2407-2409 N. Roosevelt Boulevard

Key West, Florida

TRAFFIC STUDY

prepared for:
Trepanier & Associates, Inc.

KBP CONSULTING, INC.

December 2018

2407-2409 N. Roosevelt Boulevard

Key West, Florida

Traffic Study

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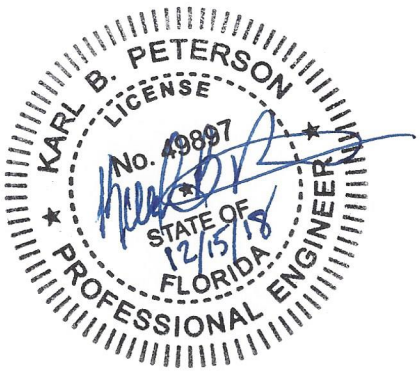

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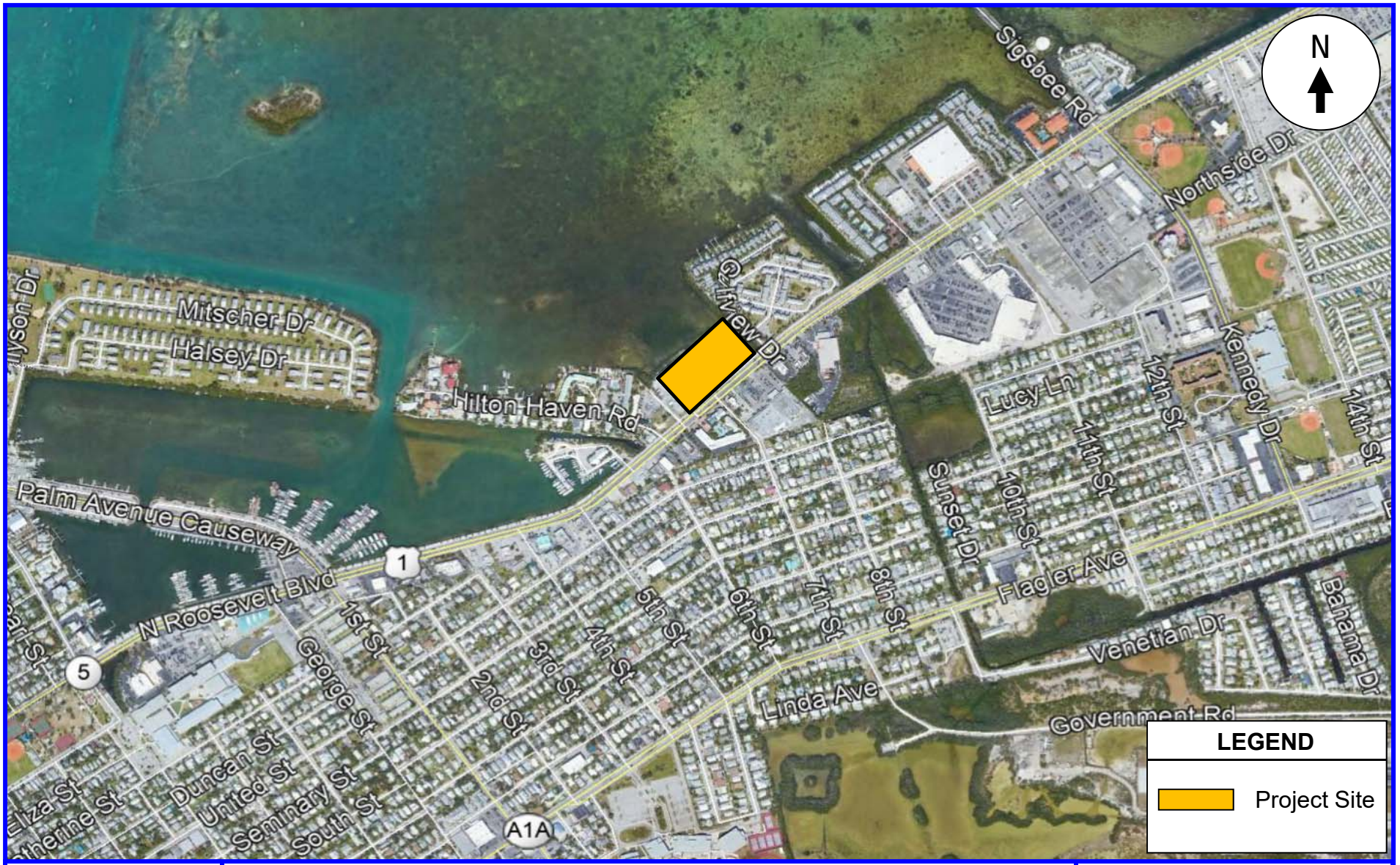
INTRODUCTION

The property located at 2407-2409 N. Roosevelt Boulevard (State Road 5) in Key West, Monroe County, Florida currently contains a two-story mixed-use building (i.e. medical office, retail, and residential uses) and a single-story office building. Plans are underway to redevelop a portion of this site by eliminating the single-story office building and introducing affordable housing by way of live-aboard boat slips. The location of this project site is illustrated in Figure 1 on the following page.

KBP Consulting, Inc. has been retained by Trepanier & Associates, Inc. to prepare a traffic study in connection with the proposed redevelopment of this property. This study addresses the trip generation characteristics of the existing and proposed development, the projected increase in turning movement volumes at the project access driveways on N. Roosevelt Boulevard, and the vehicular access to N. Roosevelt Boulevard.

