488 Residences at Riverwalk

traffic study

prepared for:
Ellis Diversified, Inc

Traf Tech
ENGINEERING, INC.

April 2017

Revised May 2017

Traf Tech
ENGINEERING, INC.

May 30, 2017

Mr. Jim Ellis
Ellis Diversified, Inc
3020 NE 32nd Avenue # 110
Fort Lauderdale, Florida 33308

Re: 488 Residences at Riverwalk – Fort Lauderdale, Florida
Revised Traffic Engineering Study

Dear Jim:

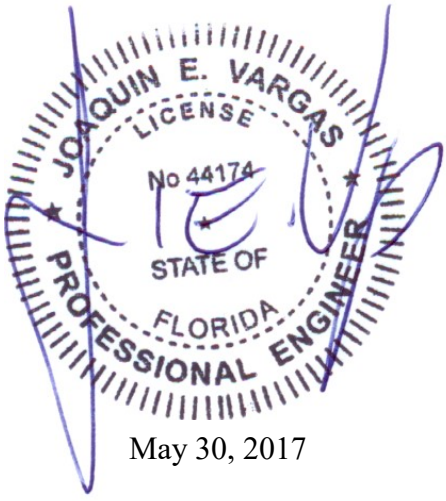
Traf Tech Engineering, Inc. is pleased to provide you with the results of the revised traffic study undertaken for the proposed 488 Residences at Riverwalk development planned to be located at 488 SW 1st Avenue, Fort Lauderdale, Broward County, Florida.

It has been a pleasure working with Ellis Diversified, Inc., on this project.

Sincerely,

TRAF TECH ENGINEERING, INC.

Joaquin E. Vargas, P.E.
Senior Transportation Engineer



May 30, 2017

8400 North University Drive, Suite 309, Tamarac, Florida 33321
Tel: (954) 582-0988 Fax: (954) 582-0989

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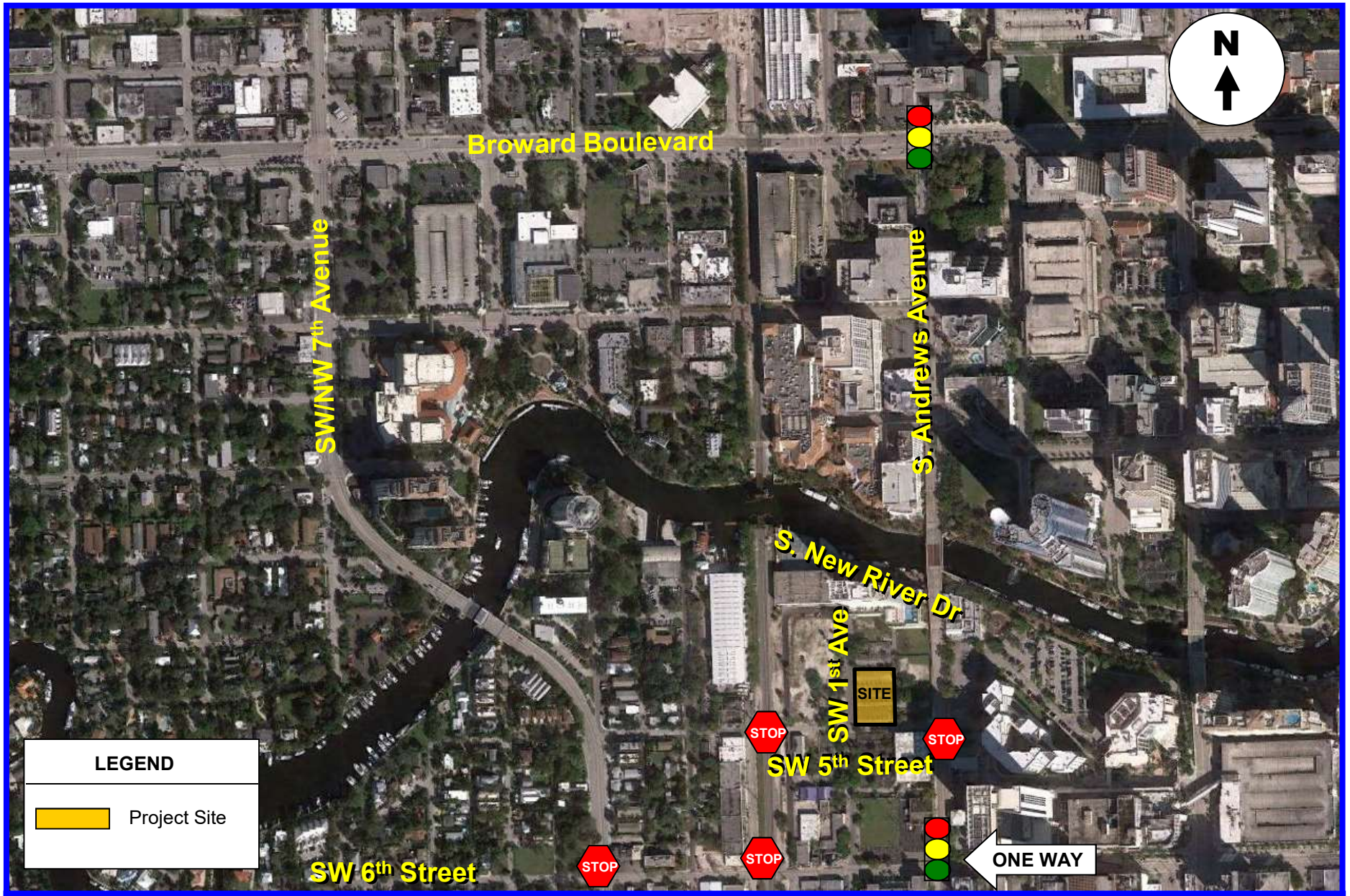
INTRODUCTION

488 Residences at Riverwalk is a proposed residential development with a retail component planned to be located at 488 SW 1st Avenue, Fort Lauderdale in Broward County, Florida. Figure 1 on the following page shows the location of the project site as well as the transportation network located in the immediate vicinity of the project site.

Traf Tech Engineering, Inc. was retained by Ellis Diversified, Inc., to conduct a traffic study in connection with the subject project. The study addresses trip generation, access to the site, the traffic impacts on the nearby transportation network, and potential roadway improvement intended to mitigate the new trips generated by the project, if any.

This study is divided into seven (7) sections, as listed below:

1. Inventory
2. Existing Conditions
3. Traffic Counts
4. Trip Generation
5. Trip Distribution and Traffic Assignment
6. Traffic Analysis
7. Conclusions



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PROJECT LOCATION MAP

FIGURE 1
488 Residences at Riverwalk
Fort Lauderdale, Florida

Existing Land Use

The project site is currently vacant.

Proposed Land Uses and Access

Proposed for the site is a 363-unit high-rise residential development and 6,200 square feet of retail. The access to the site will be provided via SW 1st Avenue. The parking garage will be un-impeded (not gated) for both retail users as well as residents.

For purposes of this traffic study, the project is anticipated to be built and occupied by the year 2020. Appendix A contains a copy of the proposed site plan for the 488 Residences at Riverwalk project.

EXISTING CONDITIONS

This section addresses the roadway system surrounding the project site and intersections.

