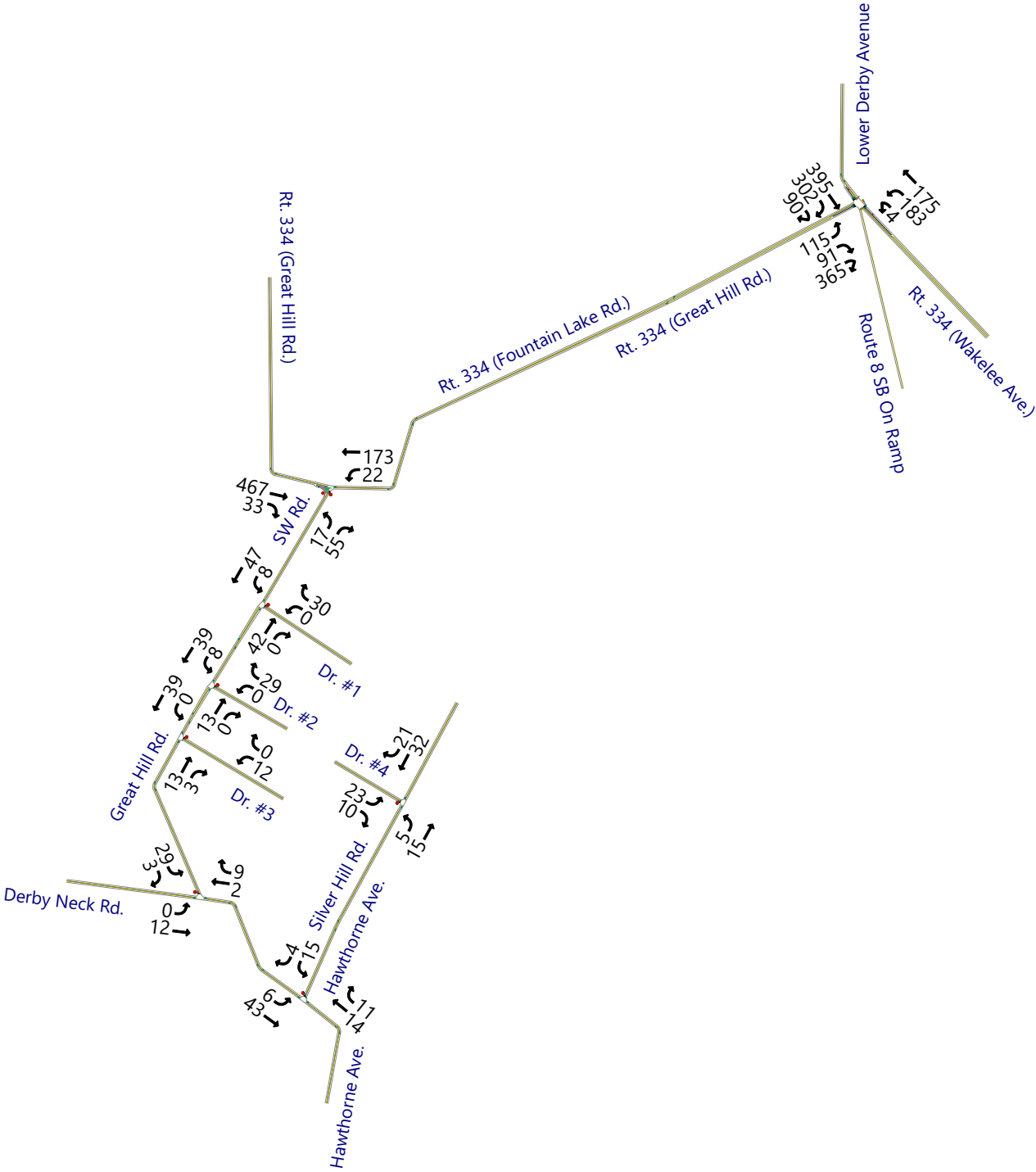


**Figure 8 2027 Build Traffic Volumes
Weekday Morning Peak Hour of Adjacent Streets**

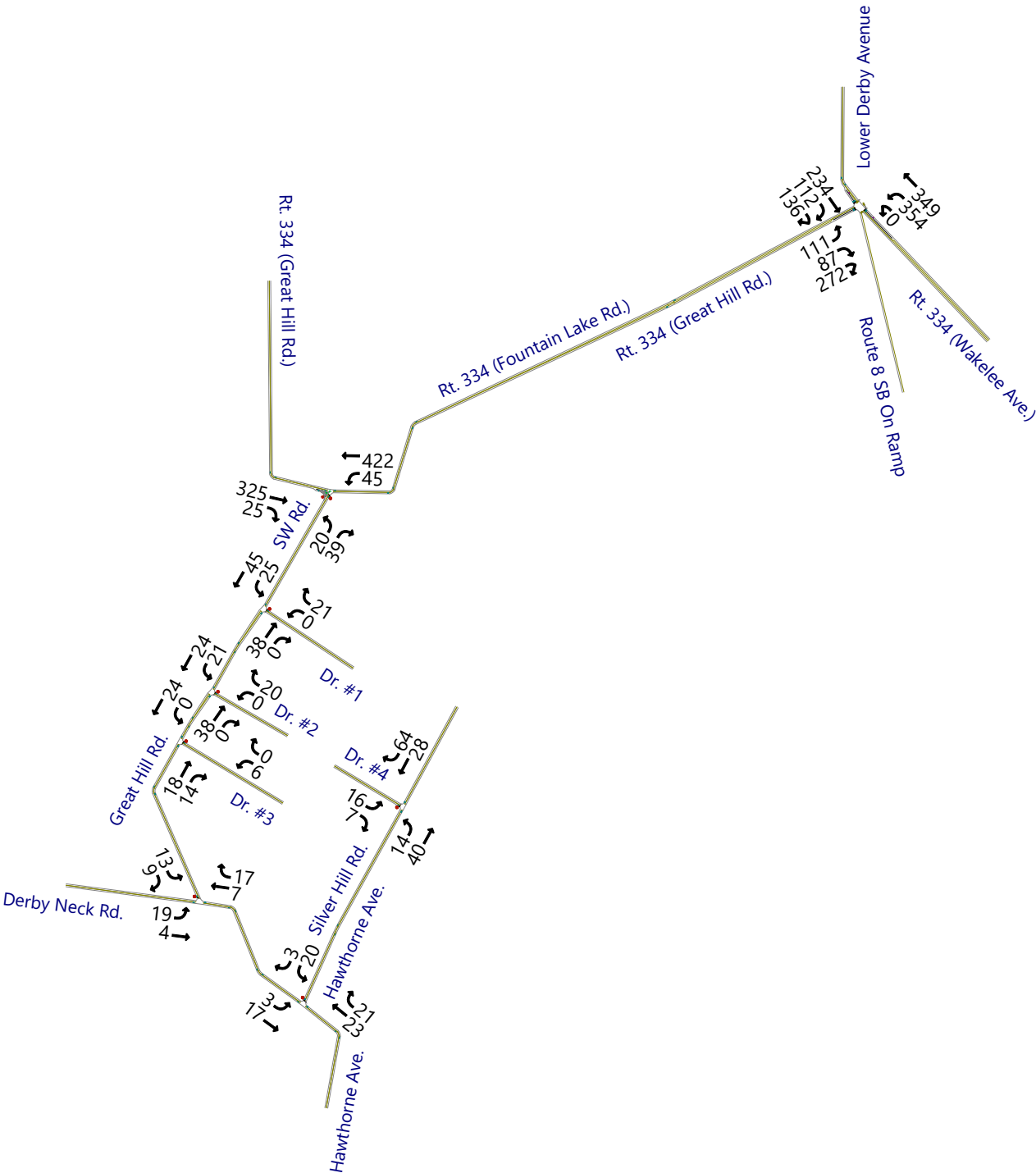


**Figure 9 2027 Build Traffic Volumes
Weekday Afternoon Peak Hour of Adjacent Streets**

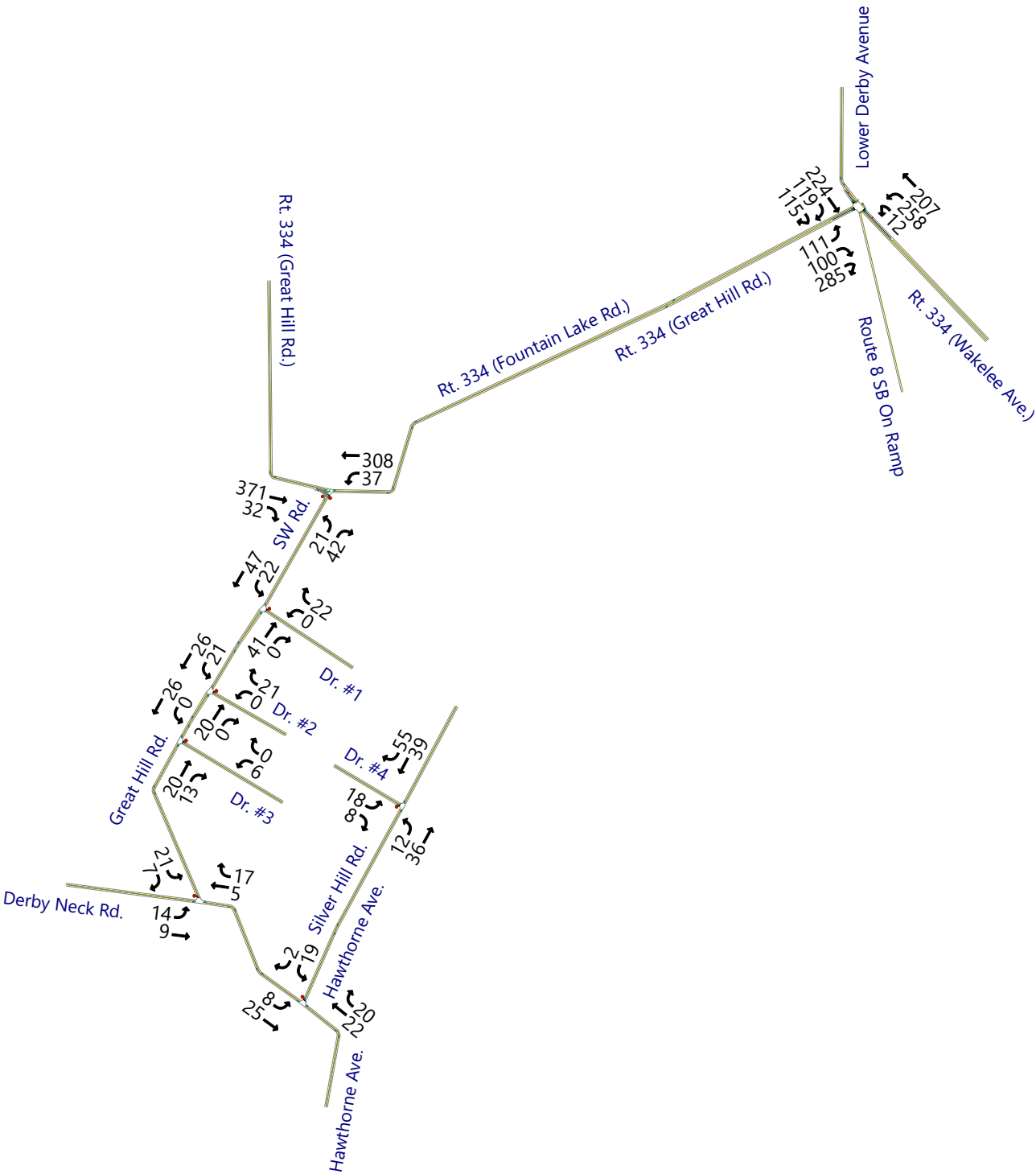


Figure 10 2027 Build Traffic Volumes
Saturday Midday Peak Hour of Adjacent Streets

Land Use: 130

Industrial Park

Description

An industrial park contains several individual industrial or related facilities. It is characterized by a mix of manufacturing, service, and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. Many industrial parks contain highly diversified facilities. Some parks in the database have a large number of small businesses and others have one or two dominant industries. General light industrial (Land Use 110) and manufacturing (Land Use 140) are related uses.

Additional Data

The sites were surveyed in the 1980s, the 2000s, 2010s, and the 2020s in California, Georgia, New Jersey, Massachusetts, New York, Ontario (CAN), and Pennsylvania.