This traffic study is divided into four (4) sections, as listed below:

1. Inventory
2. Trip Generation
3. Trip Distribution and Traffic Assignment
4. Summary & Conclusions



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Project Location Map

FIGURE 1
2407-2409 N. Roosevelt
Key West, Florida

INVENTORY

Existing Land Uses and Access

The subject site is comprised of two (2) parcels with a total land area of +/- 5.117 acres. The Parcel ID Numbers are 00002280-000100 and 00002280-000101. The existing development on the site consists of a two-story mixed-use building with two (2) apartments, a medical office, and a retail store (i.e. massage parlor). There is also a single-story office building with approximately 3,200 square feet of finished leasable area. Vehicular access is provided by one (1) full access driveway located on N. Roosevelt Boulevard.

Proposed Land Uses and Access

The subject site will be redeveloped with affordable housing. This housing will be provided in the form of 74 live-aboard boat slips. The two-story building will remain generally as is; however, the single-story building will be eliminated to make room for a club house to serve the residents of this community. Approximately 11 parking spaces will be provided on-site while an additional 20 parking spaces will be provided on the adjacent parcel to the south. Extensive parking will be provided for both bicycles and scooters. (It is noted that, of the 74 proposed live-aboard boat slips to be provided, only 27 boat slips will have rights to park an automobile on site. Every boat slip will have the ability to park bicycles and scooters on site.) Appendix A contains a preliminary site plan for the proposed redevelopment activity.

Transportation System

The primary roadway serving the subject study area is N. Roosevelt Boulevard (State Road 5). This facility is a state-maintained five-lane principal arterial roadway with two (2) northbound lanes, two (2) southbound lanes, and a center two-way left-turn lane. The posted speed limit in this area is 35 miles per hour (mph) and the FDOT's access management classification is "6-Non-Restrictive". The subject area is well-served by an existing designated shared bicycle lane along N. Roosevelt Boulevard and pedestrian sidewalks / crosswalks.

Transit Service

The subject site is served by Key West Transit. The Blue, Green, and Red routes along with the Lower Keys Shuttle provide service along N. Roosevelt Boulevard. The northbound bus stop is located immediately across N. Roosevelt Boulevard near the northern boundary of the subject site. The southbound bus stop is located approximately 140 feet to the south of the project driveway and across from the Taco Bell.

TRIP GENERATION

A trip generation analysis has been conducted for the existing and proposed development on the site. The analysis was performed using the trip generation rates and equations published in the Institute of Transportation Engineer's (ITE) *Trip Generation Manual (10th Edition).* The trip generation analysis was undertaken for the daily, AM peak hour, and PM peak hour conditions. According to the ITE report, the most appropriate "land use" categories for the existing and proposed development are as follows:

Small Office Building – ITE Land Use #712

- Weekday: T = 16.19 (X)
  where T = number of trips and X = gross floor area
- AM Peak Hour: T = 1.92 (X) (83% in / 17% out)
- PM Peak Hour: T = 2.45 (X) (32% in / 68% out)

Multifamily Housing (Low-Rise) – ITE Land Use #220

- Daily: T = 7.56 (X) – 40.86
  where T = number of trips and X = number of dwelling units
- AM Peak Hour: Ln(T) = 0.95 Ln(X) – 0.51 (23% in / 77% out)
- PM Peak Hour: Ln(T) = 0.89 Ln(X) – 0.02 (63% in / 37% out)

As noted previously, of the 74 proposed live-aboard boat slips to be provided, only 27 boat slips (or, approximately 36%) will have rights to park an automobile on site. On the other hand, every boat slip will have the ability to park bicycles and scooters on site. As a result of this site characteristic, it is evident that the traditional automobile trip generation of the site will be significantly reduced. Additionally, it is noted that the area is well served by Key West Transit (i.e. the Blue, Green, and Red routes along with the Lower Keys Shuttle), wide accessible sidewalks, and a designated bicycle facility along N. Roosevelt Boulevard. Given these characteristics and the urbanized location of this site, it is estimated that the number of vehicle trips will be at least 50% less than a traditional multifamily housing site. Therefore, a 50% trip reduction has been factored in the trip generation analysis for this site.

Utilizing the previously-listed trip generation rates and equations from the referenced ITE document along with the appropriate trip reduction factor for this site, a trip generation analysis was undertaken for the existing and proposed redevelopment activity. The results of this effort are documented in Table 1 below and excerpts from the referenced ITE Manual are presented in Appendix B.

Table 1
Trip Generation Analysis
2407-2409 N. Roosevelt Boulevard - Key West, Florida

Land Use	Size	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Existing Land Use								
Small Office Building	3,200 SF	52	5	1	6	3	5	8
Total		**52**	**5**	**1**	**6**	**3**	**5**	**8**
Proposed Land Use								
Multifamily Housing (Low-Rise)	74 DU	519	8	28	36	28	17	45
- Alternative Mode Reduction (-50%)		(260)	(4)	(14)	(18)	(14)	(9)	(23)
Total		**259**	**4**	**14**	**18**	**14**	**8**	**22**
Difference (Proposed - Existing)		**207**	**(1)**	**13**	**12**	**11**	**3**	**14**

Compiled by: KBP Consulting, Inc. (December 2018).
Source: ITE Trip Generation Manual (10th Edition).

As indicated in Table 1 above, the number of vehicle trips expected to be generated by the proposed live-aboard community consists of 259 daily vehicle trips, 18 vehicle trips in the AM peak hour (4 inbound and 14 outbound), and 22 vehicle trips in the PM peak hour (14 inbound and 8 outbound). When considering the existing development on this site that will be eliminated, this represents an increase of 207 daily vehicle trips, an increase of 12 vehicle trips during the AM peak hour, and an increase of 14 vehicle trips during the PM peak hour.

TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

The trip distribution and traffic assignment for the affordable housing community to be located at 2407-2409 N. Roosevelt Boulevard was developed based upon knowledge of the study area, examination of the surrounding roadway network characteristics, review of current traffic volumes, and existing land use patterns. Figure 2 on the following page depicts the anticipated trip distribution for this project.

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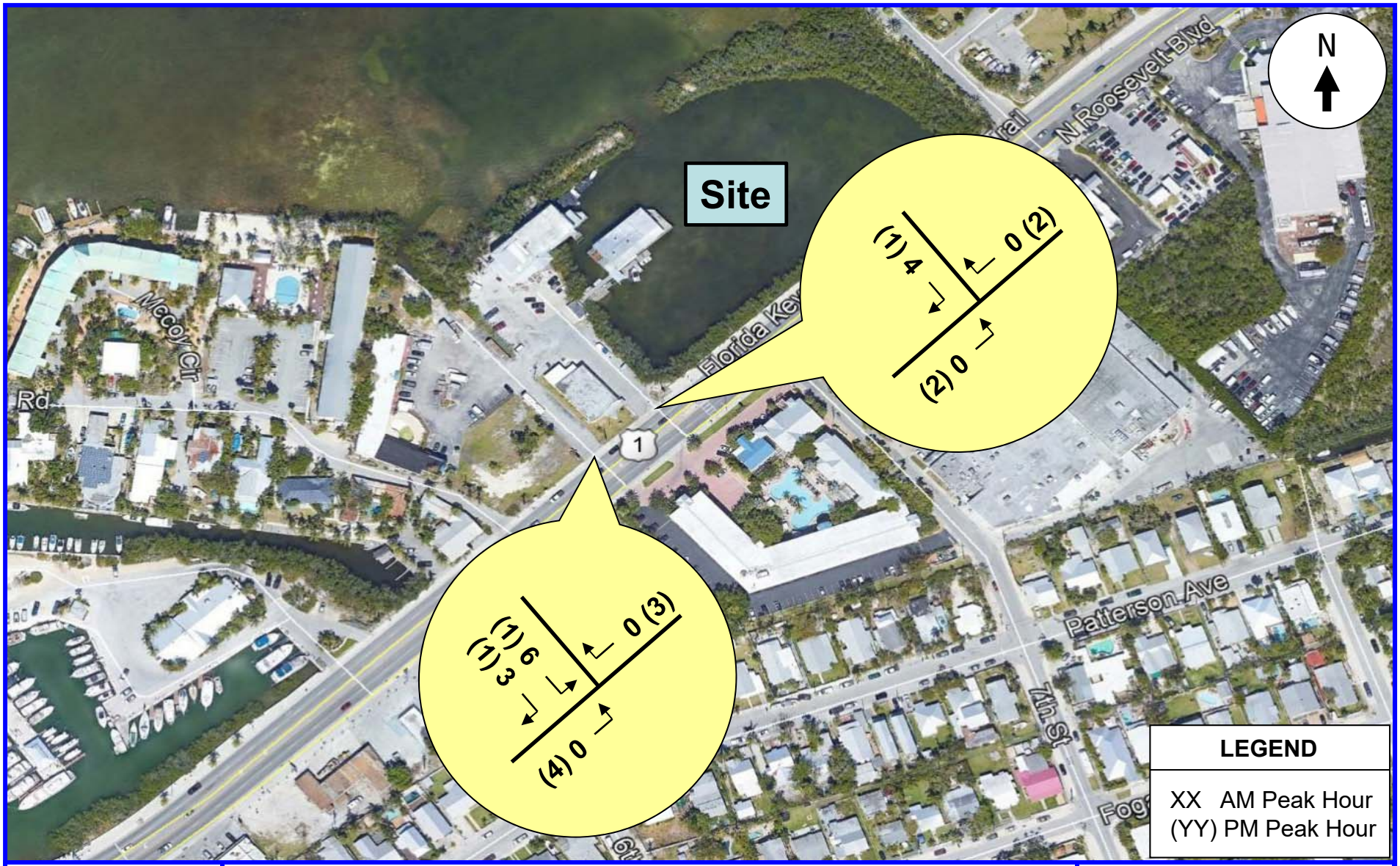
Trip Distribution

FIGURE 2
2407-2409 N. Roosevelt
Key West, Florida

The net new AM peak hour and PM peak hour traffic to be generated by the proposed live-aboard units at 2407-2409 N. Roosevelt Boulevard was assigned to the site's project driveway on N. Roosevelt Boulevard as well as the driveway immediately to the south that will provide access to the additional parking spaces to be created on the adjacent parcel.

Based upon a site review of the existing access point to the subject parcel, it is evident that left-turns out onto N. Roosevelt Boulevard can be difficult and potentially unsafe. There is an existing mid-block pedestrian crosswalk immediately to the north that has raised medians on either side. The presence of these raised medians limits the ability of motorists to perform two-stage left-turn maneuvers to travel north on N. Roosevelt Boulevard. For this reason, it is recommended that egress movements from the project driveway be limited to right-turns only.

The driveway traffic assignment is summarized in Figure 3 on the following page. As indicated in Figure 3, the projected increase in driveway volumes will be minimal during both of the peak periods of the day.



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Driveway Traffic Assignment
Net New Vehicle Trips

FIGURE 3
2407-2409 N. Roosevelt
Key West, Florida

SUMMARY & CONCLUSIONS

The property located at 2407-2409 N. Roosevelt Boulevard in Key West, Monroe County, Florida currently contains a two-story mixed-use building (i.e. medical office, retail, and residential uses) and a single-story office building. Plans are underway to redevelop a portion of this site by eliminating the single-story office building and introducing affordable housing by way of live-aboard boat slips.