Roadway System

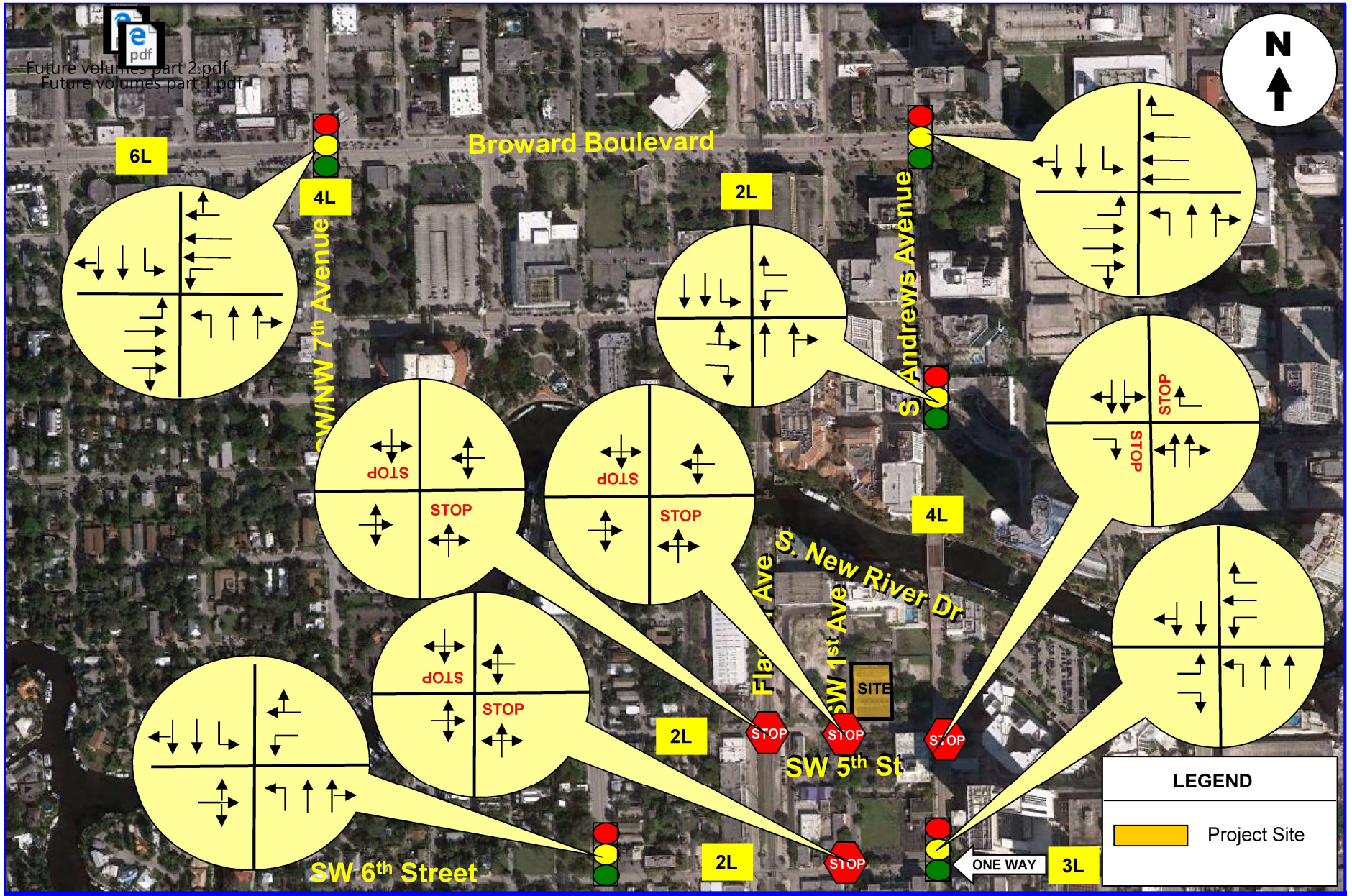
The transportation network located in the vicinity of the project site includes one major arterial, two minor arterial roadways, one collector street, and two local facilities that primarily function as access streets to nearby land uses. The major arterial includes Broward Boulevard, an east-west roadway that provides three through lanes in each direction. The minor arterial roadways include South Andrews Avenue and SW/NW 7th Avenue, north-south roadways that provides two through lanes in each direction. The collector street includes SW/SE 6th Street, an east-west roadway. The subject east-west roadway provides three through lanes in the westbound direction (operates as a one-way westbound roadway between SE 3rd Avenue and S. Andrews Avenue) and becomes a two-way facility west of South Andrews Avenue. The two local roadways include SW 1st Avenue (a north-south street) and SW 5th Street (an east-west roadway).

Intersections

For purposes of this study, eight intersections located in the vicinity of the project were selected for analysis purposes. The intersections are described below:

1. *S. Andrews Avenue and SE 5th Street*: This is a stop-control intersection. The east and west approaches of this intersection provide stop signs and are restricted to right-turns only.
2. *S. Andrews Avenue and SE 6th Street*: This is a signalized intersection.
3. *SW 1st Avenue and SW 6th Street:* This is a stop-control intersection with stop signs on SW 1st Avenue.
4. *SW 5th Street and Flagler Avenue:* This is a stop-control intersection with stop signs on Flagler Avenue.
5. *SW 6th Street and SW 4th Avenue:* This is a signalized intersection.
6. *Broward Boulevard and S. Andrews Avenue:* This is a signalized intersection.
7. *Broward Boulevard and SW 7th Avenue:* This is a signalized intersection.
8. *Andrews Avenue and Las Olas Boulevard:* This is a signalized intersection

Figure 2 depicts the number of lanes on the roadways located within the study area of the proposed project. The turning lanes provided at the intersections selected for analysis purposes are also illustrated in the figure.



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EXISTING LANE GEOMETRY

FIGURE 2
488 Residences at Riverwalk
Fort Lauderdale, Florida

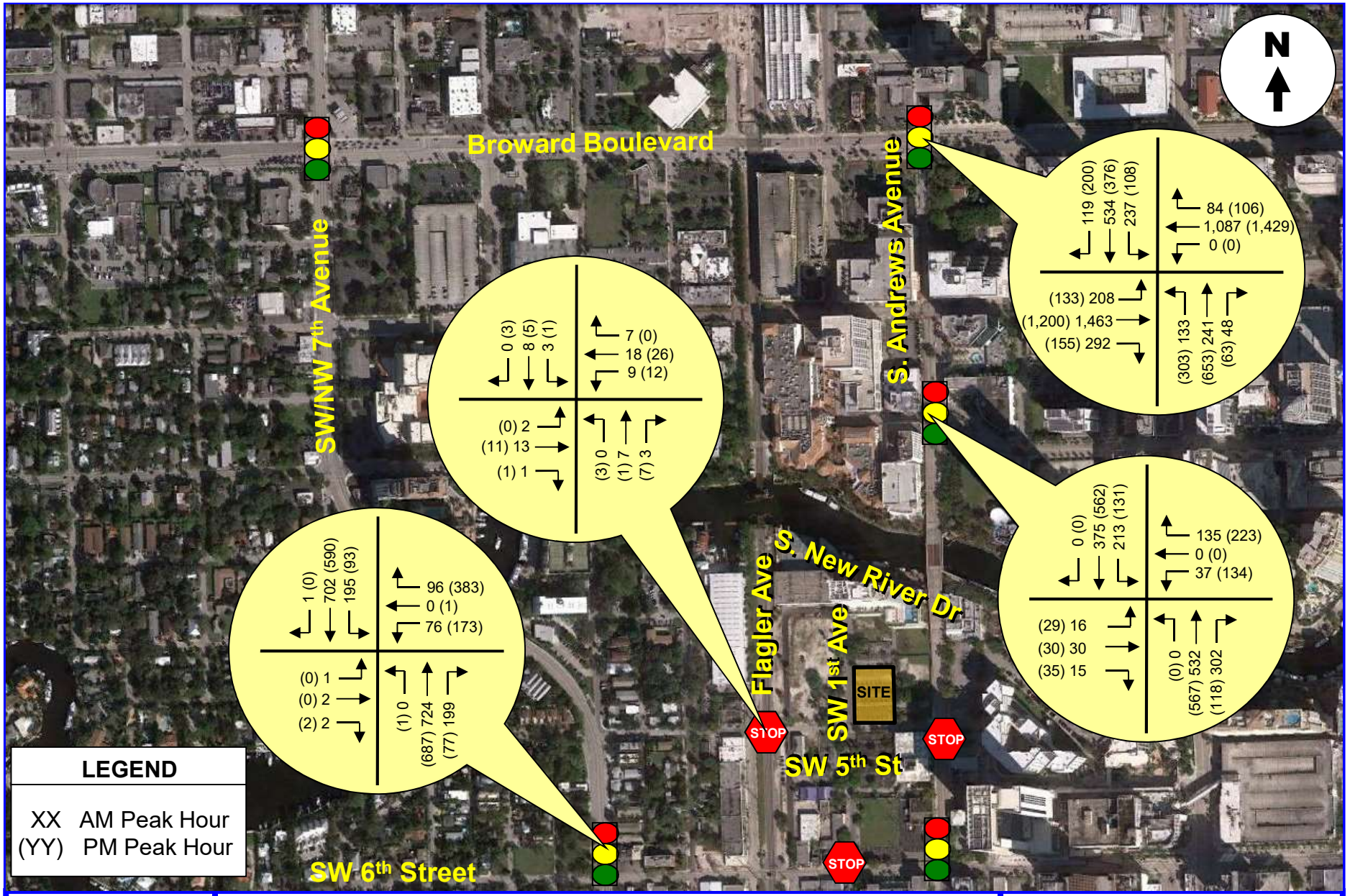
TRAFFIC COUNTS

Traf Tech Engineering, Inc., in association with Traffic Survey Specialists, Inc., collected intersection turning movement counts at the following eight (8) intersections located within the study area:

1. Andrews Avenue and SW/SE 6th Street (signalized intersection)
2. Andrew Avenue and SW/SE 5th Street (stop-control intersection)
3. SW 6th Street and SW 1st Avenue (stop-control intersection)
4. SW 5th Street and Flagler Avenue (stop-control intersection)
5. SW 6th Street and SW 4th Avenue (signalized intersection)
6. Broward Boulevard and Andrews Avenue (signalized intersection)
7. Broward Boulevard and SW 7th Avenue (signalized intersection)
8. Andrews Avenue and Las Olas Boulevard (signalized intersection)

The intersection turning movement counts were collected on Tuesday, September 15, 2015, Tuesday June 9, 2015, Wednesday September 23, 2015, and Tuesday October 18, 2016. The intersection turning movement counts were recorded during the morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) peak periods and included pedestrians and bicyclists.

Figures 3a and 3b summarize the results of the intersection turning movement counts. Appendix B contains the traffic counts, as collected in the field. The signal timing plans for the signalized intersections were obtained from Broward County Traffic Engineering Division and are also contained in Appendix B.



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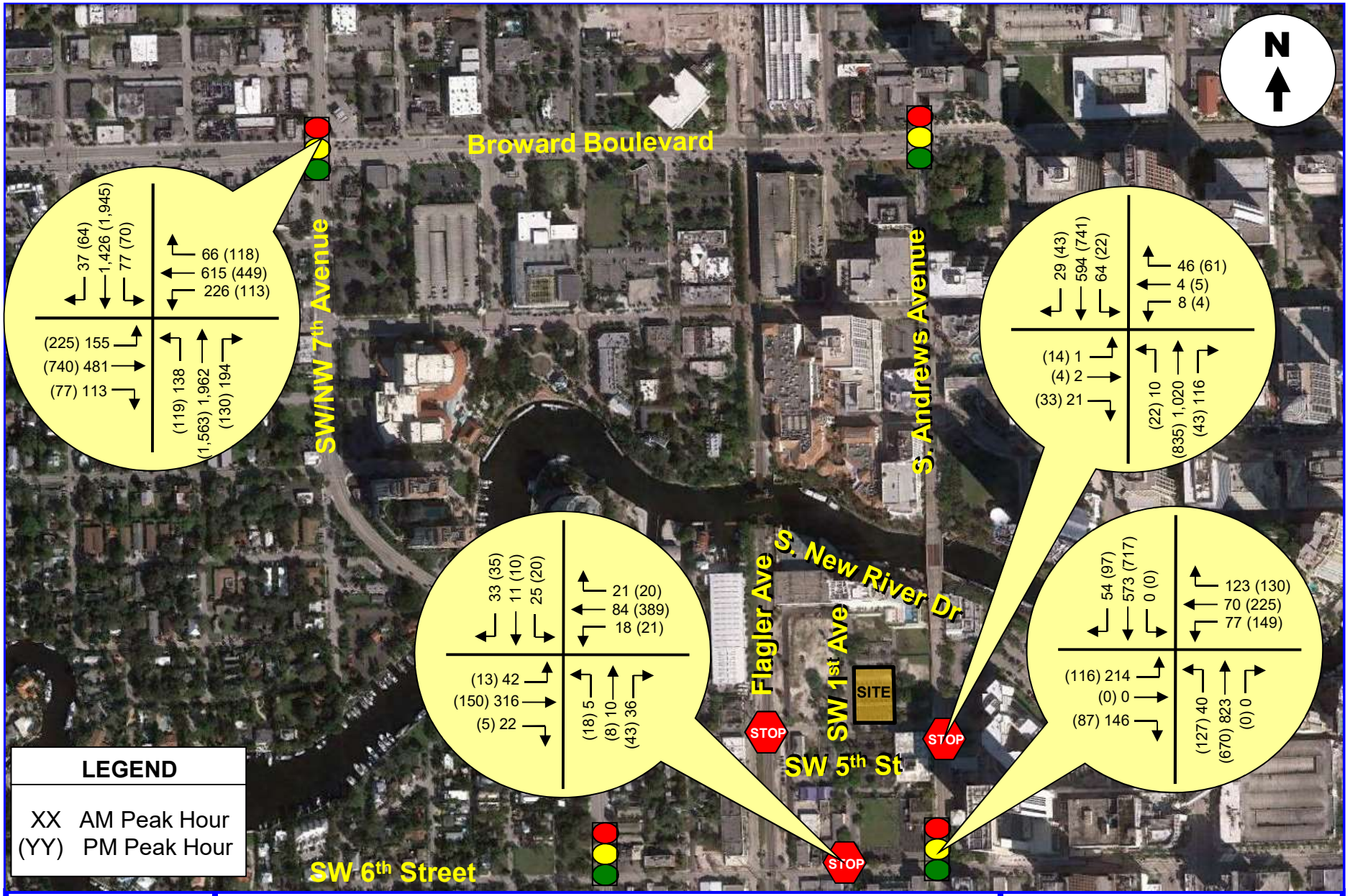
EXISTING TRAFFIC COUNTS
(2016 peak season volumes)

FIGURE 3A
488 Residences at Riverwalk
Fort Lauderdale, Florida



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EXISTING TRAFFIC COUNTS
(2016 peak season volumes)

FIGURE 3B
488 Residences at Riverwalk
Fort Lauderdale, Florida

TRIP GENERATION

The trip generation for the proposed 488 Residences at Riverwalk development was based on information contained in the Institute of Transportation Engineer's (ITE) *Trip Generation* manual (9th Edition). According to the subject ITE manual, the most appropriate "land use" categories for the subject project are ITE's Land Use 232 – High Rise Residential Condominium/Townhouse and ITE's Land Use 826 – Specialty Retail.

Table 1 documents the trips generated associated with the 488 Residences at Riverwalk project.

TABLE 1
Trip Generation Summary
488 Residences at Riverwalk

PROPOSED DEVELOPMENT (363 Residential Units and 6,200 sf Retail)							
Land Use	**Daily Trips**	**AM Peak Trips**			**PM Peak Trips**		
		Total	**In**	**Out**	**Total**	**In**	**Out**
Retail (6,200 sq.ft.)	303	36	16	20	146	70	76
Residential (363 units)	1,517	134	25	109	139	86	53
External Trips =	**1,820**	**170**	**41**	**129**	**285**	**156**	**129**

SOURCE: ITE Trip Generation Manual (9th Edition)

As indicated in Table 1, the new trips consist of approximately 1,820 daily trips, approximately 170 AM peak hour trips (41 inbound and 129 outbound), and approximately 285 PM peak hour trips (156 inbound and 129 outbound).