Source Numbers

106, 162, 184, 251, 277, 422, 706, 747, 753, 937, 1032, 1070

Industrial Park (130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 34

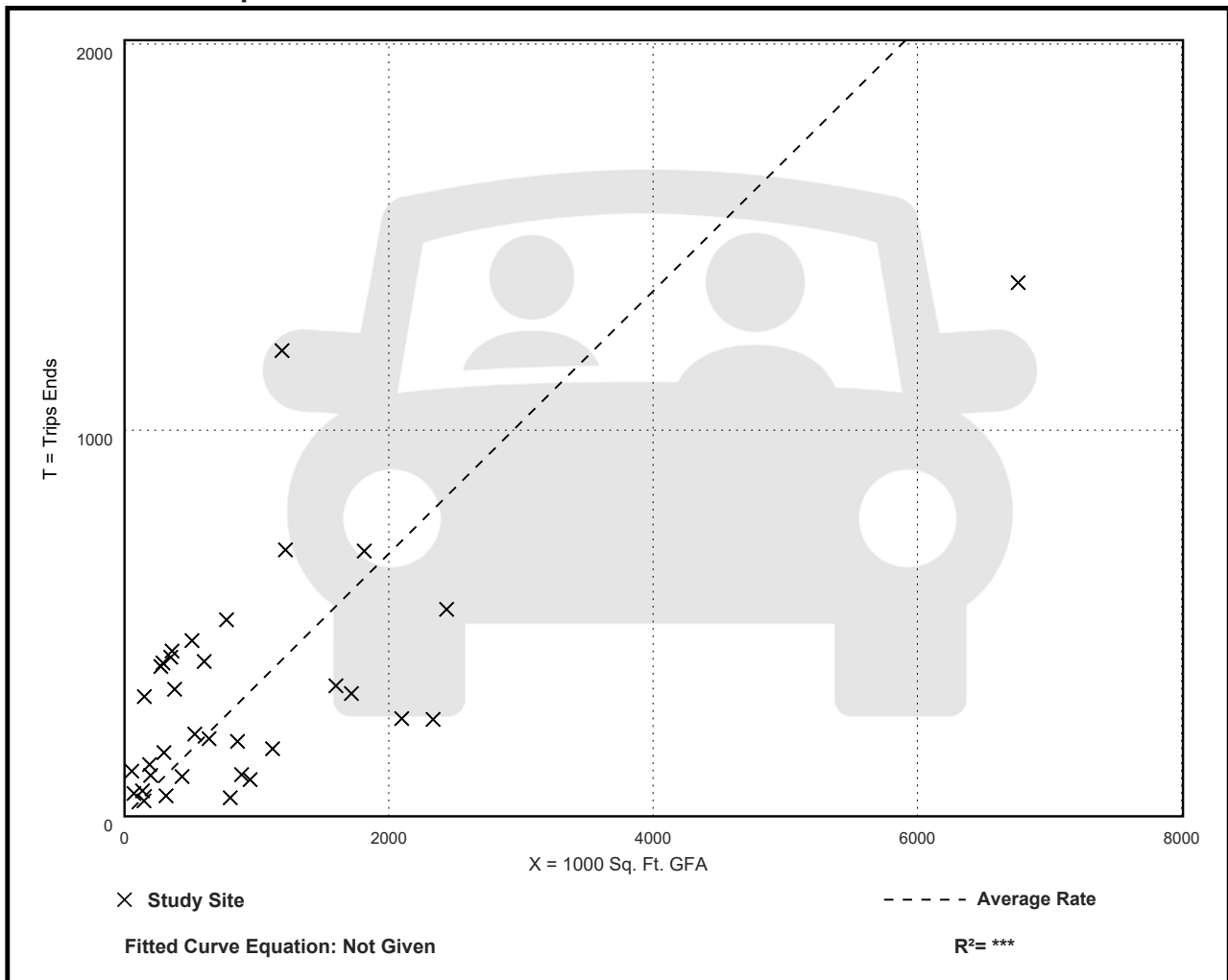
Avg. 1000 Sq. Ft. GFA: 956

Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.06 - 2.13	0.33

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 35

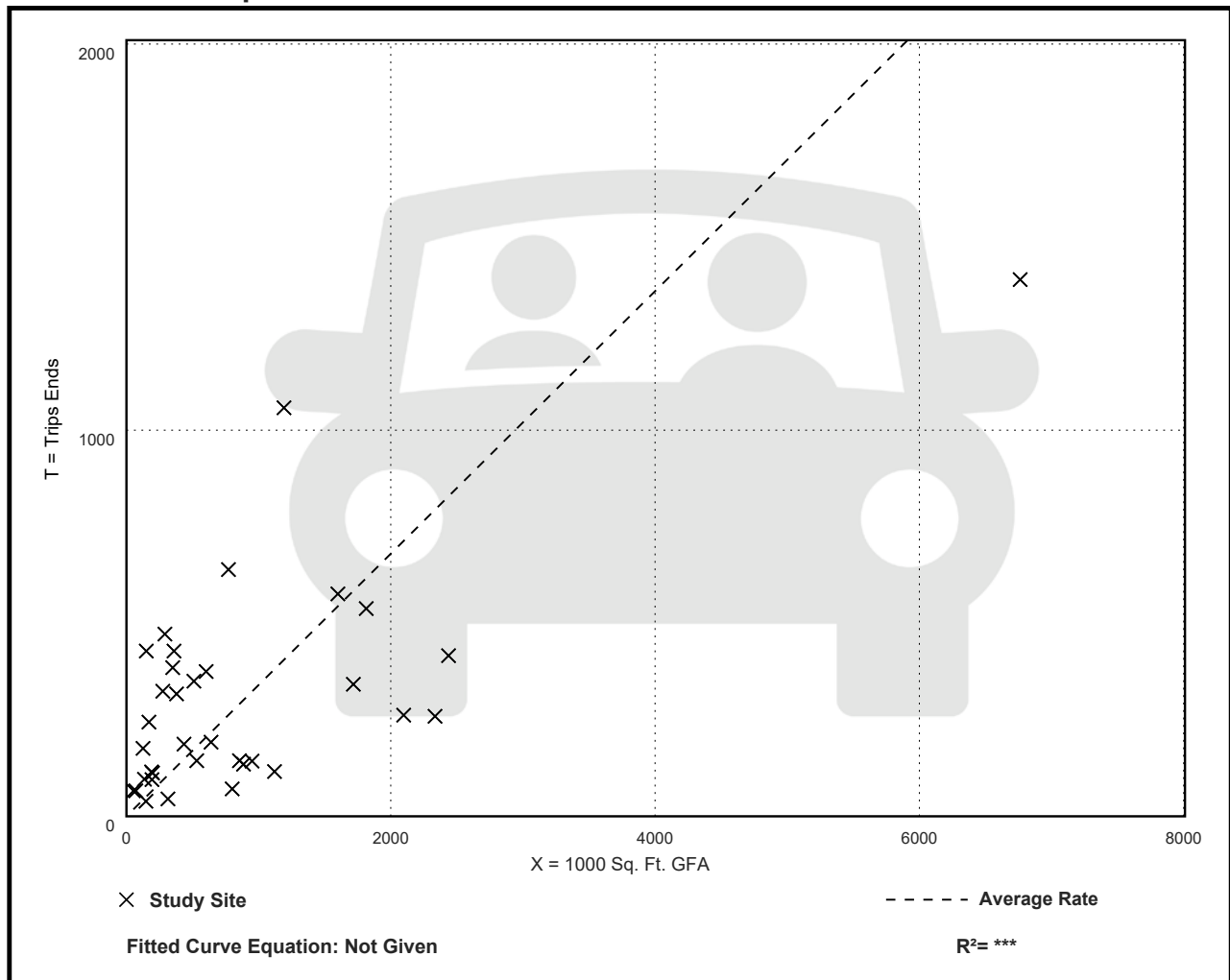
Avg. 1000 Sq. Ft. GFA: 899

Directional Distribution: 22% entering, 78% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.09 - 2.85	0.36

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 321

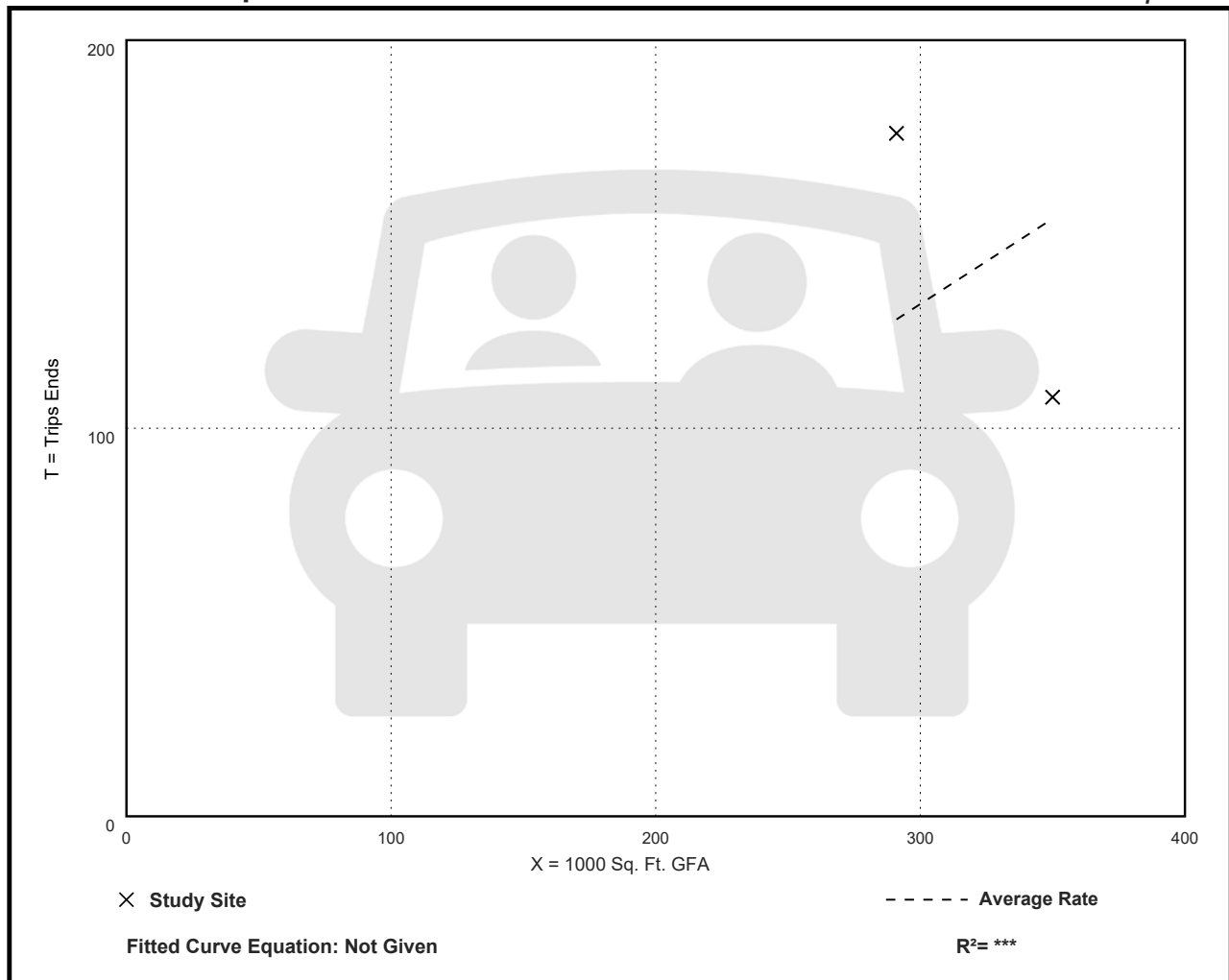
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.44	0.31 - 0.60	***

Data Plot and Equation

Caution – Small Sample Size



Land Use: 210

Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates based on a small sample of sites are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 251), and higher than those for senior adult housing -- single-family (Land Use 251). Further analysis of this housing type will be conducted in a future edition of *Trip Generation Manual*.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

For 30 of the study sites, data on the number of residents and number of household vehicles are available. The overall averages for the 30 sites are 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Arizona, California, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, North Carolina, Ohio, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, and West Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077, 1078, 1079

Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 192

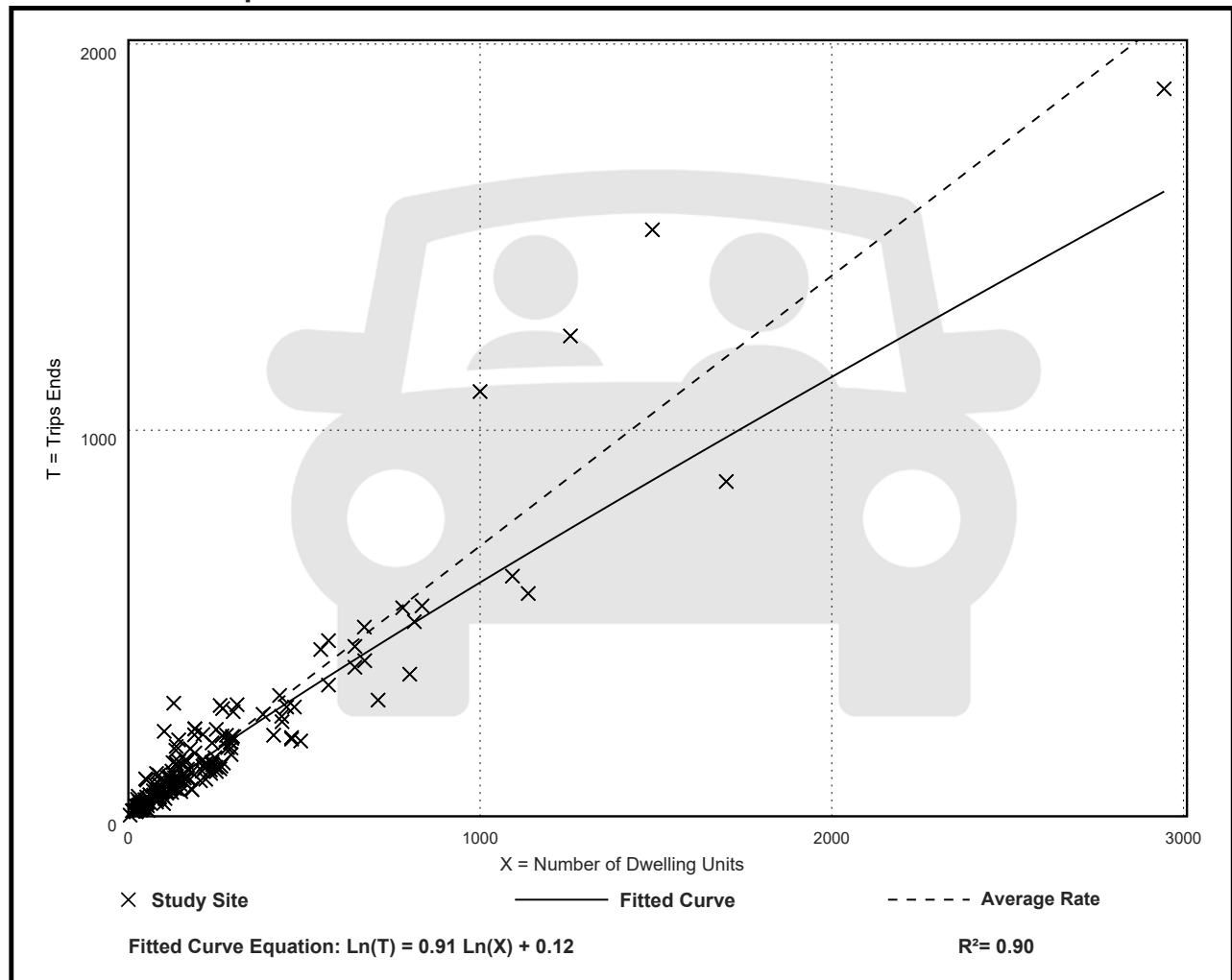
Avg. Num. of Dwelling Units: 226

Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 208

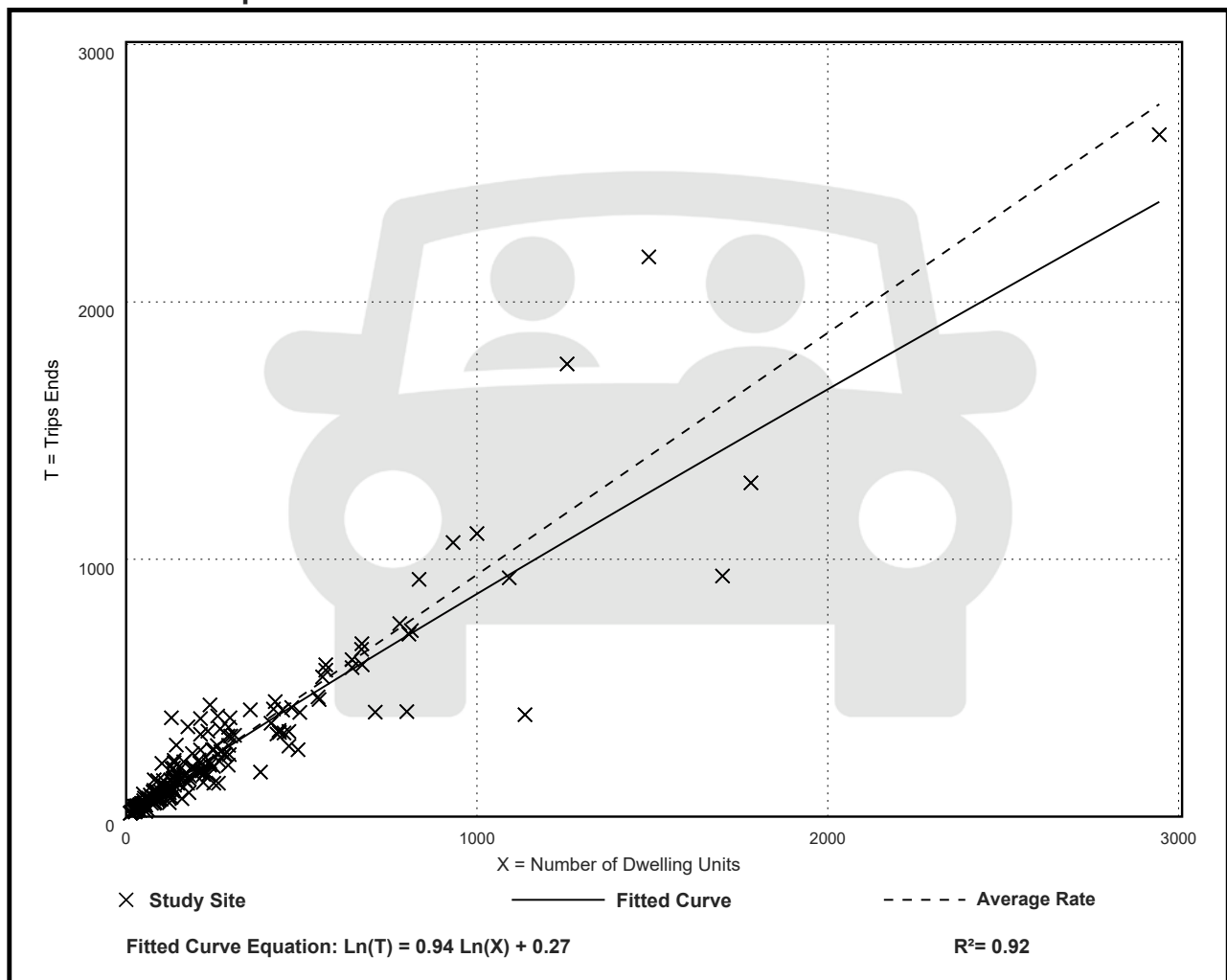
Avg. Num. of Dwelling Units: 248

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 42

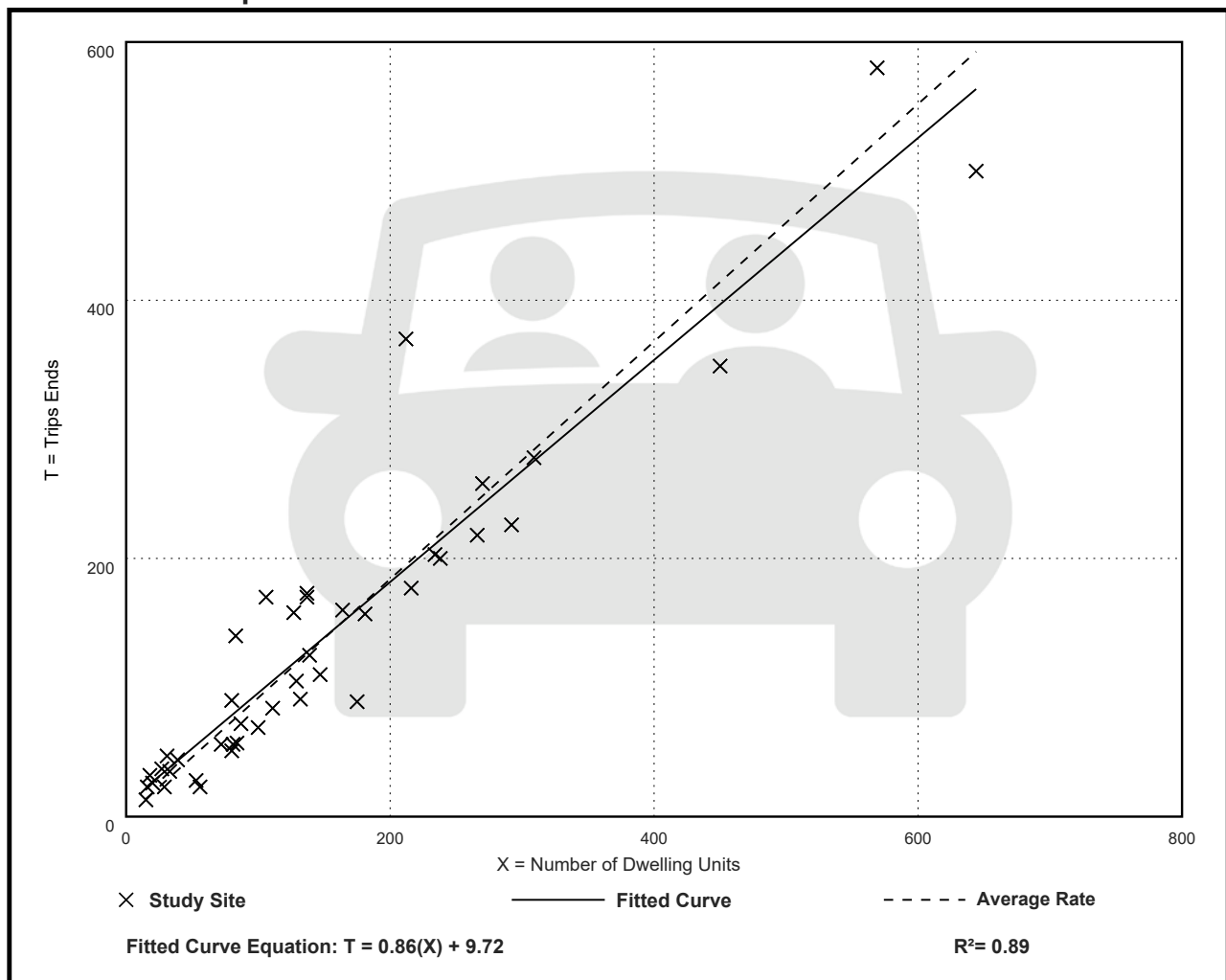
Avg. Num. of Dwelling Units: 152

Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.92	0.41 - 1.78	0.27

Data Plot and Equation



Land Use: 215

Single-Family Attached Housing

Description

Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.

Additional Data

The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Utah, Virginia, and Wisconsin.

Source Numbers

168, 204, 211, 237, 305, 306, 319, 321, 357, 390, 418, 525, 571, 583, 638, 735, 868, 869, 870, 896, 912, 959, 1009, 1046, 1056, 1058, 1077

Single-Family Attached Housing (215)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 46

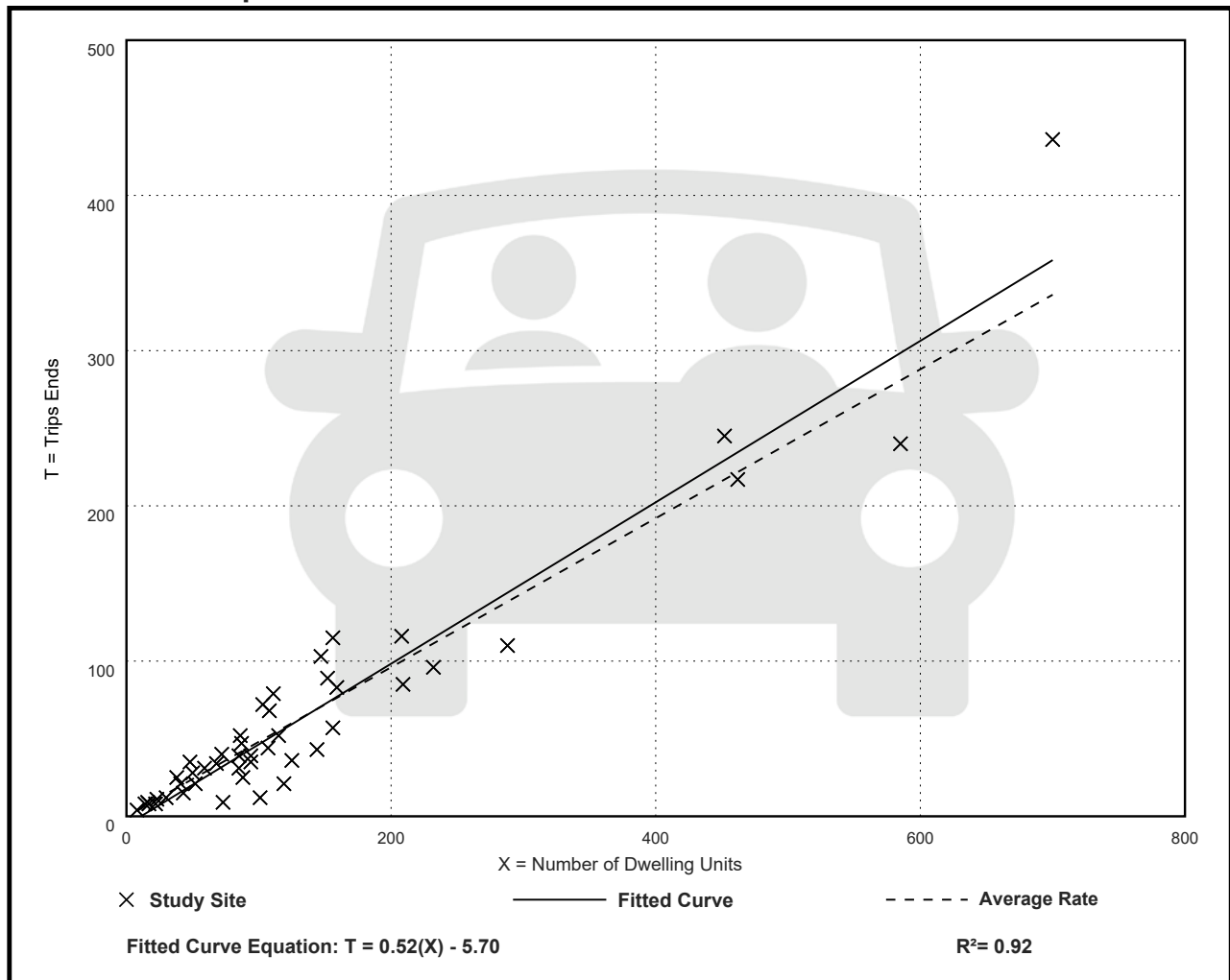
Avg. Num. of Dwelling Units: 135

Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



Single-Family Attached Housing (215)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 51

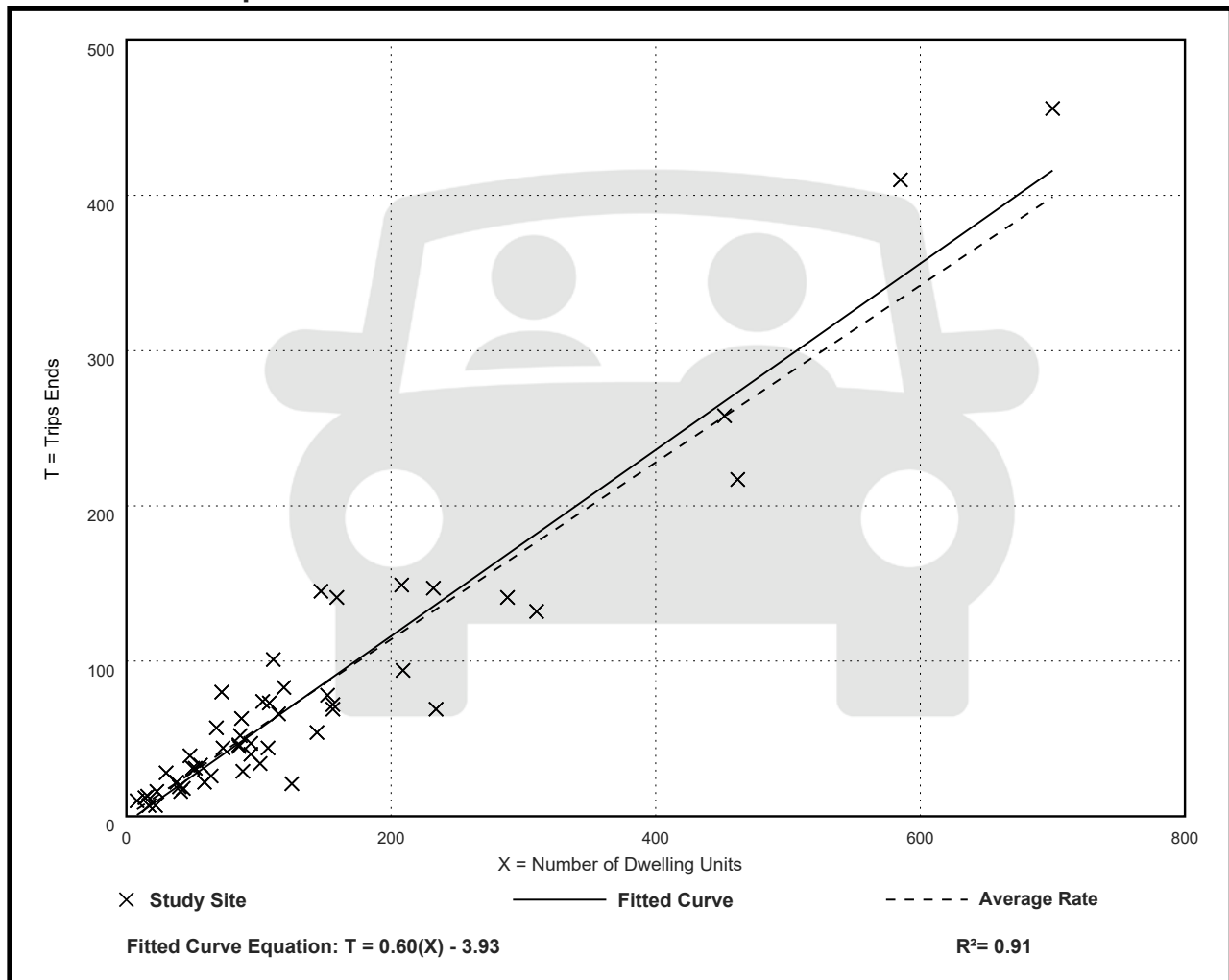
Avg. Num. of Dwelling Units: 136

Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



Single-Family Attached Housing (215)

Vehicle Trip Ends vs: Dwelling Units

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 7

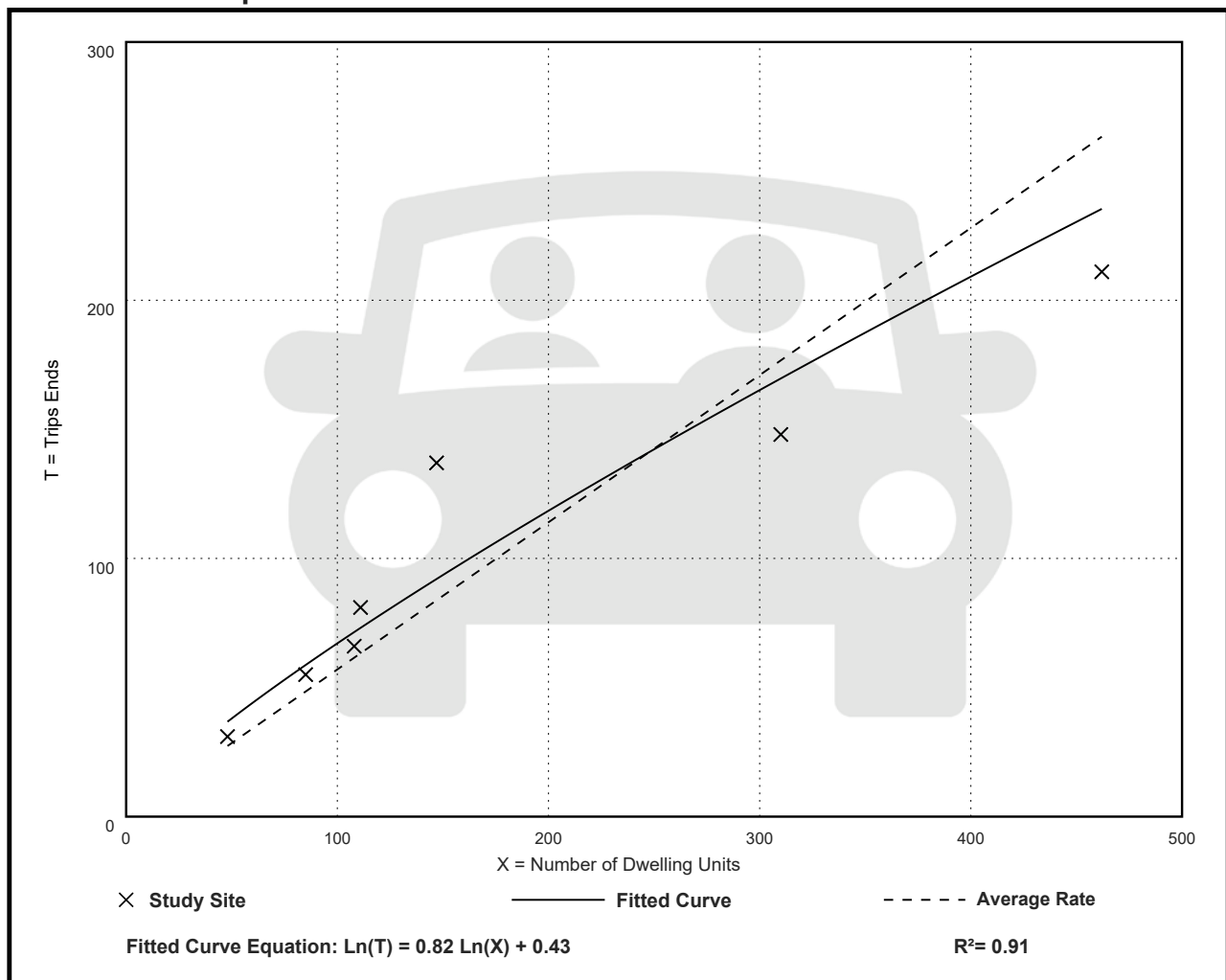
Avg. Num. of Dwelling Units: 182

Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.46 - 0.93	0.17

Data Plot and Equation



Land Use: 221

Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (mid-rise) (Land Use 226), and mid-rise residential with ground-floor commercial (Land Use 231) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.5 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), California, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, Montana, New Jersey, New York, Ontario (CAN), Oregon, Utah, and Virginia.