The existing development on the site consists of a two-story mixed-use building with two (2) apartments, a medical office, and a retail store (i.e. massage parlor). There is also a single-story office building with approximately 3,200 square feet of leasable area. The subject site will be redeveloped with affordable housing. This housing will be provided in the form of 74 live-aboard boat slips. The two-story building will remain as is; however, the single-story building will be eliminated to make room for a club house to serve the residents of this community.

Based upon the location of the site and the operational characteristics of the community, it is anticipated that many of the residents will choose alternative modes of transportation (i.e. walking, bicycling, and using Key West Transit which offers service immediately adjacent to the site) thereby significantly reducing the traffic impacts of this site. As indicated in the trip generation analysis, the number of vehicle trips expected to be generated by the proposed live-aboard community consists of 259 daily vehicle trips, 18 vehicle trips in the AM peak hour (4 inbound and 14 outbound), and 22 vehicle trips in the PM peak hour (14 inbound and 8 outbound). When considering the existing development on this site that will be eliminated, this represents an increase of 207 daily vehicle trips, an increase of 12 vehicle trips during the AM peak hour, and an increase of 14 vehicle trips during the PM peak hour.

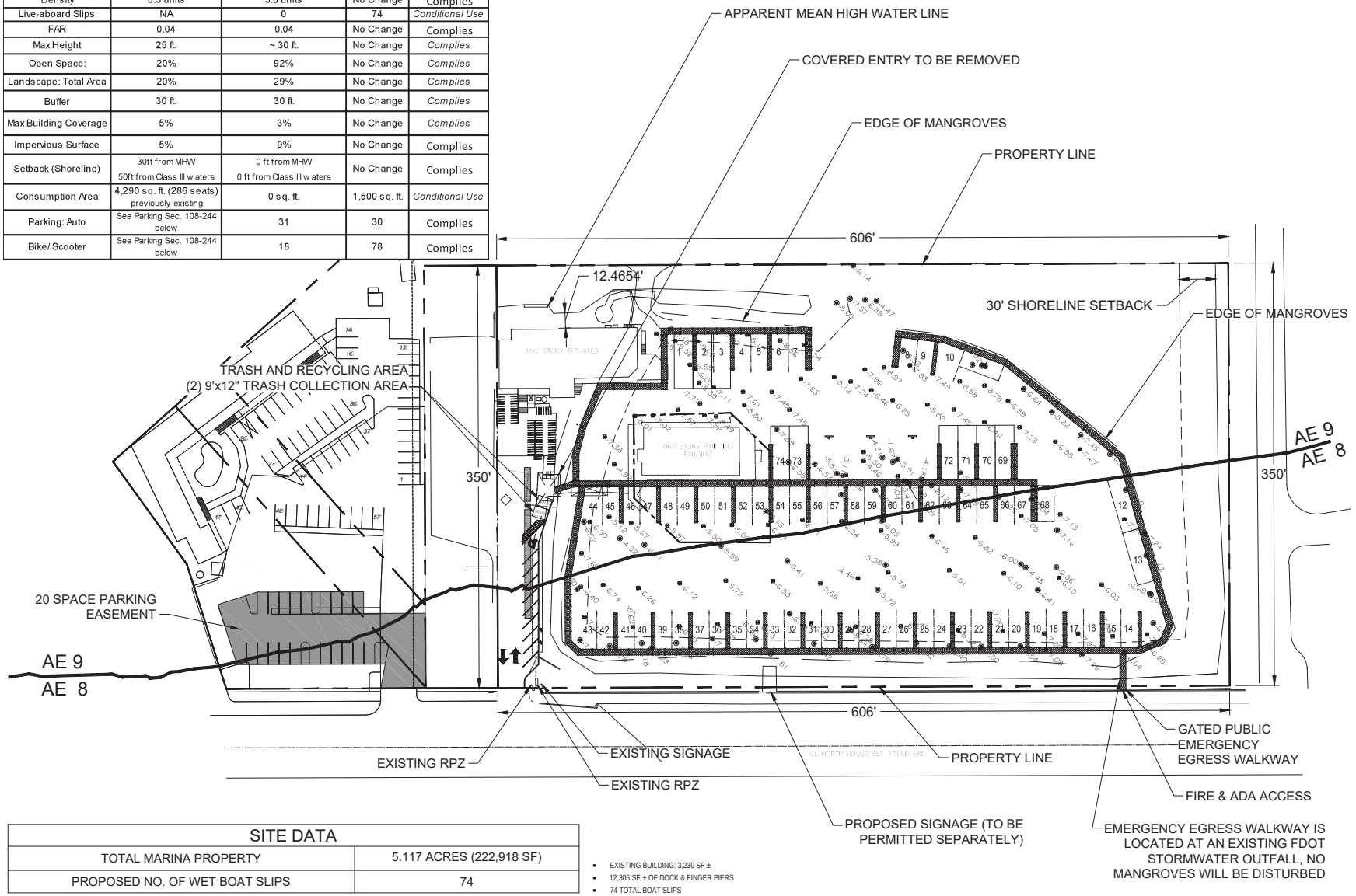
Based upon the trip generation and distribution characteristics for this site, it is evident that the additional traffic to be generated by the redevelopment activity will be minimal.