The trip generation equations for the proposed development program, given by ITE, are:

HIGH RISE RESIDENTIAL CONDOMINIUM/TOWNHOUSE (Land Use 232)

Daily Trips

T = 4.18 (X)
Where T = average daily vehicle trip ends
X = number of residential units

AM Peak Hour of Adjacent Street (Typical Morning Rush Hour)

T = 0.29 (X) + 28.86 (19% inbound and 81% outbound)
Where T = average AM peak hour vehicle trip ends
X = number of residential units

PM Peak Hour of Adjacent Street (Typical Afternoon Rush Hour)

T = 0.34 (X) +15.47 (62% inbound and 38% outbound)
Where T = average PM peak hour vehicle trip ends
X = number of residential units

SPECIALTY RETAIL (Land Use 826)

Daily Trips

T = 42.78 (X) + 37.66

Where T = average daily vehicle trip ends

X = 1,000 square feet of gross leasable area

AM Peak Hour of Adjacent Street (Used Peak Hour of Generator)

T = 2.40 (X) + 21.48 (44% inbound and 56% outbound)

Where T = average AM peak hour vehicle trip ends

X = 1,000 square feet of gross leasable area

PM Peak Hour of Adjacent Street (Typical Afternoon Rush Hour)

T = 4.91 (X) + 115.59 (48% inbound and 52% outbound)

Where T = average PM peak hour vehicle trip ends

X = 1,000 square feet of gross leasable area

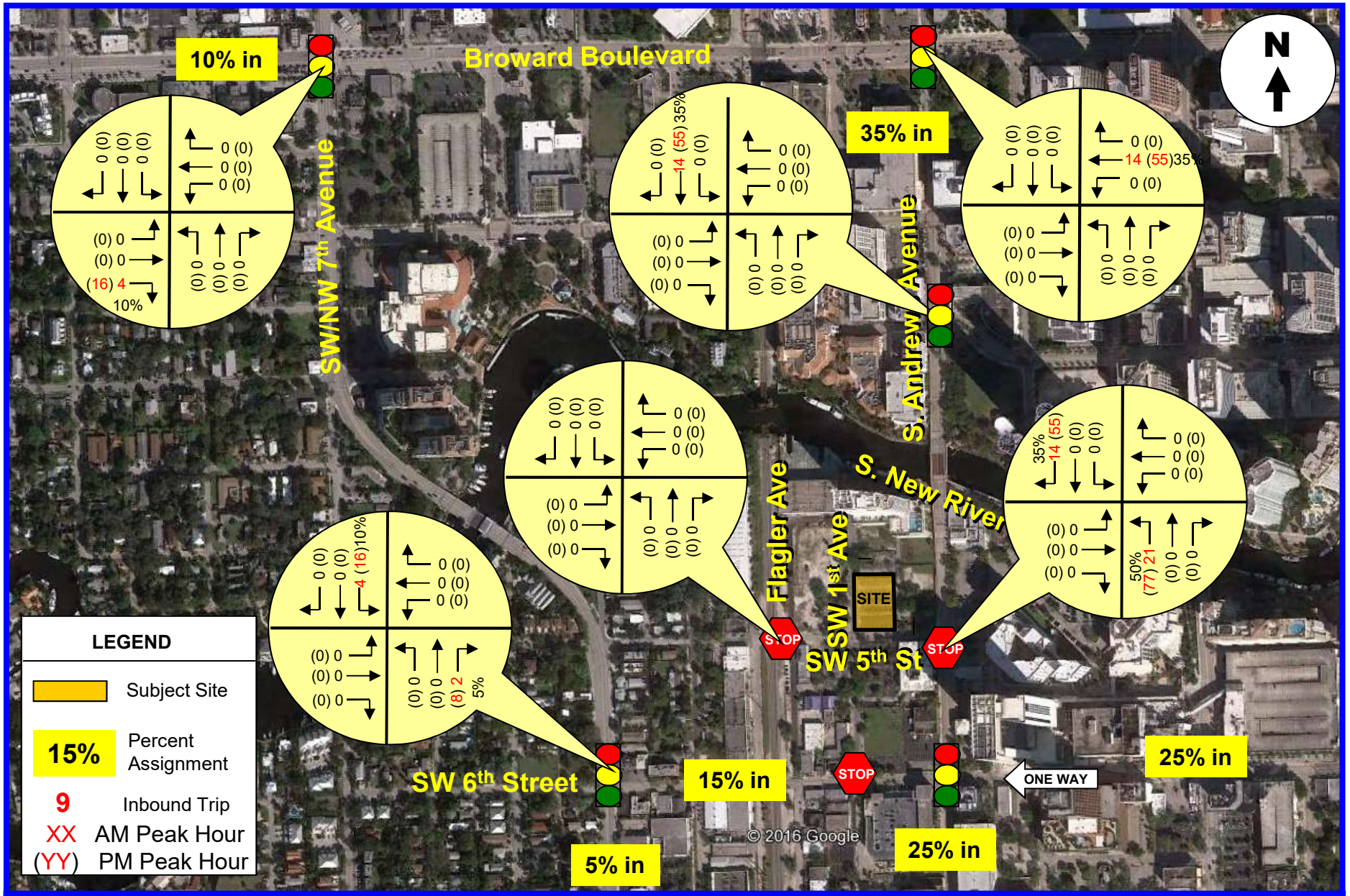
For the residential land use, the formula produced higher peak hour trips than the rates and therefore, the formula was used for a more conservative approach. The AM peak and PM Peak hour rates per dwelling unit are 0.34 and 0.38, respectively. Similarly, the formula was used for the retail land use since it produced higher trips than the rates. The rates are 2.71 and 6.84 trips per 1,000 square feet, respectively.

TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

The trip distribution and traffic assignment for the proposed project was based on knowledge of the study area, examination of the surrounding roadway network characteristics, review of current traffic volumes, and existing land use patterns. The trip distribution assumed for the 488 Residences at Riverwalk project is summarized below:

- 35% to and from the north via South Andrews Avenue
- 25% to and from the south via South Andrews Avenue
- 25% to and from the east via SE 6th Street/SE 7th Street
- 15% to and from the west via SW 6th Street

The new AM and PM peak hour traffic generated by the 488 Residences at Riverwalk project was assigned to the nearby transportation network using the trip distribution documented above. The subject traffic assignment is summarized in Figures 4a thru 4d.



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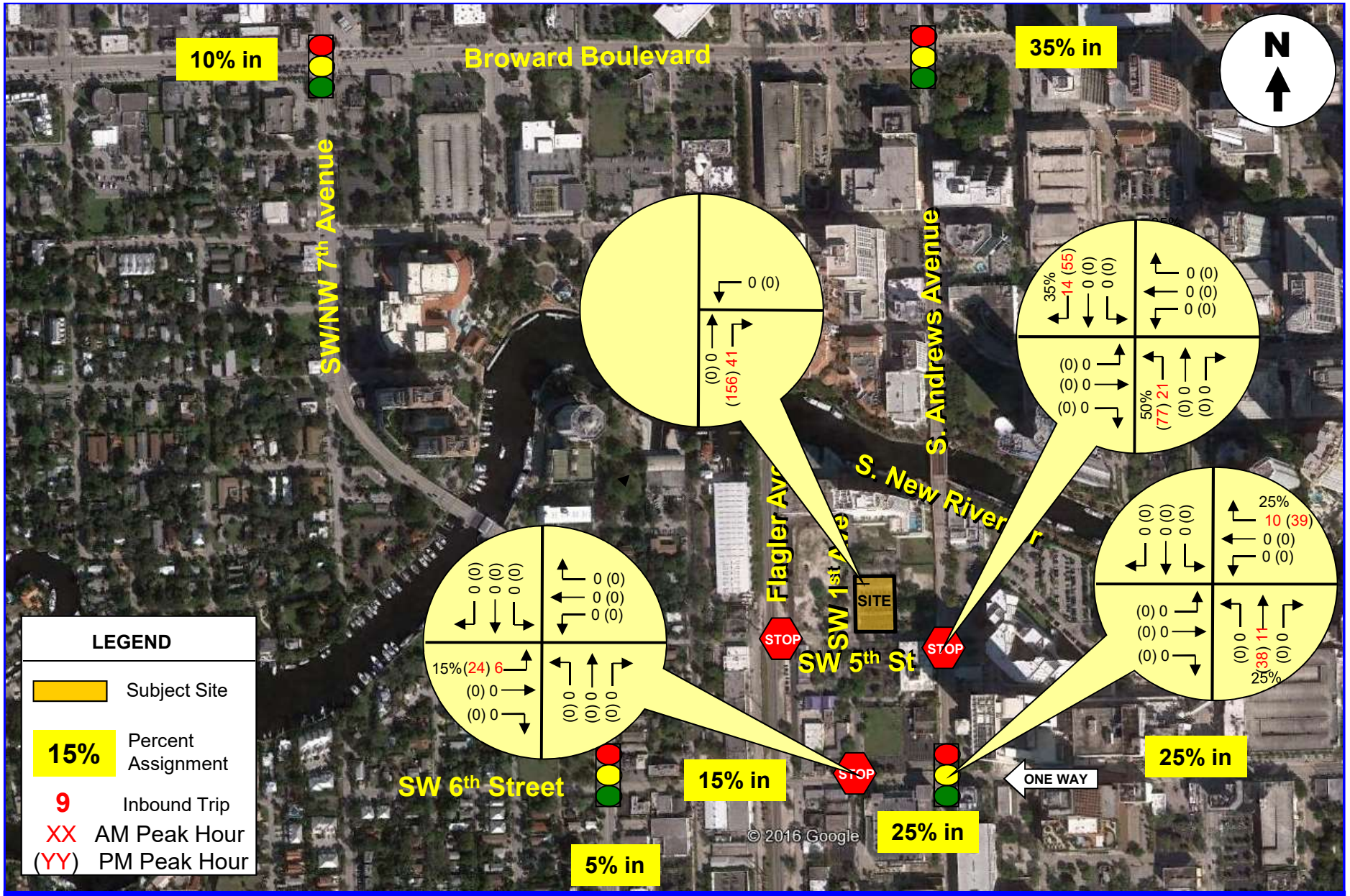
PROJECT TRAFFIC ASSIGNMENT
(New Project Trips)