Source Numbers

168, 188, 204, 305, 306, 321, 818, 857, 862, 866, 901, 904, 910, 949, 951, 959, 963, 964, 966, 967, 969, 970, 1004, 1014, 1022, 1023, 1025, 1031, 1032, 1035, 1047, 1056, 1057, 1058, 1071, 1076

Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 30

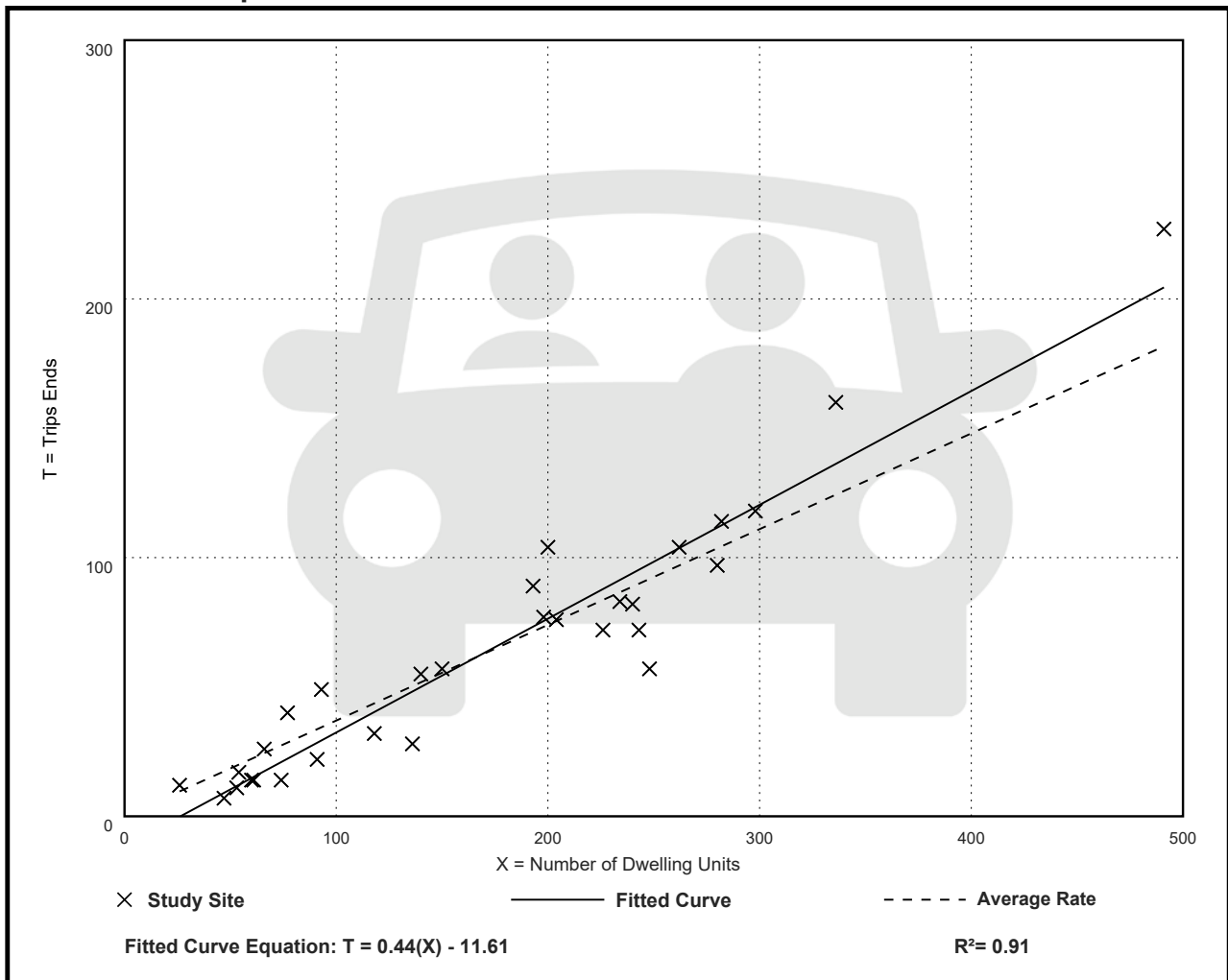
Avg. Num. of Dwelling Units: 173

Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

Data Plot and Equation



Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 31

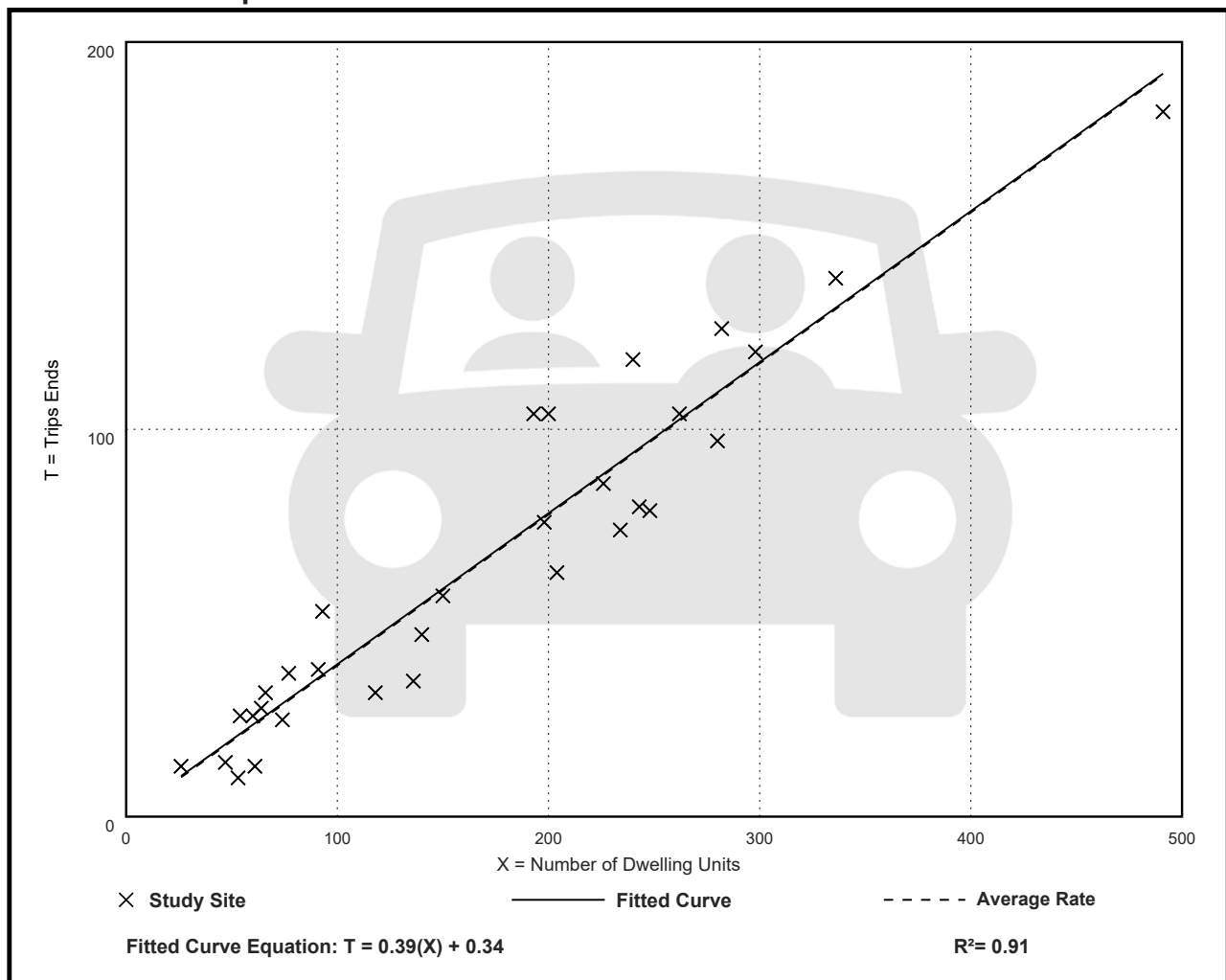
Avg. Num. of Dwelling Units: 169

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

Data Plot and Equation



Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 5

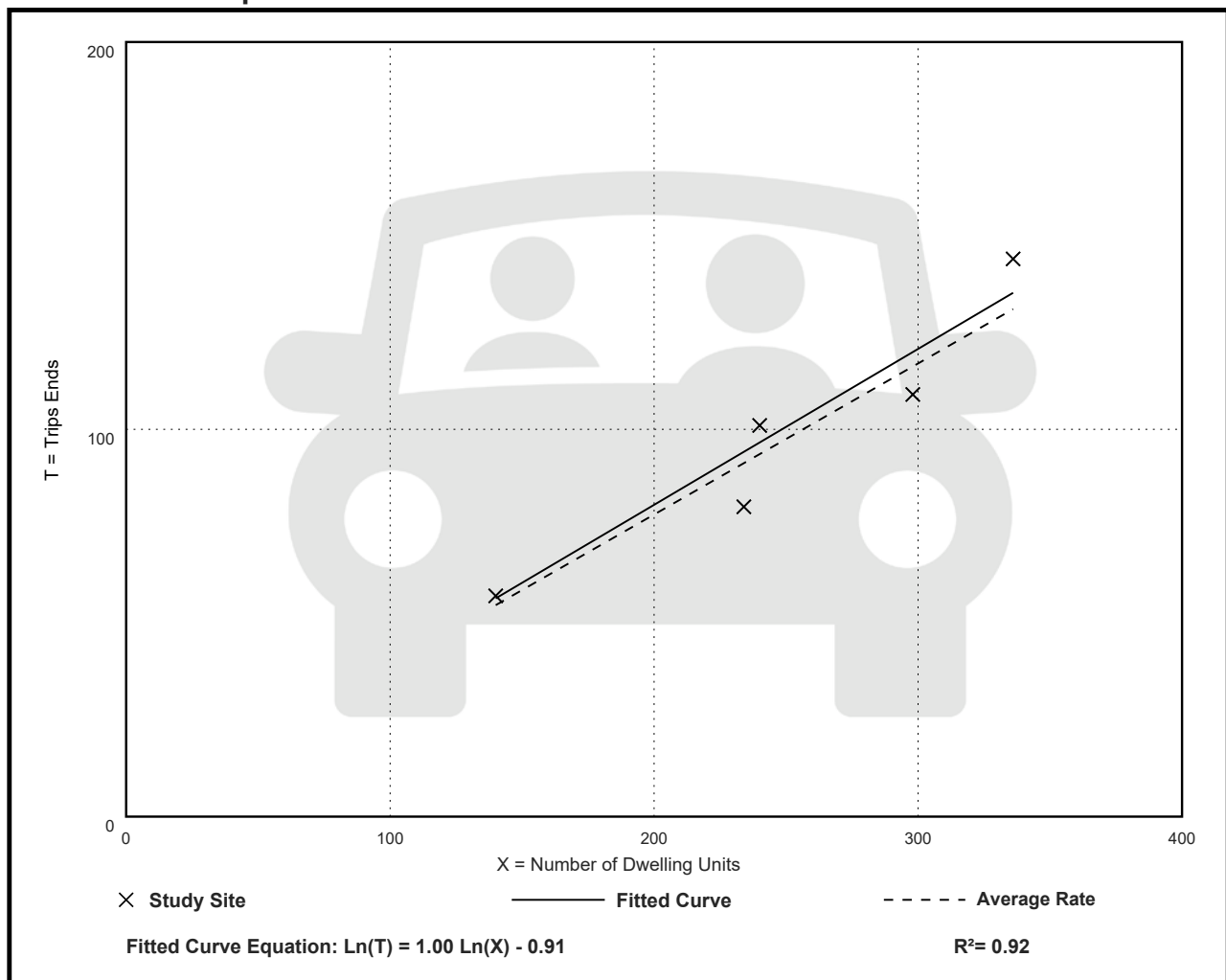
Avg. Num. of Dwelling Units: 250

Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.34 - 0.43	0.04

Data Plot and Equation



Land Use: 495

Recreational Community Center

Description

A recreational community center is a stand-alone public facility similar to and including YMCAs. These facilities often include classes and clubs for adults and children, a day care or nursery school, meeting rooms and other social facilities, swimming pools and whirlpools, saunas, tennis, racquetball, handball, pickle ball, basketball and volleyball courts; outdoor athletic fields/courts, exercise classes, weightlifting and gymnastics equipment, locker rooms, and a restaurant or snack bar. Public access is typically allowed and a membership fee may be charged. Racquet/tennis club (Land Use 491), health/fitness club (Land Use 492), and athletic club (Land Use 493) are related land uses.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), Arizona, Indiana, Minnesota, New Hampshire, New York, Oregon, Pennsylvania, Tennessee, and Utah.

Source Numbers

281, 410, 443, 571, 618, 705, 719, 850, 866, 971, 1055

Recreational Community Center (495)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 12

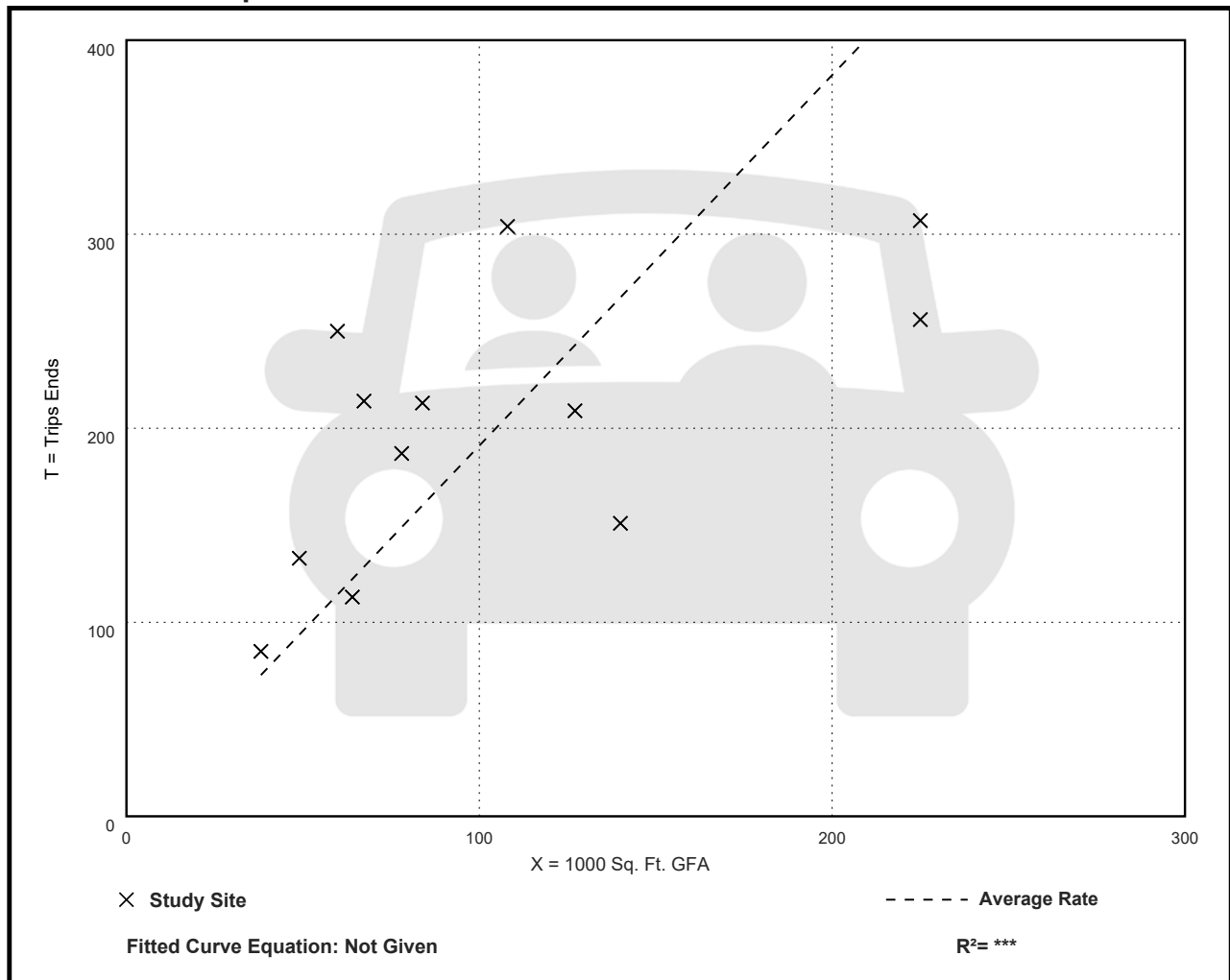
Avg. 1000 Sq. Ft. GFA: 105

Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.91	1.08 - 4.18	0.88

Data Plot and Equation



Recreational Community Center (495)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 15