APPENDIX A

2407-2409 N. Roosevelt Boulevard

Preliminary Site Plan

Site Data	Required/ Allowed	Existing	Proposed	Compliance
Zoning	Conservation	Conservation	No Change	*Complies*
Site Size	10 ac	5.12 ac. (222,918 sq. ft.)	No Change	Complies
Upland Area	NA	0.69 ac (30,149 sq. ft.)	No Change	*Complies*
Density	0.5 units	3.0 units	No Change	Complies
Live-aboard Slips	NA	0	74	*Conditional Use*
FAR	0.04	0.04	No Change	Complies
Max Height	25 ft.	~ 30 ft.	No Change	*Complies*
Open Space:	20%	92%	No Change	*Complies*
Landscape: Total Area	20%	29%	No Change	*Complies*
Buffer	30 ft.	30 ft.	No Change	*Complies*
Max Building Coverage	5%	3%	No Change	*Complies*
Impervious Surface	5%	9%	No Change	Complies
Setback (Shoreline)	30ft from MHW 50ft from Class III waters	0 ft from MHW 0 ft from Class III waters	No Change	Complies
Consumption Area	4,290 sq. ft. (286 seats) previously existing	0 sq. ft.	1,500 sq. ft.	*Conditional Use*
Parking: Auto	See Parking Sec. 108-244 below	31	30	Complies
Bike/ Scooter	See Parking Sec. 108-244 below	18	78	Complies



SITE DATA	
TOTAL MARINA PROPERTY	5.117 ACRES (222,918 SF)
PROPOSED NO. OF WET BOAT SLIPS	74

- EXISTING BUILDING: 3,230 SF ±
- 12,305 SF ± OF DOCK & FINGER PIERS
- 74 TOTAL BOAT SLIPS

Meridian Engineering LLC
201 Front Street, Suite 203
Key West, Florida 33040
AUTHORIZATION #29401
ph:305-293-3263 fax:293-4899

Seal:

NOT VALID FOR CONSTRUCTION UNLESS SIGNED AND SEALED IN THIS BLOCK

RICHARD J. MILELLI
PE #58315

2407-2409 N. ROOSEVELT BLVD
KEY WEST, FLORIDA

Drawn By: ANF
Checked By: RJM

Revisions:

Title:
PROPOSED SITE PLAN

Sheet Number:
C-1.0

Date: OCTOBER 26, 2018

APPENDIX B

ITE Trip Generation Data

Land Use: 712
Small Office Building

Description

A small office building houses a single tenant and is less than or equal to 5,000 gross square feet in size. It is a location where affairs of a business, commercial or industrial organization, or professional person or firm are conducted. General office building (Land Use 710) is a related use.

Additional Data

Time-of-day distribution data for this land use are presented in Appendix A. For the 18 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:30 a.m. and 12:30 p.m. and 5:00 and 6:00 p.m., respectively.

The sites were surveyed in the 1980s and the 2010s in Alberta (CAN), Texas, and Wisconsin.

Source Numbers

890, 891, 959, 976

Small Office Building
(712)

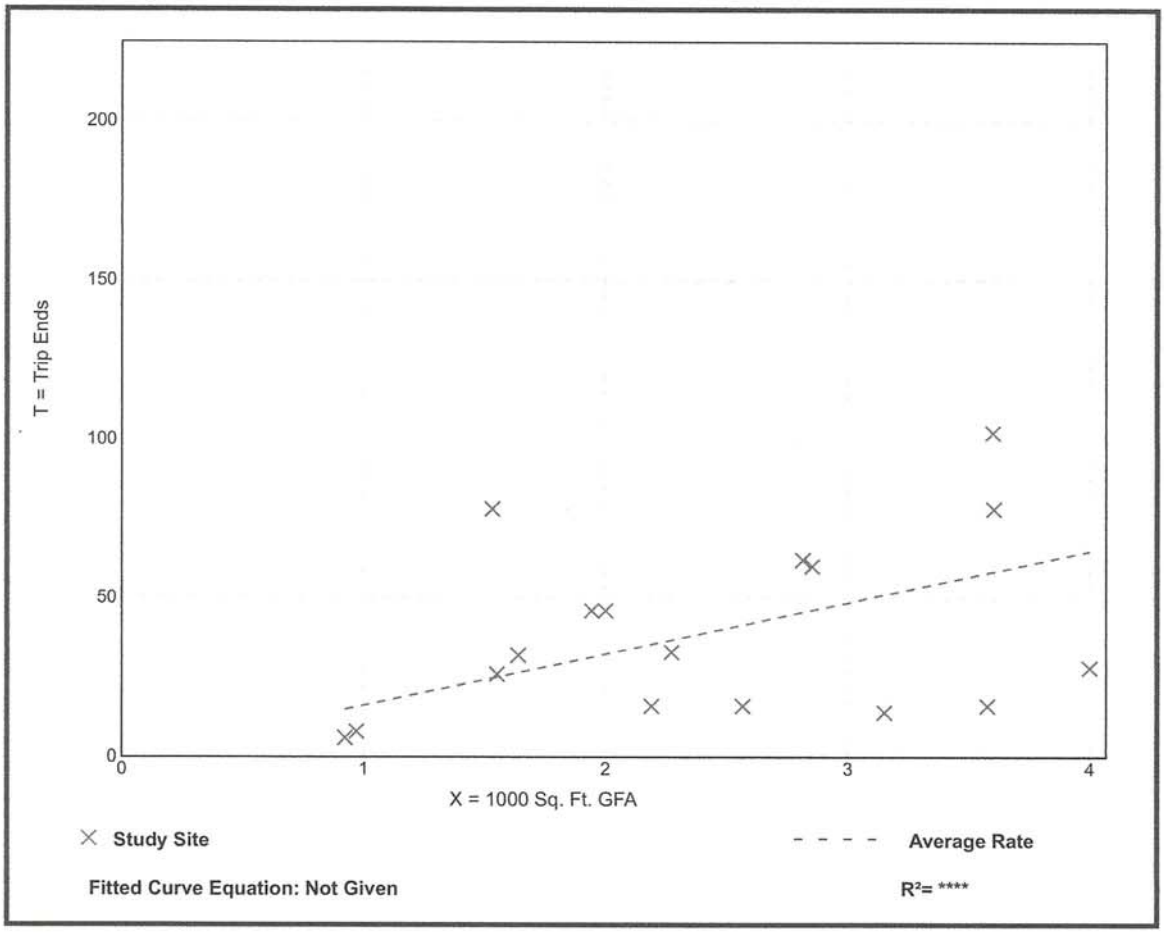
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 17
1000 Sq. Ft. GFA: 2
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
16.19	4.44 - 50.91	11.03