FIGURE 4A
488 Residences at Riverwalk
Fort Lauderdale, Florida



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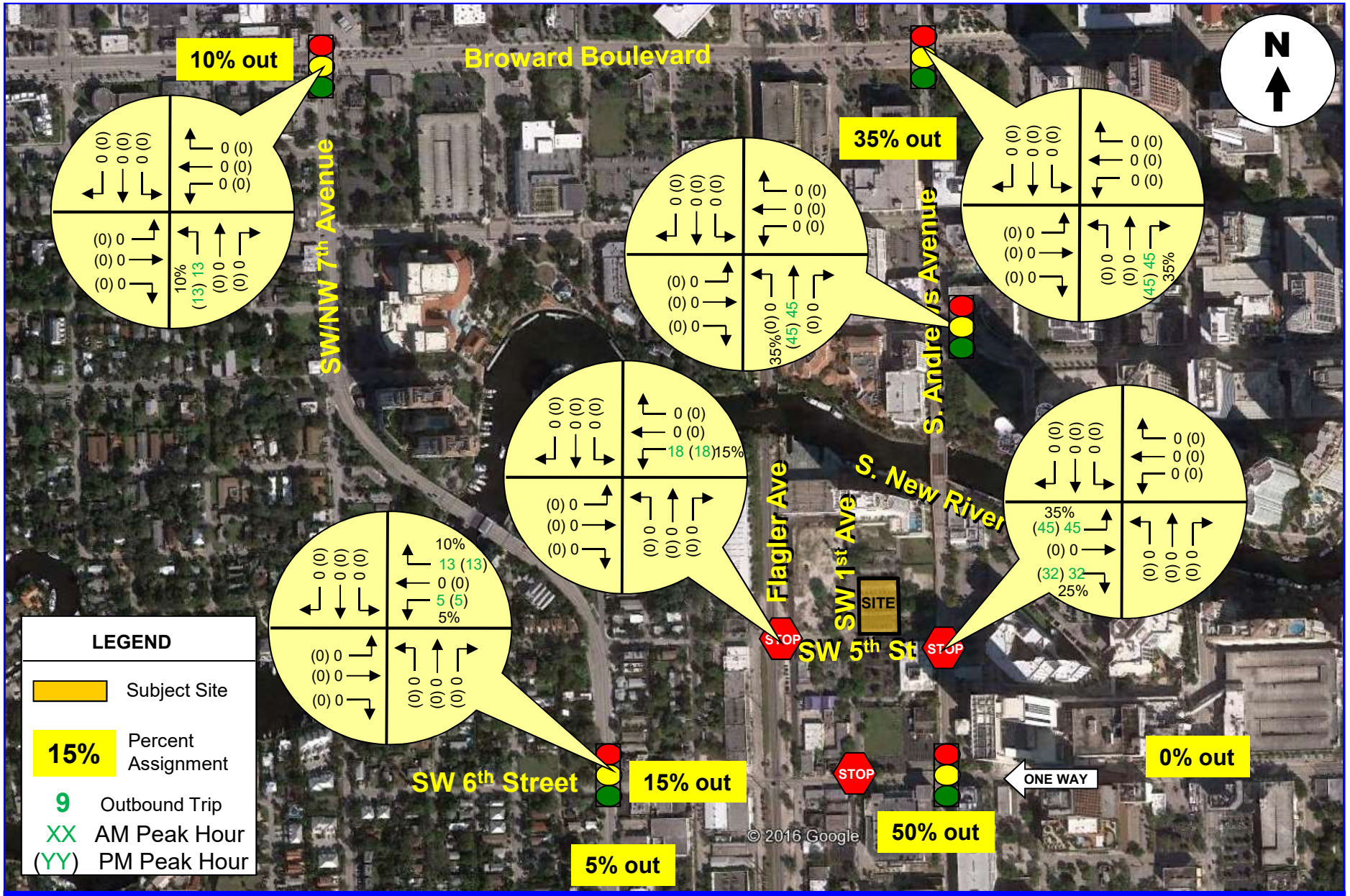
PROJECT TRAFFIC ASSIGNMENT
(New Project Trips)

FIGURE 4B
488 Residences at Riverwalk
Fort Lauderdale, Florida



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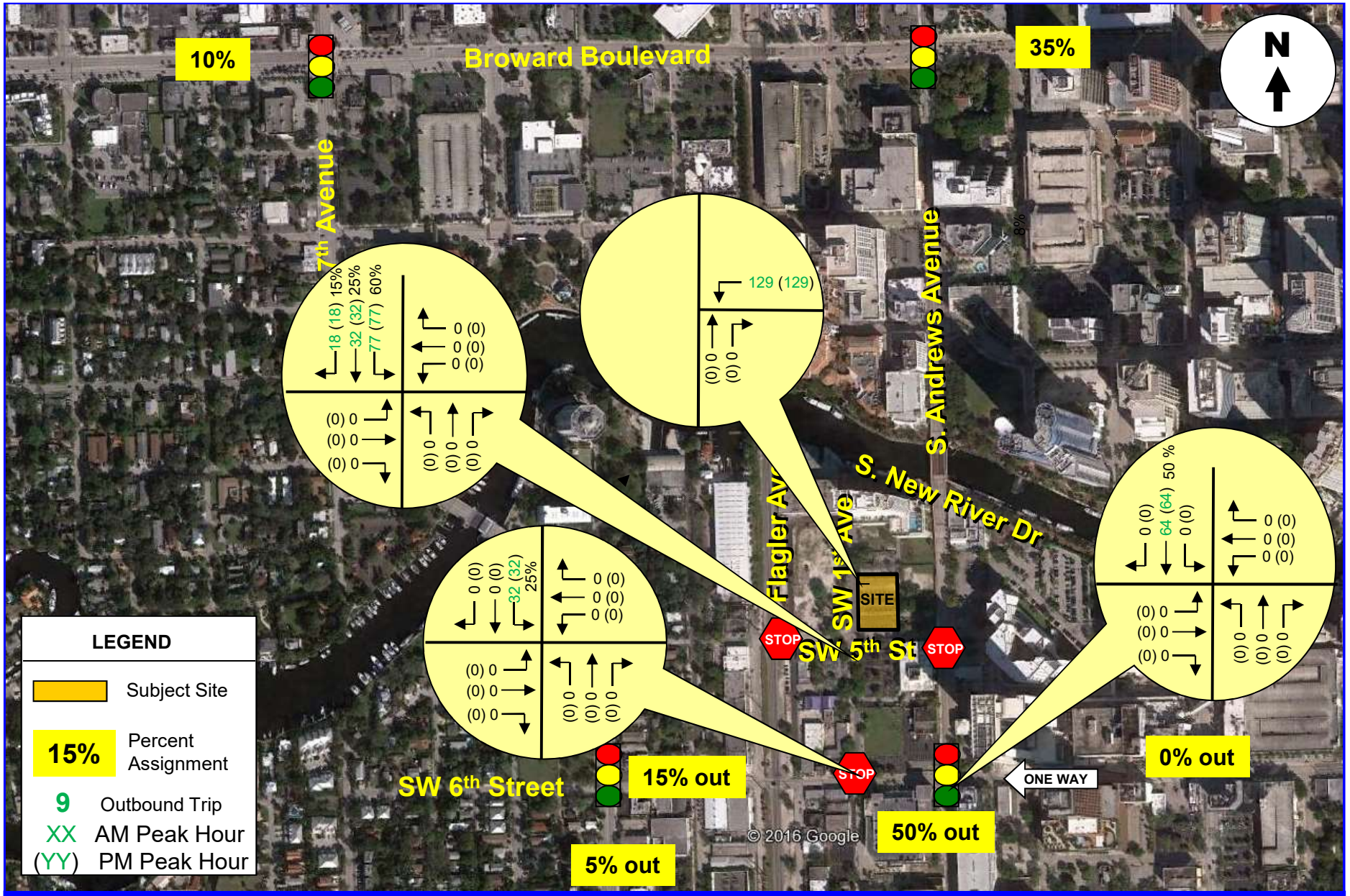
PROJECT TRAFFIC ASSIGNMENT
(New Project Trips)