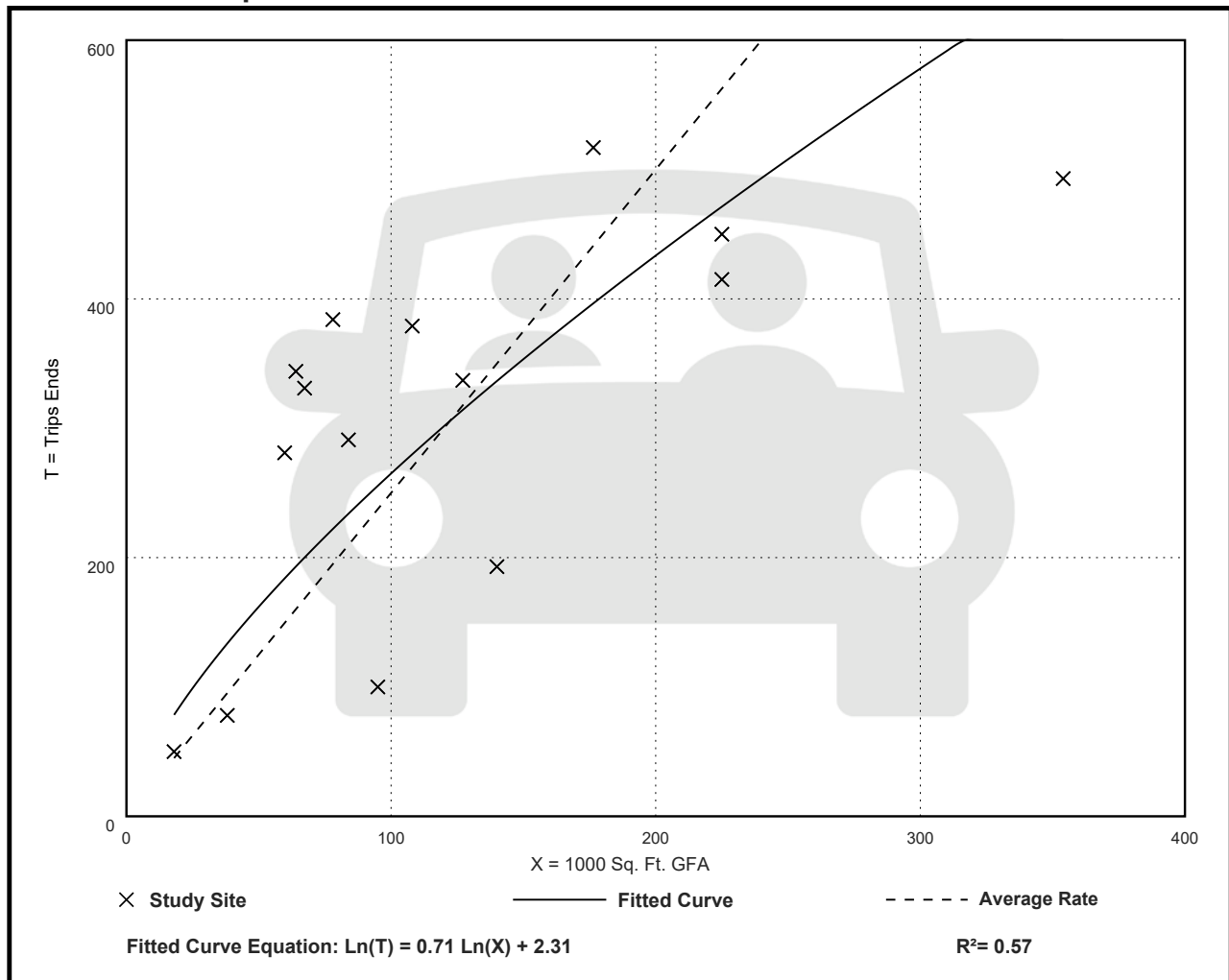
Avg. 1000 Sq. Ft. GFA: 124

Directional Distribution: 47% entering, 53% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
2.50	1.05 - 5.37	1.28

Data Plot and Equation



Recreational Community Center (495)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 4

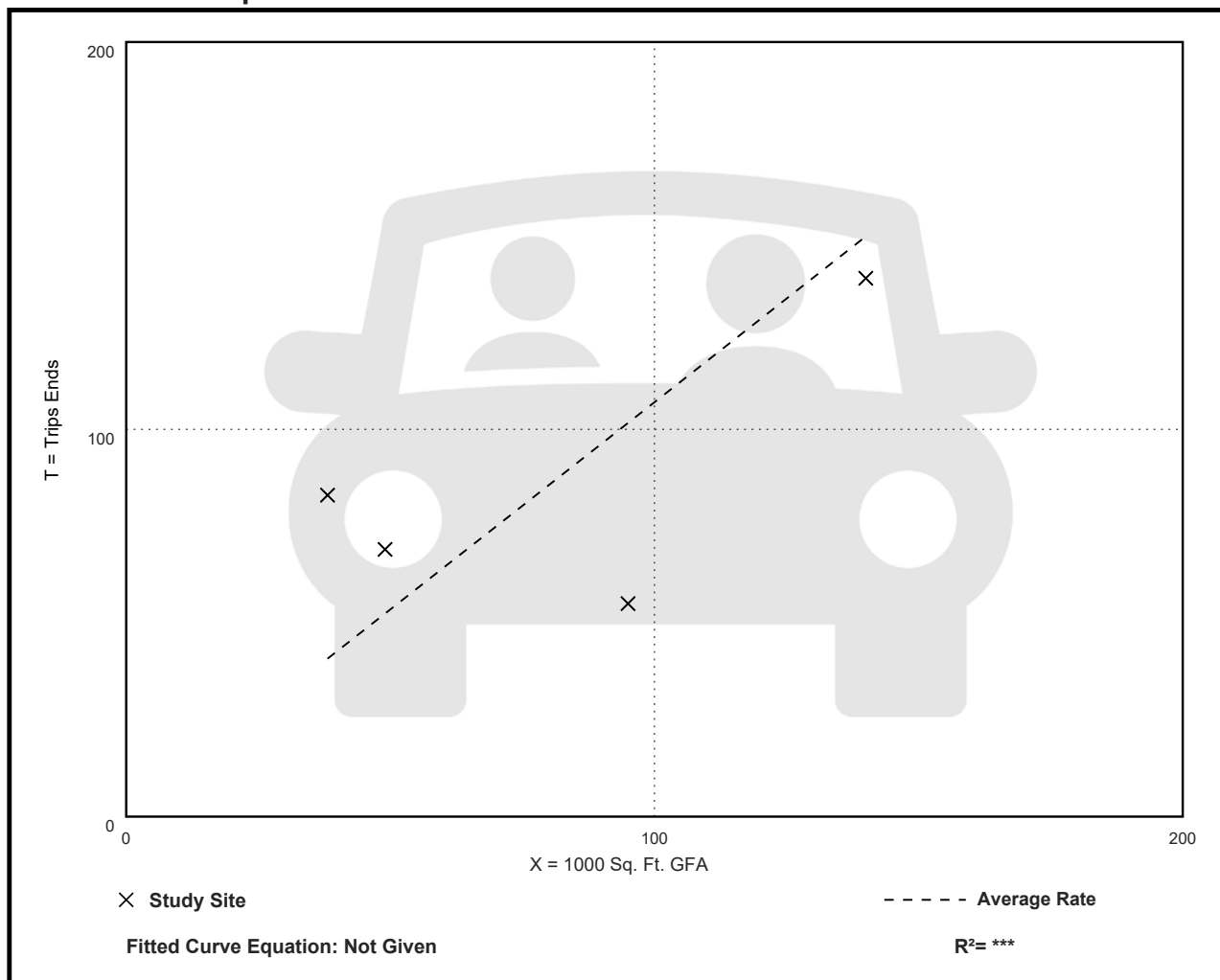
Avg. 1000 Sq. Ft. GFA: 81

Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.07	0.58 - 2.18	0.56

Data Plot and Equation



HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)

											
Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	96	89	316	0	0	385	294	67	4	165	170
Future Volume (vph)	96	89	316	0	0	385	294	67	4	165	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7			4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00			1.00	1.00
Frt	1.00	0.85				1.00	0.85			1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (prot)	1736	1553				1827	1553			1736	1827
Flt Permitted	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (perm)	1736	1553				1827	1553			1736	1827
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	102	95	336	0	0	410	313	71	4	176	181
RTOR Reduction (vph)	0	192	0	0	0	0	65	0	0	0	0
Lane Group Flow (vph)	102	239	0	0	0	410	319	0	0	180	181
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot				NA	Prot		Prot	Prot	NA
Protected Phases	4	4				2	2		1	1	1 2
Permitted Phases											
Actuated Green, G (s)	12.6	12.6				20.0	20.0			8.7	32.7
Effective Green, g (s)	12.6	12.6				20.0	20.0			8.7	32.7
Actuated g/C Ratio	0.22	0.22				0.35	0.35			0.15	0.57
Clearance Time (s)	5.1	5.1				6.7	6.7			4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5			1.0	
Lane Grp Cap (vph)	383	342				639	543			264	1046
v/s Ratio Prot	0.06	c0.15				c0.22	0.21			c0.10	0.10
v/s Ratio Perm											
v/c Ratio	0.27	0.70				0.64	0.59			0.68	0.17
Uniform Delay, d1	18.4	20.5				15.5	15.2			22.9	5.8
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	5.7				2.0	1.4			5.7	0.0
Delay (s)	18.7	26.2				17.5	16.5			28.6	5.8
Level of Service	B	C				B	B			C	A
Approach Delay (s/veh)	24.7			0.0		17.0					17.2
Approach LOS	C			A		B					B
Intersection Summary											
HCM 2000 Control Delay (s/veh)			19.5			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.67								
Actuated Cycle Length (s)			57.1			Sum of lost time (s)			15.8		
Intersection Capacity Utilization			70.0%			ICU Level of Service			C		
Analysis Period (min)			15								
c Critical Lane Group											

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	102	431	410	384	180	181
v/c Ratio	0.27	0.81	0.65	0.63	0.69	0.16
Control Delay (s/veh)	22.6	24.5	21.9	17.4	39.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.6	24.5	21.9	17.4	39.8	5.2
Queue Length 50th (ft)	30	59	125	84	62	24
Queue Length 95th (ft)	73	#214	217	172	#144	47
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	465	596	816	749	341	1291
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.72	0.50	0.51	0.53	0.14

Intersection Summary

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

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection

Int Delay, s/veh 0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	451	27	11	167	7	6
Future Vol, veh/h	451	27	11	167	7	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	518	31	13	192	8	7

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	518
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.245
Pot Cap-1 Maneuver	-	-	1032
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1032
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.53	13.44
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	441	-	-	111	-
HCM Lane V/C Ratio	0.034	-	-	0.012	-
HCM Control Delay (s/veh)	13.4	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 5.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	7	2	9	28	3
Future Vol, veh/h	0	7	2	9	28	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	9	3	12	36	4

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	14	0	0 18 8
Stage 1	-	-	- 8 -
Stage 2	-	-	- 9 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1604	-	- 1000 1073
Stage 1	-	-	- 1015 -
Stage 2	-	-	- 1014 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1604	-	- 1000 1073
Mov Cap-2 Maneuver	-	-	- 1000 -
Stage 1	-	-	- 1015 -
Stage 2	-	-	- 1014 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.72
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1604	-	-	-	1007
HCM Lane V/C Ratio	-	-	-	-	0.04
HCM Control Delay (s/veh)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 7th TWSC
12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	1.1					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	4	4	1	42	14	2
Future Vol, veh/h	4	4	1	42	14	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	5	5	1	50	17	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	70	18	19	0	-	0
Stage 1	18	-	-	-	-	-
Stage 2	52	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	937	1064	1604	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	936	1064	1604	-	-	-
Mov Cap-2 Maneuver	936	-	-	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Approach	SB	SE		NW		
HCM Control Delay, s/v	8.65	0.17		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SBLn1	
Capacity (veh/h)	-	-	42	-	996	
HCM Lane V/C Ratio	-	-	0.001	-	0.01	
HCM Control Delay (s/veh)	-	-	7.2	0	8.7	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	-	0	

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)

											
Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	96	89	316	0	0	385	294	67	4	165	170
Future Volume (vph)	96	89	316	0	0	385	294	67	4	165	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7			4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00			1.00	1.00
Frt	1.00	0.85				1.00	0.85			1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (prot)	1736	1553				1827	1553			1736	1827
Flt Permitted	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (perm)	1736	1553				1827	1553			1736	1827
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	102	95	336	0	0	410	313	71	4	176	181
RTOR Reduction (vph)	0	192	0	0	0	0	65	0	0	0	0
Lane Group Flow (vph)	102	239	0	0	0	410	319	0	0	180	181
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot				NA	Prot		Prot	Prot	NA
Protected Phases	4	4				2	2		1	1	1 2
Permitted Phases											
Actuated Green, G (s)	12.6	12.6				20.0	20.0			8.7	32.7
Effective Green, g (s)	12.6	12.6				20.0	20.0			8.7	32.7
Actuated g/C Ratio	0.22	0.22				0.35	0.35			0.15	0.57
Clearance Time (s)	5.1	5.1				6.7	6.7			4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5			1.0	
Lane Grp Cap (vph)	383	342				639	543			264	1046
v/s Ratio Prot	0.06	c0.15				c0.22	0.21			c0.10	0.10
v/s Ratio Perm											
v/c Ratio	0.27	0.70				0.64	0.59			0.68	0.17
Uniform Delay, d1	18.4	20.5				15.5	15.2			22.9	5.8
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	5.7				2.0	1.4			5.7	0.0
Delay (s)	18.7	26.2				17.5	16.5			28.6	5.8
Level of Service	B	C				B	B			C	A
Approach Delay (s/veh)	24.7			0.0		17.0					17.2
Approach LOS	C			A		B					B
Intersection Summary											
HCM 2000 Control Delay (s/veh)			19.5			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.67								
Actuated Cycle Length (s)			57.1			Sum of lost time (s)			15.8		
Intersection Capacity Utilization			70.0%			ICU Level of Service			C		
Analysis Period (min)			15								
c Critical Lane Group											

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	92	319	233	207	348	347
v/c Ratio	0.27	0.70	0.44	0.40	0.80	0.29
Control Delay (s/veh)	23.4	19.6	21.7	12.9	35.5	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.4	19.6	21.7	12.9	35.5	5.3
Queue Length 50th (ft)	26	41	64	27	106	40
Queue Length 95th (ft)	68	#131	139	87	#215	85
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	442	533	599	577	601	1282
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.60	0.39	0.36	0.58	0.27

Intersection Summary

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

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection

Int Delay, s/veh 0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	
Traffic Vol, veh/h	451	27	11	167	7	6
Future Vol, veh/h	451	27	11	167	7	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	518	31	13	192	8	7

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	518
Stage 1	-	-	518
Stage 2	-	-	217
Critical Hdwy	-	4.15	6.45
Critical Hdwy Stg 1	-	-	5.45
Critical Hdwy Stg 2	-	-	5.45
Follow-up Hdwy	-	2.245	3.345
Pot Cap-1 Maneuver	-	1032	382
Stage 1	-	-	592
Stage 2	-	-	812
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1032	377
Mov Cap-2 Maneuver	-	-	377
Stage 1	-	-	592
Stage 2	-	-	801