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

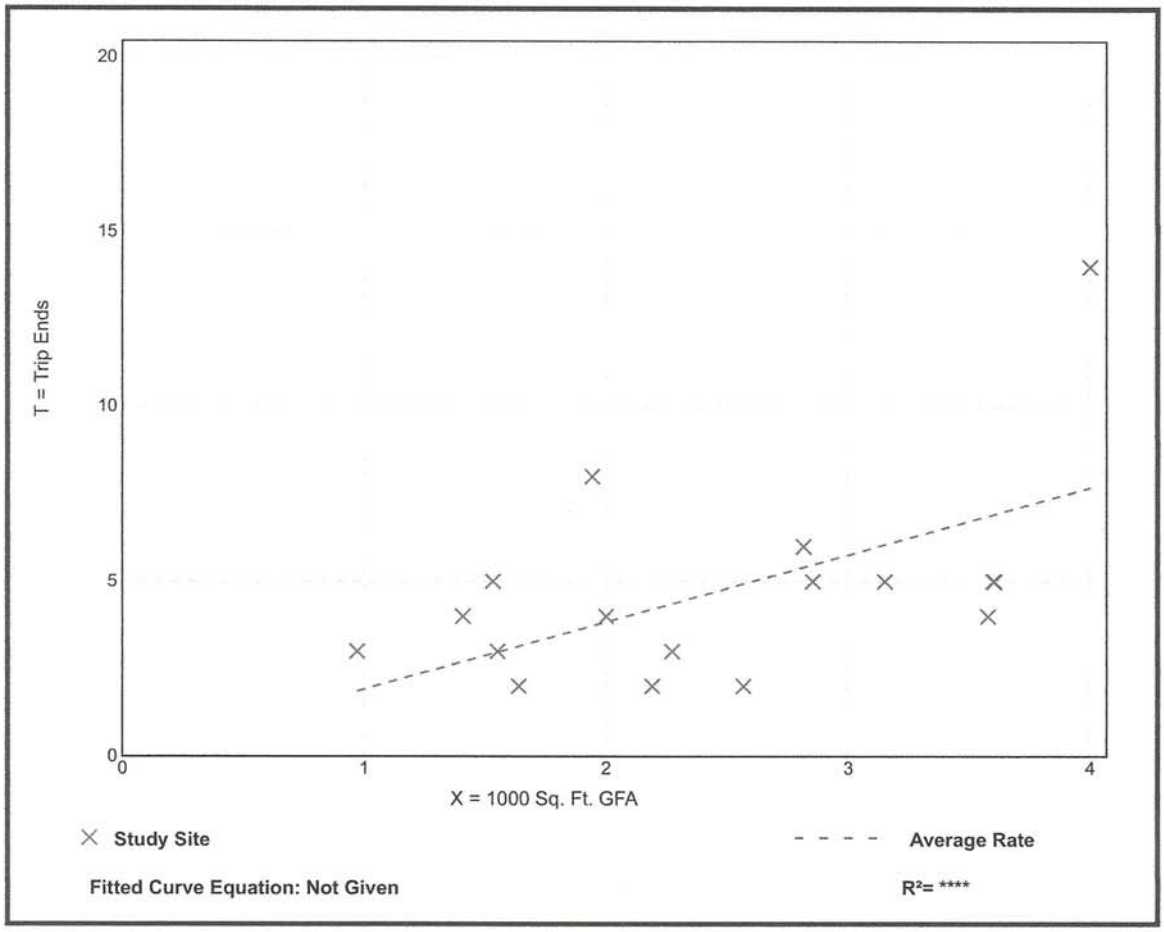
Small Office Building
(712)

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: 17
1000 Sq. Ft. GFA: 2
Directional Distribution: 83% entering, 18% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.92	0.78 - 4.12	0.97