FIGURE 4C
488 Residences at Riverwalk
Fort Lauderdale, Florida



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PROJECT TRAFFIC ASSIGNMENT
(New Project Trips)

FIGURE 4D
488 Residences at Riverwalk
Fort Lauderdale, Florida

TRAFFIC ANALYSIS

This section of the study is divided into two parts. The first part consists of developing the future conditions traffic volumes for the study area. The second part includes level-of-service analyses for existing and future conditions.

Future Conditions Traffic Volumes

Two sets of future traffic volumes were developed. The first set includes project buildout conditions (assumed to be 2020) without the proposed project and the second set adds the project trips anticipated to be generated by the 488 Residences at Riverwalk project.

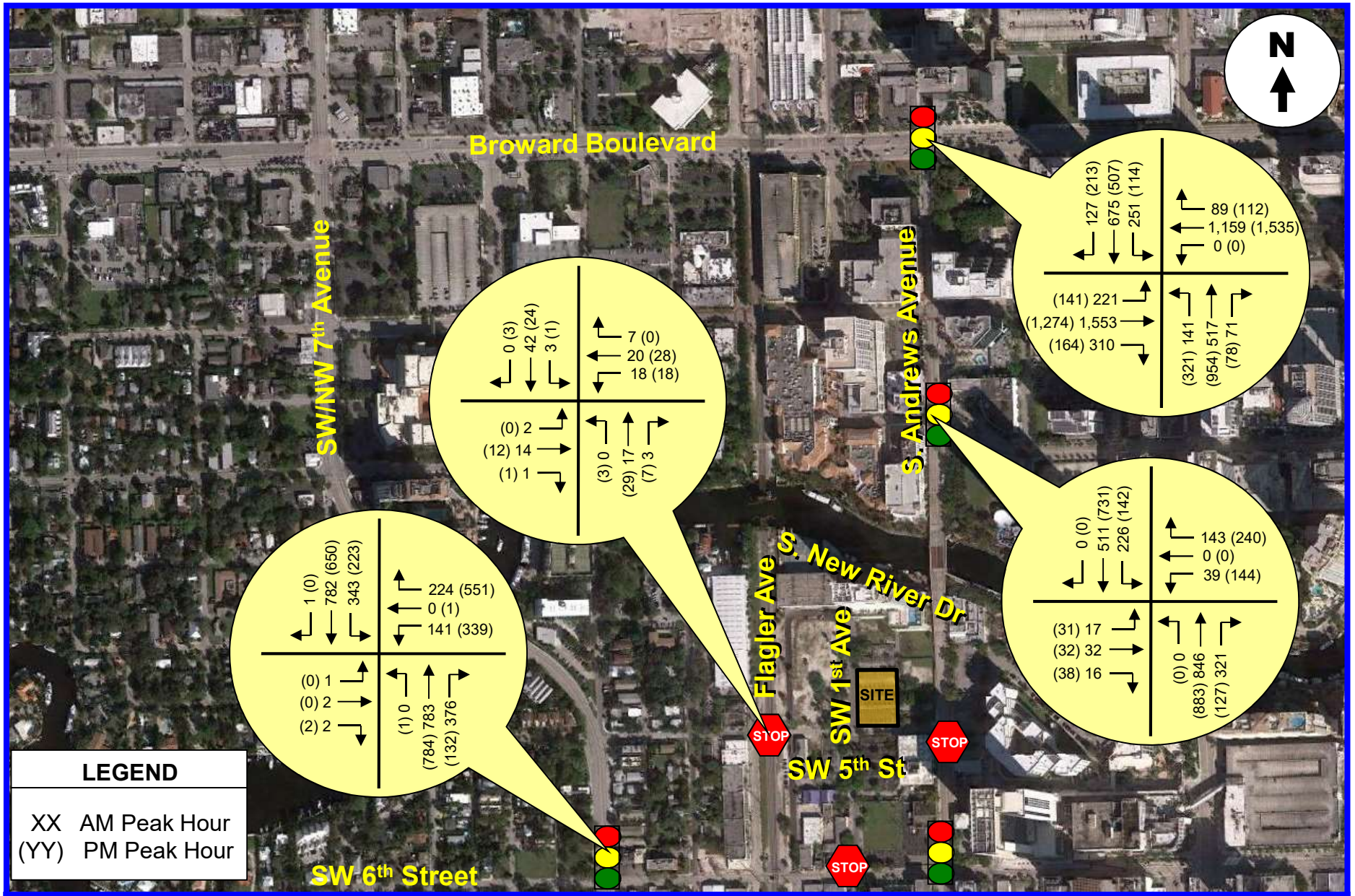
In order to develop future-year traffic volumes, without the proposed project, two separate analyses were undertaken. The first analysis converts the existing AM and PM peak hour traffic counts collected in the field during the month of September June, and October to average peak season conditions. Based on FDOT's Peak Season Factor Category report, adjustment factors of 1.07, 1.03, and 1.06 are required to convert traffic counts collected in the third week of September, second week of June, and second week of October to average peak season conditions (refer to Appendix C). The second analysis includes a growth factor to project 2015 peak season traffic volumes to future conditions (year 2020). For purposes of this traffic study, a 1.5% growth rate was applied to the 2015 traffic counts in order to develop 2020 background traffic conditions.

Additionally, future trips associated with seven nearby approved developments (Andrews Towers, Courthouse, one20fourth, New River Yacht Club Phase 2, 111 Broward, Marina Lofts Phases 1 and 2,1st Avenue Residences, and New River Yacht Club III) were added to the background traffic. The future traffic calculations (peak season adjustments, traffic growth, committed developments, and the traffic associated with the proposed development) for the study intersections are contained in Appendix D in tabular format.

Figures 5a, 5b, 6a and 6b present the future traffic volumes for the study area. Figures 5a and 5b include background traffic only (without the proposed project) and Figures 6a and 6b include the additional traffic anticipated to be generated by the 488 Residences at Riverwalk project development.

Level of Service Analyses

Intersection capacity analyses were performed for the six study intersections. The analyses were undertaken following the capacity/level of service procedures outlined in the Highway Capacity Manual using the SYNCHRO software. The results of the intersection analyses are summarized in Tables 2 and 3. Appendix E contains the computer printouts of the intersection capacity analyses.