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.53	13.44
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	441	-	-	111	-
HCM Lane V/C Ratio	0.034	-	-	0.012	-
HCM Control Delay (s/veh)	13.4	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 5.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
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Lane Configurations 

Traffic Vol, veh/h	0	7	2	9	28	3
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Future Vol, veh/h	0	7	2	9	28	3
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Conflicting Peds, #/hr	0	0	0	0	0	0
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Sign Control	Free	Free	Free	Free	Stop	Stop
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RT Channelized	-	None	-	None	-	None
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Storage Length	-	-	-	-	0	-
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Veh in Median Storage, #	-	0	0	-	0	-
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Grade, %	-	0	0	-	0	-
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Peak Hour Factor	77	77	77	77	77	77
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Heavy Vehicles, %	2	2	2	2	2	2
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Mvmt Flow	0	9	3	12	36	4
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Major/Minor	Major1	Major2	Minor2
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Conflicting Flow All	14	0	0	18	8
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Stage 1	-	-	-	8	-
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Stage 2	-	-	-	9	-
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Critical Hdwy	4.12	-	-	6.42	6.22
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Critical Hdwy Stg 1	-	-	-	5.42	-
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Critical Hdwy Stg 2	-	-	-	5.42	-
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Follow-up Hdwy	2.218	-	-	3.518	3.318
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Pot Cap-1 Maneuver	1604	-	-	1000	1073
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Stage 1	-	-	-	1015	-
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Stage 2	-	-	-	1014	-
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Platoon blocked, %	-	-	-	-	-
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Mov Cap-1 Maneuver	1604	-	-	1000	1073
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Mov Cap-2 Maneuver	-	-	-	1000	-
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Stage 1	-	-	-	1015	-
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Stage 2	-	-	-	1014	-
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Approach	EB	WB	SB
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HCM Control Delay, s/v	0	0	8.72
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HCM LOS			A
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Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
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Capacity (veh/h)	1604	-	-	-	1007
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HCM Lane V/C Ratio	-	-	-	-	0.04
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HCM Control Delay (s/veh)	0	-	-	-	8.7
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HCM Lane LOS	A	-	-	-	A
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HCM 95th %tile Q(veh)	0	-	-	-	0.1
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HCM 7th TWSC 12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	1.1					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	4	4	1	42	14	2
Future Vol, veh/h	4	4	1	42	14	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	5	5	1	50	17	2
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	70	18	19	0	-	0
Stage 1	18	-	-	-	-	-
Stage 2	52	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	937	1064	1604	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	936	1064	1604	-	-	-
Mov Cap-2 Maneuver	936	-	-	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Approach	SB		SE		NW	
HCM Control Delay, s/v	8.65		0.17		0	
HCM LOS	A					
Minor Lane/Major Mvmt	NWT		NWR	SEL	SET	SBLn1
Capacity (veh/h)	-		-	42	-	996
HCM Lane V/C Ratio	-		-	0.001	-	0.01
HCM Control Delay (s/veh)	-		-	7.2	0	8.7
HCM Lane LOS	-		-	A	A	A
HCM 95th %tile Q(veh)	-		-	0	-	0

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)

											
Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	89	97	237	0	0	218	116	77	12	244	202
Future Volume (vph)	89	97	237	0	0	218	116	77	12	244	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7			4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00			1.00	1.00
Frt	1.00	0.85				1.00	0.85			1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (prot)	1787	1599				1881	1599			1787	1881
Flt Permitted	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (perm)	1787	1599				1881	1599			1787	1881
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	93	101	247	0	0	227	121	80	12	254	210
RTOR Reduction (vph)	0	132	0	0	0	0	71	0	0	0	0
Lane Group Flow (vph)	93	216	0	0	0	227	130	0	0	267	210
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot				NA	Prot		Prot	Prot	NA
Protected Phases	4	4				2	2		1	1	1 2
Permitted Phases											
Actuated Green, G (s)	11.6	11.6				15.8	15.8			11.7	31.5
Effective Green, g (s)	11.6	11.6				15.8	15.8			11.7	31.5
Actuated g/C Ratio	0.21	0.21				0.29	0.29			0.21	0.57
Clearance Time (s)	5.1	5.1				6.7	6.7			4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5			1.0	
Lane Grp Cap (vph)	377	337				541	460			380	1079
v/s Ratio Prot	0.05	c0.14				c0.12	0.08			c0.15	0.11
v/s Ratio Perm											
v/c Ratio	0.25	0.64				0.42	0.28			0.70	0.19
Uniform Delay, d1	18.0	19.8				15.8	15.2			20.0	5.6
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	3.7				0.4	0.2			4.8	0.0
Delay (s)	18.3	23.4				16.2	15.4			24.7	5.6
Level of Service	B	C				B	B			C	A
Approach Delay (s/veh)	22.3			0.0		15.8					16.3
Approach LOS	C			A		B					B
Intersection Summary											
HCM 2000 Control Delay (s/veh)			18.1			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.57								
Actuated Cycle Length (s)			54.9			Sum of lost time (s)			15.8		
Intersection Capacity Utilization			60.5%			ICU Level of Service			B		
Analysis Period (min)			15								
c Critical Lane Group											

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	93	348	227	201	267	210
v/c Ratio	0.25	0.74	0.42	0.38	0.70	0.18
Control Delay (s/veh)	21.6	23.2	20.7	12.2	31.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	21.6	23.2	20.7	12.2	31.1	5.0
Queue Length 50th (ft)	25	52	61	25	81	25
Queue Length 95th (ft)	68	#187	136	83	158	50
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	460	536	623	596	625	1254
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.65	0.36	0.34	0.43	0.17

Intersection Summary

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

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection

Int Delay, s/veh 0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑		↑	↑	
Traffic Vol, veh/h	359	19	6	295	13	7
Future Vol, veh/h	359	19	6	295	13	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	403	21	7	331	15	8

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	403
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.11
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.209
Pot Cap-1 Maneuver	-	-	1161
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1161
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.16	13.55
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	443	-	-	36	-
HCM Lane V/C Ratio	0.051	-	-	0.006	-
HCM Control Delay (s/veh)	13.6	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	6	2	17	20	1
Future Vol, veh/h	1	6	2	17	20	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	1	8	3	22	26	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	24	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.14	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.236	-	-
Pot Cap-1 Maneuver	1577	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1577	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.04	0	8.74
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	257	-	-	-	990
HCM Lane V/C Ratio	0.001	-	-	-	0.027
HCM Control Delay (s/veh)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 7th TWSC

12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	1.3					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	3	2	5	24	21	6
Future Vol, veh/h	3	2	5	24	21	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	6	27	23	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	64	27	30	0	-	0
Stage 1	27	-	-	-	-	-
Stage 2	38	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	941	1049	1583	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	985	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	938	1049	1583	-	-	-
Mov Cap-2 Maneuver	938	-	-	-	-	-
Stage 1	992	-	-	-	-	-
Stage 2	985	-	-	-	-	-
Approach	SB	SE		NW		
HCM Control Delay, s/v	8.7	1.26		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SBLn1	
Capacity (veh/h)	-	-	310	-	979	
HCM Lane V/C Ratio	-	-	0.004	-	0.006	
HCM Control Delay (s/veh)	-	-	7.3	0	8.7	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	-	0	

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)

											
Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	102	91	329	0	0	395	302	79	4	183	175
Future Volume (vph)	102	91	329	0	0	395	302	79	4	183	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7			4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00			1.00	1.00
Frt	1.00	0.85				1.00	0.85			1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (prot)	1736	1553				1827	1553			1736	1827
Flt Permitted	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (perm)	1736	1553				1827	1553			1736	1827
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	109	97	350	0	0	420	321	84	4	195	186
RTOR Reduction (vph)	0	196	0	0	0	0	65	0	0	0	0
Lane Group Flow (vph)	109	251	0	0	0	420	340	0	0	199	186
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot				NA	Prot		Prot	Prot	NA
Protected Phases	4	4				2	2		1	1	1 2
Permitted Phases											
Actuated Green, G (s)	12.9	12.9				20.5	20.5			9.3	33.8
Effective Green, g (s)	12.9	12.9				20.5	20.5			9.3	33.8
Actuated g/C Ratio	0.22	0.22				0.35	0.35			0.16	0.58
Clearance Time (s)	5.1	5.1				6.7	6.7			4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5			1.0	
Lane Grp Cap (vph)	382	342				640	544			275	1055
v/s Ratio Prot	0.06	c0.16				c0.23	0.22			c0.11	0.10
v/s Ratio Perm											
v/c Ratio	0.29	0.73				0.66	0.63			0.72	0.18
Uniform Delay, d1	19.0	21.2				16.0	15.8			23.4	5.8
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	7.5				2.2	1.9			7.7	0.0
Delay (s)	19.3	28.7				18.2	17.7			31.1	5.8
Level of Service	B	C				B	B			C	A
Approach Delay (s/veh)	26.9			0.0		18.0					18.9
Approach LOS	C			A		B					B
Intersection Summary											
HCM 2000 Control Delay (s/veh)			21.0			HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.69								
Actuated Cycle Length (s)			58.5			Sum of lost time (s)			15.8		
Intersection Capacity Utilization			73.1%			ICU Level of Service			D		
Analysis Period (min)			15								
c Critical Lane Group											

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	109	447	420	405	199	186
v/c Ratio	0.29	0.83	0.66	0.67	0.73	0.16
Control Delay (s/veh)	23.1	26.5	22.6	18.8	42.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.1	26.5	22.6	18.8	42.8	5.2
Queue Length 50th (ft)	35	67	136	97	73	26
Queue Length 95th (ft)	77	#227	222	186	#165	48
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	453	591	796	733	332	1288
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.76	0.53	0.55	0.60	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection

Int Delay, s/veh 0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	467	28	11	173	7	6
Future Vol, veh/h	467	28	11	173	7	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	537	32	13	199	8	7

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	537
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.245
Pot Cap-1 Maneuver	-	-	1016
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1016
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.51	13.72
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	428	-	-	108	-
HCM Lane V/C Ratio	0.035	-	-	0.012	-
HCM Control Delay (s/veh)	13.7	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 5.1

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 0 12 2 9 29 3

Future Vol, veh/h 0 12 2 9 29 3

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 77 77 77 77 77 77

Heavy Vehicles, % 2 2 2 2 2 2

Mvmt Flow 0 16 3 12 38 4

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 14 0 - 0 24 8

Stage 1 - - - - 8 -

Stage 2 - - - - 16 -

Critical Hdwy 4.12 - - - 6.42 6.22

Critical Hdwy Stg 1 - - - - 5.42 -

Critical Hdwy Stg 2 - - - - 5.42 -

Follow-up Hdwy 2.218 - - - 3.518 3.318

Pot Cap-1 Maneuver 1604 - - - 992 1073

Stage 1 - - - - 1015 -

Stage 2 - - - - 1007 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1604 - - - 992 1073

Mov Cap-2 Maneuver - - - - 992 -

Stage 1 - - - - 1015 -

Stage 2 - - - - 1007 -

Approach EB WB SB

HCM Control Delay, s/v 0 0 8.76

HCM LOS A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1604 - - - 999

HCM Lane V/C Ratio - - - - 0.042

HCM Control Delay (s/veh) 0 - - - 8.8

HCM Lane LOS A - - - - A

HCM 95th %tile Q(veh) 0 - - - 0.1

HCM 7th TWSC
12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	1.6					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	5	4	6	43	14	6
Future Vol, veh/h	5	4	6	43	14	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	6	5	7	51	17	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	86	20	24	0	-	0
Stage 1	20	-	-	-	-	-
Stage 2	65	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	918	1060	1598	-	-	-
Stage 1	1005	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	914	1060	1598	-	-	-
Mov Cap-2 Maneuver	914	-	-	-	-	-
Stage 1	1000	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Approach	SB	SE		NW		
HCM Control Delay, s/v	8.74	0.89		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SBLn1	
Capacity (veh/h)	-	-	220	-	974	
HCM Lane V/C Ratio	-	-	0.004	-	0.011	
HCM Control Delay (s/veh)	-	-	7.3	0	8.7	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	-	0	

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL	NWT
Lane Configurations										
Traffic Volume (vph)	102	87	247	0	0	234	112	100	354	349
Future Volume (vph)	102	87	247	0	0	234	112	100	354	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7		4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00		1.00	1.00
Frt	1.00	0.85				1.00	0.85		1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	1599				1881	1599		1787	1881
Flt Permitted	0.95	1.00				1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	1599				1881	1599		1787	1881
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	104	89	252	0	0	239	114	102	361	356
RTOR Reduction (vph)	0	155	0	0	0	0	72	0	0	0
Lane Group Flow (vph)	104	186	0	0	0	239	144	0	361	356
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot				NA	Prot		Prot	NA
Protected Phases	4	4				2	2		1	1 2
Permitted Phases										
Actuated Green, G (s)	11.3	11.3				16.3	16.3		14.5	34.8
Effective Green, g (s)	11.3	11.3				16.3	16.3		14.5	34.8
Actuated g/C Ratio	0.20	0.20				0.28	0.28		0.25	0.60
Clearance Time (s)	5.1	5.1				6.7	6.7		4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5		1.0	
Lane Grp Cap (vph)	348	312				529	450		447	1130
v/s Ratio Prot	0.06	c0.12				c0.13	0.09		c0.20	0.19
v/s Ratio Perm										
v/c Ratio	0.30	0.60				0.45	0.32		0.81	0.32
Uniform Delay, d1	19.9	21.2				17.1	16.4		20.4	5.7
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	2.5				0.4	0.3		9.7	0.1
Delay (s)	20.3	23.8				17.6	16.7		30.1	5.7
Level of Service	C	C				B	B		C	A
Approach Delay (s/veh)	22.9			0.0		17.2				18.0
Approach LOS	C			A		B				B
Intersection Summary										
HCM 2000 Control Delay (s/veh)			19.1			HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.61							
Actuated Cycle Length (s)			57.9			Sum of lost time (s)			15.8	
Intersection Capacity Utilization			66.6%			ICU Level of Service			C	
Analysis Period (min)			15							
c Critical Lane Group										

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	104	341	239	216	361	356
v/c Ratio	0.30	0.73	0.45	0.42	0.81	0.29
Control Delay (s/veh)	24.0	21.2	22.1	13.5	36.9	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	24.0	21.2	22.1	13.5	36.9	5.4
Queue Length 50th (ft)	31	45	69	31	113	44
Queue Length 95th (ft)	75	#160	143	92	#242	87
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	437	537	591	571	593	1278
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.64	0.40	0.38	0.61	0.28

Intersection Summary

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

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	
Traffic Vol, veh/h	325	11	9	422	13	5
Future Vol, veh/h	325	11	9	422	13	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	349	12	10	454	14	5
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	349	0	823	349
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	473	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1215	-	345	696
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	629	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1215	-	341	696
Mov Cap-2 Maneuver	-	-	-	-	341	-
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	622	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		0.17		14.52	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	397	-	-	38	-	
HCM Lane V/C Ratio	0.049	-	-	0.008	-	
HCM Control Delay (s/veh)	14.5	-	-	8	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 3.6

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 5 4 7 17 13 3

Future Vol, veh/h 5 4 7 17 13 3

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 73 73 73 73 73 73

Heavy Vehicles, % 0 0 0 0 0 0

Mvmt Flow 7 5 10 23 18 4

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 33 0 - 0 40 21

Stage 1 - - - - 21 -

Stage 2 - - - - 19 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1592 - - - 976 1062

Stage 1 - - - - 1007 -

Stage 2 - - - - 1009 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1592 - - - 972 1062