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

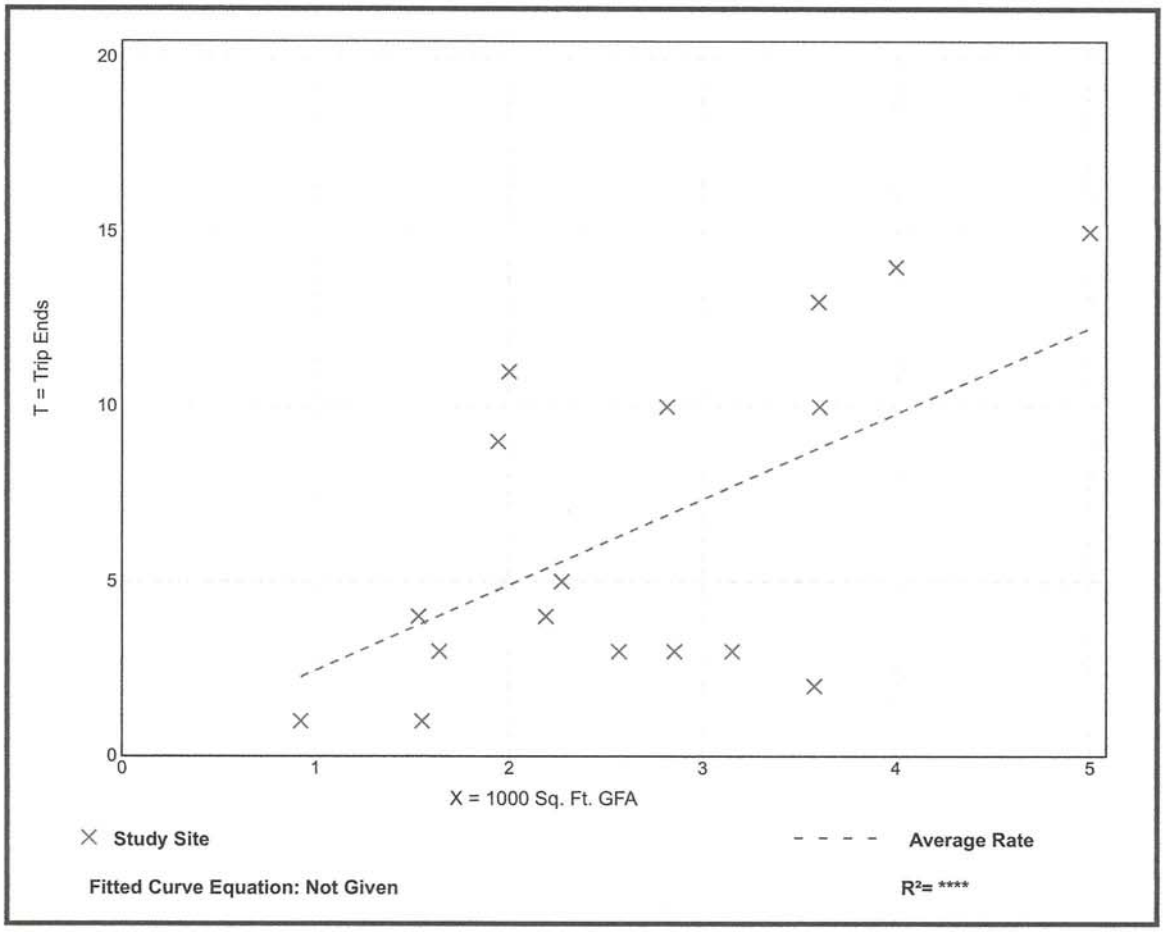
Small Office Building
(712)

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: 17
1000 Sq. Ft. GFA: 3
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
2.45	0.56 - 5.50	1.38

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

Land Use: 220
Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors). Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), and off-campus student apartment (Land Use 225) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the low-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Time-of-day distribution data for this land use are presented in Appendix A. For the 10 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:45 and 5:45 p.m., respectively. For the one site with Saturday data, the overall highest vehicle volume was counted between 9:45 and 10:45 a.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 11:45 a.m. and 12:45 p.m.

For the one dense multi-use urban site with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 6:15 and 7:15 p.m., respectively.

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

The average numbers of person trips per vehicle trip at the five general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.13 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.21 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, District of Columbia, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Minnesota, New Jersey, New York, Ontario, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Virginia, and Washington.

It is expected that the number of bedrooms and number of residents are likely correlated to the number of trips generated by a residential site. Many of the studies included in this land use did not indicate the total number of bedrooms. To assist in the future analysis of this land use, it is important that this information be collected and included in trip generation data submissions.

Source Numbers

168, 187, 188, 204, 211, 300, 305, 306, 319, 320, 321, 357, 390, 412, 418, 525, 530, 571, 579, 583, 864, 868, 869, 870, 896, 903, 918, 946, 947, 948, 951

Multifamily Housing (Low-Rise)
(220)

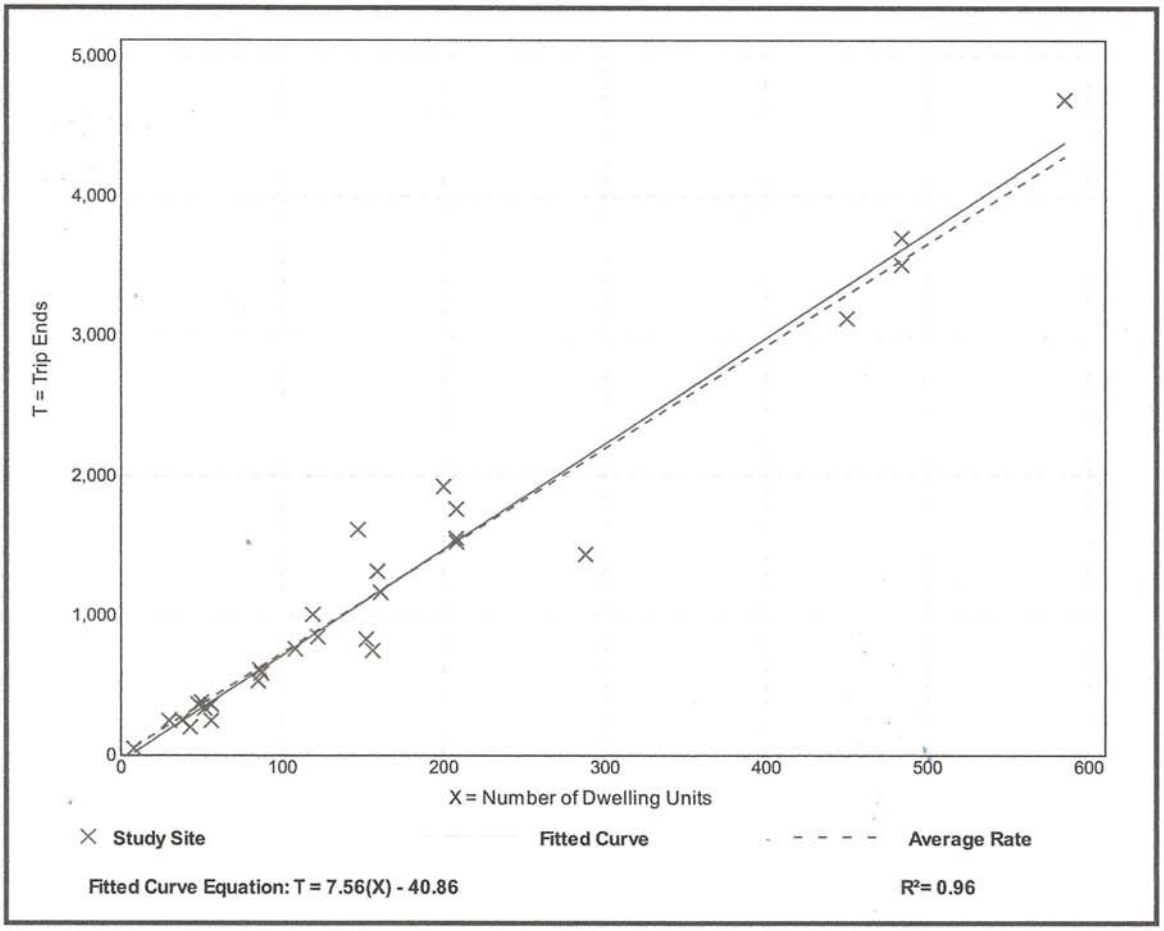
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 29
Avg. Num. of Dwelling Units: 168
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.32	4.45 - 10.97	1.31