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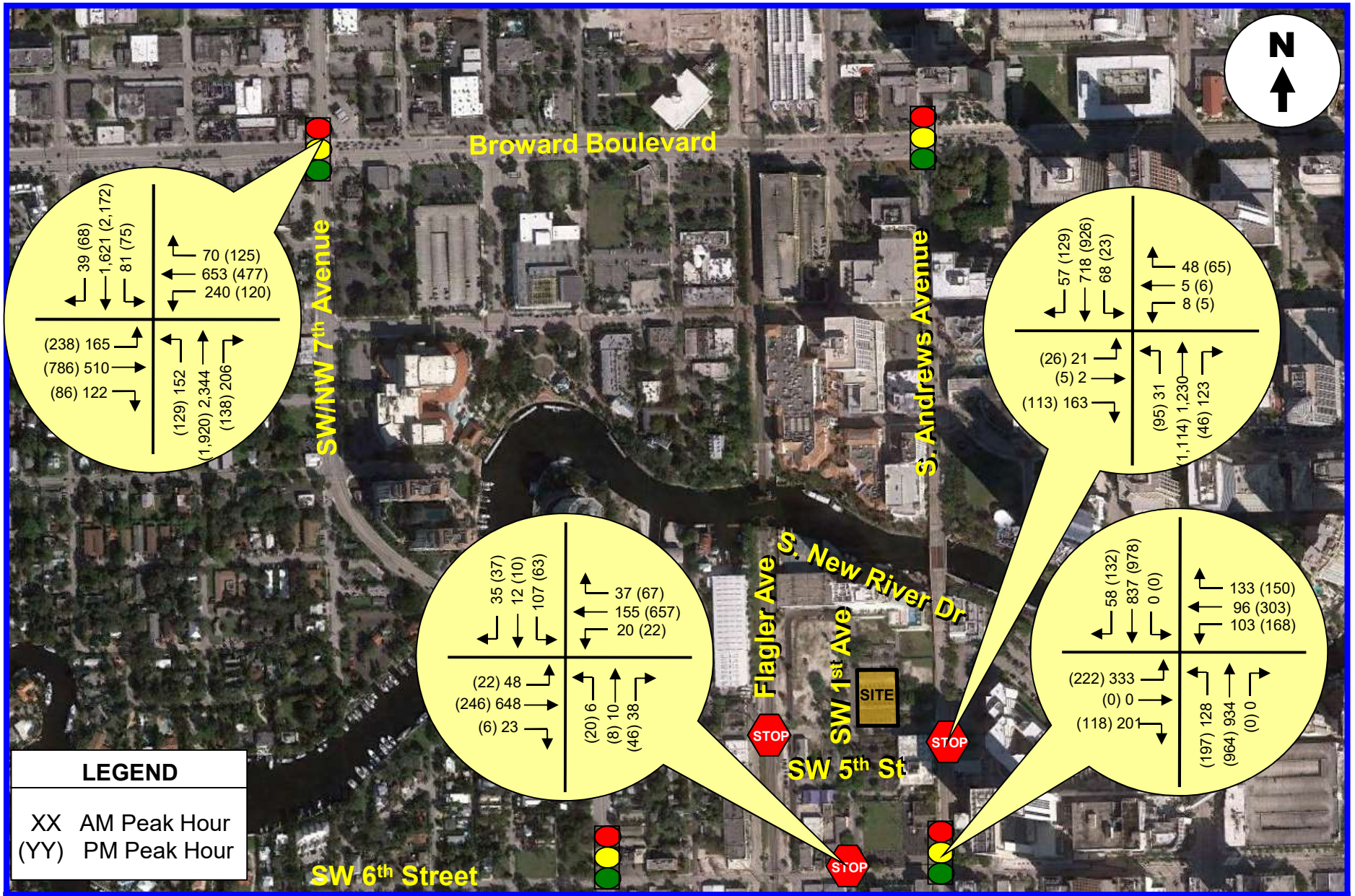
BACKGROUND TRAFFIC – YEAR 2020

FIGURE 5A
488 Residences at Riverwalk
Fort Lauderdale, Florida



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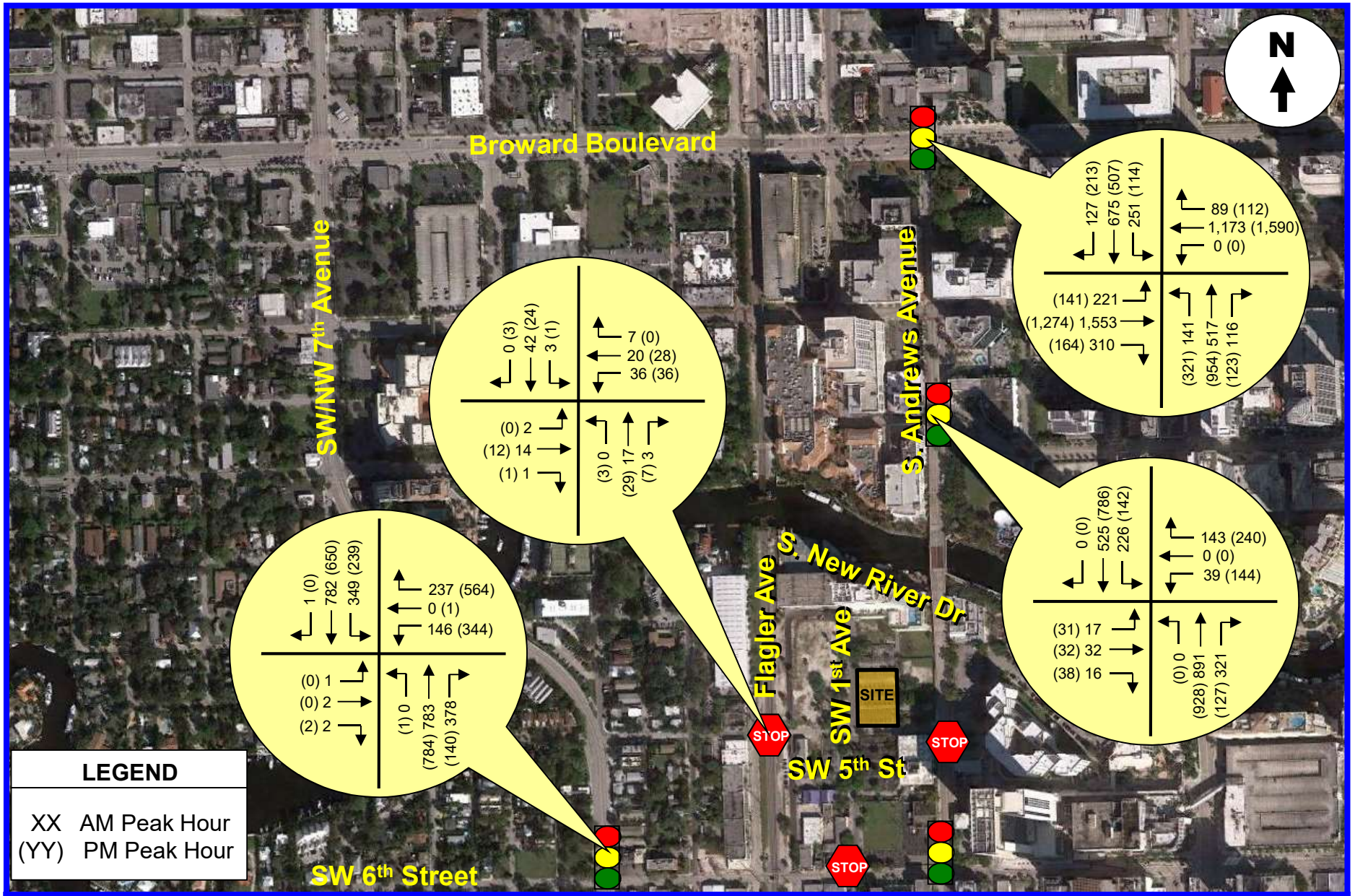
BACKGROUND TRAFFIC – YEAR 2020