Mov Cap-2 Maneuver - - - - 972 -

Stage 1 - - - - 1002 -

Stage 2 - - - - 1009 -

Approach EB WB SB

HCM Control Delay, s/v 4.04 0 8.73

HCM LOS A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1000 - - - 988

HCM Lane V/C Ratio 0.004 - - - 0.022

HCM Control Delay (s/veh) 7.3 0 - - 8.7

HCM Lane LOS A A - - A

HCM 95th %tile Q(veh) 0 - - - 0.1

HCM 7th TWSC 12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	2.5					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	13	3	3	17	23	7
Future Vol, veh/h	13	3	3	17	23	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	3	3	18	25	8
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	54	29	33	0	-	0
Stage 1	29	-	-	-	-	-
Stage 2	25	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	954	1046	1579	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	998	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	952	1046	1579	-	-	-
Mov Cap-2 Maneuver	952	-	-	-	-	-
Stage 1	992	-	-	-	-	-
Stage 2	998	-	-	-	-	-
Approach	SB	SE		NW		
HCM Control Delay, s/v	8.78	1.09		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SBLn1	
Capacity (veh/h)	-	-	270	-	969	
HCM Lane V/C Ratio	-	-	0.002	-	0.018	
HCM Control Delay (s/veh)	-	-	7.3	0	8.8	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	-	0.1	

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)

											
Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	102	100	259	0	0	224	119	84	12	258	207
Future Volume (vph)	102	100	259	0	0	224	119	84	12	258	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7			4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00			1.00	1.00
Frt	1.00	0.85				1.00	0.85			1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (prot)	1787	1599				1881	1599			1787	1881
Flt Permitted	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (perm)	1787	1599				1881	1599			1787	1881
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	106	104	270	0	0	233	124	88	12	269	216
RTOR Reduction (vph)	0	139	0	0	0	0	72	0	0	0	0
Lane Group Flow (vph)	106	235	0	0	0	233	140	0	0	282	216
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot				NA	Prot		Prot	Prot	NA
Protected Phases	4	4				2	2		1	1	1 2
Permitted Phases											
Actuated Green, G (s)	12.1	12.1				15.9	15.9			12.2	32.1
Effective Green, g (s)	12.1	12.1				15.9	15.9			12.2	32.1
Actuated g/C Ratio	0.22	0.22				0.28	0.28			0.22	0.57
Clearance Time (s)	5.1	5.1				6.7	6.7			4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5			1.0	
Lane Grp Cap (vph)	386	345				534	454			389	1078
v/s Ratio Prot	0.06	c0.15				c0.12	0.09			c0.16	0.11
v/s Ratio Perm											
v/c Ratio	0.27	0.68				0.44	0.31			0.72	0.20
Uniform Delay, d1	18.3	20.2				16.4	15.7			20.3	5.8
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	5.0				0.4	0.3			5.6	0.0
Delay (s)	18.6	25.2				16.8	16.0			25.9	5.8
Level of Service	B	C				B	B			C	A
Approach Delay (s/veh)	23.7			0.0		16.4					17.2
Approach LOS	C			A		B					B
Intersection Summary											
HCM 2000 Control Delay (s/veh)			19.2			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.60								
Actuated Cycle Length (s)			56.0			Sum of lost time (s)			15.8		
Intersection Capacity Utilization			62.9%			ICU Level of Service			B		
Analysis Period (min)			15								
c Critical Lane Group											

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	106	374	233	212	282	216
v/c Ratio	0.28	0.78	0.44	0.40	0.73	0.19
Control Delay (s/veh)	22.2	25.1	21.4	13.0	32.4	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.2	25.1	21.4	13.0	32.4	5.2
Queue Length 50th (ft)	29	58	66	30	89	28
Queue Length 95th (ft)	76	#207	139	89	168	52
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	452	537	612	587	614	1246
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.70	0.38	0.36	0.46	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	
Traffic Vol, veh/h	371	20	6	308	13	7
Future Vol, veh/h	371	20	6	308	13	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	417	22	7	346	15	8
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	417	0	776	417
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	360	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1148	-	367	638
Stage 1	-	-	-	-	667	-
Stage 2	-	-	-	-	709	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1148	-	364	638
Mov Cap-2 Maneuver	-	-	-	-	364	-
Stage 1	-	-	-	-	667	-
Stage 2	-	-	-	-	703	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		0.16		13.86	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	429	-	-	34	-	
HCM Lane V/C Ratio	0.052	-	-	0.006	-	
HCM Control Delay (s/veh)	13.9	-	-	8.2	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 3.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	9	5	17	21	1
Future Vol, veh/h	1	9	5	17	21	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	1	12	6	22	27	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	28	0	0 31 17
Stage 1	-	-	- 17 -
Stage 2	-	-	- 14 -
Critical Hdwy	4.14	-	- 6.44 6.24
Critical Hdwy Stg 1	-	-	- 5.44 -
Critical Hdwy Stg 2	-	-	- 5.44 -
Follow-up Hdwy	2.236	-	- 3.536 3.336
Pot Cap-1 Maneuver	1572	-	- 977 1056
Stage 1	-	-	- 1000 -
Stage 2	-	-	- 1004 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1572	-	- 977 1056
Mov Cap-2 Maneuver	-	-	- 977 -
Stage 1	-	-	- 999 -
Stage 2	-	-	- 1004 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.73	0	8.78
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	180	-	-	-	980
HCM Lane V/C Ratio	0.001	-	-	-	0.029
HCM Control Delay (s/veh)	7.3	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 7th TWSC

12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	2.3					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	11	2	8	25	22	8
Future Vol, veh/h	11	2	8	25	22	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	2	9	28	24	9
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	74	29	33	0	-	0
Stage 1	29	-	-	-	-	-
Stage 2	46	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	929	1046	1578	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	977	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	924	1046	1578	-	-	-
Mov Cap-2 Maneuver	924	-	-	-	-	-
Stage 1	988	-	-	-	-	-
Stage 2	977	-	-	-	-	-
Approach	SB	SE		NW		
HCM Control Delay, s/v	8.89	1.77		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SBLn1	
Capacity (veh/h)	-	-	436	-	941	
HCM Lane V/C Ratio	-	-	0.006	-	0.015	
HCM Control Delay (s/veh)	-	-	7.3	0	8.9	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	-	0	

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)

											
Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	115	91	365	0	0	395	302	90	4	183	175
Future Volume (vph)	115	91	365	0	0	395	302	90	4	183	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7			4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00			1.00	1.00
Frt	1.00	0.85				1.00	0.85			1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (prot)	1736	1553				1827	1553			1736	1827
Flt Permitted	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (perm)	1736	1553				1827	1553			1736	1827
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	122	97	388	0	0	420	321	96	4	195	186
RTOR Reduction (vph)	0	216	0	0	0	0	65	0	0	0	0
Lane Group Flow (vph)	122	269	0	0	0	420	352	0	0	199	186
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	Prot				NA	Prot		Prot	Prot	NA
Protected Phases	4	4				2	2		1	1	1 2
Permitted Phases											
Actuated Green, G (s)	13.2	13.2				20.5	20.5			9.3	33.8
Effective Green, g (s)	13.2	13.2				20.5	20.5			9.3	33.8
Actuated g/C Ratio	0.22	0.22				0.35	0.35			0.16	0.57
Clearance Time (s)	5.1	5.1				6.7	6.7			4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5			1.0	
Lane Grp Cap (vph)	389	348				636	541			274	1050
v/s Ratio Prot	0.07	c0.17				c0.23	0.23			c0.11	0.10
v/s Ratio Perm											
v/c Ratio	0.31	0.77				0.66	0.65			0.73	0.18
Uniform Delay, d1	19.0	21.4				16.2	16.1			23.5	5.9
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	9.9				2.3	2.5			7.9	0.0
Delay (s)	19.4	31.3				18.5	18.6			31.4	5.9
Level of Service	B	C				B	B			C	A
Approach Delay (s/veh)	28.9			0.0		18.6					19.1
Approach LOS	C			A		B					B
Intersection Summary											
HCM 2000 Control Delay (s/veh)			22.1			HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.71								
Actuated Cycle Length (s)			58.8			Sum of lost time (s)			15.8		
Intersection Capacity Utilization			76.0%			ICU Level of Service			D		
Analysis Period (min)			15								
c Critical Lane Group											

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	122	485	420	417	199	186
v/c Ratio	0.32	0.86	0.66	0.69	0.73	0.16
Control Delay (s/veh)	23.5	28.4	22.8	19.7	43.2	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.5	28.4	22.8	19.7	43.2	5.3
Queue Length 50th (ft)	39	73	136	102	73	26
Queue Length 95th (ft)	84	#247	222	195	#165	48
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	450	609	790	728	330	1278
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.80	0.53	0.57	0.60	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	
Traffic Vol, veh/h	467	33	22	173	17	55
Future Vol, veh/h	467	33	22	173	17	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	537	38	25	199	20	63
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	537	0	786	537
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	249	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1016	-	357	538
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	785	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1016	-	347	538
Mov Cap-2 Maneuver	-	-	-	-	347	-
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	763	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		0.97		14.14	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	476	-	-	203	-	
HCM Lane V/C Ratio	0.174	-	-	0.025	-	
HCM Control Delay (s/veh)	14.1	-	-	8.6	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-	

HCM 7th TWSC

4: Great Hill Road/SW Rd. & Dr. #1

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	30	42	0	8	47
Future Vol, veh/h	0	30	42	0	8	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	33	46	0	9	51
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	114	46	0	0	46	0
Stage 1	46	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	882	1024	-	-	1562	-
Stage 1	977	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	877	1024	-	-	1562	-
Mov Cap-2 Maneuver	877	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v	8.63	0		1.06		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	1024	262	-	
HCM Lane V/C Ratio	-	-	0.032	0.006	-	
HCM Control Delay (s/veh)	-	-	8.6	7.3	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	12	2	9	29	3
Future Vol, veh/h	0	12	2	9	29	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	3	12	38	4

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	14	0	0 24 8
Stage 1	-	-	- 8 -
Stage 2	-	-	- 16 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1604	-	- 992 1073
Stage 1	-	-	- 1015 -
Stage 2	-	-	- 1007 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1604	-	- 992 1073
Mov Cap-2 Maneuver	-	-	- 992 -
Stage 1	-	-	- 1015 -
Stage 2	-	-	- 1007 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	8.76
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1604	-	-	-	999
HCM Lane V/C Ratio	-	-	-	-	0.042
HCM Control Delay (s/veh)	0	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 7th TWSC
12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	2.3					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	15	4	6	43	14	11
Future Vol, veh/h	15	4	6	43	14	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	18	5	7	51	17	13
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	89	23	30	0	-	0
Stage 1	23	-	-	-	-	-
Stage 2	65	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	914	1056	1590	-	-	-
Stage 1	1002	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	910	1056	1590	-	-	-
Mov Cap-2 Maneuver	910	-	-	-	-	-
Stage 1	997	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Approach	SB	SE		NW		
HCM Control Delay, s/v	8.93	0.89		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SBLn1	
Capacity (veh/h)	-	-	220	-	938	
HCM Lane V/C Ratio	-	-	0.004	-	0.024	
HCM Control Delay (s/veh)	-	-	7.3	0	8.9	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	-	0.1	

HCM 7th TWSC

23: Great Hill Rd./Great Hill Road & Dr. #3

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	12	0	13	3	0	39
Future Vol, veh/h	12	0	13	3	0	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	0	14	3	0	42
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	58	16	0	0	17	0
Stage 1	16	-	-	-	-	-
Stage 2	42	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	949	1064	-	-	1600	-
Stage 1	1007	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	949	1064	-	-	1600	-
Mov Cap-2 Maneuver	949	-	-	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s/v	8.85	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	949	1600	-	
HCM Lane V/C Ratio	-	-	0.014	-	-	
HCM Control Delay (s/veh)	-	-	8.8	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	

HCM 7th TWSC
26: Great Hill Road & Dr. #2

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	29	13	0	8	39
Future Vol, veh/h	0	29	13	0	8	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	32	14	0	9	42
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	74	14	0	0	14	0
Stage 1	14	-	-	-	-	-
Stage 2	60	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	930	1066	-	-	1604	-
Stage 1	1009	-	-	-	-	-
Stage 2	963	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	925	1066	-	-	1604	-
Mov Cap-2 Maneuver	925	-	-	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	957	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v	8.48	0		1.24		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 1066		306	-	
HCM Lane V/C Ratio	-	- 0.03		0.005	-	
HCM Control Delay (s/veh)	-	- 8.5		7.3	0	
HCM Lane LOS	-	- A		A	A	
HCM 95th %tile Q(veh)	-	- 0.1		0	-	

HCM 7th TWSC

31: Silver Hill Rd./Silver Hill Road & Dr. #4

Intersection

Int Delay, s/veh 3.1

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations 

Traffic Vol, veh/h 23 10 5 15 32 21

Future Vol, veh/h 23 10 5 15 32 21

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 0 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 2 2 2 2 2 2

Mvmt Flow 25 11 5 16 35 23

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 73 46 58 0 - 0

Stage 1 46 - - - - -

Stage 2 27 - - - - -

Critical Hdwy 6.42 6.22 4.12 - - -

Critical Hdwy Stg 1 5.42 - - - - -

Critical Hdwy Stg 2 5.42 - - - - -

Follow-up Hdwy 3.518 3.318 2.218 - - -

Pot Cap-1 Maneuver 930 1023 1547 - - -

Stage 1 976 - - - - -

Stage 2 995 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 927 1023 1547 - - -

Mov Cap-2 Maneuver 927 - - - - -

Stage 1 973 - - - - -

Stage 2 995 - - - - -

Approach EB NB SB

HCM Control Delay, s/v 8.92 1.83 0

HCM LOS A

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h) 450 - 954 - -

HCM Lane V/C Ratio 0.004 - 0.038 - -

HCM Control Delay (s/veh) 7.3 0 8.9 - -

HCM Lane LOS A A A - -

HCM 95th %tile Q(veh) 0 - 0.1 - -

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL	NWT
Lane Configurations										
Traffic Volume (vph)	111	87	272	0	0	234	112	136	354	349
Future Volume (vph)	111	87	272	0	0	234	112	136	354	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7		4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00		1.00	1.00
Frt	1.00	0.85				1.00	0.85		1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	1599				1881	1599		1787	1881
Flt Permitted	0.95	1.00				1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	1599				1881	1599		1787	1881
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	113	89	278	0	0	239	114	139	361	356
RTOR Reduction (vph)	0	171	0	0	0	0	72	0	0	0
Lane Group Flow (vph)	113	196	0	0	0	239	181	0	361	356
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot				NA	Prot		Prot	NA
Protected Phases	4	4				2	2		1	1 2
Permitted Phases										
Actuated Green, G (s)	11.5	11.5				16.3	16.3		14.5	34.8
Effective Green, g (s)	11.5	11.5				16.3	16.3		14.5	34.8
Actuated g/C Ratio	0.20	0.20				0.28	0.28		0.25	0.60
Clearance Time (s)	5.1	5.1				6.7	6.7		4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5		1.0	
Lane Grp Cap (vph)	353	316				527	448		445	1126
v/s Ratio Prot	0.06	c0.12				c0.13	0.11		c0.20	0.19
v/s Ratio Perm										
v/c Ratio	0.32	0.62				0.45	0.40		0.81	0.32
Uniform Delay, d1	20.0	21.3				17.2	17.0		20.5	5.8
Progression Factor	1.00	1.00				1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	3.3				0.5	0.4		10.2	0.1
Delay (s)	20.3	24.6				17.7	17.4		30.7	5.8
Level of Service	C	C				B	B		C	A
Approach Delay (s/veh)	23.6			0.0		17.5				18.4
Approach LOS	C			A		B				B
Intersection Summary										
HCM 2000 Control Delay (s/veh)			19.6			HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.62							
Actuated Cycle Length (s)			58.1			Sum of lost time (s)			15.8	
Intersection Capacity Utilization			70.4%			ICU Level of Service			C	
Analysis Period (min)			15							
c Critical Lane Group										

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	113	367	239	253	361	356
v/c Ratio	0.32	0.76	0.46	0.49	0.81	0.29
Control Delay (s/veh)	24.4	22.0	22.3	15.5	36.9	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	24.4	22.0	22.3	15.5	36.9	5.4
Queue Length 50th (ft)	34	48	70	44	115	45
Queue Length 95th (ft)	80	#173	143	114	#242	87
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	436	551	590	570	592	1274
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.67	0.41	0.44	0.61	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection

Int Delay, s/veh 1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	325	25	45	422	20	39
Future Vol, veh/h	325	25	45	422	20	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	349	27	48	454	22	42

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	349
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.11
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.209
Pot Cap-1 Maneuver	-	-	1215
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1215
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	0.78	13.73
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	475	-	-	173	-
HCM Lane V/C Ratio	0.133	-	-	0.04	-
HCM Control Delay (s/veh)	13.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

HCM 7th TWSC

4: Great Hill Road/SW Rd. & Dr. #1

Intersection

Int Delay, s/veh 2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	21	38	0	25	45
Future Vol, veh/h	0	21	38	0	25	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	41	0	27	49

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	145	41	0
Stage 1	41	-	-
Stage 2	103	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	848	1030	-
Stage 1	981	-	-
Stage 2	921	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	833	1030	-
Mov Cap-2 Maneuver	833	-	-
Stage 1	981	-	-
Stage 2	905	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.58	0	2.62
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1030	643
HCM Lane V/C Ratio	-	-	0.022	0.017
HCM Control Delay (s/veh)	-	-	8.6	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 4.8

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 19 4 7 17 13 9

Future Vol, veh/h 19 4 7 17 13 9

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 73 73 73 73 73 73

Heavy Vehicles, % 0 0 0 0 0 0

Mvmt Flow 26 5 10 23 18 12

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 33 0 - 0 79 21

Stage 1 - - - - 21 -

Stage 2 - - - - 58 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1592 - - - 929 1062

Stage 1 - - - - 1007 -

Stage 2 - - - - 970 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1592 - - - 914 1062

Mov Cap-2 Maneuver - - - - 914 -

Stage 1 - - - - 990 -

Stage 2 - - - - 970 -

Approach EB WB SB

HCM Control Delay, s/v 6.03 0 8.83

HCM LOS A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1487 - - - 969

HCM Lane V/C Ratio 0.016 - - - 0.031

HCM Control Delay (s/veh) 7.3 0 - - 8.8

HCM Lane LOS A A - - A

HCM 95th %tile Q(veh) 0 - - - 0.1

HCM 7th TWSC
12: Hawthorne Ave. & Derby Neck Road

Intersection						
Int Delay, s/veh	2.6					
Movement	SBL	SBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	20	3	3	17	23	21
Future Vol, veh/h	20	3	3	17	23	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	3	3	18	25	23
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	61	36	48	0	-	0
Stage 1	36	-	-	-	-	-
Stage 2	25	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	945	1036	1559	-	-	-
Stage 1	986	-	-	-	-	-
Stage 2	998	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	943	1036	1559	-	-	-
Mov Cap-2 Maneuver	943	-	-	-	-	-
Stage 1	984	-	-	-	-	-
Stage 2	998	-	-	-	-	-
Approach	SB	SE		NW		
HCM Control Delay, s/v	8.87	1.1		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SBLn1	
Capacity (veh/h)	-	-	270	-	954	
HCM Lane V/C Ratio	-	-	0.002	-	0.026	
HCM Control Delay (s/veh)	-	-	7.3	0	8.9	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	-	0.1	

HCM 7th TWSC

23: Great Hill Rd./Great Hill Road & Dr. #3

Intersection

Int Delay, s/veh 0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	0	18	14	0	24
Future Vol, veh/h	6	0	18	14	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	0	20	15	0	26

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	53	27	0
Stage 1	27	-	-
Stage 2	26	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	955	1048	-
Stage 1	995	-	-
Stage 2	996	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	955	1048	-
Mov Cap-2 Maneuver	955	-	-
Stage 1	995	-	-
Stage 2	996	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	955	1577
HCM Lane V/C Ratio	-	-	0.007	-
HCM Control Delay (s/veh)	-	-	8.8	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 7th TWSC
26: Great Hill Road & Dr. #2

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	38	0	21	24
Future Vol, veh/h	0	20	38	0	21	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	22	41	0	23	26
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	113	41	0	0	41	0
Stage 1	41	-	-	-	-	-
Stage 2	72	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	884	1030	-	-	1568	-
Stage 1	981	-	-	-	-	-
Stage 2	951	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	870	1030	-	-	1568	-
Mov Cap-2 Maneuver	870	-	-	-	-	-
Stage 1	981	-	-	-	-	-
Stage 2	937	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v	8.57	0		3.42		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 1030		840	-	
HCM Lane V/C Ratio	-	- 0.021		0.015	-	
HCM Control Delay (s/veh)	-	- 8.6		7.3	0	
HCM Lane LOS	-	- A		A	A	
HCM 95th %tile Q(veh)	-	- 0.1		0	-	

HCM 7th TWSC

31: Silver Hill Rd./Silver Hill Road & Dr. #4

Intersection

Int Delay, s/veh 1.9

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations 

Traffic Vol, veh/h 16 7 14 40 28 64

Future Vol, veh/h 16 7 14 40 28 64

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 0 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 2 2 2 2 2 2

Mvmt Flow 17 8 15 43 30 70

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 139 65 100 0 - 0

Stage 1 65 - - - - -

Stage 2 74 - - - - -

Critical Hdwy 6.42 6.22 4.12 - - -

Critical Hdwy Stg 1 5.42 - - - - -

Critical Hdwy Stg 2 5.42 - - - - -

Follow-up Hdwy 3.518 3.318 2.218 - - -

Pot Cap-1 Maneuver 854 999 1493 - - -

Stage 1 957 - - - - -

Stage 2 949 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 845 999 1493 - - -

Mov Cap-2 Maneuver 845 - - - - -

Stage 1 947 - - - - -

Stage 2 949 - - - - -

Approach EB NB SB

HCM Control Delay, s/v 9.18 1.93 0

HCM LOS A

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h) 467 - 887 - -

HCM Lane V/C Ratio 0.01 - 0.028 - -

HCM Control Delay (s/veh) 7.4 0 9.2 - -

HCM Lane LOS A A A - -

HCM 95th %tile Q(veh) 0 - 0.1 - -

HCM Signalized Intersection Capacity Analysis

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)

											
Movement	EBL	EBR	EBR2	NBL	NBR	SET	SER	SER2	NWL2	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	111	100	285	0	0	224	119	115	12	258	207
Future Volume (vph)	111	100	285	0	0	224	119	115	12	258	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.1	5.1				6.7	6.7			4.0	4.0
Lane Util. Factor	1.00	1.00				1.00	1.00			1.00	1.00
Frt	1.00	0.85				1.00	0.85			1.00	1.00
Flt Protected	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (prot)	1787	1599				1881	1599			1787	1881
Flt Permitted	0.95	1.00				1.00	1.00			0.95	1.00
Satd. Flow (perm)	1787	1599				1881	1599			1787	1881
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	113	102	291	0	0	229	121	117	12	263	211
RTOR Reduction (vph)	0	152	0	0	0	0	72	0	0	0	0
Lane Group Flow (vph)	113	241	0	0	0	229	166	0	0	275	211
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot				NA	Prot		Prot	Prot	NA
Protected Phases	4	4				2	2		1	1	1 2
Permitted Phases											
Actuated Green, G (s)	12.2	12.2				15.8	15.8			12.0	31.8
Effective Green, g (s)	12.2	12.2				15.8	15.8			12.0	31.8
Actuated g/C Ratio	0.22	0.22				0.28	0.28			0.22	0.57
Clearance Time (s)	5.1	5.1				6.7	6.7			4.0	
Vehicle Extension (s)	2.5	2.5				2.5	2.5			1.0	
Lane Grp Cap (vph)	390	349				532	452			384	1071
v/s Ratio Prot	0.06	c0.15				c0.12	0.10			c0.15	0.11
v/s Ratio Perm											
v/c Ratio	0.29	0.69				0.43	0.37			0.72	0.20
Uniform Delay, d1	18.2	20.1				16.3	16.0			20.3	5.8
Progression Factor	1.00	1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3	5.1				0.4	0.4			5.2	0.0
Delay (s)	18.5	25.2				16.7	16.4			25.5	5.8
Level of Service	B	C				B	B			C	A
Approach Delay (s/veh)	23.7			0.0		16.6					17.0
Approach LOS	C			A		B					B
Intersection Summary											
HCM 2000 Control Delay (s/veh)			19.2			HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.59								
Actuated Cycle Length (s)			55.8			Sum of lost time (s)			15.8		
Intersection Capacity Utilization			66.5%			ICU Level of Service			C		
Analysis Period (min)			15								
c Critical Lane Group											

Queues

15: Route 8 SB On Ramp & Rt. 334 (Wakelee Ave.)/Lower Derby Avenue & Rt. 334 (Great Hill Rd.)



Lane Group	EBL	EBR	SET	SER	NWL	NWT
Lane Group Flow (vph)	113	393	229	238	275	211
v/c Ratio	0.29	0.79	0.43	0.46	0.72	0.18
Control Delay (s/veh)	22.2	24.9	21.2	14.3	32.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.2	24.9	21.2	14.3	32.0	5.2
Queue Length 50th (ft)	31	58	65	38	87	28
Queue Length 95th (ft)	80	#214	137	105	163	50
Internal Link Dist (ft)	1703		166			1484
Turn Bay Length (ft)	200			130	330	
Base Capacity (vph)	453	551	613	588	615	1245
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.71	0.37	0.40	0.45	0.17

Intersection Summary

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

HCM 7th TWSC

2: SW Rd. & Route 334 (Great Hill Road)/Route 334 (Fountain Lake Road)

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	
Traffic Vol, veh/h	371	32	37	308	21	42
Future Vol, veh/h	371	32	37	308	21	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	90	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	399	34	40	331	23	45
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	399	0	810	399
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	411	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	1165	-	351	653
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	672	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1165	-	336	653
Mov Cap-2 Maneuver	-	-	-	-	336	-
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	643	-
Approach	EB		WB		NB	
HCM Control Delay, s/v	0		0.88		13.38	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1		EBT	EBR	WBL	WBT
Capacity (veh/h)	497		-	-	193	-
HCM Lane V/C Ratio	0.136		-	-	0.034	-
HCM Control Delay (s/veh)	13.4		-	-	8.2	0
HCM Lane LOS	B		-	-	A	A
HCM 95th %tile Q(veh)	0.5		-	-	0.1	-

HCM 7th TWSC

4: Great Hill Road/SW Rd. & Dr. #1

Intersection

Int Delay, s/veh 2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	22	41	0	22	47
Future Vol, veh/h	0	22	41	0	22	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	24	45	0	24	51

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	143	45	0
Stage 1	45	-	-
Stage 2	99	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	849	1025	-
Stage 1	978	-	-
Stage 2	925	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	836	1025	-
Mov Cap-2 Maneuver	836	-	-
Stage 1	978	-	-
Stage 2	910	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.59	0	2.34
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1025	574
HCM Lane V/C Ratio	-	-	0.023	0.015
HCM Control Delay (s/veh)	-	-	8.6	7.3
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 7th TWSC

10: Derby Neck Rd./Derby Neck Road & Great Hill Road

Intersection

Int Delay, s/veh 4.8

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 14 9 5 17 21 7

Future Vol, veh/h 14 9 5 17 21 7

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 73 73 73 73 73 73

Heavy Vehicles, % 0 0 0 0 0 0

Mvmt Flow 19 12 7 23 29 10

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 30 0 - 0 69 18

Stage 1 - - - - 18 -

Stage 2 - - - - 51 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1596 - - - 940 1066

Stage 1 - - - - 1009 -

Stage 2 - - - - 977 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1596 - - - 929 1066

Mov Cap-2 Maneuver - - - - 929 -

Stage 1 - - - - 997 -

Stage 2 - - - - 977 -

Approach EB WB SB

HCM Control Delay, s/v 4.43 0 8.91

HCM LOS A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1096 - - - 960

HCM Lane V/C Ratio 0.012 - - - 0.04

HCM Control Delay (s/veh) 7.3 0 - - 8.9

HCM Lane LOS A A - - A

HCM 95th %tile Q(veh) 0 - - - 0.1

HCM 7th TWSC
12: Hawthorne Ave. & Derby Neck Road

Intersection

Int Delay, s/veh 2.6

Movement SBL SBR SEL SET NWT NWR

Lane Configurations 

Traffic Vol, veh/h 19 2 8 25 22 20

Future Vol, veh/h 19 2 8 25 22 20

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage, # 0 - - 0 0 -

Grade, % 0 - - 0 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 2 2 2 2 2 2

Mvmt Flow 21 2 9 27 24 22

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 79 35 46 0 - 0

Stage 1 35 - - - - -

Stage 2 45 - - - - -

Critical Hdwy 6.42 6.22 4.12 - - -

Critical Hdwy Stg 1 5.42 - - - - -

Critical Hdwy Stg 2 5.42 - - - - -

Follow-up Hdwy 3.518 3.318 2.218 - - -

Pot Cap-1 Maneuver 923 1038 1562 - - -

Stage 1 988 - - - - -

Stage 2 978 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 918 1038 1562 - - -

Mov Cap-2 Maneuver 918 - - - - -

Stage 1 982 - - - - -

Stage 2 978 - - - - -

Approach SB SE NW

HCM Control Delay, s/v 8.98 1.77 0

HCM LOS A

Minor Lane/Major Mvmt NWT NWR SEL SET SBLn1

Capacity (veh/h) - - 436 - 928

HCM Lane V/C Ratio - - 0.006 - 0.025

HCM Control Delay (s/veh) - - 7.3 0 9

HCM Lane LOS - - A A A

HCM 95th %tile Q(veh) - - 0 - 0.1

HCM 7th TWSC

23: Great Hill Rd./Great Hill Road & Dr. #3

Intersection

Int Delay, s/veh 0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	0	20	13	0	26
Future Vol, veh/h	6	0	20	13	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	0	22	14	0	28

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	57	29	0
Stage 1	29	-	-
Stage 2	28	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	950	1046	-
Stage 1	994	-	-
Stage 2	994	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	950	1046	-
Mov Cap-2 Maneuver	950	-	-
Stage 1	994	-	-
Stage 2	994	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	8.81	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	950	1575
HCM Lane V/C Ratio	-	-	0.007	-
HCM Control Delay (s/veh)	-	-	8.8	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 7th TWSC
26: Great Hill Road & Dr. #2

Intersection						
Int Delay, s/veh	3.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	21	20	0	21	26
Future Vol, veh/h	0	21	20	0	21	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	23	22	0	23	28
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	96	22	0	0	22	0
Stage 1	22	-	-	-	-	-
Stage 2	74	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	904	1055	-	-	1594	-
Stage 1	1001	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	891	1055	-	-	1594	-
Mov Cap-2 Maneuver	891	-	-	-	-	-
Stage 1	1001	-	-	-	-	-
Stage 2	935	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s/v	8.49	0		3.26		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 1055		804	-	
HCM Lane V/C Ratio	-	- 0.022		0.014	-	
HCM Control Delay (s/veh)	-	- 8.5		7.3	0	
HCM Lane LOS	-	- A		A	A	
HCM 95th %tile Q(veh)	-	- 0.1		0	-	

HCM 7th TWSC

31: Silver Hill Rd./Silver Hill Road & Dr. #4

Intersection

Int Delay, s/veh 2

Movement

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	8	12	36	39	55
Future Vol, veh/h	18	8	12	36	39	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	9	13	39	42	60

Major/Minor

	Minor2	Major1	Major2
Conflicting Flow All	138	72	102
Stage 1	72	-	-
Stage 2	65	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	856	990	1490
Stage 1	951	-	-
Stage 2	957	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	848	990	1490
Mov Cap-2 Maneuver	848	-	-
Stage 1	942	-	-
Stage 2	957	-	-

Approach

	EB	NB	SB
HCM Control Delay, s/v	9.19	1.86	0
HCM LOS	A		

Minor Lane/Major Mvmt

	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	450	-	887	-	-
HCM Lane V/C Ratio	0.009	-	0.032	-	-
HCM Control Delay (s/veh)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

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By Marc J Garofalo MPA, MMC, MCTC at 10:20 am, Oct 19, 2026