Data Plot and Equation



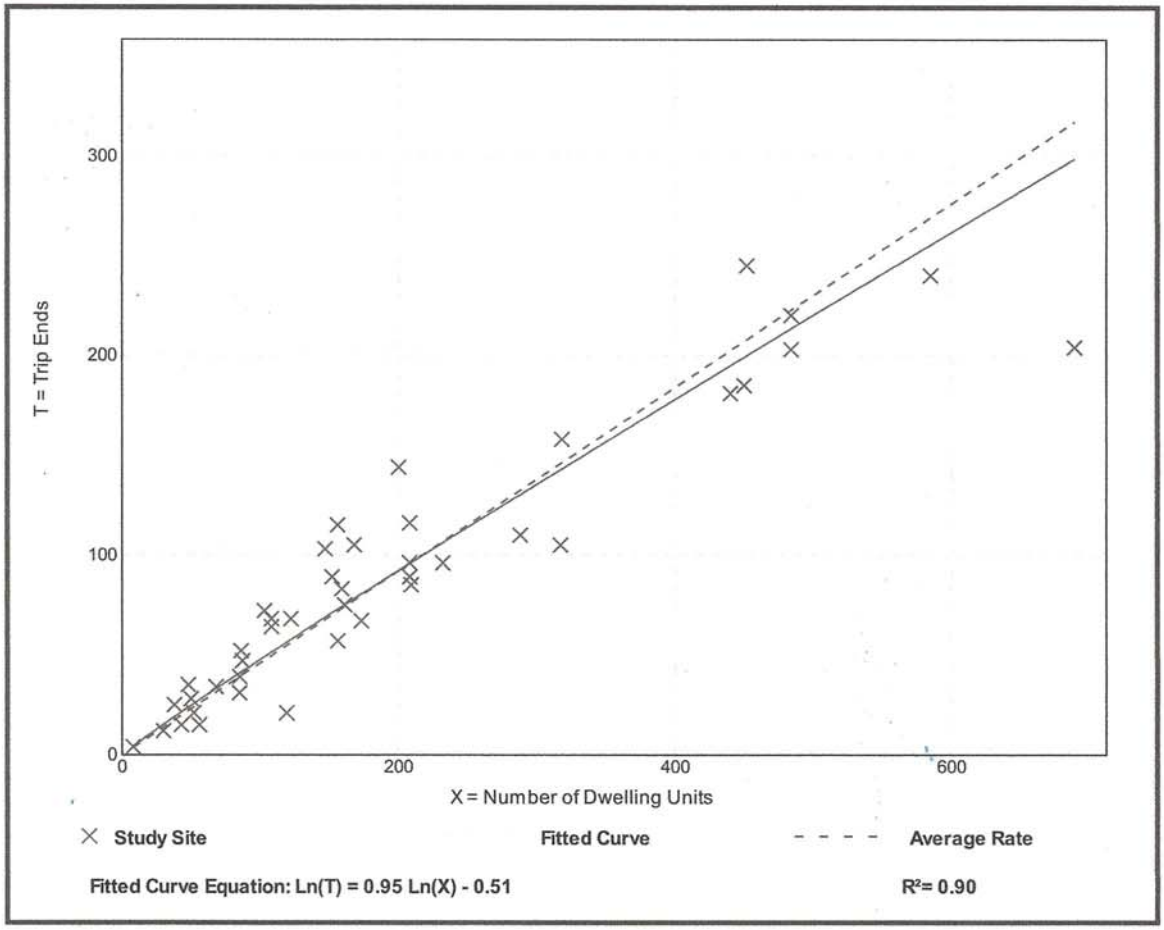
Multifamily Housing (Low-Rise)
(220)

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: 42
Avg. Num. of Dwelling Units: 199
Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.46	0.18 - 0.74	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise)
(220)

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: 50
Avg. Num. of Dwelling Units: 187
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.56	0.18 - 1.25	0.16

Data Plot and Equation