FIGURE 5B
488 Residences at Riverwalk
Fort Lauderdale, Florida



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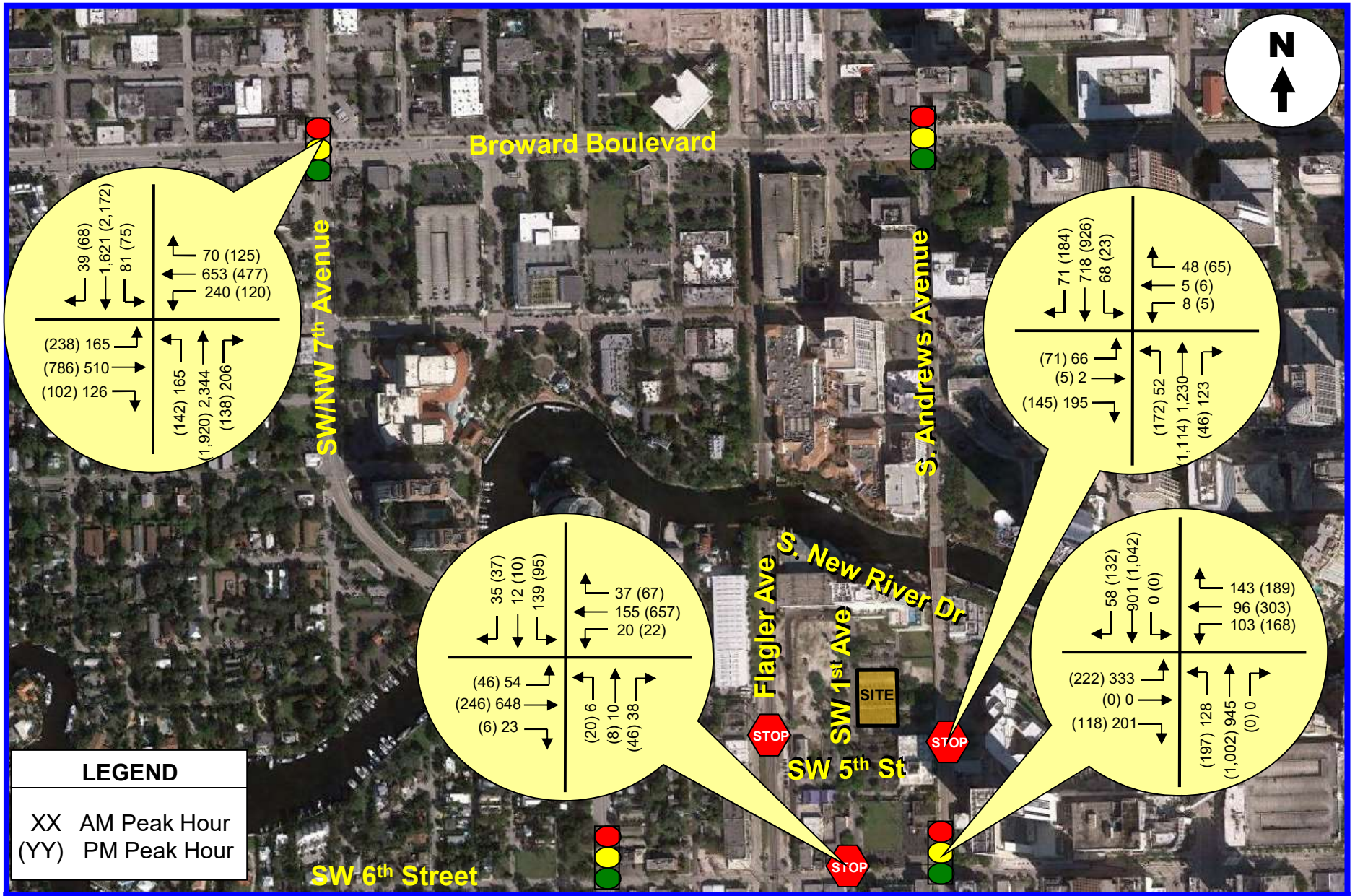
TOTAL TRAFFIC W/PROJECT – YEAR 2020

FIGURE 6A
488 Residences at Riverwalk
Fort Lauderdale, Florida



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TOTAL TRAFFIC W/PROJECT – YEAR 2020

FIGURE 6B
488 Residences at Riverwalk
Fort Lauderdale, Florida

TABLE 2 Intersection Level of Service – Signalized Intersections 488 Residences at Riverwalk			
		Future Traffic Conditions	
Intersection	2016 Existing	2020 Without Project	2020 With Project
SW 6th Street/SW 4th Ave	A (D)	C (F)	D (F)
SW 6th St./S. Andrews Ave	F (E)	F (F)	F (F)
Broward Blvd/ S. Andrews Ave	D (E)	E (E)	E (E)*
Broward Blvd/ SW/NW 7th Ave	F (F)	F (F)	F (F)
Andrews Avenue/Las Olas Blvd	C (C)	C (C)	C (C)

*Source: Highway Capacity Manual. LEGEND: AM Peak (PM Peak). * LOS with improvements*

As indicated in Table 2, Level of Service (LOS) deficiencies are projected for most of the signalized intersections. Note that the deficient level of service at the intersections is mostly due to additional trips generated by committed developments in the area.

TABLE 3 Intersection Level of Service – Stop Control Intersections 488 Residences at Riverwalk			
		Future Traffic Conditions	
Intersection/Movements	2016 Existing	Year 2020 Without Project	Year 2020 With Project
S. Andrews/5th Street			
- NB Left-Turn	A (A)	A (A)	A (A)
- SB Left-Turn	A (A)	A (A)	A (A)
- EB Approach	B (B)	B (C)	D (C)
- WB Approach	B (C)	C (C)	C (C)
SW 6th Street/SW 1st Ave			
- NB Approach	B (B)	C (C)	C (C)
- SB Approach	B (C)	F (F)	F (F)
- EB Left-Turn	A (A)	A (A)	A (A)
- WB Left-Turn	A (A)	A (A)	A (A)
Flagler Avenue/SW 5th St			
- EB Left	A (A)	A (A)	A (A)
- WB Left	A (A)	A (A)	A (A)
- NB Approach	A (A)	A (A)	B (B)
- SB Approach	A (A)	B (A)	B (B)

Source: Highway Capacity Manual. LEGEND: AM Peak (PM Peak)

As indicated in Table 3, all stop-controlled intersections are projected to operate adequately with one exception. The southbound approach of the SW 1st Avenue/SW 6th Street intersection is projected to operate at a poor level of service. However, this approach is projected to fail without the proposed project.

If feasible, the southbound approach of this intersection should be re-striped in order to provide one exclusive left-turn lane and one shared through/right-turn lane. With the subject improvement in place, the project impacts are mitigated on the southbound approach.

The access driveway off of SW 1st Avenue is projected to operate at level of service "A" as a stop-control intersection during the AM and PM peak hours. No turn lanes are required at the access driveway.

CONCLUSIONS

488 Residences at Riverwalk is a proposed residential development with a retail component planned to be located at 488 SW 1st Avenue, Fort Lauderdale in Broward County, Florida.

Traf Tech Engineering, Inc. was retained by Ellis Diversified, Inc., to conduct a traffic study in connection with the subject project. The study addresses trip generation, access to the site, the traffic impacts on the nearby transportation network, and potential roadway improvement intended to mitigate the new trips generated by the project, if any.

The project site is currently vacant. Proposed for the site is a 363-unit high-rise residential development and 6,200 square feet of retail. The access to the site will be provided via SW 1st Avenue.

The conclusions of the traffic study are presented below:

- The new trips consist of approximately 1,820 daily trips, approximately 170 AM peak hour trips (41 inbound and 129 outbound), and approximately 285 PM peak hour trips (156 inbound and 129 outbound).

- Level of service deficiencies are projected for most of the intersections. However, this is an existing problem that is mostly due to additional trips generated by committed developments in the area.

- All stop-controlled intersections are projected to operate adequately with one exception. The southbound approach of the SW 1st Avenue/SW 6th Street intersection are projected to operate at a poor level of service. However, this approach is projected to fail without the proposed project. If feasible, the southbound approach of this intersection should be re-striped in order to provide one exclusive left-turn lane and one shared through/right-turn lane. With the subject improvement in place, the project impacts are mitigated on the southbound approach. With the subject improvement in place, the project impacts are mitigated on the southbound approach.

- The access driveway off of SW 1st Avenue is projected to operate at level of service "A" as a stop-control intersection during the AM and PM peak hours. No turn lanes are required at the access driveway.